Zootaxa 2629: 1–28 (2010)
www.mapress.com/zootaxa/
Copyright © 2010 · Magnolia Press

Article

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

Onthophagus (*Palaeonthophagus*) *medius* (Kugelann, 1792)—a good western palaearctic species in the *Onthophagus vacca* complex (Coleoptera: Scarabaeidae: Scarabaeinae: Onthophagini)

ECKEHARD RÖSSNER[1], JOACHIM SCHÖNFELD[2] & DIRK AHRENS[3]

[1]*Reutzstr. 5, 19055 Schwerin, Germany. E-mail: roessner.e@web.de*

[2]*Erlenweg 9, 53489 Sinzig, Germany. E-mail: joachim_schoenfeld@web.de*

[3]*Department of Entomology, Natural History Museum, London SW7 5BD, UK. Current address: Zoologisches Forschungsmuseum A. Koenig, Adenauerallee 160, 53113 Bonn, Germany. E-mail: ahrens.dirk_col@gmx.de, d.ahrens.zfmkuni-bonn.de*

Abstract

Based on a morphological taxonomic revision of available species, and supported by a separate molecular phylogenetic study, we identified *Onthophagus* (*Palaeonthophagus*) *medius* (Kugelann, 1792) as a good western palaearctic species and a sibling species of *O. vacca* (Linnaeus, 1767). In this paper we diagnose and illustrate the key morphological features and distribution of both species. A neotype is designated for *Copris medius* Kugelann, 1792.

Key words: Dung beetles, Europe, sibling species, distribution, integrative taxonomy

Introduction

The *Onthophagus vacca* (Linnaeus, 1767) species complex was previously thought to include a single species in Europe, which was described based on just female specimens from southern France ("Gallia australi") and northern Poland/Germany ('Prussia' = "Borussia" in Linnaeus 1767). However, subsequently to its original description several additional forms (= taxa) were established, partly due to ignorance of the identity of the true *O. vacca* (e.g. Fourcroy 1785) or due to apparent distinctive patterns of variation in several external features such as the pronotum and elytra or the different shapes of the carinae on the head and horns (Kugelann 1792, Panzer 1796, Schrank 1798, Sturm 1800, Mulsant 1842, Fischer von Waldheim 1844, Gistel 1857, Motschulsky 1845, Seabra 1907). Erichson (1848) distinguished two taxa, *O. vacca* and *O. medius* (Kugelann, 1792) (from Prussia), based on a comparison of the two species that revealed clear differences between them. However, he was uncertain because of the wide variation of external morphology and colour. Since then, *O. medius* has been treated as a synonym of *O. vacca* by all subsequent authors (e.g. Horion 1958; Balthasar 1963; Baraud 1985, 1992; Stebnicka 1983; Martin-Piera & López-Colón 2000; Kabakov 2006). For example, Horion (1958) argued that *O. medius* is often treated as 'variation' and merely an insignificant colour aberration. Even intensive comparative morphological studies by Zunino (1979), who designated *O. vacca* as type species of the new subgenus *Palaeonthophagus*, and by Kabakov (2006), who illustrated two forms of genitalia for *O. vacca* without more detailed explanations, could not definitively resolve the 'uncertainty' within this species complex. After a series of preliminary morphological investigations by one of us (E.R.), we had some 'intuitive' reason to reassess Erichson's (1948) treatment of this complex as two different species. In a separate study that will be reported elsewhere, we performed a phylogenetic analysis of mitochondrial DNA (*cox1*) of a number of specimens of the *O. vacca* complex available from a selection of European localities within the complete range of the species. Genetic results are also consistent with a morphometric analysis (being prepared by Ahrens and colleagues) confirming the existence of at least two separate species in the *O. vacca* complex. Based on these results, we present here the results of the study of dry material from

Accepted by A. Smith: 16 Jun. 2010; published: 29 Sep. 2010

a wide range of collections and museums all over Europe, leading to the clarification of morphological differentiation and distribution of the two sibling species, *O. vacca* and *O. medius*.

Material and methods

For identification, genitalia of all male specimens were dissected and mounted together with the specimen on the same pin. Specimen morphology illustrations were done by E.R. with a drawing tube attached to the stereo microscope. Specimen data are provided as written on labels, between quotation marks. All details from molecular and morphometric analyses will be provided in a separate paper being prepared by Ahrens and colleagues.

The following abbreviations indicate the private and institutional collections in which the examined specimens are preserved:

ARK	Arbeitsgemeinschaft Rheinischer Koleopterologen (at ZFMK), Bonn, Germany
CAG	Collection of Arbeitsgemeinschaft Rheinischer Koleopterologen, Wuppertal (now at ZFMK), Bonn, Germany
CAL	Collection of Andreas Link, Haid/Ansfelden, Austria
CAB	Collection of Axel Bellmann, Bremen, Germany
CAS	Collection of Andre Skale, Hof/Saale, Germany
CDF	Collection of Dirk Frenzel, Sonneberg, Germany
CDR	Collection of Dirk Rohwedder, Bonn, Germany
CEH	Collection of Eckart Heise, Vastorf, Germany
CER	Collection of Eckehard Röβner, Schwerin, Germany
CHB	Collection of Heinz Baumann, Düsseldorf, Germany
CHF	Collection of Hans Fery, Berlin, Germany
CHKa	Collection of Harald Kalz, Schlabendorf, Germany
CHKo	Collection of Hans Kostenbader, Stuttgart, Germany
CHM	Collection of Heiko Müller, Zittau, Germany
CHR	Collection of Holger Ringel, Greifswald, Germany
CHS	Collection of Heiko Sparmberg, Erfurt, Germany
CJS	Collection of Joachim Schönfeld, Sinzig, Germany
CJW	Collection of Jörg Weipert, Plaue, Germany
CKHa	Collection of Karl Hadulla, Bonn, Germany
CKH	Collection of Konrad Hengmith, Hamburg, Germany
CKR	Collection of Klaus Renner, Bielefeld, Germany
CLS	Collection of Ludger Schmidt, Hannover, Germany
CME	Collection of Michael Eifler, Pinneberg, Germany
COH	Collection of Oliver Hillert, Berlin, Germany
CPJ	Collection of Palle Jörum, Odense, Denmark
CRP	Collection of Rüdiger Peschel, Chemnitz, Germany
CTB	Collection of Tristao Branco, Porto, Portugal
CUS	Collection of Ulrich Schaffrath, Kassel, Germany
CWA	Collection of Wolfgang Apfel, Eisenach, Germany
CWB	Collection of Wolfgang Bäse, Reinsdorf, Germany
CWM	Collection of Werner Malchau, Schönebeck/Elbe, Germany
CWR	Collection of Wolfgang Richter, Oderwitz, Germany
CWZ	Collection of Wolfgang Ziegler, Rondeshagen, Germany
DEI	Deutsches Entomologisches Institut, Müncheberg (L. Behne, L. Zerche), Germany
IZH	Institut für Zoologie der Universität Halle/Wittenberg (K. Schneider), Germany

LSL	Linnean Society, Burlington House, London (M. Barclay), UK
NHML	Natural History Museum, London (M. Barclay), UK
NME	Naturkundemuseum Erfurt (M. Hartmann), Germany
NMP	National Museum, Museum of Natural History, Prague (J. Hájek), Czech Republic
NSMW	Naturwissenschaftliche Sammlung des Naturkundemuseum Wiesbaden (F. Geller-Grimm), Germany
SMNS	Staatliches Museum für Naturkunde Stuttgart (W. Schawaller), Germany
SMTD	Staatliches Museum für Tierkunde Dresden (O. Jäger), Germany
ZMFK	Zoologisches Forschungsmuseum A. Koenig, Bonn (M. Schmitt), Germany
ZMHB	Zoologisches Museum der Humboldt-Universität zu Berlin (J. Frisch), Germany
ZSM	Zoologische Staatssammlung München (M. Baehr), Germany

Results

Based on the Maximum Likelihood tree from the Cytochrome Oxidase Subunit 1 tree (Fig. 1, details are being prepared by Ahrens and colleagues) the specimens of the *O. vacca* complex divide in two well-supported clades. Evidence to conclude for the existence of two separate species include the fact that specimens from one clade were sometimes sympatric with specimens in the other clade.

Based on our morphological taxonomic investigations we identified, amongst the list of the currently accepted synonyms of *O. vacca*, the name *O. medius* as the valid name for the second taxon. In general, compared to other *Onthophagus* species, the morphological differences between *O. vacca* and *O. medius* are subtle, especially with smaller specimens (‘forma minor'). Diagnostic characters for the two taxa refer principally to the 'forma major' (specimens of large size) and are summarized in Table 1. However, small specimens also have distinct trends in the colour of head and pronotum, legs and elytra, which facilitate species assignment (Table 1). We could not find significantly constant differences 'by eye' in the lamella copulatrix (Fig. 3AC–AT) nor in the female genitalia, which usually both provide good diagnostic features for species distinction (Zunino 1978).

Conclusions on species taxonomy

The morphological and molecular data examined indicate the existence of two separate species in Europe within the *O. vacca* complex that are widely sympatric. Given the poor original descriptions, the lack of type material, and the absence of tissue samples in order to obtain sequence data for these names, it is difficult to assign the correct species synonymy for the other 15 synonyms of *O. vacca* (Löbl et al. 2006). Based on our comprehensive study of the distribution, the character variation of all available morphological traits, and the little information given in the original descriptions, the species synonymies are revised here. Support for the synonymies are given in Table 2.

Onthophagus (*Palaeonthophagus*) *vacca* (Linnaeus, 1767)

Scarabaeus vacca Linnaeus, 1767: 547 (Type locality: "Habitat in Galia australi.").
Copris conspurcatus Fourcroy, 1785: 14 (Type locality: environment of Paris).
Pilularius aeruginosus Schrank, 1798 (Type locality: "Baiern" [= Germany, Bavaria]).
Onthophagus vacca var. *difficilis* Mulsant, 1842: 133 (Type locality: France).
Onthophagus vacca var. *similis* Mulsant, 1842: 134 (Type locality: France).
Onthophagus tricornis Fischer von Waldheim, 1844: 43 (Type locality: "Rossia meridionali").
Onthophagus antilope Motschulsky, 1845: 57 (Type locality: "an der Grenze zu Persien").
Onthophagus vacca Var. *lusitanicus* Seabra, 1907: 133 (Type locality: Bussaco [Portugal, Buçaco]).

TABLE 1. Diagnostic characters differentiating *O. vacca* from *O. medius*. The characters are illustrated in Figs. 2–3.

Character	*O. vacca* (Linnaeus)	*O. medius* (Kugelann)
Marginal line at base of pronotum	interrupted laterally or very weak beside posterior angles (Fig. 2AI)	even and not interrupted over entire length (Fig. 2AJ)
Colour of head and pronotum	intensively metallic green, rarely cupreous	black, with weakly dark-green metallic shine or dark cupreous, rarely metallic green
Colour of elytra	prevailing ground colour yellow, dark spots well isolated, rarely linked with each other (Figs. 2A–G)*	generally with prevailing dark spots being rarely isolated (Figs. 2I–M) but often densely arranged in dark asymmetrical stripes, stripes sometimes also symmetrical (Fig. 2N–O)
Colour of elytral spots and legs	black with green metallic sheen	black with or without very weak green metallic sheen
Sutural interval	narrowly dark	widely or completely dark
Head, carina of vertex (female)	relatively narrow, with a horn at each side (Figs. 2T, 2V, 2Z, 2AA)	wide, weakly elevated and blunt at each side (Figs. 2X, 2AC)
Anterior edge of clypeus (male)	distinctly sinuate (Fig. 2R)	truncated or only weakly sinuate (Fig. 2P, 2Q)
Head, horn of vertex (lateral view) (male)	straight (Fig. 2AH)	S-shaped (Figs. 2AF–AG)
Parameres (male)	ventral face flat (lateral view, Fig. 3D), tip of parameres directed more ventrad, narrow, apex rounded; mesal portion of parameres not widened (dorsal view, Figs. 3C, 3E–P)	ventral face convex (lateral view, Fig. 3B), tip of parameres directed externally, almost rectangular and widely rounded (dorsal view, Figs. 3A, 3Q–AB)

* Exception: in populations from Corsica and Sardinia, spots are often linked to dark stripes (Fig. 2H); these individuals co-occur with weakly spotted specimens.

Type material examined: Lectotype (*Scarabaeus vacca*, designated by Krell (1996)) [Figs. 2F, 2T, 2Z]: "vitulus [black handwritten on white paper], vacca [with pencil handwritten on white paper] | vacca [black handwritten] 25 [black printed on white paper] | Lectotype Scarabaeus vacca Linné des. D. Ahrens 2008 [black hand written on red paper]" (♀, coll. CARL LINNAEUS [LSL INS 3356], LSL). Paralectotype (*Scarabaeus vacca*) [Figs. 2A, 2U, 2AB]: "Paralectotype Scarabaeus vacca Linné des. D. Ahrens 2008 [black handwritten on red paper]" (♀, coll. CARL LINNAEUS [LSL INS 3357], LSL). [An additional female specimen labelled "Angl. Jones" was located with the two type specimens under No. LSL INS 3358 in the collection LINNAEUS belongs to another *Onthophagus* species].

Belgium: "Belgium" (1 ♂, 1 ♀, coll. Fry, NHML). **France:** "Environs de Paris, de Vauloger" (1 ♂, 3 ♀♀, coll. Nevinson, NHML).- "Frankreich, Bordeaux 4.[19]43, F. Ermisch lgt." (3 ♀♀, ZMHB).- "Perpignan, Pyr. or., Waegner" (3 ♂♂, ZMHB).- "Perpignan Schwarzer" (1 ♀, SMTD).- "21.7.[19]75 Argeles b. Perpignan (F.), Pferdekot, Fery leg." (6 ♂♂, 6 ♀♀, CHF).- "France, Var. Bauduen, 16.8.1988, leg. Schaffrath" (1♂, ZMHB).- "F / Var, Bauduen, in Menschenkot, 800 NN, 17.8.1988, leg. Schaffrath" (1 ♂, 1 ♀, CUS).- "F./ Var: Comps sur Artuby, Schafkot, ca. 950 NN, 10.5.1990, leg. Schafrath" (1 ♀, CUS).- "F. Süd, Perpignan, Fluß Tet, Millas RN116, 3.4.[19]83 F. Köhler" (1 ♂, ZMHB).- "F. Süd, Perpignan, Umg. Strand bei Eine DB1, 2.4.[19]85 F. Köhler" (1 ♂, 1 ♀, ZMHB).- "Perpignan Eselsmist 3.4.[19]55 D" (1 ♀, SMNS).- "F. Süd, Pyrenäen, Arles s. Tech D115, 3.4.[19]85 F. Köhler" (1 ♀, ZMHB).- "Col du Ares (1500 m) Pyrenäen, 19/ 1991 leg: D. Ahrens" (1 ♀, CDA).- "Frankreich, Labenne bei Bayonne (Chaloss), 27.VII.1994 leg. O. Hillert" (1 ♀, COH).- "F - Alp. Maritimes, 1150 m, Plateau de Chaussols, Av. Charogne 14.5.2006 H. Kostenbader leg." (2 ♀♀, CHKo).- "28.7.[19]75 Arles, Camargue (F.), Pferdekot, Fery leg." (1 ♂, CHF).- "16.7 [19]75 Lac St. André (F.) b. Chambery, Eselskot, Fery leg." (1 ♀, CHF).- "12.8.[19]80 Toulon, Pferdekot, Fery leg." (1 ♂, 4 ♀♀, CHF).- "6.4.[19]81 Toulon, Le Revest, Fery leg." (4 ♂♂, 3 ♀♀, CHF).- "Gall. mer., Pouzi hac, N-ö

Nimes | 2.5.1980 leg. E. Ulbrich" (1 ♂, SMNS).- "Gall. mer. (Herault) Agde 4.-15.4.[19]82 Rieger" (2 ♂♂, 2 ♀♀, SMNS).- "Gallia, Dep. Loire, Atlantique | St. Herblain V.1985" (1 ♂, 2 ♀♀, SMNS).- "Etang sur Arroux 26.6.[19]40 Folwaczny" (1 ♀, SMNS).- "France, Rhonetal 25.7.1973 leg. Lau" (1 ♂, SMNS).- "Gallia/ Ardeche, Vernoux/ Valence, A.6.[19]74, Messulat" (1 ♂, coll. J. Schönfeld"- dto., nur "M.8.88" (1 ♀, CJS).- dto., nur "E.7.85" (1 ♀, CJS).- "F.: Dept. Ardéche: SW Coudon, 12 km S Lablachére. 9.4.[19]90, J. Scheuern leg." (2 ♂♂, 1 ♀, CJS).- "Unt. Elsass, Zabern [= Saverne]. Giebeler | Kollektion Giebeler" (1 ♀, NSMW).- "Marseille. Hmghy." (1 ♂, coll. Heyden, DEI).- "S. France: (Var), La Sainte Baume. 16–28.V.1921. K. G. Blair" (1 ♂, NHML).- "Gallia" (3 ♂♂, NHML).- "Beg-Meil, Finistere 8.03" (2 ♂♂, coll. Odier, NHML).- "Moulins" (2 ♂♂, 1 ♀, coll. Nevinson, NHML).- "Erquy, Cotes du Nord, France, H. D. Preston. 1916-173" (4 ♂♂, 1 ♀, NHML).- "France" (1 ♂, coll. Nevinson, NHML).- "Environs de Bordeau, de Vauloger" (1 ♂, coll. Nevinson, NHML).- "Perpignan" (1 ♂, 1 ♀, coll. Pascoe, NHML).- "Levant, 4385" (1 ♂, 1 ♀, NHML).- "Environs de Rouen, de Vauloger" (1 ♀, coll. Nevinson, NHML).- "Gall. m." (1 ♀, coll. Nevinson, NHML).- "Bordeaux" (1 ♀, coll. Pascoe, NHML).- "Environs de Caen, de Vauloger" (1 ♀, coll.Nevinson, NHML).- "Indre-et-Loire: Pernay, 2.v.1964, J. Rabaça legit" (5 ♂♂, 2 ♀♀, CTB).- "Sarthe: La Ferté-Bernard, Pasquier legit" (2 ♂♂, 2 ♀♀, CTB).- "Sarthe: Lamnay, bouses, 19.ix.1959, Pasquier legit" (1 ♂, 1 ♀, CTB).- Rennes, L. Bleuse, R. Oberthür, Eing. Nr. 4, 1956" (1 ♂, ZMFK).- "Beziers, Sig. R. Oberthür, Eing. Nr. 4, 1956" (2 ♂♂, ZMFK).- "Toulouse, Sig. R. Oberthür, Eing. Nr. 4, 1956" (2 ♂♂, ZMFK).- "Limoges, L. Bleuse, R. Oberthür, Eing. Nr. 4, 1956" (1 ♀, ZMFK).- "Montpelliere, Onth. vacca, R. Oberthür, Eing. Nr. 4, 1956. requ de R. Dize" (2 ♀♀, ZMFK).- "Grasse, A.M., Sig. R. Oberthür (Coll Tondu), Eing. Nr. 4, 1956" (1 ♀, ZMFK).- "Pyren. or., Dr. Balthasar" (1 ♂, 1 ♀, NMP).- "Dpt. Vaucluse, Anfang Juni 1898 | Riedel." (3 ♂♂, 1 ♀, NMP).- "Le Lavandou, Var, Gall. a. m., ex P. Obenb." (2 ♂♂, NMP).- "Ga. mer., Esterel, 7.[19]30, Dr. Balthasar" (1 ♂, NMP).- "Dpt. d'Or, Ende Mai 1898 | Riedel" (2 ♀♀, NMP). **Corsica (France):** "Corsica, 1635, Sammlung F. Rüschkamp, Eing. Nr. 1, 1964." (1 ♀, ZMFK).- "Ajaccio, Corse [leg.] Schneider" (2 ♂♂, 1 ♀, ZMHB).- "Corse, Ghisoni, 600 m NN, 10.5.1988, leg. U. Schaffrath" (1 ♂, ZMHB).- "Tattone, Corsica, 3.VI.[19]12, E. Christeller, Berlin" (2 ♂♂, 1 ♀, ZMHB).- "Vizzavona, Corsica, 26.V.19[12], E. Christeller, Berlin" (1 ♂, 1 ♀, ZMHB).- "Boca di Larone/ Korsika, 18.6.1990, leg. Hengmith" (4 ♂♂, 1 ♀, ZMHB).- "Korsika, Corte, 13.4.1990, P. Wunderle" (1 ♂, ZMHB).- "Bonifacio / Corse, in Schafdung, 80 NN, 13.5.1988, leg. Schaffrath" (2 ♂♂, 1 ♀, CUS).- "Ghisoni / Corse, in Kuhdung, 600 NN, 10.5.1988, leg. Schaffrath" (1 ♂, 1 ♀, CUS).- "1.8.[19]74 Vico (Corse), ca. 800 m, Rinderkot, Fery leg." (2 ♂♂, 4 ♀♀, CHF).- "20.7.[19]74 Sierra b. Porto (Corse), Eselskot, Fery leg." (1 ♂, 2 ♀♀).- dto., nur "28.7.74, Rinderkot" (1 ♂, 1 ♀, CHF); dto., nur "8.8.74, Rinderkot" (2 ♀♀, CHF)- dto., nur "9.4.79, Rinderkot" (1 ♀, CHF).- "8.4.19[79 Korsika, Francardo, Schafskot, Fery leg." (5 ♂♂, 6 ♀♀, CHF).- "13.4.[19]81 Corse, Aleria, Schafskot, Fery leg." (1 ♂, CHF).- "1.8.[19]74 Evisa (Corse), Rinderkot, Fery leg." (1 ♂, CHF).- "13.4.[19]79 Korsika, Tuarelli, Rinderkot, Fery leg." (3 ♂♂, CHF).- "13.7.[19]88 Corse, Rinderkot, Asco, 1000 m, Fery leg." (5 ♂♂, 3 ♀♀, CHF).- "Corse: 28.7.1980 Asco. 5 km SW. Scheuern leg." (1 ♀, SMNS).- "Corse: 28.8.1980 16 km SE Helgodére. Scheuern leg." (2 ♂♂, 1 ♀, SMNS).- "Frankreich – Korsika, Chiova d'Asinu, 15.07.1999 leg. Dirk Rohwedder" (1 ♀, CJS).- "Frankreich – Korsika, Arggiavara, 18.07.1999 leg. Dirk Rohwedder" (1 ♀, CJS).- "Frankreich – Korsika, Zonza, 18.07.1999 leg. Dirk Rohwedder" (1 ♀, CJS).- "Corse: SE Belgodére: Col de Colombano, 690 m. Scheuern leg. 28.7.1980" (1 ♀, CJS).- "Gallia/ Korsika, L'Ospedale A.7.[19]78, Messulat" (1 ♀, CJS).- "Corse: 5 km sw Asco: 950 m. 29.VIII.1980, Scheuern leg." (2 ♀♀, CJS).- "Corse: 28.8.1980, 16 km SE Belgodére, Scheuern leg." (1 ♂, 1 ♀, CJS).- "Corse: Quenza: 15 km E Aulléne. 3.8.1980, Scheuern leg." (1 ♀, CJS).- "Gallia/ Korsika, Porto Vecchio, A.7.[19]78, Messulat" (1 ♂, 1 ♀, CJS).- "Corse: 6.8.1980, 11 km ENE Asco. Scheuern leg." (1 ♂, 1 ♀, CJS).- "Corse: 3.VIII.1980, 11 km N Aulléne: Col de la Vacchia, 1200 m, Scheuern leg." (1 ♂, 1 ♀, CJS).- "Corsica. Valentiner. Ajaico 20/3[18]79" (8 ♂♂, 1 ♀, NSMW).- "Corsica. Valentiner. Bonifa. 9/4[18]79" (2 ♀♀, NSMW).- "Corsica 12768" 1 ♀, SMTD).- "Frankreich, Corsica, Umg. Corté, ca. 600 m, 20.05.1994, leg. Ringel" (1 ♂, 1 ♀, CHR).- "Frankreich, Corsica, Berg d'Alzo und Gorges de la Restonica, ca. 1300 m, 22.05.1994, leg. Ringel" (2 ♂♂, 1 ♀, CHR).- "Corsica, Vissavona Juli [18]99, W.Liebmann" (1 ♀, DEI).- "Corsica 1905, Aleria, Coll. O. Leonhard" (1 ♂, DEI).- "Corsica 1905, Bastia, Coll. O. Leonhard" (1 ♀, DEI).- "Corsica V/75, Col de Bavella, Hüdepohl" (1 ♀, ZSM).- "Corsica V/75 Foret de Zonza, Hüdepohl" (1 ♂, ZSM).- "Korsika, Corte, [leg.] P. Wunderle, 13.4.1990" (1 ♀, CLS).- "France/

Korsika, U. Corte, Val de la Restonica, 13.IV.1990, 700 m, l. V. Assing" (1 ♂, CLS).- "Corsica: Asco. Sept. & Oct. 1907. Dr. Forsyth Major. B. M. 1927-6" (1 ♂, NHML).- "Corte, Corsica. G. C. C." (1 ♀, coll. G. C. Champion, NHML).- "Vizzavona, Corsica. G. C. C. 2500–4000 ft." (3 ♂♂, 3 ♀♀, NHML).- "Corsica. Whitehead." (3 ♀♀, NHML).- "Corse, Corse-du-Sud, Chiova-d'Asino, 15.07.1999, leg. Dirk Rohwedder" (4 ♂♂, 3 ♀♀, CDR).- "Corse, Corse-du-Sud, Zonza, 18.07.1999, leg. Dirk Rohwedder" (2 ♂♂, 3 ♀♀, CDR).- "Corse, Corse-du-Sud, Argiavara, 18.07.1999, leg. Dirk Rohwedder" (2 ♀♀, CDR).- "Korsika, Dr. Frank" (1 ♂, NMP).- "Corse: forêt de Vizzavona, 900–1100 m, V-1955, [leg.] G. Fagel" (1 ♀, NMP).- "Corsica occ., Porto env., leg. K. Hůrka, 26.–30.6.1999" (1 ♀, NMP).- "Korsika, 12 km SSE St. Florent: Col de San Stefano, 27.07.1980, leg. J. Scheuern" (3 ♂♂, 3 ♀♀, CJS).- "Korsika, SE Belgodère: Col de Colombano , 690 m, 28.07.1980, leg. J. Scheuern" (4 ♂♂, 2 ♀♀, CJS).- "Korsika, 34 km ENE Porto: Col de Vergia, 1450 m, 30.07.1980, leg. J. Scheuern" (1 ♂, CJS).- "Korsika, 16 km SE Belgodère: Navaccia-Tal; 2 km SE Abzweigung nach Novella, 28.07.1980, leg. J. Scheuern" (3 ♂♂, 7 ♀♀, CJS).- "Korsika, 13 km W Ajaccio: Abzweigung nach Appettio, 31.07.1980, leg. J. Scheuern" (1 ♀, 1 ♀, CJS).- "Korsika, Asco, 28.07.1980, leg. J. Scheuern" (2 ♂♂, CJS).- "Korsika, 11 km N Aullène: Col de La Vaccio, 1200 m, 03.08.1980, leg. J. Scheuern" (4 ♀♀, CJS). **Spain:** "Spanien, Prov. Teruel, Mas de las Matas (13 km sö Alcorisa), 500 m, 17.–21.VI.1992, leg. E. Rößner" (1 ♂, CER).- "E.-Teruel, San Just, Palomar de Arroyos, 21.4.2004, K. Hadulla leg." (2 ♀♀, CKHa).- "Spain, Cadiz, Jimena de la Frontera, 5.–6.VI.1991, Wrase" (1 ♂, CER).- "Spain, Cadiz, San Roque, 28.V.–4.VI.1991, Wrase" (1 ♀, CER).- "Spain, Caceres, Charca del Carrizo (S Brozas) 350 m, 20.VI.1991, Wrase" (2 ♂♂, CER).- "Spanien, Morella, Prov. Castellon de la Plana, 1000 m, 19./20.VI.1992, leg. A. Schröder" (4 ♂♂, 2 ♀♀, CER).- dto., nur "leg. H. Kalz" (8 ♂♂ , 12 ♀♀, CHKa).- "Algeciras, Andalusien, Prof. G.Strobl" (1 ♀, ZMHB).- "Andalusia" (2 ♂♂, ZMHB).- "Südspanien, Prof. G. Strobl" (1 ♂, ZMHB).- "Lusit." (1♂, ZMHB).- "P. Andalucia/ Esp., Granada, 6.4.[19]74, W. Ziegler leg." (1 ♀, CEH).- "E, Prov. Alicante, Sierra de Aitana, 17.3.19[74], Meybohm lg." (1♀, CEH).- "Spanien/ Andalusien, Sierra Morena ca. 500 m, S. Ollala, 12.–13.03.1985, leg. Hendrich/Herzig" (8 ♂♂, 6 ♀♀, COH).- "Espana, Catalonia, Ripoll, 30.VI.1994, leg. Hornburg" (1 ♂, COH).- "Spanien (Andalicia), Tarifa bei Algeciras, 04.03.1998, Pferdekot, leg. Hillert" (13 ♂♂, 8 ♀♀, COH).- "Spanien (Andalucia), Conil de la Frontera (Vejer-Cadiz), Pferdekot, 07.03.1998, leg. Hillert" (4 ♂♂, 4 ♀♀, COH).- "Spanien (Andalucia), Rota bei Cadiz, Pferdekot, 08.03.1998, leg. Hillert" (2 ♂♂, 3 ♀♀, COH).- "Spanien (Andalucia), Medina Sidona (Cadiz), Rinderkot, 08.03.1998, leg. Hillert" (4 ♂♂, 2 ♀♀, COH).- "Cadiz Spanien, San Roqûe 18.3.[19]84" (1 ♂, 1 ♀, CRP).- "Spanien (Andalucia), Sierra de Fates, bei Tarifa, Rinderkot, 05.03.1998, leg. Hillert" (1♂, 1 ♀, COH).- "Spanien, Andalusien, Prov. Cadiz, Tarifa, leg. Bellmann 30.03.1998" (1 ♀, CAB).- "Spanien (Andalucia), Grazalema bei Ronda, Sierra Margarita, Rinderkot, 10.03.1998, leg. Hillert" (1 ♂, 2 ♀♀, COH).- "Spanien Anadalusien, Prov. Malaga, Ronda, leg. Bellmann 27.03.1998" (5 ♂♂, 2 ♀♀, CAB).- "18.3.[19]86 Espagna, Pr. Malaga, Ronda, Benaojan, Schafskot, Fery leg." (1 ♂, 2 ♀♀, CHF).- "Spanien (Andalucia), Zahara de los Atunes (Vejer-Tarifa), Ziegenkot, 06.03.1998, leg. Hillert" (1 ♀, COH).- "4.8.[19]85 Espagna, Sierra Nevada, Laujar südl. Puerto d. l. Ragua, Rinderkot, ca. 1800 m, Fery leg." (1 ♂, CHF).- "30.3.[19]86 Espagna westl. Zaragoza, Schafskot, Fery leg." (1 ♂, CHF).- "1.1.[19]84 Cadiz, Rinderkot, Fery leg." (1 ♂, CHF).- "8.8.[19]84 Espagna, Prov. Cadiz (Andalus.), Barbate, Rinderkot, Fery leg." (1 ♀, CHF).- "22.5.[19]90 Espana, Prov. Burgos, Arlanzon, Rinderkot, Fery leg." (2 ♂♂, 1 ♀, CHF).- "27.8.[19]89 Espana, Prov. Burgos, Arlanzon, Pineda de la Sierra, Eselskot, Fery leg." (4 ♂♂, 2 ♀♀, CHF).- "15.6.[19]90 Espana, Prov. Teruel, S. d. Albarricin, Orihuela de Tremedal, Schafskot, ca. 1500 m, Fery leg." (3 ♂♂, 1 ♀, CHF).- "31.3.1972 Spanien, Playa (Costa Brava) leg. D. Harde" (1 ♂, 7 ♀♀, SMNS).- "Hisp. Costa Brava, Playa de Aro 13.–31.V.1973 R. Köstlin leg." (2 ♂♂, SMNS).- "Spanien 19.5.1971 Pto de Contreras, M.A.Ertel leg." (1♂, SMNS).- "Spanien, Costa Brava, Estartit 14.5.1980 H. u. K.W. Harde leg." (3 ♀♀, SMNS).- "E-Prov. Castellon, W Morella 800 m, 19.4.1984 W. Schawaller leg." (1 ♀, SMNS).- "SP.: 25.4.1987 Sierra Nevada: 800 m, Orgivs-Capileira, Scheuern leg." (2 ♀♀, SMNS).- "Estella 10.4.[19]55 D" (1 ♂, SMNS).- "Spanien, Prov. Cadiz, La Linea 10 m, 15.5.[19]83" (1 ♂, 1 ♀, CHB).- "Andalusien, Sierra Bermeja, April 1965 leg. E. Gersdorf" (1 ♂, 1 ♀, CJS).- "Andalusien, Guediaro, April 1965, leg. E. Gersdorf" (1 ♀, CJS).- "SP.: 19.4.1984, Prov. Castellon: W Morella, 800 m, Rio Bergantes. Scheuern leg." (2 ♀♀, CJS).- "SP.: 25.4.1987, Sierra Nevada: 800 m, Orgivs-Capileira. Scheuern leg." (2 ♀♀, CJS).- "Katalonien, Blanes 4.[19]60 leg. Gersdorf"

(2 ♀♀, CJS).- "S[an]. Ildefonso Hispania" (1 ♀, SMTD).- "Andalusien Std., Coll. Kraatz" (2 ♂♂, DEI).- "Algeciras 7.7.[18]98, Coll. Kraatz" (1 ♂, 1 ♀, DEI).- "Ponferrada, Paganetti, Coll. O. Leonhard" (1 ♂, DEI).- "Andalus. Wltl" (1 ♂, 1 ♀, coll. Heyden, DEI).- "Lusitan. Dyrll." (1 ♀, coll. Heyden, DEI).- "Lanjaron 30.5.[18]95" (1 ♀, ZSM).- dto., nur "26.6.95" (1 ♂, ZSM).- "Spanien/ Granada, U. Capileira, Alpujarra, 2100 m, 05.08.1991, leg. B. Rauhut" (1 ♂, CLS).- "Spain, U. Barcelona, E Loret de Mar, Macchie/ Pferdekot, 30.03.1986, leg. P. Sprick" (1 ♀, CLS).- "Spanien, Prov.Caceres, Extremadura, Coria, 270 m, 04.04.2007, leg. Dirk Frenzel" (1♂, CDF).- "Spanien, Prov. Caceres, Extremadura, NE von Zarza la Mayor 39° 55’ 48’’ N, 6° 48’ 27’’ W, 370 m, 31.III.2007 leg. J. Weipert" (1 ♂, CJW).- "Spain: Sierra de Guadarrama. viii.1927. B. Uvarov." (1 ♂, 2 ♀♀, NHML).- "Avila. Spain. G. C. C." (1 ♂, coll. G. C. Champion, NHML).- "Canales, Pr. Logrono, Spain. G. C. C." (2 ♀♀, coll. G. C. Champion, NHML).- "La Granja, Spain, G. C. C." (2 ♀♀, coll. C. C. Champion, NHML).- "Algeciras, Dr. Cameron" (1 ♂, 1 ♀, NHML).- "Spain: Granada, Granada-Mulhacen Rd., Mt. Mulhacen, 2250 m. 21.V.1967" (2 ♂♂, coll. M. E. Bacchus & B. Levey, NHML).- "Lusitan" (1 ♀, coll. Fry, NHML).- "E/ nö Tarifa, Embalse de Almodovar, 13.4.2007, W. Ziegler" (2 ♀♀, CWZ).- "E/ Costa de la Luz, El Palmar, sü. Conil, 15.4.2007, W. Ziegler" (2 ♂♂, 2 ♀♀, CWZ).- "E/ Rio Guadalquivir, Trebujena nö Sanlúcar, 9.4.2007, W. Ziegler" (1 ♀, CWZ).- "Spain, Higuera de la Sierra 490 m (295732892, 4177527) 09.06.2008" (3 ♂♂, ex coll. A. Pizzo, NHML).- "Spain, Guadix 1000 m (305472647, 4R5726) 14., 15., 18.vi.2008" (3 ♂♂, ex coll. A. Pizzo, NHML).- "Gibraltar", 94-58" (1 ♂, NHML).- "Gibraltar" (5 ♂♂, 4 ♀♀, coll. G. C. Champion, NHML).- "Espagne: Castille, Puerto de Bejar, 800–1400 m, V.–VI. 1957, [leg.] G. Fagel" (1 ♂, 1 ♀, NMP).- "Hispanie Algeciras" (1 ♀, NMP).- "S. Spanien, Sierra Morena | ex coll. Dr. Kallert Hamburg" (1 ♀, NMP).- "Hispanie Cordoba" (1 ♂, 1 ♀, NMP). **Portugal:** "P., A. Alenteo, UG Gavião: Lomenda, ca. 200 NN, 10.5.1991, leg. Schaffrath" (1 ♂, CUS).- "PAL-Europa-Portugal, Algarve, Westküste 10 km N Odeceixe 25.6.2001 R. Peschel" (1 ♂, 2 ♀♀, CRP).- "P: Algarve, Sagres IV.1987 leg. G. Sama" (1 ♂, 1 ♀, SMNS).- "Portugal, Cercal S. Sant[iago] do Cacem, 21.VI.1982, J. Hemmen leg." (4 ♂♂, 2 ♀♀, NSMW).- "Aljezur: Aljezur, 13.vi.2001, T. Branco legit" (2 ♀♀, CTB).- "Aljezur: Bordeira, 14.vi.2002, T. Branco legit" (1 ♂, CTB).- "Monchique: Foia, 13.vi.2001, T. Branco legit" (1 ♀, CTB).- dto., nur "13.vi.2002" (2 ♂♂, 3 ♀♀, CTB).- "Portimão: Portimão, 27.vi.1979, M.L.Correia legit" (2 ♂♂, CTB).- "Silves: Armação de Pera, 28.v.2002, T. Branco legit" (1 ♂, 1 ♀, CTB).- "Vila do Bispo: Vila do Bispo, 10.vi.2002, T. Branco legit" (2 ♂♂, 1 ♀, CTB).- "Alter do Chão: Alter Pedroso, 13.iii.2006, T. Branco legit" (1 ♂, 3 ♀♀, CTB).- dto., nur "15.iii.2006" (2 ♀♀, CTB).- "Avis: Ervedal, 12.iii.2006, T. Branco legit" (1 ♀, CTB).- "Borba: Borba, 9.iv.1977, T. Branco & A. Zuzarte legit" (4 ♂♂, 3 ♀♀, CTB).- "Estremoz: Veiros, Vale das Quintas, 16.iv.1976, A. Zuzarte legit" (1 ♂, CTB).- "Estremoz: Veiros, Vale das Quintas, 2.iv.1977, A. Zuzarte legit" (1 ♂, CTB).- "Estremoz: Venda da Porca, 11.iii.2006, T. Branco legit" (1 ♀, CTB).- "Fronteira: Herdade Grande, 7.iv.1977, T. Branco & A. Zuzarte legit" (1 ♂, 1 ♀, CTB).- "Marvão: Porto de Espada, 12.v.1999, A. Zuzarte legit" (3 ♀♀, CTB).- dto., nur "pitfall, 12–26.v.1999" (1 ♀, CTB).- dto., nur "26.v.1999" (1 ♀, CTB).- "Marvão: Vale de Rodão, pitfall, 12–26.v.1999, A. Zuzarte legit" (1 ♀, CTB).- "Monforte: Herdade das Lagens, 16.iii.2007, A. Zuzarte legit" (1 ♂, 6 ♀♀, CTB).- dto., nur "29.iii.2007" (1 ♂, 3 ♀♀, CTB).- "Monforte: Herdade da Palmeira, 27.x.1998, A. Zuzarte legit" (1 ♀, CTB).- "Mora: Montinho das Ferrarias, 9.iii.1979, A. Zuzarte legit" (1 ♂, CTB).- "Mourão: Granja, 12.iv.1987, T. Branco legit" (5 ♂♂, 6 ♀♀, CTB).- dto, nur "14.iv.1987" (1 ♂, CTB).- "Mourão: Luz, 14.iv.1987, T. Branco legit" (3 ♂♂, CTB).- "Mourão: Mourão, 15.iv.1987, T. Branco legit" (1 ♀, CTB).- "Portalegre: Cruz do Cume, pitfall, 28.iv–12.v.1999, A. Zuzarte legit" (1 ♂, 1 ♀, CTB).- "Portalegre: Frei Álvaro, 7.iii.2000, A. Zuzarte legit" (1 ♀, CTB).- dto., nur "pitfall, 29.iii–12.iv.2000" (1 ♂, 1 ♀, CTB).- "Sousel: Santo Amaro, 8.iv.1977, T. Branco & A. Zuzarte legit" (2 ♂♂, 7 ♀♀, CTB).- dto., nur "25.v.2001" (1 ♀, CTB).- dto., nur "9.iv.2007" (1 ♂, 2 ♀♀, CTB).- "Sousel: Sousel, 13.iii.2006, T. Branco legit" (3 ♀♀, CTB).- "Almodôvar: Santa Clara-a-Nova, Pegos de Horta, 16.ii.2003, T. Branco legit" (1 ♂, CTB).- "Ferreira do Alentejo: Aldeia de Ruins, 19.ii.2006, T. Branco legit" (1 ♀, CTB).- "Grândola: Azinheira dos Barros, 22.ii.2006, T. Branco legit" (2 ♀♀, CTB).- "Mértola: Espírito Santo, 30.iii.2007, T. Branco legit" (1 ♀, CTB).- "Odemira: Odemira, 16.iv.1982, T. Branco legit" (1 ♂, CTB).- "Serpa: Guadalupe, 6.x.1999, T. Branco legit" (1 ♂, CTB).- "Manteigas: Nave de S$^{to.}$ António (Serra da Estrela), 1540 m, 5.vii.2002, T. Branco legit" (10 ♂♂, 9 ♀♀, CTB).- dto., nur " 6.vii.2002" (2 ♂♂, 2 ♀♀, CTB).- "Seia: Sabugueiro (Serra da Estrela), 10–11.v.1986, T. Branco legit" (2 ♂♂, 3 ♀♀, CTB).- "Belmonte:

Inguias, iii.1962, J. Matos legit" (1 ♂, CTB).- "Castelo Branco: Malpica do Tejo, 18.iii.2003, T. Branco legit" (1 ♀, CTB).- dto., nur"21.iii.2003" (3 ♂♂, 2 ♀♀, CTB).- "Idanha-a-Nova: Idanha-a-Velha, 17.iii.2003, T. Branco legit" (2 ♀♀, CTB).- dto., nur "20.iii.2003" (3 ♂♂, 4 ♀♀, CTB).- "Póvoa do Varzim: Aguçadoura, 27.iv.1975, F. Figueiredo legit" (1 ♂, CTB).- "Resende: S. Cipriano, 22–24.v.1977, J. Ramalho legit" (1 ♂, 1 ♀, CTB).- "Santo Tirso: Monte Córdova, 24.vi.1973, F. Figueiredo legit" (1 ♀, CTB).- "Vila do Conde: Azurara, 2.iii.1980, T. Branco legit" (1 ♀, CTB).- "Vila do Conde: Vila do Conde, 10.viii.1977, T. Branco legit" (1 ♂, 8 ♀♀, CTB).- "Cascais: S. João do Estoril, 22.iii.1969, T. Branco legit" (4 ♂♂, 1 ♀, CTB).- dto., nur "4.v.1969" (2 ♂♂, CTB).- "Oeiras: Cruz-Quebrada, iii.1963, T. Branco legit " (1 ♂, 1 ♀, CTB).- dto., nur "iv.1963" (2 ♀♀, CTB).- dto., nur "5.v.1963" (2 ♂♂, 1 ♀, CTB).- dto., nur "19.iv.1964" (1 ♀, CTB).- dto., nur "24.X.1964" (1 ♀, CTB).- "Sintra: Rio de Mouro, 12.iii.1961, L. Ambar legit" (1 ♂, CTB).- dto., nur " 28.v.1967" (1 ♂, CTB).- "Arcos de Valdevez: Serra do Soajo, 10.iv.1973, F. Figueiredo legit" (1 ♂, CTB).- dto. nur "11.vii.1976" (1 ♂, CTB).- "Arcos de Valdevez: Mezio (Serra do Soajo), 18.viii.1974, T. Branco legit" (1 ♀, CTB).- "Póvoa de Lanhoso: Serra de S.Mamede de Penafiel, F. Figueiredo legit" (1 ♂, CTB).- "Terras de Bouro: Serra do Gerês, 1.vi.1972, F. Figueiredo legit" (5 ♂♂, 1 ♀, CTB).- dto., nur "2.vii.1972" (1 ♀, CTB).- dto., nur " 8.vii.1972" (3 ♂♂, CTB).- "Viana do Castelo: Bretial (Serra de Arga), 19.iv.1979, T. Branco legit" (2 ♂♂, CTB).- "Vieira do Minho: Serra da Cabreira, 1.iv.1973, T. Branco legit" (1 ♀, CTB).- dto., nur "9.vi.1973" (1 ♀, CTB).- dto, nur "15.viii.1975" (2 ♂♂, CTB).- dto., nur "20.vii.1975" (7 ♂♂, 5 ♀♀, CTB).- dto., nur "4.vii.1976" (2♂♂, CTB).- "Coruche: Coruche, 20.iii.1975, T. Branco legit" (1 ♂, 1 ♀, CTB).- "Coruche: Monte da Barca, 25.ii.1979, A. Zuzarte legit" (2 ♂♂, 1 ♀, CTB).- dto., nur "11.iv.1987" (1 ♂, CTB).- "Coruche: Santana do Mato, 20.iv.1979, A. Zuzarte legit" (1 ♂, CTB).- "Salvaterra de Magos: Muge, 18.iii.1967, T. Branco legit" (1 ♂, CTB).- dto., nur "25.iii.1967" (2 ♂♂, 2 ♀♀, CTB).- dto., nur "9.iv.1967" (1 ♀, CTB).- dto., nur "13.iv.1973" (1 ♀, CTB).- dto., nur "13.iv.1974" (1 ♀, CTBH).- dto., nur "15.iii.1975" (1 ♀, CTB).- dto., nur "23.iii.1975" (2 ♂♂, 7 ♀♀, CTB).- dto., nur "29.iii.1986" (1 ♀, CTB).- "Vila Franca de Xira: Vila Franca de Xira, 9.iv.1986, T. Branco legit" (7 ♂♂, 8 ♀♀, CTB).- "Bragança: Martim (Serra de Nogueira), 11.viii.1984, T. Branco legit" (4 ♂♂, 2 ♀♀, CTB).- "Bragança: Meixedo, 23.v.2007, T. Branco legit" (1 ♂, 2 ♀♀, CTB).- "Bragança: Rabal, 22.v.2007, T. Branco legit" (1 ♂, CTB).- "Miranda do Douro: Fonte d'Aldeia, 3.vii.2001, T. Branco legit" (5 ♂♂, 9 ♀♀, CTB).- "Miranda do Douro: Vila Chã de Braciosa, 3.vii.2001, T. Branco legit" (2 ♀♀, CTB).- "Vila Pouca de Aguiar: Serra da Padrela, 28.iv.1984, T. Branco legit" (1 ♀, CTB).- "Vinhais: Quadra, 21.v.2007, T. Branco legit" (1 ♀, CTB). **Italy:** "Italien, I. Capri, 14.03.[19]03" (1 ♂, ZMHB).- "Dr. Feige, Roma, Monte Cavo" (1 ♂, ZMHB).- "Calabria, Corare, 7.IV.[18]83" (1 ♂, 1 ♀, ZMHB).- "17.6.[19]83 Calabria, Cosenza, Rinderkot, Fery leg." (1 ♂, CHF).- "Lucania, Policoro (MT) 17-VI-1976 leg. Angelini F. | sotto sterco bovino" (2 ♀♀, SMNS).- "Calabria Antonimina g. Paganetti" (1 ♂, SMNS).- "Calabria Cimina, Paganetti" (1 ♂, SMNS).- "It. Apul., Corato 22.IV.[19]78 Köstlin leg." (1 ♀, SMNS).- "Umbrien Italia" (2 ♀♀, SMTD).- "Neapel, coll. Stierlin" (1 ♂, 1 ♀, DEI).- "Umgbg. v. Rom 1902, Castel Gandolfo 13.10" (1 ♂, 1 ♀, NMP).- "Salerno-Paestum, Italia - 1.7.1972, lgt. Dr. Z. Pádr" (1 ♀, NMP).- "Calabria, Cimina, lg. Paganetti" (1 ♀, DEI).- "Brindisi" (1 ♂, coll. Nevinson, NHML).- "Amalfi, Italy. T. A. C." (1 ♂, coll. G. C. Champion, NHML).- "Italy, St. Antioco, Dunes arround Tonnara (1 km S Calasetta), 10 m, 39°04'54,0'' N, 08°21'34,6'' E, 12.vi.2008, Ahrens & Fabrizi" (3 ♂♂, NHML).- "Italy, Pantano della Zottola, Iserina (E 424539, N 4619338), 13.06.2007" (1 ♀, NHML).- "Sicil., [leg.] Grohm[ann]." (1 ♂, ZMHB).- "Sicilien, Palermo, ex coll. Dr. Studt G." (1 ♀, ZMHB).- "Italia, NO-Sizilien Randazzo, 25.5.2006, W. Ziegler" (1 ♂, 2 ♀♀, CWZ).- "26.3.[19]83 Sicilia, Castelbuono, 600 m, Pferdekot, Fery leg." (1 ♂, 2 ♀♀, CHF).- "22.3.[19]83 Sicilia, Campofelica, Menschenkot, Fery leg." (1 ♀, CHF).- "Sicilien Messina. 2.5.[19]43" (2 ♂♂, 2 ♀♀, SMNS).- "Sicilien. Valentiner. Palermo 14/4[18]80" (1 ♂, NSMW).- "Catania Sicil., S. G. Strand" (1 ♂, NSMW).- "Italien/ Sizilien-Nord, Parco delle Madonie, Gratteri, 16.V.[20]06 leg. H. Sparmberg" (1 ♀, CHS).- "Sicilia, Randazzo, 3.5.[19]33, W. Liebmann" (1 ♂, DEI).- "Sicil. | Kiesenwetter" (1 ♀, ZSM).- "Palermo" (1 ♂, coll. G. C. Champion, NHML).- "Sardegna, Cagliari, Pula, 18.05.1987, leg. Karl Hadulla" (4 ♂♂, 3 ♀♀, CDR).- "Sardinien, San Teodoro, 05.V.1992, leg. A. Kleeberg" (1 ♂, CER).- "Sardagne, Cabras, 23.V.[18]90" (1 ♂, 1 ♀, ZMHB).- "Italy Sardegna, Nuoro, 7 km NE of Desulo 1300 m. 28-IV-1982, P. Kanaar" (1 ♂, CRP).- "Italy Sardegna, Cagliari, 10 km NNW Teulada, 2-V-1982 leg. P. Kanaar" (1 ♂, CRP).- "Taccu, Nur. Sanu, 815, 8.4.[19]74" (1 ♂, CAB).- "Ulassai, Terralba, 170, 9.4.[19]74" (1 ♀, CAB).-

"Sardinien, SE, Foresta di Monturba, 15 km nördl. von Lanusei, ca. 800 m, 18.VI.2006, leg. W. Apfel" (8 ♂♂, 12 ♀♀, CWA).- "12.7.[19]81 Fertilia, Sardinien, Rinderkot, Fery leg." (1 ♂, 3 ♀♀, CHF).- "Sardinien, Bristr... IV 14 Grist... | Coll. Piesbergen" (2♂♂, 1 ♀, SMNS).- "Sardinien: NU Pso. Arcueri 980 m, 20.IV.1992 leg. Schawaller" (4 ♂♂, 4 ♀♀, SMNS).- "Sardinia, Pula, 5.–12.6.[19]23 W. Liebmann" (1 ♀, SMNS).- "Sardinia Oristano, Frkl. Müller" (5 ♂♂, 4 ♀♀, SMTD).- "Sardinia. Aritzo. Mte. Genargentu, Geo. C. Krüger" (3 ♂♂, 2 ♀♀, DEI).- "Sardin. Asuni, Krausse 5.1909" (1 ♀, DEI).- "Sardinia" (3 ♀♀, SMTD).- "Sardin. Hndsch." (3 ♂♂, 3 ♀♀, coll. Heyden, DEI).- "Sardinien, N Bolotana, 18.04.2007, leg. H. Kalz" (1 ♀, CHKa).- "Sardinien, Umgebung Nuoro, 14.04.2007, leg. H. Kalz" (2 ♀♀, CHKa).- "Ostküste Sardinien, Umg. S.-Lucia, 18.04.2007, leg. H. Kalz" (1 ♀, CHKa).- "Sardegna, Olbia IV.73 Hüdepohl" (7 ♂♂, 5 ♀♀, ZSM).- Sardegna, Umg. Nuoro, Hüdepohl 6/76" (1 ♂, ZSM).- "Oristano 3.6.[19]08" (1 ♂, ZSM).- dto., nur "24.5.08" (1 ♀, ZSM).- "Italia, Sardinia, Cat. d. Marghine, Mt. Palai 1000 m, Laub, 12.X.[19]89, [leg.] Wunderle" (1 ♂, CLS).- "Sardinien, Villanova Stusali, 25.VIII.1980, leg. Wunderle" (1 ♀, CLS).- "Sard., 3 km NW v. Lago alto di Flamend., 25.08.1980, leg. Wunderle" (1 ♂, CLS).- "Nuoro: Dorgali, v.1970, Castellini legit" (1 ♂, 1 ♀, CTB).- "Italy, Sardinia (W coast): Rio Antas valley, Fluminimaggiore-Tempio di Antas, 222 m, 39°24’15,5’’ N, 08°28’20,8’’ E 10.vi.2008, Ahrens & Fabrizi" (1 ♂, 2 ♀♀, NHML).- "Italy, Cala Gonone, Sardinia, 12.vi.2007, C. Gillet" (1 ♂, NHML).- "Italia, Sardegna (Nuoro), Cala Gonone, 12.vi.2007, Quercus forest, leg. C.P.D.T. Gillet" (1 ♂, NHML). "Sardinien, Santa Margherita Pula, Cagliari, 15.05.–04.06.1987, leg. K. Hadulla” (11 ♂♂, 10 ♀♀, CKHa).- "Sardinien, Sant’ Antioco, 23.05.1987, leg. K. Hadulla" (1 ♂, CKHa).- "Sardinien, Sinas: N San Salvatore, 14.04.1992, leg. J. Scheuern” (1 ♂, CJS).- "Sardinien, CA: Porto Teulada, 16.04.1992, leg. J. Scheuern” (2 ♂♂, CJS).- "Sardinien, NU: Bau e Mela, 850 m, 21.04.1992, leg. J. Scheuern" (2 ♂♂, 3 ♀♀, CJS). **Germany:** "German. St." (1 ♂, 1 ♀, coll. Heyden, DEI).- "Germ." (1 ♀, ZSM).- "Monachium [= München]" (1 ♂, ZSM).- "Hartmannshf. [= Hartmannshof] 19.06.[19]06 | München H. Kulzer" (1 ♀, ZSM).- "Schleissheim 4.6.[19]04 | München H. Kulzer" (1 ♂, ZSM).- dto., nur "27.6.07" (1 ♂, ZSM).- "Bavaria Steinhal | Museum antiquum." (1 ♂, SMTD). **Austria:** "St. Michel, Styria [Sankt Michael in Obersteiermarkt]" (1 ♀, ZMHB).- "Hungaria, Leitha-Geb., 13.5.[19]07" (1 ♂, ZMHB).- "Burgenland, Neusiedl" (1 ♀, ZMHB).- "3.4.[19]74 Nähe Apetlon, Austria, Neusiedler See, Pferdekot, Fery leg." (1 ♂, CHF).- "3.VI.1928. Umgebung Apetlon am Neusiedler See" (1 ♀, SMTD).- "Austria, Baden bei Wien 1866 e coll A. Fiedler" (2 ♂♂, 1 ♀, SMNS).- "Illmitz Nsdlsee 5.[19]65 Folwaczny" (1 ♀, SMNS).- "Neusiedler See, leg. R. Zimmermann, Juli [19]46, Schmidt" (1 ♀, SMTD).- "Aust." (5 ♂♂, 1 ♀, ZMHB).- "Burgenland, Hölle, 25.05.2001, leg. Dirk Rohwedder" (1 ♀, CDR).- "Neusiedl. See u. Ug., Austria, Dr. Lechner" (1 ♂, ZMFK).- "Lainz-Wien, April 1954, Dr. H. Lechner" (1 ♂, ZMFK).- "Österreich Wien | ex coll. Dr. Kallert Hamburg" (1 ♂, NMP).- "Austria inf. | Mus. Pragense, Col. Kambersky” (1 ♀, NMP). **Czech Republic:** "Strakonice" (1 ♂ NMP).- "ČSR. Moravia, Pozdřany, V/29. [leg.] A. Hofer" (1 ♀, NMP).- "Děvin. Nová Ves, [leg.] Roland" (1 ♀, NMP).- "Benešov 7.1949, [leg.] Pradáč” (1 ♂, NMP).- "Mus. Pragense, Boh." (2 ♂♂, NMP).- "Moravia" (2 ♂♂, 1 ♀, NMP).- "Schlesien | W. Koltze Hamburg" (1 ♂, NMP). **Slovakia:** "Košice V. 1937" (1 ♀, SMNS).- "Košice leg. Olexa 5-[19]49" (1 ♀, SMNS).- "Slovaquie, Košice V.[19]37 coll. Pospišil" (1 ♀, SMTD).- "Slovakia mer., Opat. N. Ves 18.5.1993, A. Trmal lgt." (1 ♂, CHB).- "Bolesó Hung: Com: Trencsen [= Trenčin]" (1 ♀, SMTD).- "Slovakia 1935. Gbely, 12.V., [leg.] O. Kodym" (1 ♀, NMP).- "Bratislava, [leg.] Roland” (1 ♀, NMP).- "Bratislava, [leg.] O. Kavan” (1 ♀, NMP).- "Vyhorlat, Slovakia or., Europa centr., lgt. Privora - 23.IV.[19]52” (2 ♀♀, NMP).- "Dobšiná Slov. 25.7.1948” (1 ♀, NMP).- "Trnava Tchécosl.” (1 ♀, NMP).- "Slovakei” (1 ♂, NMP).- "Slovakia, Senica 1935. 7.V. [leg.] O. Kodym" (1 ♂, NMP).- "Slov. merid., Štúrovo, Ing. Kouřil" (1 ♀, NMP). **Hungary:** "Ujpest, Hungaria" (1 ♂, ZMHB).- "Ujpest Ungarn" (1 ♂, 2 ♀♀, SMTD).- "HU Batorliget, Zab.-Szat.-Ber. 22.06.2005, leg. H. Müller" (1 ♀, CHM).- "Hungary: Papa. E. Horvath." (1 ♂, 1 ♀, NHML).- "Hung." (2 ♂♂, 1 ♀, ZMHB).- "Ungarn" (1 ♂, SMNS).- "Ungarn | Kollektion Dr. Fuchs" (1 ♂, CHJ).- "Ungarn | Kollektion Dr. Fuchs" (1 ♀, NSMW).- "Hung." (1 ♀, ZSM).- "Ungarn" (3 ♀♀, ZSM).- "Hungary" (1 ♂, NHML).- Budapest, Hungaria, Miex Coll. Missionshaus SVD Steyl, Eing. Nr. 3/59" (1 ♀, ZMFK).- "Ungarn | W. Koltze Hamburg” (1 ♂, 1 ♀, NMP).- "Vagsellyger Umg., Pressb. Comit. Béla Drexler" (1 ♀, ZMHB).- **Ukraine:** "V[elikiye]. Komyaty, Podk[arpatská]. Rus, Danihelka lgt." (1 ♂, 2 ♀♀, NMP).- "Kuzy S. WI., Podk[arpatská]. Rus, Dr. Kli…" (3 ♂♂, 2 ♀♀, NMP).- "Čonok- Podk[arpatská]. Rus, [leg.] Eisenschimmel" (1 ♂, 1 ♀, NMP).- "SU: Charkow, Wereschakowka, 18.IV.1939, leg. M. Pamjanit" (1

♀, ZMHB).- "Umgeb. Kiew, Dorf Bylitschi 9.5.1919, leg. Dragomirow" (1 ♀, ZMHB).- "Kiew, Umgb. Pustscha Wodiza, 26.5.1919, leg. Schpett" (1 ♂, ZMHB).- "Tschernin, 1922, Tarastsch. ujesd. Gebiet Kiew, leg. Dobrshanskij" (1 ♀, ZMHB).- "Ukr. s. Sinjawa ehem. Zerk. okr., leg. Jenni 1924" (1 ♀, ZMHB).- "St. Tschertkowo, Woroschilowgr. obl. [= Lugansk], Milowsk. rajon 19.8.1939" (1 ♂, 1 ♀, ZMHB).- "Ukraine, Kamienka, 35 m s. v. Rowenki [= Rovenki], VI.1918, A. Spaney" (4 ♂♂, ZMHB).- "Ch. taur. [Cherssoness-Taurus = Jaila-Gebirge]" (2 ♂♂, ZMHB).- "Rußland: Rjetschilza a. Dnjepr, Bez. Goni..., 18.5.19[42 Raissi" (1 ♂, SMNS). **Russia:** "s. Drjasgi, Pawlowsk.gub. [wahrscheinlich: Pavlovsk bei Voronež] 16.8.1931, leg. Sawtschenko" (1 ♂, ZMHB).- "Souv., Saratov, Nikolajevsk, 22.V.1928" (1 ♀, ZMHB).- "Kisha Kuban-Geb., Coll. Prager 1.–9.VI.1913" (1 ♂, ZSM).- "UdSSR, NW-Kaukasus, Teberda (Stadt), 1200 m, 18.V.1986, leg. E. Rößner" (3 ♂♂, 2 ♀♀, CER).- "UdSSR, Kaukasus, 2 km n von Werchni Baksan, ca. 1600 m, 15.VI.1987, leg. A. Schröder" (2 ♂♂, 2 ♀♀, CER).- "Kaukasus, Karbadino-Balkaria, Baksan-Tal bei Tyrnyanz 1250–1550 m. 27.VI.1991 Martens/ Schawaller et al." (1 ♀, SMNS).- "Ca. boreal. Wladikawkas, Rost colleg." (1 ♂, 1 ♀, DEI).- "Caucasus 15–16" (1 ♂, ZSM).- "Caucasus, Alexandrofska, Ryssel S.V. / 18.4.[19]01" (3 ♂♂, 6 ♀♀, ZMHB).- "Gruzie, Dombaj 3.8.1976, J. Pradáč leg." (1 ♂, NMP).- "Kaukasus Derbent. | H. Rolle Berlin. | ex coll. Hopffgarten Berlin." (1 ♀, NMP). **Croatia:** "Dalmatien, Hoar 3.IV.[19]29 Citadelle, P. Schulze S.G." (1 ♀, ZMHB).- "Ins. Brazza [= Brač], Ad. Hoffmann" (1 ♀, ZMHB).- "Dinarische Alpen, Coll. O. Leonhard" (2 ♂♂, DEI).- "Dalmatien" (1 ♂, SMTD).- "Meusel, Croatia, Coll. Schenkling" (1 ♂, 1 ♀, DEI).- "Dalma" (1 ♂♂, 2 ♀♀, NHML).- "Jugoslavia, Korčula, Dr. J. Fleischer" (1 ♂, NMP).- "Dalmatien" (2 ♂♂, 1 ♀, NMP).- "Dalmatia" (1 ♀, NMP). **Serbia:** "Serbia or., Pirot, [leg.] Boř. Rambousek" (1♂, NMP).- "Banat, Steppe Deliblat 1911 | Coll. Piesbergen" (1 ♀, SMNS).- "Dalmatien, Lesina [= Hvar], Reitter, Sammlung F. Rüschkamp, Eing. Nr. 1, 1964" (1 ♂, ZMFK).- "F. Belgrad, Dr. Martin, Sig. R. Oberthür (Coll C. Martin), Eing. Nr. 4, 1956" (1 ♂, ZMFK). **Bosnia-Herzegovina:** "Sarajevo. Bosn. 5 [19]07" (1 ♀, NMP).- "Bosn. or. Foča, VII.[19]21, Dr. Balthasar" (1 ♀, NMP).- "Brčko. Bosnia" (1 ♀, NMP). **Montenegro:** "No 451 Montenegro, Vojnik-Gebirge, Brezovi-do 1000 m, 27.6.[19]11 Schumacher S.V." (1 ♂, ZMHB).- "Castelnuovo [= Herceg-Novi], [leg.] Hummler" (1 ♂, ZMHB).- "Budua [= Budva], [leg.] Hummler" (1 ♂, ZMHB).- "Jugoslawien, Montenegro, Sutomore (N Bar, Adriak.) 19.–23.-VI.1991, leg. E. Rößner" (1 ♀, CER).- "10.4.[19]84 Jugoslaw., Hercegnovi, Rinderkot, Fery leg." (2 ♂♂, 1 ♀, CHF).- "Dalmacia 1936, Hercegnovi, [leg.] A. Matějka - IV." (5 ♂♂, 4 ♀♀, NMP). **Macedonia:** "Mazedonien, Üsküb [= Skopje], 1.-5.4.[19]17 P. Schulze S.G." (1 ♂, 1 ♀, ZMHB).- "7.4.[19]85 Yugoslav. nord-westl. Skopje, Rinderkot, Fery leg." (1 ♀, CHF).- "Blatec, 08.08.1986, leg. K. Hadulla" (1 ♂, 1 ♀, CKHa).- dto., nur "13.08.1986" (3 ♂♂, 1 ♀, CKHa).- dto., nur "15.08.1986" (1 ♂, CKHa).- "Crnik, 12.08.1986, leg. K. Hadulla" (8 ♂♂, 10 ♀♀, CKHa).- "Losnov, 10.08.1986, leg. K. Hadulla" (1 ♂, CKHa).- "Laki, 14.08.1986, leg. K. Hadulla" (1 ♀, CKHa).- "Pestovi, 20.08.1986, leg. K. Hadulla" (1 ♀, CKHa). **Romania:** "Brassó [= Braşov] Tr." (1 ♂, NMP).- "Siebenbürgen, Roseln [= Ruja, Ruiseln], 7.-8.[19]31 Böhme leg." (3 ♂♂, 1 ♀, ZMHB).- "Rumänien, Candesti 9.5.[19]17 W. Liebmann" (2♂♂, 1 ♀, DEI).- "Roumanie, Comana Vlasca, A.L. Montandon" (1 ♂, 2 ♀♀, DEI).- "Dobroudja, Mangalia, A.L. Montandon" (1 ♂, DEI).- "Transsylvania, Rodnaer Gebirge 1891 Leonhard" (1 ♀, DEI).- "Carpathes, Sinaia Valachie, A.L. Montandon" (1 ♀, DEI).- "Romania, Mamaia, 1.–14.7.[19]88 Richter" (2♂♂, 2 ♀♀, CWR).- "Rumänien" (2 ♀♀, SMTD).- "Dobroudja. Macin. A. L. Montandon" (1 ♀, coll. Nevinson, NHML). **Bulgaria:** "Ljulin Sof. 4.6.[19]19 | Bulgaria, Ing. Hanuš" (1 ♂, 2 ♀♀, NMP).- "Orechovice 2 6.[19]19 | Bulgaria, Ing. Hanuš" (1 ♂, NMP).- "Bulg. Rumel., Kajbelare, 15.IV.19[09]. Rambousek" (1 ♂, NMP).- "5.5.1933, Mandra Bulgarien, leg. Fuss" (1 ♂, 1 ♀, NMP).- "Bulg. mer.-occ., Sandanski, 16.–24.6.[19]71, Jelinek lgt" (1 ♂, NMP).- "Rumelia" (2 ♂♂, ZSM).- "BG, Sveti Vlas, 16.V.2005, leg. H. Müller" (5 ♂♂, 5 ♀♀, CHM).- "Bulgaria, Sveti Vlas, 8.5.–19.5.[20]05, leg. W. Richter" (6 ♂♂, 7 ♀♀, CWR).- "VRB, Bez. Burgas, Umg. Vlas, 2.–13.VII.1988, Schröder" (5 ♂♂, 10 ♀♀, CER).- "SO-Bulgarien, Schwarzmeerküste, Reservat Arkutino, 03.VIII.1985, A. Kallies" (1 ♂, CER).- "VRB, Mičurin [= Zarewo], 01.IX.1984, leg. Schnitter" (1 ♀, IZH).- "SO-Bulgarien, Zarewo, 13.V.2002, leg. E. Rößner" (1 ♂, CER).- "Bulgarien, Schwarzmeerküste, Umgeb. Kamtschija, 2.–9.VII.1981, leg. U. Heinig" (3 ♂♂, 1 ♀, COH).- "Bulgaria, Achtopol, 15.–21.7.1984 leg. U. Arnold" (1♂, CDA).- "SO-Bulgarien, Sakar-Gebirge: Ustrem (15 km sö Topolevgrad), 15.V.2002, leg. E. Rößner" (1 ♂, CER).- "SO-Bulgarien, Strandža-Gebirge: Gramatikovo, 10.V.2006, leg. W. Malchau" (1 ♀, CWM).- "SO-Bulgarien, Topolovgrad, 07.V.2005, leg. W.

Malchau" (1 ♂, CWM).- "Sofia, IV.[19]03" (1 ♀, ZMHB).- "Bulg. Stara plan., Wasil Lewski pr. Karlowo, 2./5.V.1985, leg. Wrase" (1 ♂, 2 ♀♀, ZMHB; 1 ♀, CHKa).- "Bulg., St. Planina, Umg. Sahrane, Stausee b. Dimitri, 18.V.1984, B. Jaeger" (1 ♀, CER; 1 ♀, CHKa).- "Bulgarien, Goze Delschew, Pirin, in Eselkot, 23.VII.1989, leg. F. Burger" (1 ♂, NME).- "SW-Bulgarien, Umg. Sandanski, 13.–24.VII.1985, leg. M. Schülke" (1 ♂, CER).- "SW-Bulgarien, Umg. Sandanski, 20.IV.1985, leg. B. Jaeger" (1 ♂, CHKa).- "SW-Bulgarien, Umgebung von Sandanski, ca. 300 m, 12.–24.VII.1984, leg. A. Schröder" (2 ♀♀, CER).- dto., nur "A.VII.1989" (1 ♂, CER).- "Bulgarien, Macedonien, Sandanski, 10.V.1984, leg. Croy" (1 ♀, COH).- "Bulgaria mer. occ., Sandanski env., 1996-06-28, Libor Klima lgt." (1 ♀, CHB).- "Bulgaria, Umg. Sandanski, 27.4.-9.5.[20]03, leg. W. Richter" (3 ♂♂, 2 ♀♀, CWR).- "SW-Bulgarien, Umg. Melnik, 12.–20.V.1981, leg. H. Wendt" (4 ♂♂, 7 ♀♀, ZMHB).- "SW-Bulgarien, Umg. Roshen, 17.–20.V.1981, leg. H. Wendt" (1 ♂, 1 ♀, ZMHB).- "Bulgarien, Umg. Kresna-Pass, 16. Mai 1981, leg. H. Wendt" (1 ♀, ZMHB).- "VRB, Rhodopen, Nähe Marziganitza, 1200–1400 m, Schröder" (1 ♂, 3 ♀♀, CER).- "Bulgarien, Sitnjakovo 1730 m, Tschetér Tepé VII.[19]16 v. Boetticher S.G." (1 ♀, ZMHB).- "Bulgaria, Velingrad 25.V.[19]72" (1 ♂, 1 ♀, SMTD).- "Bulg. Tschamkorija M. Hilf 1911, Coll. O. Leonhard" (1 ♀, DEI).- "BG Borovets, 1900 m, 19.06.1994 leg. H. Müller" (1 ♀, CHM).- "Bulgaria, 42 km S Burgas, 12 km S Krusevec, 17.V.2002, leg. L. Schmidt" (2 ♂♂, 1 ♀, CLS).- "Bulgaria, 100 km SW Burgas, Elhovo, Viehweide, 15.V.2002, l. L. Schmidt" (2 ♀♀, CLS).- "Bulgaria, 70 km S Burgas, Zwezdec, 14.V.2002, leg. L. Schmidt" (1 ♀, CLS).- "Mandra; Bulgarien, 18.5.1933, leg. Fuss" (1 ♂, 1 ♀, ZMFK). **Albania:** "Albania mer., Liqeni i Butrintit, [leg.] Smetana 1958" (1 ♂, 1 ♀, NMP). **Greece:** "Graecia, L. Salvator." (1 ♂, NMP).- "GR: Larissa, 7.7.2001 O. Oros: Marmarini 39°42'54" N 22°35'16" E Pferdedung" (2 ♂♂, CJS).- "Griechenland, Oiti-Gebirge, 1500m, 18.-25.5.1956, Fr. Borchmann leg, Eing. Nr. 8, 1956" (1 ♂, 4 ♀♀, ZMFK).- "Griechenland, Langhadas-Saloniki, 3.-8.4.1956, Fr. Borchmann leg, Eing. Nr. 8, 1956" (1 ♀, ZMFK).- "Athenae" (1 ♂, ZSM).- "Saloniki" (2 ♂♂, ZSM).- "Attika | Kiesenwetter" (1 ♂, ZSM).- "Griech. Mazedonien, Langaza, 5.V.1942, leg. Kühlhorn" (4 ♀♀, ZSM).- "12.8.[19]78 Korfu, Ag. Matheos, Eselskot, Fery leg." (2 ♂♂, 1 ♀, CHF).- dto., nur "15.4.84" (6 ♂♂, 2 ♀♀, CHF).- "Balkan, Corfu, Paganetti [19]03" (1 ♀, DEI).- "7.7.[19]76 Thassos b. Aliki, N.-Gr., Eselskot, Fery leg." (1 ♂, 3 ♀♀, CHF).- "11.4.[19]84 N. Apollonia östl. Saloniki, Schafskot, Fery leg." (1 ♂, CHF).- "6.4.19[85] Graecia, Stavrupolis, Xanthi, Schafskot, Fery leg." (1 ♂, CHF).- "17.7.[19]76 Toroni, Chalkidiki, Gr., Rinderkot, Fery leg." (1 ♂, CHF).- "18.7.[19]76 Sikia, Chalkidiki (Gr.), Rinderkot, Fery leg." (2 ♂♂, 4 ♀♀, CHF).- "13.4.[19]84 Marmaras, Chalkidiki, Schafskot, Fery leg." (1 ♂, 1 ♀, CHF).- "11.4.[19]84 N.Griech., Kavalia, Rinderkot, Fery leg." (6 ♂♂, 2 ♀♀, CHF).- "Greece – Epirus, 4 km E of Vrisela, 12 km NE Igoumenitsa 29-V-1983 P. Kanaar" (1 ♀, CRP).- "GR – Epirus, Ugb. Metsovo, 10.7.2006 Heise leg." (7 ♂♂, 2 ♀♀, CEH).- "GR/ Prov. Epirus 1700 m, Metsovo (Pindos Geb.) 10.7.2006, W. Ziegler" (3 ♂♂, CWZ).- "Greece (Macedonia), Mts. Vrondous 1500 m, Serres env. N 41°16’17,2’’/E 023°35’52,5’’, 20.IV.2005, leg. O. Hillert" (3 ♂♂, 2 ♀♀, COH).- "Métsovo Pass, GR, Reg. Epeiros 10.07.2006, leg. Hengmith" (1 ♂, 1 ♀, CKH).- "Griechenland, Kalambaka bei Trikala (Pindos-Gebirge), 09.06.1996, leg. O. Hillert" (1 ♂, 1 ♀, COH).- "Griechenland (Thessaly), 10 km east of Larissa, 12.IV.2003 leg. O. Hillert" (1 ♀, COH).- "Griechenland (Thessaly), Mt. Ossa, N 39°44’28,8’’/E 022°34’09,3’’, 13.IV.2003 leg. O. Hillert" (1 ♀, COH).- "Athos (Macedonien), A. Schatzmayr" (1 ♂, ZMHB).- "GR, Stomio [Stómion], 13.VII.2002, leg. M. Eifler" (1 ♂, 1 ♀, CME).- "GR, Ossa-Gebirge, Stomio, 5.-18.7.[20]02, E. Heise" (1 ♂, CEH).- "GR – Thessalia, Stomio, 5.7.2006 Heise leg." (1 ♂, CEH).- "GR, Mt. Olympos, Kokkinopilos, 5.-18.7.[20]02, E Heise" (2 ♂♂, 2 ♀♀, CEH).- "GR, Olympias, 14.07.2002, leg. M. Eifler" (1 ♂, 2 ♀♀, CME).- "Greece, Olympia, Miraka, 400 m, 24.3.1992, leg. J. Frisch, Fulda" (1 ♀, ZMHB).- "Langadas-Kolchikos b. Saloniki IV.[19]42 Madel S.G." (1 ♂, 1 ♀, ZMHB).- "Parnass" (1 ♂, ZMHB).- "Olymp, 21.4.[18]70" (2 ♂♂, ZMHB).- "Anno Viannos, 27.III.1988, leg. Link" (2 ♀♀, CAL).- "Graecia Mesolongion 6.[19]75 Folwaczny" (1 ♂, SMNS).- "GR, Makedonien, Nomós Kastoriá, Kastoriá-See, Nordufer, 700 m, 3.V.1994, leg. Schawaller" (1♂, SMNS).- "Greece, 04.V.1977, Böotien; Limni Iliki; nördl. Theben; Westufer | 1. Orient-Exkursion; Inst. f. Zool., Mainz; Prof. R. Kinzelbach, leg. Scheuern" (1 ♂, 1 ♀, CJS).- "Graecia/ Maked., Smolikas 2000 m, 5.-11.8.1980, leg. Mühle" (2 ♀♀, CJS).- "Greece: 30.6.2000, Sithonia: 1 km S Sarti, 40°04’26’’N, 23°59’09’’E. Scheuern leg." (1 ♂, CJS).- "Greece, Umg. Kalampaka, 7.-11.05.[19]93 leg. Ringel" (1 ♂, 1 ♀, CHR).- "Kephallenia 1905, O. Leonhard" (1 ♂, DEI).- "Kephalonia 1908, Charakti legit. M. Hilf, Coll. O. Leonhard"

(1 ♂, DEI).- "Kephalonia 1908, Argostoli legit. M. Hilf, Coll. O. Leonhard" (1 ♀, DEI).- "Macedonia, Vardarebene, A. Schatzmayr, Coll. O. Leonhard" (2 ♂♂, 2 ♀♀, DEI).- "Vardarebene, Salonich, A. Schatzmayr" (1 ♂, 1 ♀, DEI).- "Morea, Hagios Wlassis, Brenske" (1 ♀, DEI).- "Parnass 9.5.[18]65, Coll. Kraatz" (1 ♂, DEI).- "Attica 8.6.[18]69, Coll. Kraatz" (2 ♂♂, 2 ♀♀, DEI).- "Hellas/ Chalkid., Kassandra, Polychronon, 20.03.1989" (1 ♀, CLS).- "Griechenland, Pilion, III.1981, leg. Wunderle" (1 ♀, CLS).- "Greece: Mt. Parnassus nr. Arakhova. 11.viii.1939. c.l., 500 m." (1 ♂, 1 ♀, coll. Grebenchikoff, NHML).- "Greece: Mycenea. vii.1938. Grebenchikoff, B. M. 1958-569." (1 ♀, NHML).- "Corfu" (1 ♂, coll. Nevinson, NHML).- "Greece, Merlin Coll. 96-275" (1 ♀, NHML).- "Cephalonia" (1 ♀, coll. G. C. Champion, NHML).- "Marathon" (1 ♀, coll. G. C. Champion, NHML).- "Salonica." (1 ♂, 2 ♀♀, coll. G. C. Champion, NHML).- "Piraeus" (1 ♀, coll. G. C. Champion, NHML).- "GR, Peloponnes, Pirgos, Prov. Messinia, 29.06.2005, leg. W. Ziegler" (7 Ex., CWZ; 5 Ex., CME; 5 ♂♂, 3 ♀♀, CEH).- "GR, nö-Peloponnes, Kalavrita, Prov. Achaia, 12.5.2005, leg. W. Ziegler" (6 Ex., CWZ).- "Pelop., Exochori, 02.07.2005, leg. M. Eifler" (1 ♂, CME).- "Pelop., Stoupa, 29.06.2005, leg. M. Eifler" (2 Ex., CME; 2 ♂♂, 2 ♀♀, CEH).- "Gr. Pelpones, Galatás, 7.-28.6.[19]76 Köstlin leg." (1 ♂, 2 ♀♀, SMNS).- "Gr. Peloponnes, Kalamata 12.-30.4.1982 Köstlin leg." (3 ♀♀, SMNS).- "Gr. Peloponnes, Andvitsena 20.4.1982 Köstlin leg." (1 ♀, SMNS).- Graecia, Taygetos [19]79, V. Melich" (1 ♀, CHB).- "Hellas, Olympia, leg. Gersdorf 4.[19]58" (1 ♂, CJS).- "Greece: 7.IV.1977, Peloponnes, Yithion, Wassilipotamus 10,5 km nordöstlich | 1. Orient-Exkursion; Inst. f. Zool., Mainz; Prof. R. Kinzelbach, leg. Scheuern" (1 ♂, CJS).- "GR/ Messina/ Peloponnes/ Umgebung Gialova 1.-5.5.1989, Persohn leg." (1 ♂, CJS).- "Tayg." (1 ♂, ZSM).- "Hellas/ Achaia, 30 km südwestl. Patras, Kalogria, 30.III.1988, leg. L. Schmidt" (2 ♂♂, 4 ♀♀, CLS).- "Hellas/ Achaia, U. Patras, Kalavrita, 720 m, 12.05.1989" (1 ♀, CLS).- "Hellas/ Ilea, 40 km SW Patras, Manolada, 29.III.1986, leg. L. Schmidt" (1 ♂, CLS).- "Hellas/ Ilea, U. Olympia, Panopoulos, 700 m, 16.V.1989, leg. L. Schmidt" (1 ♂, CLS).- "Hellas/ Ilea, U. Pirgos, Alfiosufer, 16.V.1989, leg. L. Schmidt" (1 ♀, CLS).- "Hellas/ Argolis, U. Nafplion, 03.IV.1986, leg. L. Schmidt" (1 ♀, CLS).- "Hellas/ Messina, Taygetos b. Artemisia, 800 m, 02.VIII.1990, leg. L. Schmidt" (1 ♀, CLS).- "Hellas/ Messina, Taygetos-Paß, Angada b. Ag. Petros, 13.08.1990, 1450 m, leg. L. Schmidt" (2 ♀♀, CLS).- "Kreta Paganetti | Coll. Piesbergen" (4 ♂♂, 2 ♀♀, SMNS).- "GR: West-Kreta, N-Küste: Georgioupoli, 17.IV.1992, leg. E. Rößner" (3 ♂♂, 2 ♀♀, CER).- "GR-Kreta 1998 Georgioupoli Strand 20.04. leg.: R. Peschel" (1 ♀, CRP).- "Westkreta, Askifos (800 m), 16.IV.1992, leg. E. Rößner" (1 ♂, 6 ♀♀, CER).- "Crete-E, Ierapetra E, 0–20 m NN, 17.–23.04.2000, leg. A. Kopetz" (4 ♂♂, NME).- "Kreta, Paganetti / 112983" (2 ♂♂, ZMHB).- "Kreta, Paganetti" (1 ♂, NMP).- "Kreta, Limni Kournas, 04.IV.1989, leg. Link" (1 ♀, CAL).- "Kreta, Omalos-Ebene, 11.-16.6.[19]42, 1000 m, Kl. Zimmermann leg." (1 ♂, 1♀, ZMHB).- "Kreta, Kap Korikos, 19.4.[19]42, Kl. Zimmermann leg." (1 ♀, ZMHB).- "Kreta-West 2001, Nida-Hochebene 15 km südlich von Anogia, 1150 m, 4.V., leg. W. Apfel" (3 ♀♀, NME).- "Crete, Chania, 30 km SE, Askifon, Goni, S, 700–1050 mNN, 26.04.2000, leg. A. Kopetz" (1 ♂, NME).- "West-Kreta, Chaniá (Canéa) 3.4.1925, A. Schulz S.G." (2 ♂♂, ZMHB).- "Insel Kreta, Ajos Joánnis, Ep. Ajos Wássilis, 21.3.[19]25, A. Schulz S.G." (1 ♂, 2 ♀♀, ZMHB).- "O. Kreta, Ajos Joánnis unterhalb Phaestos, 16.5.[19]25, A. Schulz S.G." (2 ♂♂, 4 ♀♀, ZMHB).- "Insel Kreta nahe Nordküste, Kurná a. See, 25.3.[19]25, A. Schulz S.G." (3 ♂♂, 1 ♀, ZMHB).- "O. Kreta, Miräss, Epar. Känúrgion, 16.5.[19]25, A. Schulz S.G." (1 ♂, 2 ♀♀, ZMHB).- "West-Kreta, Kolibári, Ep. Kissames, 21.4.[19]25, A. Schulz S.G." (1 ♂, 1 ♀, ZMHB).- "O. Kreta, Iráklion (Cándia) 29.4.[19]25, Schulz S.G." (2 ♂♂, ZMHB).- "W. Kreta, Südküste, Skáloti, 19.3.[19]25, A. Schulz S.G." (2 ♂♂, ZMHB).- "Insel Kreta, Armóru südl. v. Rhéthimnon, 22.3.19[25], A. Schulz S.G." (1 ♂, ZMHB).- "West-Kreta, Kloster Aja Triás a Akrotiri, 2.3.[19]25, A. Schulz S.G." (1 ♂, ZMHB).- "Insel Kreta, Nordküste, zwischen Drhámia u. Kalami, 25.-26.3.[19]25, A. Schulz S.G." (2 ♀♀, ZMHB).- "Kreta, Malia-Strand, 29.3.[19]73, Dr. Fülschner & Meybohm" (1 ♂, CEH).- "Kreta, Nomus (Iraklion), Moni Vrondisiov bei Zaros, 05.05.1998, leg. Hornburg" (2 ♀♀, COH).- "Kreta-West, Nida-Hochebene, 15 km südlich von Anogia, 1150 m, 4.V.2001, leg. W. Apfel" (1 ♂, CWA).- "29.3.[19]85 Graecia, Kreta, Chora, Sphakion, Schafskot, 500 m, Fery leg." (1 ♂, 1 ♀, CHF).- "30.3.[19]85 Graecia, Kreta, Komitades, Chora, Sphakion, 100 m, Fery leg." (1 ♀, CHF).- "III.[19]84 Kreta, Umg. Tymbakion, Schafskot, Fery leg." (1 ♀, CHF).- "GR: Kreta, 12.4.1993, Frangocastelo, leg. Winkelmann-Klöck" (1 ♂, CHF).- "GR: Kreta, Plakias, 2.-16.4.1993, leg. Winkelmann" (1 ♂, CHF).- "28.3.[19]85 Graecia, Kreta, Kyparissos, Iraklion, Eselskot, Fery leg." (3 ♀♀, CHF).- "29.3.[19]85 Graecia,

Kreta, westl. Rethymnon, Schafskot, Fery leg." (5 ♂♂, 1 ♀, CHF).- "Kreta, Réthymnon 8.-29.V.1979 R. Köstlin leg." (3 ♂♂, 1 ♀, SMNS).- "Kreta 28.IV.-19.V.[19]74 R. Köstlin leg." (1 ♂, 2 ♀♀, SMNS).- "Kreta, Ierapetra 16.–30.IV.1975 R. Köstlin leg." (1 ♂, SMNS).- "GR-Kreta, Umg. Heraklion, Linopermata, 15.5.[19]87, Scherm leg." (6 ♂♂, 5 ♀♀, SMNS).- "Kreta, Paganetti" (2 ♂♂, DEI).- "Kreta, Paganetti, Onth. vacca" (1 ♂, 1 ♀, ZMFK).- "Crete: Omalos. vii.1939. Grebenchikoff. B. M. 1958-569." (1 ♂, NHML).- "Crete, Rethymno, Opsigias (459 m), 31.05.2008, leg. Dirk Rohwedder" (2 ♂♂, 2 ♀♀, CDR).- "Crete, Rethymno, 3 km östlich von Prinos, 01.06.2008, leg. Dirk Rohwedder" (13 ♂♂, 13 ♀♀, CDR).- "Hellas, Chalkis, leg. Gersdorf 4.[10]58" (1 ♀, CJS).- "Insel Tinos [= Tenos], Berg Skionia, v. Oertzen. / 84400" (1 ♂, ZMHB).- "Paros. Sig. R. Oberthür (Coll C. Martin), Eing. Nr. 4, 1956" (6 ♂♂, ZMFK).- "Rhodes (Turquie de Asie), L. Bleuse, R. Oberthür, Eing. Nr. 4, 1956, variero" (1 ♀, ZMFK).- "Nördl. Sporad, Skopelos, [leg.] Emge. / 84401" (1 ♂, ZMHB).- "Südl. Sporaden, Kos, v. Oertzen. / 84402" (1 ♂, ZMHB).- "Süd-Euboea, Karystos, v. Oertzen / 84398" (1 ♂, 1 ♀, ZMHB).- "Cykladen, Keos, v. Oertzen / 84399" (1 ♀, ZMHB).- "Kos/ Griechenl. 28.5.-11.6.[19]88, leg. Hengmith" (1 ♂, ZMHB).- "GR-Naxos Östl. Koronis, Kot 5.4.[19]90 leg. Mauser" (1 ♀, CRP).- "Naxos, Coll. O. Leonhard" (2 ♀♀, DEI).- "GR. Insel Santorin 15.-27.4.1985 leg. H. Schmalfuss" (1 ♂, SMNS).- "Rhodes, Em. Reitter" (3 ♂♂, 1 ♀, NMP).- "Rhodes (Turquie d'Asie), [leg.] L. Bleuse, 2.1895." (1 ♂, NMP).- "GR: Insel Rhodos, Kamiros 10.4.1980, W. Schawaller leg." (1 ♀, SMNS).- "GR: Santorin, Pirgos u. Emborio, 12.-17.5.1992 leg. Fichtner/Leidenroth" (2 ♂♂, SMNS).- "GR: Ins. Kefallonia, 3 km NW Poros 200- 29.IV.1996 500 m, Erhard & Schmalfuss" (1 ♀, SMNS).- "Rhodos, Lindos 16.–30.IV.1981 Köstlin leg." (1 ♀, SMNS).- "Greece: Rhodos: Lardos. 4.4.1980, Schawaller leg." (1 ♀, CJS).- "Rhodos, Lindos, leg. Gersdorf 4.[19]58" (2 ♂♂, CJS).- "GR – Naxos östl., Koronis, Kot, 5.4.[19]90, leg. Mauser" (1 ♀, CJS).- "GR-Kykladen, Paros, IV/Falle: 6-19, 19.04.-01.05.1994, leg. Glück/Steinmetz" (1 ♀, NSMW).- "Insel Rhodus" (2 ♂♂, 1 ♀, SMTD).- "Rhodus, coll. Plasin" (2 ♂♂, 3 ♀♀, DEI). **Turkey:** "v. Bodemeyer, Anatolia, Asia minor" (3 ♂♂, 4 ♀♀, NMP).- "Asia minor, Ak-Chehir, v. Bodemeyer" (1 ♀, NMP).- "Konstantinopel" (1 ♀, NMP).- "Türkei, Gallipoli [= Gelibolu] 4.-6.1918 v. Platen S.G." (1 ♂, ZMHB).- "Byzantum" (1 ♂, ZSM).- "Adampol., Constantinopel 1900. Korb" (1 ♀, ZMHB).- "Constantinopel V.1898, W. Gottwald S.V." (2 ♂♂, 2 ♀♀, ZMHB).- "Constant. | 26958" (3 ♂♂, 2 ♀♀, ZMHB).- "Türkei, V.[18]98, Umgegend von Constantinopel, G. Gottwald S.V." (2 ♂♂, 3 ♀♀, ZMHB).- "Constpl. Fr. Jean" (1 ♂, 1 ♀, coll. Heyden, DEI).- "Stambul" (1 ♀, DEI).- "Alexandr." (1♂, 1 ♀, ZSM).- "W. Kleinasien, Brussa [= Bursa], 20.-30.6.1934, leg. Frl. Neuhauser" (1♂, ZMHB).- "3.4.[19]85 Türkei, Marmaris, Rinderkot, Fery leg." (2 ♂♂, CHF).- "Anatolien, Ilkaz-See, Ende 5.[19]33, Dr. Kummerlöwe, Dr. Niethammer" (1 ♂, CER).- "Asia minor, Biledjek, v. Bodemeyer" (1♂, 1 ♀, ZMHB).- "Asia minor, Sabandja, v. Bodemeyer" (1♂, ZMHB).- "Smyrn. [Smyrna = Izmir]" (1 ♂, 1 ♀, ZMHB).- "Smyrna" (1 ♂, SMTD).- "Türkei, Rivera, Incekum (ca. 15 km W v. Alanya), 17.-28.VI.1998, leg. A. Schröder" (1 ♂, 1 ♀, CER).- "Türkei, Rivera, Manavgat, 26.IV.–5.V.1995, leg. A. Schröder" (1 ♀, CER).- "Türkei/Prov. Antalya, Alanya/Dim, 140 m NN, leg. Bellmann 17.03.2000" (6 ♂♂, 2 ♀♀, CAB).- "S-Türkei, Antalya, Akseki, 1300 m NN, leg. Bellmann 21.03.2002" (1 ♂, CAB).- "Turkey (Kütahya), Beyce, Simav env., Simav Daglari Mts., 22.IV.2004 leg. O. Hillert" (1 ♀, COH).- "Türkei, Peri, 17.06.1996, leg. D. Rohwedder" (1 ♂, CJS).- "TR – Antalya, Beldibi-Kemer, Hadulla, 13.6.[19]92" (1 ♂, CJS).- "Antalya, Manavgat, 13.06.1996, leg. Dirk Rohwedder" (2 ♀♀, CDR).- "Antalya, Peri, 17.06.1996, leg. Dirk Rohwedder" (1 ♂, CDR).- "Antalya, Taskesigi, 28.06.1998, leg. Dirk Rohwedder" (1 ♂, CDR).- "Antalya, Side-Colaki, 29.10.2005, leg. Knechtel" (1 ♀, CDR).- "Polonez, Alem Dag, Turcia, 25.IV.1967, Krätschmer leg." (2 ♂♂, 2 ♀♀, CJS).- "TR, 09.IV.1992, Bafa gölü, leg. G. Müller" (1 ♂, NSMW).- "TR, 06.IV.1992, Yapldak, Canakkale, leg. G. Müller" (2 ♂♂, 6 ♀♀, NSMW).- "Turcia Abr." (4 ♂♂, 8 ♀♀, coll. Heyden, DEI).- "Birdursee E.6.1963 | Türkei K. Wellschmied" (1 ♂, 2 ♀♀, ZSM).- "Anatolie, Ielski" (1 ♂, coll. E. Y. Western, NHML).- "Beikos. -02. M C." (1 ♀, coll. M. Cameron, NHML).- "Besika Bay" (1 ♂, 2 ♀♀, coll. G. C. Champion, NHML).- "Port Baklar" (1 ♀, coll. G. C. Champion, NHML). **Georgia:** "Svanetia, Caucasus, Dr. Veselý" (1 ♂, NMP).- "Cauc. occ., Abchasia, Avadchara 2000–2700 m, 26.–31.VII.1985, leg. Wrase" (1 ♂, CER). **Azerbaijan:** "Schuscha Karabagh" (1 ♂, SMTD).- [Kyrillisch:] "Nucha [= Sheki]" (1 ♀, ZSM).- "Suchoj Fontan 1910 Kulzer" (1 ♀, ZSM).- "Lenkoran, Sig. R. Oberthür (Coll C. Martin), Eing. Nr. 4, 1956" (3 ♂♂, ZMFK). **Iran:** "Persia Astrabad [= Gorgan]" (1 ♀, SMTD).- "Elbrus Geb., Persien, Rttr." (1 ♂, 1 ♀, NMP).- "Persien, Luristan, v. Bodemeyer" (1 ♀, NMP).

Morocco: "Tanger [= Tanjah], Marokko" (3 ♂♂, 2 ♀♀, ZMHB).- "Tanger, Rolph" (2 ♂♂, 2 ♀♀, DEI).- "Marokko, Mogador [= As Sawirah], Quedenfeldt S." (1 ♂, ZMHB).- "Marokko, Marakesch, Quedenfeldt S." (2 ♂♂, ZMHB).- "Marokko, Settat, Quedenfeldt S." (1 ♀, ZMHB).- "Marocco centr., Khenifra env. 1.5.[19]95 Lackner lgt." (3 ♂♂, 2 ♀♀, NME).- "Aquelmane Sidi Ali (2000 m) Mittl. Atlas, Maroc, M9/1991 leg: Ahrens" (1 ♀, SMTD).- "Marokko, Umgeb. Azrou, Mittl. Atlas 1600 m E III/1992 leg. D. Ahrens" (7 ♂♂, 10 ♀♀, SMTD).- "Marokko, Ain Denali E III/1992 leg. D. Ahrens" (3 ♂♂, 5 ♀♀, SMTD).- "S. Marokko, Touline M III/1992 leg. D. Ahrens" (1 ♂, SMTD).- "Marokko M. IX/1991 Col du Zad 2000 m Mitt. Atlas, leg. D. Ahrens" (8 ♂♂, 12 ♀♀, SMTD).- "29.3.[19]88 Maroc, Moy. Atlas, Khenifra, Col. Tonout, Fery leg." (1 ♂, 2 ♀♀, CHF).- "29.3.[19]88 Maroc, Maamar, b. Khenifra, div. Kot, Fery leg." (2 ♂♂, 2 ♀♀, CHF).- "26.3.[19]88 Maroc, Umg. Tanger, Cap Spartel, div. Kot, Fery leg." (2 ♂♂, 2 ♀♀, CHF).- "26.3.[19]88 Maroc, südl. Larache, Rinderkot, Fery leg." (2 ♂♂, CHF).- "10.8.[19]85 Maroc, Moy. Atlas, Azrou südl. Ajabo, 1300 m, Fery leg." (3 ♂♂, CHF).- "Südmarokko 5 km N El Ksiba [= Al-Q'sibah] - Mittlerer Atlas 750 m, 29.03.1996 leg.: R. Peschel" (1♂, CRP).- "Südmarokko 950 m NN Oasis de la Soure, Bleue de Meski 31.03.1996, R. Peschel" (2 ♀♀, CRP).- "Marocco: -V.1965, 6 km S Casa Blanca, on/ beside beach. R.O.S. Clarke" (1♂, CJS).- "Marocco: 22.V.1965, Tangiers, stones/ dung nr. baech. R.O.S. Clarke" (1 ♀, CJS).- "Marokko, M. Atlas b. Azrou 2000 m, Wohlb. 5.[19]31" (1♂, 1 ♀, SMTD).- "Marokko, Meknes, Wohlb. 5.[19]31" (1 ♂, SMTD).- "Marocco" (1 ♀, ZSM).- "Tangier" (2 ♂♂, coll. Nevinson, NHML).- "Tangier, Marocco, 1915-38" (1 ♀, NHML).- "Tangier. J. J. Walker" (2 ♂♂, 3 ♀♀, coll. G. C. Champion, NHML).- "Maroc, Tanger, coll. de Vauloger" (1 ♀, coll. Nevinson, NHML).- "Plain of Buzaghal. Tetuan, J. J. Walker" (1 ♂, coll. G. C. Champion, NHML).- "Marocco, Meknes, 12–15.vii.1973, M. I. Russell" (1 ♂, NHML).- "Marocco, Middle Atlas Mts., Azrou, 4,400 ft. 19.vi.1936" (1 ♀, coll. K. H. Chapmann & G. A. Bisset, NHML).- "Moyen Atlas: Ifrane, 31.vii.1984, J.Baraud legit" (1 ♂, 1 ♀, CTB).- "Ma.-Marrakech, Jimil, 9.6.1994, Hadulla leg." (1 ♂, CKHa).- "Rabat" (2 ♀♀, NMP). **Algeria:** "Algir, [leg.?] Parz." (1 ♂, ZMHB).- "Algeró 08" (1 ♀, ZSM).

Not localised: "La Ferués, 6.[19]60" (1 ♀, ZMHB).- [Kyrillisch:] "Bum" (1 ♀, ZSM).- "Balkan" (1 ♂, 3 ♀♀, NMP).- "Balkan, Bellova. | H. Rolle Berlin. | ex coll. v. Hopffgarten Mülverstedt" (1 ♂, NMP).- "Hustó 4.V.25 Pradáč" (1 ♂, NMP).- "Lušcnec 20.7.25" (1 ♀, NMP).- "Kovalevka, Januš Gub., Podolská" (5 ♂♂, 5 ♀♀, NMP).- "Tornok, Roland" (1 ♀, NMP).- "Leivist 12.5.08" (1 ♂, NMP).

Erroneous records: "58.119. Ruthe. Germany, 845" (2 ♂♂, NHML).- "Magdebg.? Kirsch" (1 ♂, SMTD).- "Düben Kirsch" (1 ♂, SMTD).- "Nubia. Geist" (1 ♂, 1 ♀, coll. Heyden, DEI).

Redescription. Body length: 7–13 mm, body oval, weakly convex, dull; head and pronotum metallic green, rarely cupreous; elytra yellow with asymmetric dark spots; ventral face, pygidium and legs black with weak metallic sheen; dorsal pilosity short and light.

Head. Antenna brown, clavus black; anterior edge of clypeus reflexed, with transverse wrinkles, head coarsely punctate to granulate between frontal carina and vertex.

Pronotum. Lateral margins behind anterior angles straight or convex, anterior angles weakly rounded, posterior angles sinuate, basis with distinct marginal line often narrower or entirely interrupted close to posterior angles (Fig. 2AI); punctation coarse, dense, very dense and granulate beside anterior angles, with narrow smooth impunctate sections on midline and beside posterior angles.

Elytra. Yellow, base and suture narrowly dark with green sheen, epipleura completely light; spots small, black with green sheen, asymmetric, base always without spots, yellow ground colour always prevailing as spots are slightly confluent or not confluent (Figs. 2B–G), spots rarely condensed (Fig. 2H, so far only from populations of Corsica and Sardinia) or spots completely absent (Fig. 2A); intervals chagreened, punctation even, granulate; striae shallow, weakly punctate, 7th stria weakly curved.

Pygidium. Base with marginal line, dull, punctation fine, moderately dense and simple, superficial.

Aedeagus. Figs. 3C–3P; endophallus: 3AC–AF, 3AL–AO (see Table 1).

Male, *major form*. Reflexed portion of anterior edge of clypeus weakly sinuate (Fig. 2R); frontal carina absent, inpunctate on this spot; carina of vertex with large lamella with 1st sides basally parallel, apically with a sharply pointed horn being almost rectangular erect and straight (lateral view) (Fig. 2AH); Pronotum on anterior declivity smooth, medially with a deep impression, marginal line of basis narrower or interrupted beside posterior angles (Fig. 2AI).

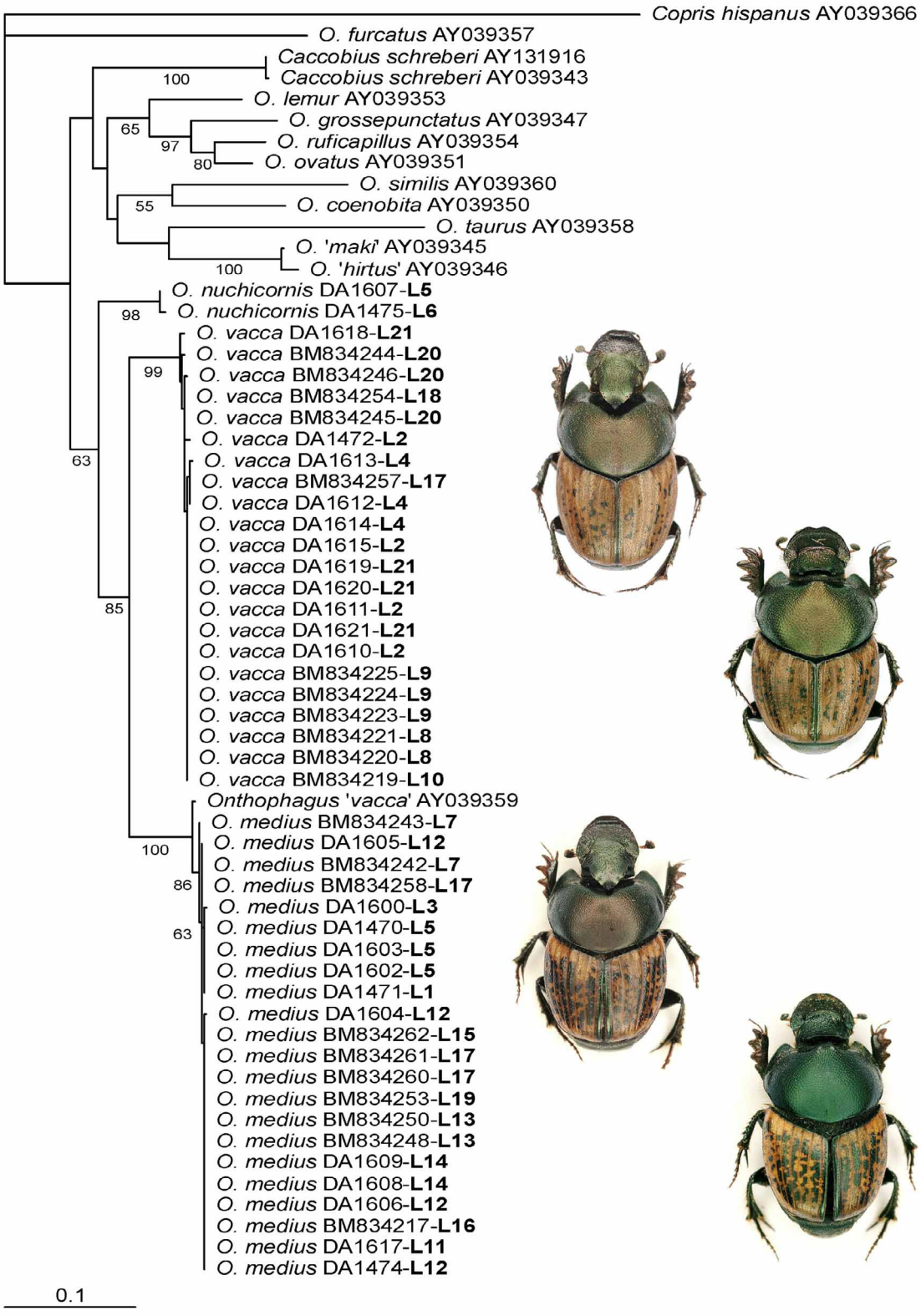

FIGURE 1. Maximum Likelihood tree with bootstrap values over 50% shown above the branches that resulted from the analysis of the mitochondrial DNA sequences. Collecting sites: Bulgaria: L1—Sakar Mts: Topolovgrad, L2—Strandza Mts.: Zvezdec, L3—Bakadzicite: Vojnika, L4—Sinemorec (8 km S Ahtopol); Germany: L5—Klein Schmölen, L6—Mecklenburg: Sternberg; Italy: L7—Torino (Ipla), L8—Sardinia: Rio Antas: Flumini-magg.-Tempio di Antas, L9—St. Antíoco, Tonnara, L10—Cala Gonone, L11—Monte Lupone, L12—Rocca Massima, L13—Lago Sefro, L14—Piane della Regna, L15—Colle dell'Orso, L16—Campodimele env., L17—Pantano della Zottola, Iserina; Spain: L18—Higuera de la Sierra, L19—Avila to El Barraco, L20—Guadix, L21—Extremadura: 1 km E Jarandilla.

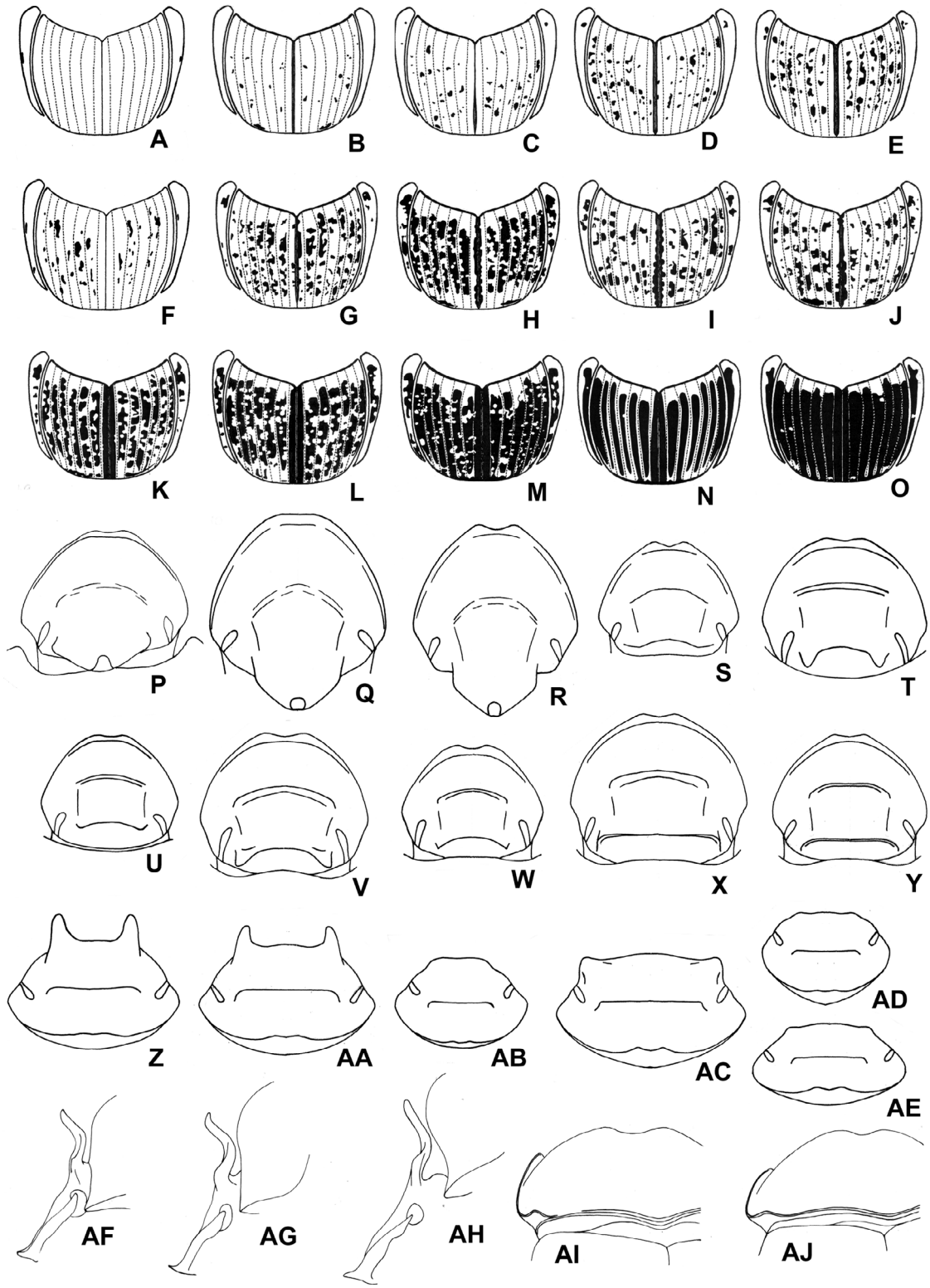

FIGURE 2. Morphological variation of *O. vacca* (**A–H, R, S–W, Z, AA, AB, AD, AH, AI**) and *O. medius* (**I–Q, S, X, Y, AC, AE–AG, AJ**) in colour of elytra (**A–O**), morphology of head (major form: **Q, R, V, X, AA, AC**; minor form: **S, W, Y, AD, AE**; male: **P–S**; female, dorsal view: **T–Y**; female, anterior view: **Z-AE**; male, lateral view: **AF–AH**) and basal portion of pronotum (**AI, AJ**). **A, U, AB**: Paralectotype (*O. vacca*); **B**: Russia: Alexandrofska, male; **C**: Bulgaria: Sveti Vlas, female; **D**: Bulgaria: Sveti Vlas, male; **E**: Russia: Teberda, male; **F, T, Z**: Lectotype (*O. vacca*); **G**: Greece: Olympias, male; **H**: France: Corsica, Ajaccio, male; **I**: Croatia, Istrien, Rabac, female; **J**: Ukraine: Falzfeinowo, male; **K**: Germany: Mecklenburg, Klein Schmölen, female; **L, P, AF, AJ:** Neotype (*Copris media*); **M:** Mecklenburg, Klein Schmölen, male; **N**: Germany: Sachsen-Anhalt, Wormsleben, male; **O:** Germany: Sachsen-Anhalt, Wormsleben, female.

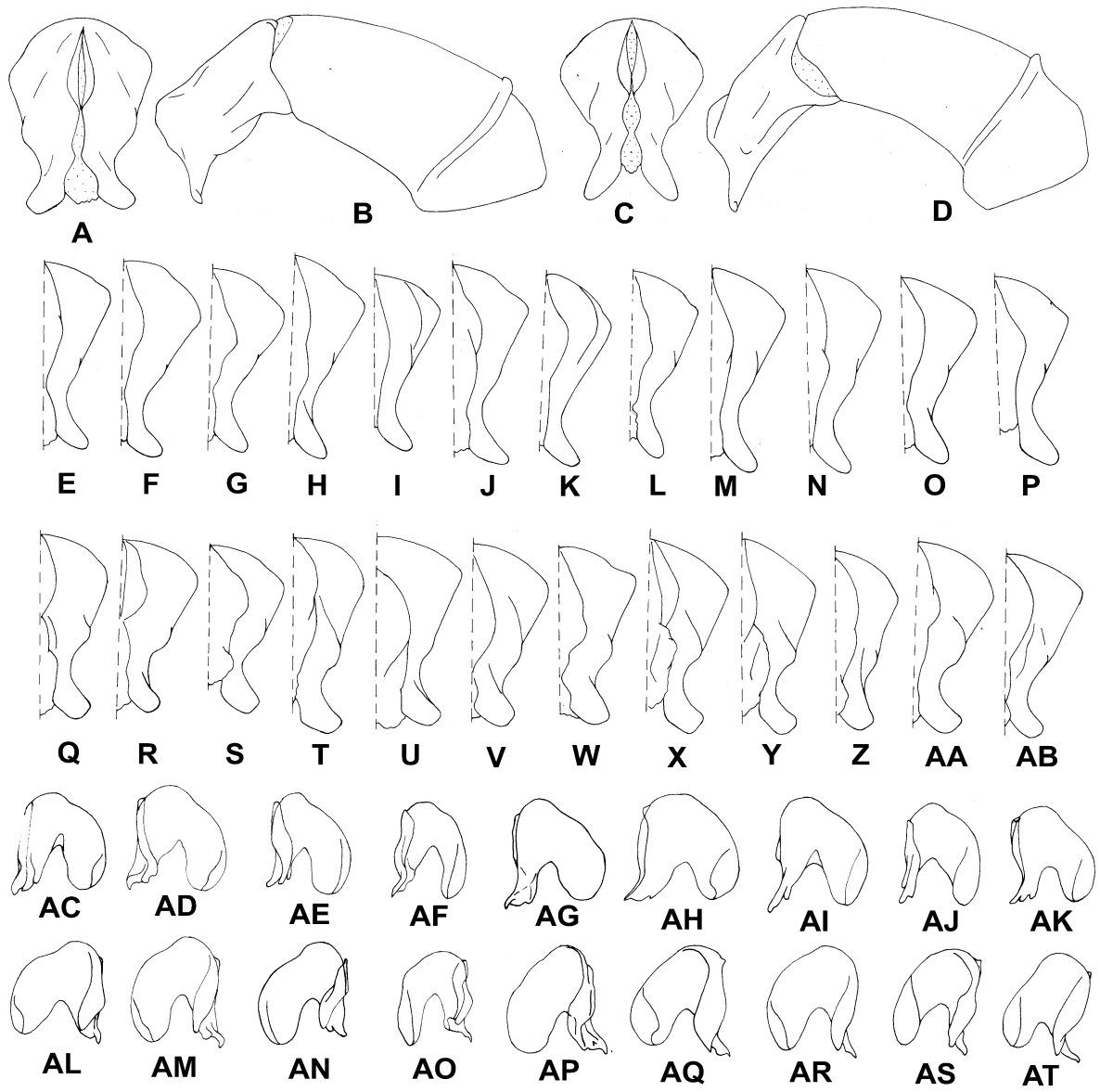

FIGURE 3. Varation of genital morphology of *O. vacca* **(C–P, AC–AF, AL–AO)** and *O. medius* **(A, B, Q–AB, AG–AK, AP–AT)** showing: parameres both **(A, C)** and right **(E–AB)** in dorsal view; aedeagus (lateral view: **B, D**), lamella copulatrix (**AC–AK**, dorsal view, **AL–AT**, ventral view). **A, B, AG, AP:** Neotype (*Copris media*); **C, D:** Hungary, Ujpest; **E:** Morocco: Tanger; **F**: Spain: Morella, Castellón de la Plana; **G:** France: Dep. Loire, Atlantique; **H:** Italy: Calabria, Cimina; **I**: Italy: Sardinia, Foresta di Monturba; **J:** Italy: Sicily, Messina; **K:** Romania: Candesti; **L:** Bulgaria: Sinemorec; **M:** Greece: Macedonia, Nomós Kastoriá; **N:** Russia: Rjetschilza a. Dnepr; **O:** Georgia: Abchasia, Avadchara; **P:** Russia: NW-Caucasus, Teberda; **Q:** France: Provice, S-et Mer; **R:** Switzerland: Martigny; **S:** Germany: Mecklenburg, Klein Schmölen; **T:** Slowakia: Zadiel; **U:** Hungary: Tihany, Plattensee; **V:** Italy: Apulia, Mte. Gargano; **W:** Italy: Abruzzo, Piane; **X:** Italy: Sicily, Messina; **Y:** Croatia: Istria, Rovin; **Z:** Bosnia-Herzegovina: Korična; **AA:** Greece: Ossa Oros, Stomia; **AB:** Russia: Caucasus; **AC, AL:** Greece: Peloponnesos, Stoupa; **AD, AJ, AM, AS**: Bulgaria: Sveti Vlas; **AE, AN:** Russia: Teberda; **AF, AO:** Greece: Peloponnesos, Kalavrita; **AH, AQ:** Germany: Steckweiler; **AI, AR:** France: St. Remy les Chevreuses; **AK, AT:** Turkey: Angora.

Male, *minor form*. Anterior edge of clypeus weakly sinuate (see Fig. 2S); frontal carina weakly indicated to slightly elevate, curved; carina of vertex with a small lamella slightly elevated at middle; pronotum anteriorly with rugose punctures, medially with a pair of small, smooth convexities, marginal line of base beside posterior angles complete.

TABLE 2. Synonymy and evidence for taxonomic assignments in the *Onthophagus* (*Palaeonthopagus*) *vacca* complex.

Name	Type locality	Synonymy	Evidence of taxonomic placement
Scarabaeus vacca Linnaeus, 1767	"Gallia australi" [= South France]	valid name	"Gallia australi" is cited first and being therefore indicator for choice of the lectotype; Linnaeus described a typical female: 'head…with two short, erect and slightly separate horns'.
Copris conspurcatus Fourcroy, 1785	Derived from title of the work: Environment of Paris [France]	*O. vacca* (female)	'Head posteriorly with two horns; elytra red and black spotted'.
Copris medius Kugelann, 1792	Derived from title of the work: Prussia	valid name	'Pronotum blackish; elytra more black spotted'.
Scarabaeus medius Panzer, 1796	Derived from title of the work: Germany	*O. medius*	The figure shows a female of *O. medius*: vertex bears two short blunt horns; elytra with dense spots orientated in rows.
Pilularius aeruginosus Schrank, 1798	Derived from title of the work: „Baiern“ [= Bavaria (Germany)]	*O. vacca*	Contains no clear diagnostic features, only 'carina of vertex with three teeth of which the middle one is the shortest'.
Copris affinis Sturm, 1800	“Michaelsberg bei Herspruck” [probably in Bavaria (Germany)]	*O. medius*	'Clypeus weakly sinuated, elytra with unordered contiguous black spots; vertex of female with a narrow transverse erect lamella'.
Onthophagus vacca var. *vicinus* Mulsant, 1842	Derived from title of the work: France	? *O. medius* (male, *minor form*)	Compared with *O. affinis* (Sturm), 'carina of vertex subtriangular, weakly developed… without extension into a horn'.
Onthophagus vacca var. *difficilis* Mulsant, 1842	Derived from title of the work: France	*O. vacca* (*minor form*)	'Male: carina of vertex reduced, arc-shaped; female: vertex with transverse carina which bears on each side a small horn or tooth'.
Onthophagus vacca var. *intermedius* Mulsant, 1842	Derived from title of the work: France	? *O.medius* (female, *minor form*)	The species was compared with *O. medius*: 'carina of vertex is similar to frontal carina'.
Onthophagus vacca var. *propinquus* Mulsant, 1842	Derived from title of the work: France	*O. medius* (female, *minor form*)	'Carina of vertex without teeth and straight'.
Onthophagus vacca var. *similis* Mulsant, 1842	Derived from title of the work: France	*O. vacca* (female, *minor form*)	'Carina of vertex reduced, arc-shaped'.
Onthophagus vacca var. *sublineolatus* Mulsant, 1842	Derived from title of the work: France	*O. medius*	'Spots of elytra shaped into stripes'.
Onthophagus vacca var. *basalis* Mulsant, 1842	Derived from title of the work: France	? *O. medius*	'Elytra brown or greenish-brown, spots reddish-yellow, as the base'.
Onthophagus tricornis Fischer von Waldheim, 1844	"Rossia meridionali" [= Southern Russia]	*O. vacca*	'Pronotum golden to cupreous; elytra blackish spotted; female having an elevated carina on vertex being elevated and slightly pointed on each side'.
Onthophagus antilope Motschulsky, 1845	"an der Grenze zu Persien"	*O. vacca* (female)	Diagnosis insufficient: 'Is larger than the previous [*O. tricornis*] and has on the head two lateral horns' (= female).
Onthophagus confluens Gistel, 1857	Germany	*O. medius*	'Blackish-cupreous; elytra dark yellowish-red, spots confluent'.
Onthophagus vacca Var. *lusitanicus* Seabra, 1907	Bussaco [= Buçaco, Portugal]	*O. vacca*	'Pronotum dark green; elytra yellow, with small black spots'.

Female, *major form*. Anterior edge of clypeus weakly or distinctly sinuate; frontal carina distinct, elevate, weakly curved; carina of vertex low and as wide as interior interocular width, each end elevated and with a

pointed horn (Fig. 2V, 2AA); pronotum at anterior marginal declivity widely smooth and only sparsely punctate, medially with a slightly anteriorly produced and medially slightly incised convexity, beside it on each side with a weak convexity, marginal line of base narrower or interrupted beside posterior angles (Fig. 2AI).

Female, *minor form*. Anterior edge of clypeus sinuate; frontal carina short and weakly elevate; carina of vertex low and narrow, ends without teeth (Fig. 2W, 2AD); pronotum anteriorly with rugose punctures, medially with a slightly transeverse smooth convexity, basal marginal line complete.

Remarks. Interestingly, Krell (1996) did not report a second type specimen. The lectotype had no labels from Krell. According to Krell (personal communication, 2010) labels might have been lost recently during the digitisation project of the Linnean collection. Therefore we placed new lectotype and paralectotype labels on the type specimens. Both the Linnaean lectotype and paralectotype were conspecific with the form more common in southern France, which is consistent with the first named citations of southern France. Since *O. vacca* does not occur in 'Prussia' (= "Borussia" in Linnaeus, 1767; Borussia was the name of a region somewhere in what was later known as Prussia, and that in late 18th century Prussia occupied what is now northern Germany and northern Poland), we can definitely assume here the type locality to be southern France, although type specimen labels had no locality information.

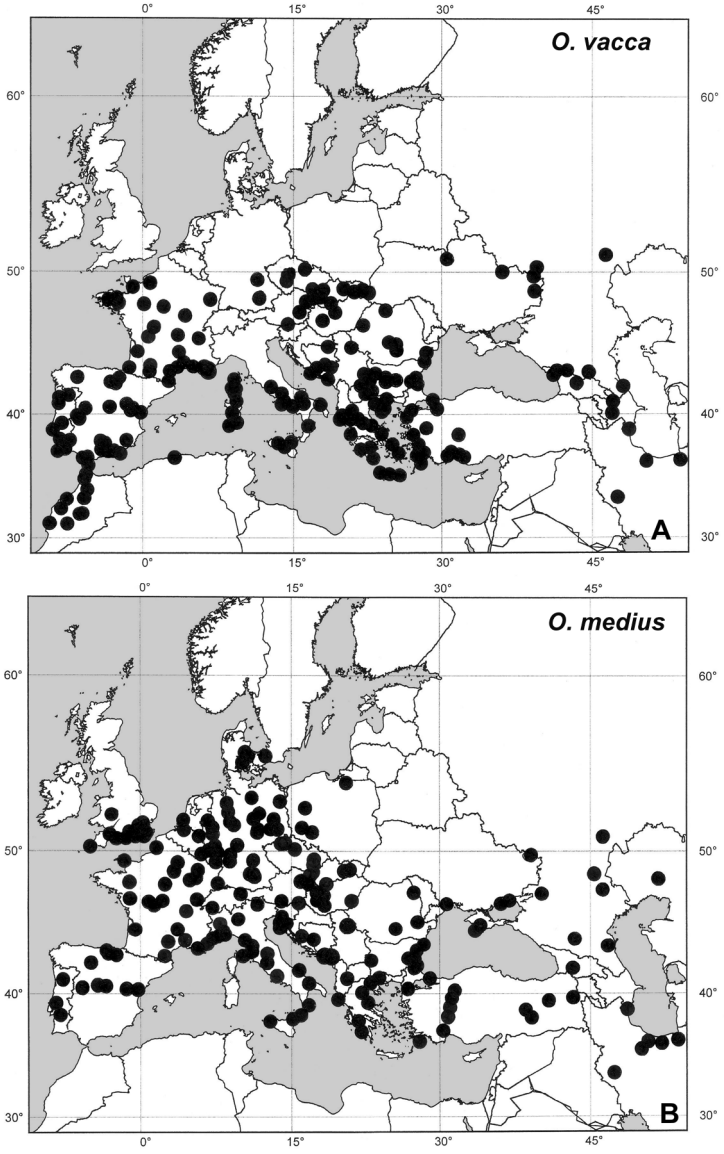

FIGURE 4. Distribution of *Onthophagus vacca* (A) and *O. medius* (B) as recorded from our data.

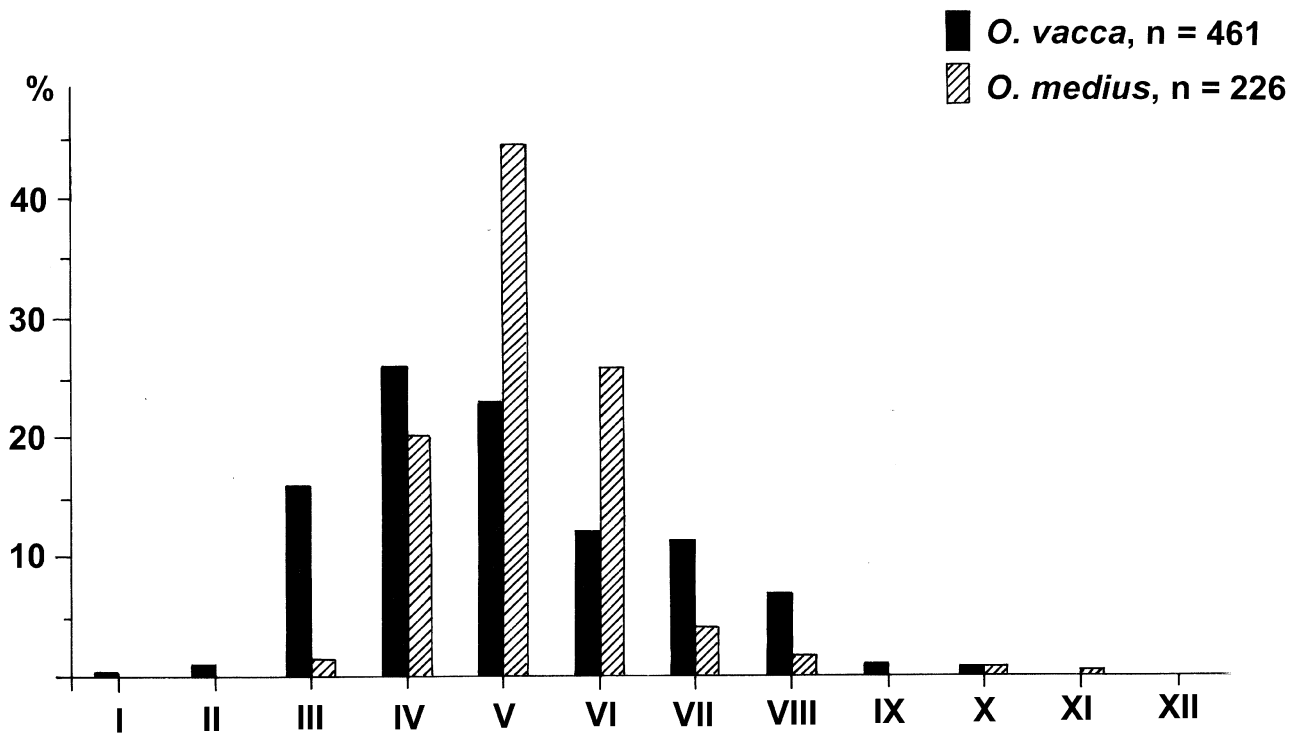

FIGURE 5. Phenology of *O. vacca* and *O. medius*, n = number of records.

***Onthophagus* (*Palaeonthophagus*) *medius* (Kugelann, 1792) (revised status)**

Copris medius Kugelann, 1792: 271 (Type locality: "Preußen").
Scarabaeus medius Panzer, 1796: 1 (Type locality: Germany).
Copris affinis Sturm, 1800: 102 (Type locality: "Michaelsberg bei Herspruck" [probably Bavaria]).
Onthophagus vacca var. *vicinus* Mulsant, 1842: 133 (Type locality: France).
Onthophagus vacca var. *intermedius* Mulsant, 1842: 134 (Type locality: France).
Onthophagus vacca var. *propinquus* Mulsant, 1842: 134 (Type locality: France).
Onthophagus vacca var. *sublineolatus* Mulsant, 1842: 134 (Type locality: France).
Onthophagus vacca var. *basalis* Mulsant, 1842: 134 (Type locality: France).
Onthophagus confluens Gistel, 1857: 61 (Type locality: Germany).

Type material examined: Neotype (*Copris medius*, **here designated**) [Figs. 2L, 2P, 2AF, 2AJ, 3A, 3B, 3AG, 3AP]: "Lyck, Ostpreussen [black handwritten] B.v.Bodemeyer [black printed on white paper] | Onthophagus vacca v. medius [black handwritten on white paper] | Neotypus Copris media Kugelann, 1792, E. Rößner, 2008 [black handwritten on red paper] | Onthophagus (Palaeonthophagus) medius (Kugelann, 1792), det. E. Rößner, 2008 [black handwritten on white paper]" (♂, ZMHB) [specimen glued on carton, genital extracted]. **Denmark**: "Helnæs, Bobakker 8.v.1999 | DK.F.NG61, P. Jörum leg." (2 ♀♀, CPJ).- "Rösnæs (Rösnæsgd.) 11.vi.2005 | DK.NWZ.PG17, P. Jörum leg." (1 ♂, 1 ♀, CPJ).- "Mögelskår 19.v.2004 | DK.EJ.NH90, P. Jörum leg." (2 ♀♀, CPJ).- "Kopenhagen | coll. Leonhard" (2 ♂♂, 2 ♀♀, DEI). **Netherlands:** "Wateringen, 4.V.1954, R. Bouwer" (1 ♂, CJS).- "Opheusten, 20.VI.1957, R. Bouwer" (1 ♀, CJS).- "Maastricht, 5.1921, [leg.] Rüschkamp, Sammlung F. Rüschkamp. Eing. Nr. 1.1964" (2 ♀♀, ZMFK). **Luxemburg:** "Luxemburg, Differdingen, 4.[19]15, P. Heymes" (1 ♀, coll. Heymes, NME).- "Luxembourg: Remich, Erpel D'Ange, Chatea Dames 29.viii.1998, ex horse dung, coll. M.V.L. Barclay" (4 ♂♂, 11 ♀♀, NHML).- "Grevenmacher, Manternach, 02.06.2001, leg. Dirk Rohwedder" (1 ♂, CDR).- "Grevenmacher, East-Gonderange, Schafkot, 03.06.2001, leg. Dirk Rohwedder" (1 ♀, CDR).- "Gonderange, 01.06.2001, leg. K. Hadulla" (1 ♀, CKHa). **Belgium:** "Belgium" (1 ♂, 1 ♀, coll. Fry, NHML).- "Antwerpen 29.5.1898." (1 ♂, NMP). **Germany:**

"Mecklenbg.: Klein Schmölen, Pferdeweide an der Löcknitz, 2833/IV, 01.V.2005, Pferdekot, leg. E. Rößner" (5 ♂♂, 5 ♀♀, CER).- dto., nur: "25.IV.2006" (4 ♂♂, CER).- "Lebus/ O. 23.5.[19]72" (1 ♂, 1 ♀, ZMHB).- "Lebus, Oderbruch, DDR, 21.V.1982, leg. U. Heinig" (1 ♀, CER).- "Oderhänge bei Lebus, DDR, 28.V.1988, leg. Schröder" (1 ♂, 1 ♀, CER).- "Teichhorn, Volksen [bei Einbeck], 5.6.[19]55, Kuhmist, Priefert & Helmke lg." (1 ♂, ZMHB).- "Bottendorf [wahrscheinlich: bei Obernholz], 23.6.[19]55, Lohse" (1 ♀, ZMHB).- "Baden b. Bremen 13.5.[19]51, 53, Kerstens" (1 ♂, CAB).- "Bremen, Baden 11/6 1950, J. D. Schroeder" (1 ♂, CAB).- "Badener Berge. 8.IV.[18]94. Achim. Hannover, coll. Künnemann" (1 ♂, DEI).- dto., nur "24.IV.98" (1 ♀, DEI).- "Lindhorst, Kr. Stadth. Hannover, IV.1951, leg. E. Gersdorf" (1 ♀, CJS).- "Geestgottberg, ST Altmark, Elbedeich b. Brücke, Schafkot 17.05.2006 [leg.] Malchau" (1 ♂, 2 ♀♀, CWM).- "Germania sept., Gatersleben (Quedlinburg), 22.6.1952. 127. [leg.] Dorn" (3 ♂♂, 3 ♀♀, ZMHB).- "Dornburg [bei Zerbst], JL, ST, Gommern, Weide östl. Ortsrand, 24.05.2007, Malchau" (1 ♂, 3 ♀♀, CWM).- "Neugattersleben, ST, BBG, Bodegrünland bei A 14, Pferd Schaf, 16.05.2007, Malchau" (1 ♂, 2 ♀♀, CWM).- "Breitenhagen: Sommerdeiche, 18.IV.2005, leg. E. Rößner" (2 ♂♂, 2 ♀♀, CER).- "Sachsen-Anhalt: NSG Lämmerberg und Vockenwinkel bei Wormsleben, 4435/IV, 29.V.1998, leg. E. Rößner" (2 ♂♂, 4 ♀♀, coll. CER; 3 ♂♂, CHKa).- "Sachsen-Anhalt: Wormsleben, 4435/IV, 26.V.1999" (2 ♂♂, 1 ♀, CER).- "Sachsen-Anhalt, Dabrun bei Wittenberg, 4142/3, Rinderkot, 18.05.2002 Bäse leg." (1 ♂, 1 ♀, CWB).- "Sachsen-Anhalt 4244/2, Premsendorf bei Jessen, an Pferdekot, 16.05.2005 K. Bäse leg." (1 ♂, 1 ♀, CWB).- "Beesenlaublingen, ST, BBG, A 14 Brücke, Saaledeich, 03.05.2007, Malchau" (1 ♀, CWM).- "Thuringia MTB 4531/4, Numburg-West, Kelbra, 20.V.[20]05, Salzwiese, Sw B, leg. H. Sparmberg" (1 ♀, CHS).- "Thuringia MTB 4531/4 Kelbra, Numburg, West, 27.IV.2007 Hf leg. H. Sparmberg" (2 ♀♀, CHS).- "Thuringia, 17.V.2002, 4832/III, Haßleben, Rinderweide, trocken, Fangart: Hf, leg. H. Sparmberg" (1 ♀, CHS).- "Kyffhäuser Schlachteberg 21.04.1989, R. Peschel" (1 ♀, CRP).- "Bad Frankenhausen, A.06.1983, leg. E. Rößner" (1 ♀, CER).- "BRD/ Thür./ Kyffhäuser, Udersleben 250 NN, U. Hämling, 28.4.1994, leg. U. Schaffrath" (1 ♂, 1 ♀, CUS).- "Thuringia MTB 4632/IV, Esperstedter Ried, Hf, 17.VI.[20]05, Gebiet A, leg. H. Sparmberg" (1 ♂, 1 ♀, CHS).- "Rastenberg: Kapellenberg, 4834/II, HF, 08.VI.2008, leg. H. Sparmberg" (3 ♂♂, CHS).- "Nöda: Rinderweide, Feuchtwiese, 4932/I, HF, 14.VI.2008, leg. H. Sparmberg" (1 ♂, CHS).- "Meining[en]. (Heyd.)" (2 ♂♂, 1 ♀, coll. Heyden, DEI).- "Saxonia Provincia, Eilenburg, Hainichen Nord, 13.4.1953.32, [leg.] Dorn" (2 ♂♂, 2 ♀♀, ZMHB).- "14.5.[19]56, Naunhof [Großenhain], [leg.] Hieke" (1 ♂, ZMHB).- "Meißen, Zadel, 24.6.[19]70" (1 ♀, ZMHB).- "D: Saxonia cent., Köllitzsch/Elbe 29.V.2001 Grünland, Projekt Uni Jena BF" (1 ♂, 1 ♀, NME).- "Düben Kirsch" (1 ♀, SMTD).- "Wehlen Märkel" (1 ♀, SMTD).- "Grunaer Wald, Düb. Heide 3.5.[19]53, L. Dieckmann, Pferdemist" (2 ♂♂, 2 ♀♀, DEI).- "D, Umg. Schlüchtern, Elm, in Kuhdung, 500 NN, 11.6.1989, leg. Schaffrath" (1 ♀, CUS).- "Lampertheim/ Rhein, S-Hessen D., 1.5.1999, leg. G. Müller" (1 ♀, CUS).- "Darmstadt 29.4.-30.7.1949 E. Möhn leg." (1 ♀, SMNS).- "Hofgeismar, Hess.-Nass. 4.V.[19]30" (3 ♂♂, 1 ♀, SMNS).- "Wiesbaden. | Collektion Kirschbaum" (1 ♀, NSMW).- "Frankft. Hyd." (4 ♂♂, 2 ♀♀, coll. Heyden, DEI).- "Rheinprovinz, Rees, 11.-13.6.[19]35, K. Ermisch." (2 ♂♂, ZMHB).- "D., R.-Pf., UG Mainz, Nackenheim, in Pferdeäpfeln, 100 NN, 22.-24.4.1990, leg. U. Schaffrath" (1 ♀, CUS).- "D. Rheintal, Bacharach, Steeg Weinberge, F. Köhler 22.05.1996" (1 ♂, ZMHB).- "D, RP, Nahe-Glan-Gebiet, Steckweiler, Solzenberg 280 m 24.04.2001, leg. F. Köhler" (5 ♂♂, 2 ♀♀, CHB).- "Rheinland-Pfalz: Steckweiler (im Alsenztal), NSG Stolzenberg, 24.IV.2001, leg. Frank Köhler" (26 ♂♂, 10 ♀♀, CER).- "D – RP-LS, Mosel, Kobern, Bellbach-Tal 100 m, 09.05.2002, leg. J. Beller" (1 ♀, CHB).- "Ger., 28.V.1978, Rh.-Pf./ Mosel, Trier, Petrisberg. Scheuern leg." (1 ♂, CJS).- "D – Rheinl.-Pfalz/ Südpfalz, Schweighofen (SÜW) beim Bahnhof, 24.V.2006, leg. L. Schmidt" (2 ♂♂, 4 ♀♀, CLS).- "D/ BW/ Breisach Oberbergen, Schelinger Weide, Kaiserstuhl, 4.6.2000, leg.: Willers" (1 ♂, ZMHB).- "Kaiserstuhl, Schelingen, 04.06.2000, K. Renner" (1 ♂, CKR).- "Rheinland/Pfalz, Schweighofen, Schafdung in Falle, 19.05.2007, leg. Dirk Rohwedder" (2 ♂♂, CDR).- "Düsseldorf, L, 5.6.1962" (1♂, coll. Koch, ZMFK).- "Düsseldorf, Z, 17.6.1964" (1 ♂, coll. Koch, ZMFK).- "Worring[er]. Bruch, [leg.] H. Appel 18.5.1957, ex Coll. Appel" (1 ♂, 1 ♀, coll. CAG Wuppertal, ZMFK).- "Rh. Ufer b. Köln, [leg.] Appel 2.5.1965, ex Coll. Appel" (1 ♀, coll. CAG Wuppertal, ZMFK).- "Bienwald, Kuhweide 500 m N Kapweyer, 49°2’4" N 8°1’20" E, 24.05.2008, leg. J. Schönfeld" (1 ♂, 1 ♀, CJS).- "Bienwald, Pferdeweide 1 km E Büschelberg, W der B 9, 49°1’17" N 8°11’7" E, 22.05.2008, leg. J. Schönfeld" (1 ♀, CJS).- "Bienwald, Kuhweide 500 m W Neulauterburg, nahe der Lauter, 48°58’42" N

8°10’8" E, 23.05.2008, leg. J. Schönfeld" (1 ♀, CJS).- "Kaiserswerth, Rheinufer (südl.), 14.5.1919, Kirsch l." (4 ♂♂, coll. ARK, ZMFK).- "Düsseldorf, 29.5.1928, [leg.] C. Henseler" (1 ♂, coll. ARK, ZMFK).- "Elberfeld, [leg.] Geilenk[euser]." (3 ♂♂, coll. ARK, ZMFK).- "Niederrhein, Rees, [leg.] Horion, K., 6.1935" (1 ♂, 1 ♀, coll. ARK, ZMFK).- "Rees, Nrh., Juni 1935, [leg.] P. Müller, Sammlung M. Schmaus, Eing.Nr. 2, 1979" (1 ♂, coll. ARK, ZMFK).- "Acker, Bonn, 9.5.1927, [leg.] Rüschkamp" (1 ♀, coll. ARK, ZMFK).- "Stobeln, 7.5.1928, [leg.] C. Henseler" (1 ♀, coll. ARK, ZMFK).- "Kastellaun, 28.6.1949, [leg.] M. Schmaus" (1 ♀, coll. ARK, ZMFK).- "Hessen, Wetterau, 4.1935, [leg.] Schoop 09" (1 ♂, ZMFK).- "Schelingen/Kaiserstuhl, Rheinaue, 28.4.[19]96 leg. Esser" (1 ♀, CAB).- "Bavaria, Erlangen" (2 ♂♂, 3 ♀♀, ZMHB).- "Ingolst[adt]. 22.5.[19]02" (1 ♀, SMTD).- "München, Coll. Kraatz" (1 ♂, 1 ♀, DEI).- "Monachium [= München], var. medius Panz." (1 ♂, ZSM).- "Monachium, var. affinis Sturm." (1 ♂, ZSM).- "Straubing 8.[19]11" (1 ♂, ZSM).- "Geisenfeld 21.V.[19]36 | Sammlung O. Bühlmann" (1 ♂, ZSM).- "Schleissheim 7.6.[19]04 | München H. Kulzer" (1 ♂, 1 ♀, ZSM).- "Hartmannshf. [= Hartmannshof], 19.6.[19]06 | München H. Kulzer" (1 ♂, 1 ♀, ZSM).- "München Umg., Obb." (1 ♂, ZSM). **Poland:** "Posen [= Poznań], [leg.] Paulisch" (1♂, ZMHB).- "Ohlau [= Oława] | Coll. Letzner" (1 ♂, DEI).- "Ost-Pr[eußen]." (1 ♀, ZMHB).- "Silesia Kirsch" (1 ♂, SMTD). **Austria:** "Neusiedlersee, 16.6.1936, Burgenland, J. Wirthumer" (1 ♂, 1 ♀, NMP).- "Österreich Wien | ex coll. Dr. Kallert Hamburg" (2 ♂♂, NMP).- "Präwald [Oberösterreich, südwestlich Windischgarsten], Kr, 26.6.[19]08" (1 ♀, ZMHB).- "Burgenland, Neusiedl" (1 ♂, 2 ♀♀, ZMHB).- "Neusiedler See, 25.5.1975" (1 ♂, ZMFK).- "Umg. Wien, [leg.] Ad. Hoffmann, ex Coll. Missionshaus SVD Steyl, Eing. Nr. 3/59" (4 ♀♀, ZMFK).- "Neusiedler See u. Umg. A 6 [19]63 leg. Witzgall" (1 ♀, CRP).- "Neusiedl. See u. Ug., Austria, Dr. Lechner" (1 ♂, CAB).- "12.7.[19]73 Burgenland, Parndorf/Hutweide" (1 ♀, CAB).- "A. NSS Apetlon 6.5.1986 leg. Hirgstetter" (1 ♀, CRP).- "4.4.[19]74 Nähe Apetlon, Austria, Neusiedler See, Fery leg." (2 ♂♂, 1 ♀, CHF).- "15.5.[19]76, Pamhagen (Austria), Neusiedler See, Pferdekot, Fery leg." (1 ♂, CHF).- "Hungaria, Leitha-Geb., F. Blühweiss" (2 ♀♀, ZMHB).- "Illmitz Brgld. 11.5.[19]66 Folwaczny" (5 ♂♂, 1 ♀, SMNS).- "Neusdl. See 25.5.1975" (2 ♀♀, SMNS).- "Aust. | 26960" (4 ♂♂, 2 ♀♀, ZMHB).- "Austria-Burgld., leg. Hebauer | Neusiedl. See, 25.5.1975" (3 ♀♀, CJS).- "A.i. Leitha-Geb., Ad. Hoffmann" (1 ♀, SMTD).- "2.VI.1928. Umgebung Apetlon am Neusiedler See" (1 ♀, SMTD).- "Neusiedler See, leg. R. Zimmermann 1941, Schmidt" (3 ♂♂, 2 ♀♀, SMTD).- dto., nur "Juli 49" (1 ♀, SMTD).- "Bündten, coll. Stierlin" (1 ♂, DEI).- "Villach" (1 ♂, ZSM).- "Neusiedler See, leg. Zimmermann 1941, [coll. H.] Schmidt" (1 ♀, ZSM).- "Austria Bgld. Parndorf, Hüdepohl 5.[19]69" (1 ♀, ZSM).- "Neusiedler See, V.1953, [leg.] Dr. H. Lechner" (1 ♂, CLS). **Czech Republic:** "Boh., Louny/Oblik 2.5.[19]62 A. Hoffner leg." (1 ♂, 1 ♀, NMP).- "Boh., Louny env. 30.IV.[19]61 V. Balthasar leg." (4 ♂♂, 5 ♀♀, NMP).- "Závist, 21… Zeman" (1 ♂, NMP).- "Env. de Praque, Bohême centr., Coll. Obenberger" (1 ♂, NMP).- "Radotin 21.5.1927" (1 ♂, NMP).- "Bohemia, Jos. Cêrný | Pardubice 18.5.1909 | Mus. Pragensde, coll. Kracik” (1 ♀, NMP).- "Moravia-1934, Veseli n[ad]. Mor[avon]. VI. [leg.] O. Kodym" (1 ♀, NMP).- "Prossnitz [= Prostějov], [leg.] K. Kyselý” (1 ♂, NMP). **Slovakia:** "Bratislava, Petržalka, [leg.] Roland" (1 ♀, NMP).- "Slov. 3-4.[19]39, Bratislava" (1 ♀, NMP).- "Slov. mer., Stúrovo, 28.-30.7.1955, V. Balthasar leg.” (1 ♂, NMP).- "Slovakia merid., Štúrovo | Parkán | [leg.] O. Kavan, 24.4.[19]49" (2 ♂♂, 4 ♀♀, NMP).- "Slovakia 1935. Plavec[ký] Sv[ätý] Mikuláš 27.V., [leg.] O. Kodym" (1 ♂, NMP).- dto., nur "5.VI." (1 ♂, NMP).- "Slovakia merid., Kováčovské vrchy, O. Kavan| Kováčar, 27.4.[19]49" (1 ♂, 5 ♀♀, NMP).- "Slovakia merid., Kováčovské vrchy, O. Kavan | Helemba, 22.4.[19]49" (1 ♂, NMP).- "Slovakei, Pannonisches Becken, Zádiel Umg. 200 m, 01.07.1970 leg. J. Hadiel" (1 ♂, CHB).- "Zadiel 1.VII.[19]70" (1 ♂, SMNS).- "Slovakia, Štúrovo-Bet.k., 29.4.[19]54, Kr. Pospišil leg." (1 ♂, SMTD).- "Slovaquie, Košice V.[19]37 coll. Pospišil" (1 ♀, SMTD).- "Slowakei, Silicka planina 12.-22.7.1993, leg. Richter" (1 ♀, CWR). **Hungary:** "Hungarie c. or., Pécz, J. Pradáč leg." (1 ♀, NMP).- "Hungarie centr., Békéscsaba env., V.1947, lgt. Škpt Havelka” (1 ♀, NMP).- "Ujpest, Ungarn | Mus. Pragense Coll. Kracik" (1 ♂, 1 ♀, NMP).- "Hungaria, Esztergom, E. Bokor" (1 ♀, ZMHB).- "Ungarn" (1 ♂, 1 ♀, ZMHB).- "Hungaria R. Scholz. | Coll. Döttling" (1 ♀, SMNS).- "Ungarn, Izshak, 21.7.[19]93, leg. E. Heise" (1 ♂, CEH).- "Ungarn, Neusiedler See, Fertöuglak, 04.05.1999 leg. A. Skale" (1 ♀, CAS).- "Ungarn, Prov. Fejer, Umgebung Aba, Handfang 23.V.-7.VI.1997, leg. F. Bahr" (1 ♂, 1 ♀, CHB).- "Ujpest Ungarn" (1 ♂, 2 ♀♀, SMTD).- "Ungarn, Halbinsel Tihany, Plattensee 2.6.[19]63, leg. G. Jaeschke" (1 ♂, 1 ♀, DEI).- "Ungarn, Buda-hegy, E.IV.1969, leg. Fritzsche" (2 ♂♂, 4 ♀♀, SMTD).- "Hungaria, Cegled, 02.05.[20]02 leg. W. Richter" (2 ♂♂, 2 ♀♀, CWR).-

"HU Mecseknadasd, Baranya Megye 09.05.[20]03 leg. H. Müller" (1 ♂, CHM).- "Ungarn | Kollektion Dr. Fuchs" (1 ♂, CJS; 1 ♀, NSMW).- "Ungarn, A. via, K. Andreas" (1 ♂, NSMW).- "Ungarn 8.10.03" (2 ♂♂. SMTD).- "Ungarn | Coll. Leonhard" (1 ♂, 3 ♀♀, DEI).- "Dunakaesz, Hungaria, ex Coll. Missionshaus SVD Steyl, Eing. Nr. 3/59" (1 ♂, ZMFK). **Switzerland:** "Martigny | coll. Stierlin" (3 ♂♂, 2 ♀♀, DEI). **France:** "Reims" (1 ♂, 1 ♀, ZMHB).- "Bretigny s/Orge [Bretigny-sur-Orge, südlich Paris] 9/5/1963 [leg. Bause]" (10 ♂♂, 9 ♀♀, ZMHB).- "Toul, 6.[19]39" (2 ♂♂, 4 ♀♀, ZMHB).- "Frankreich, Bordeaux 4.[19]43, F. Ermisch lgt." (1 ♂, 3 ♀♀, ZMHB).- "St. Remy les Chevreuses, 11/5/[19]63" (2 ♂♂, ZMHB).- "Provins (S-et M.) 22 Avr. 1946 Crottin de Cheval" (1 ♂, SMNS).- dto., nur "11. Mai 47" (1 ♀, SMNS).- "Frankreich St. Denis 6.1974" (1 ♂, 1 ♀, SMNS).- "Avord-Cher 18.6.1941 Folwaczny" (1 ♂, SMNS).- "Gallia/ Ardeche, Vernoux/ Valence, E.V.[19]74, Messulat" (1 ♀, CJS).- "Etaples | Frankreich" (1 ♂, SMTD).- "Metz 5.1916." (1 ♂, 1 ♀, SMTD).- "Boulogne" (1 ♂, coll. Andrewes, NHML).- "Manche, M. St. Michel, 17.5.64" (1 ♀, NHML).- "S. France: (Var), La Sainte Baume. 16–28.V.1921. K. G. Blair." (3 ♂♂, 1 ♀, NHML).- "Environs de Bordeaux, de Vauloger" (1 ♂, 1 ♀, coll. Nevinson, NHML).- "Bordeaux" (1 ♂, coll Nevinson, NHML).- "Moulins" (1 ♂, coll. Nevinson, NHML).- "Nancy M." (1 ♂, coll. Andrewes, NHML).- "Gallia Merid" (1 ♂, coll. Fry, NHML).- "Gall. cent." (1 ♂, coll. Nevinson, NHML).- "France" (1 ♂, coll. Nevinson, NHML).- "Gallia" (1 ♂, coll. Fry, NHML).- "Gallia Mulst" (2 ♂♂, SMTD).- "Indre-et-Loire: Pernay, 2.v.1964, J.Rabaça legit" (2 ♀♀, CTB).- "Jura: Arc-Senans, Les Communaux, 20.v.1956 (ex coll. Pasquier)" (1 ♂, CTB).- "Jura: Les Arsures, 3.vi.1956 (ex coll. Pasquier)" (2 ♂♂, 1 ♀, CTB).- "Mayenne: Couptrain, P. Rodary legit" (1 ♀, CTB).- "Saône-et-Loire: La Selle, iv.1950, P.Rodary legit" (1 ♂, CTB).- "Grasse, A.M. ex Slg. R. Oberthür (Coll. Tondu) Eing. Nr. 4.1956" (1 ♂, 1 ♀, ZMFK).- "La Salvetat (Hérault), ex Slg. R. Oberthür (Coll. Tondu) Eing.Nr. 4.1956" (1 ♂, ZMFK).- "Lyon, ex Slg. R. Oberthür (Coll. Tondu) Eing.Nr. 4.1956" (1 ♂, ZMFK).- "Wassy, Hte Marne, ex Slg. R. Oberthür (Coll. Tondu) Eing. Nr. 4.1956" (1 ♂, ZMFK).- "Camarque, ex Slg. R. Oberthür (Coll. Tondu) Eing. Nr. 4.1956" (1 ♀, ZMFK).- "Pontavert-France 27.4.1944, [leg.] Hans Pscher" (1 ♀, NMP).- "Dpt. d'Or, Ende Mai 1898 | Riedel" (4 ♂♂, 3 ♀♀, NMP).- "Pyren. or., Dr. Balthasar" (1 ♂, NMP). **Great Britain:** "Chesil 1864 J. Gray" (1 ♂, SMTD).- "Hunts: Woodwalton Fen. 6.vi.1938 E. A. Duffy" (1 ♂, NHML).- "W Pontrilas, 29.XI.1929 C. E. T." (1 ♂, coll. C. E. Tottenham, NHML).- "Benfleet 28-iv-1930 C. E. T." (2 ♂♂, 2 ♀♀, coll. C. E. Tottenham, NHML).- "Bexhill 16.iv.1923 C. E. T." (2 ♂♂, coll. C. E. Tottenham, NHML).- dto., nur "V.1923" (2 ♀♀, coll. C. E. Tottenham, NHML).- "Chichester 9.V.1919 C. E. T." (4 ♂♂, 2 ♀♀, coll. C. E. Tottenham, NHML).- "Warth Dorset or grass 6-VI-37" (1 ♀, NHML).- "Kent: Dartford, Marshes. 19.IV.1952. J. F. Burton, Cowdung" (1 ♀, NHML).- "Somerset" (3 ♂♂, coll. Andrewes, NHML).- "Cookham" (3 ♂♂, 3 ♀♀, NHML).- "England. On Cowdung. Totton, Hants, ? Aug. 1953. SU 355127. G. R. Vardy" (1 ♀, NHML).- "England: Dorset (09), Ballard Down, SZ0280, 16.iv.2007 ex horse dung, shaded, coll. D. J. Mann, OUMNH-2007-045" (1 ♂, 1 ♀, NHML).- "Power. Hampstead. 53.7" (2 ♂♂, coll. W. A. Power, NHML).- "Power. Gravesend. 69.20" (1 ♂, coll. W. A. Power, NHML).- "Power. Barnes. 69.18" (1 ♂, NHML).- "Weymouth, April 21-1901." (2 ♂♂, 2 ♀♀, coll. Donisthorpe, NHML).- "Isle of Wight (W Brook), June 5.1899" (1 ♂, coll. Donisthorpe, NHML).- "Rodwell, N. Weymouth, April 10-1896" (1 ♀, coll. Donisthorpe, NHML).- "Chingford VI.1911" (1 ♂, coll. H. C. Dollman, NHML).- "Etching m-6.24" (1 ♂, coll. C. J. Saunders, NHML).- "Ryde" (1 ♂, 4 ♀♀, coll. D. Sharp, NHML).- "Edenbridge. June 1890" (1 ♂, coll. D. Sharp, NHML).- "Isle of Sheppey. G. C. C." (1 ♀, coll. G. C. Champion, NHML).- "London distr. G. C. C." (2 ♂♂, 3 ♀♀, coll. G. C. Champion, NHML).- "Abbey Wood. T. W." (1 ♂, coll. T. Wood, NHML).- "Padstow 1.V.1922 S. B." (1 ♂, 1 ♀, coll. C. E. Tottenham, NHML).- "Barcombe 2.4.27 flood." (1 ♂, coll. C. J. Saunders, NHML).- dto., nur "24.10.25" (1 ♂, coll. C. J. Saunders, NHML).- "Brighton 15.5.38 L. A. Cox" (3 ♂♂, 1 ♀, coll. C. J. Saunders, NHML).- "Anglia" (1 ♂, 1 ♀, coll. Fry, NHML). **Portugal:** "P, Ribatejo, UG Santarem, S. de Aire, Kuh, 500 NN, 9.5.1991, leg. U. Schaffrath" (1 ♀, CUS).- "Monforte: Herdade das Esquilas, 20.v.1997, A. Zuzarte legit" (1 ♂, CTB).- "Resende: S. Cipriano, 22.vi.1978, J. Ramalho legit" (1 ♀, CTB).- dto., nur "21.vi.1979" (5 ♂♂, 4 ♀♀, CTB). **Azores:** "Azores | Coll. Felsche, Kauf 20.1918" (2 ♀♀, SMTD). **Spain:** "29.6.[19]92 (5) Navarra, Valle de Roncal, Garde, Rinderkot, Fery leg." (1 ♂, 2 ♀♀, CHF).- "E. Navarra, Sierra de Aralar 1000 m, 23.5.[19]96 leg. Strke" (2 ♀♀, SMNS).- "E – Navarra, Sierra de Aralar, 700 m, S. Miguel de Aralar, 23.5.1996 Starke leg." (1 ♂, 1 ♀, CJS).- "Spanien, Morella, Prov. Castellon de la Plana, 1000 m, 19./20.VI.1992, leg. E. Rößner" (1 ♂, CER).- "15.6.[19]90 Espana, Prov. Teruel, S. d.

Albarricin, Orihuela del Tremedal 1500 m, Schafskot, Fery leg." (1 ♀, CHF).- "E.-Teruel, Albarracin, 15.-17.4.2004, K. Hadulla leg." (1 ♀, CKHa).- "2.4.[19]88 Espana, Prov. Madrid, Sierra des Guadarrama, Lozoya, Rinderkot, Fery leg." (1 ♂, 3 ♀♀, CHF).- "S[an]. Ildefonso" (1 ♀, SMTD).- "Lisitan. Dyrell." (3 ♂♂, 1 ♀, coll. Heyden, DEI).- "Serra de Gredos, La Serrada/ Span. VI/VII.1060, J. Vives leg." (6 ♂♂, 3 ♀♀, ZSM).- "Palencia, Pag[...]" (1 ♂, ZSM).- "Sa[ntibáñez]. de Bejar, Spain, G. C. C." (1 ♀, coll. G. C. Champion, NHML).- "Spain, Avila to El Barraco, 1400 m (30T359999 4487524) 21-22.6.2008" (3 ♂♂, ex coll. A. Pizzo, NHML). **Italy:** "4.5.1991 No. Italien, Mt. Giorgio bei Savona (700 m) leg: Ahrens" (2 ♂♂, 3 ♀♀, CDA).- "Alp. Mar. piemont., Limone, 1000–1200 m, Tetti Camila, 20-VI-1951 [leg.] G. Fagel" (1 ♀, NMP).- "Italien 29/VI 24, K: 3411" (4 ♂♂, 1 ♀, NMP).- "16.6.[19]83 Toscana, Chinsi, Schafskot, Fery leg." (1 ♀, CHF).- "Castel di Sangro, Prov. di Aquila, Paganetti" (1 ♀, ZMHB).- "6.5.[19]90 Italia, Puglia, Umg. Laterza, S Bari, Schafskot, Fery leg." (1♂, CHF).- "Dr. Feige, Roma, Monte Cavo" (2 ♀♀, ZMHB).- "20.6.[19]83 Calabria, Gambarie, Schafskot, 1000 m, Fery leg." (1 ♀, CHF).- "27.6.[19]83 Calabria, Sila, Germano 1000 m, Rinderkot, Fery leg." (1 ♀, CHF).- "Gargano, Ital./ IV.[19]75, leg. Niehuis" (1 ♂, CJS).- "Insel Elba, Monte Capanne, 9.4.[19]54, Dr. David" (1 ♀, ZMHB).- "Calabrien. Cosenza 6.6.[19]43" (1 ♀, SMNS).- "Calabria – Asprom. Cittanova (RC) 1300 m, Zomaro, 23.VIII.[19]81 leg. F. Angelini" (1 ♀, SMNS).- "Liguria, Testico 11.6.[19]62 W. Liebmann" (1 ♂, SMNS).- "Südtirol, Staben, Sonnenhang, 20.-23.5.[19]72 Rieger" (1 ♀, SMNS).- "Italien, Lazio, Colle Albani, Lariano, C. Pacione, 9.IV.1999 lg. Ahrens, Fabrizi" (10 ♂♂, 5 ♀♀, SMTD).- "Italia, Lazio, Colli Albani: Vivaro 1 km E of Nemi, 5.V.1999 leg. S. Fabrizi" (2 ♂♂, 5 ♀♀, SMTD).- "Lombardia Italia" (7 ♀♀, SMTD).- "Calabria, Antonimina 1905, Paganetti" (4 ♂♂, 2 ♀♀, DEI).- "Calabria, Aspromonte, lg. Paganetti" (1 ♂, DEI).- "San Basilio, Murgien, Paganetti" (2 ♀♀, DEI).- "Apulien, Mte. Gargano" (1 ♂, SMNS).- "Monte Gargano 14.6.1907 legit M. Hilf, Coll. O. Leonhard" (1 ♀, DEI).- "Pisa" (1 ♀, ZSM).- "Roma" (1 ♀, ZSM).- "Firenze: M. Giovi, 4.v.1968, S.Rocchi legit" (3 ♂♂, 2 ♀♀, CTB).- "Firenze: Pratolino, 2.v.1970, S. Rocchi legit" (8 ♂♂, 11 ♀♀, CTB).- "Firenze: Vallombrosa, Secchieta, 20.vi.1970, S. Rocchi legit" (1 ♀, CTB).- "Ligúria: Savona, Mte. S. Giorgio, 20.iv.1965, G.Dellacasa legit" (1 ♂, 2 ♀♀, CTB).- "Ligúria: Savona, Mte. S. Giorgio, 17.v.1965, L.Briganti legit" (2 ♂♂, 1 ♀, CTB).- "Italy, Colle dell'Orso (CB) (E450310, N4607162), 1400 m 09.06.2007" (2 ♂♂, ex coll. A. Pizzo, NHML).- "Italy, Pantano della Zottola, Iserina (E424539, N4619338), 13.06.2007" (2 ♂♂, 2 ♀♀, ex coll. A. Pizzo, NHML).- "Italy, Lazio: Monti Aurunci, Campodimele env., 824 m 41°22'30,1'' N, 13°32'26,3'' E, 31.V.2008 Ahrens & Fabrizi" (1 ♀, NHML).- "Italy, Altopiano di Monte: Lago Sefro (MC), 910 m, 43°07'44,41'' N, 12°58'01,10'' E, 01.06.2008" (4 ♂♂, ex coll. A. Pizzo, NHML).- "Italy Torino (Ipla) (N400) 23.V.2007" (2 ♂♂, ex coll. A. Pizzo, NHML).- "Sicilien, Palermo, Ex c. Dr. Studt G." (1 ♂, ZMHB).- "NO-Sizilien, Le Madonie, Piano Zucchi 1000 m, 23.5.2006, W. Ziegler" (4 ♀♀, CWZ).- "I – Sizilien, Madonie, Piano Zucci 22.5.2006, Heise leg." (2 ♂♂, 1 ♀, CEH).- "I – Sizilien, Madonie, Piano Battaglia 23.5.2006, Heise leg." (1 ♂, CEH).- "18.4.[19]84 Sicilia, Buccheri, Rinderkot, Fery leg." (1 ♂, CHF).- "25.3.[19]83 Sicilia, Collesano, 400 m, Rinderkot, Fery leg." (1 ♀, CHF).- "25.3.[19]83 Sicilia, Campofehice, 400 m, Rinderkot, Fery leg." (2 ♂♂, CHF).- "Sicilien Messina. 25.4.[19]43" (5 ♂♂, 8 ♀♀, SMNS).- "Sicilien, Messina, 25.4.[19]43, W. Liebmann" (1 ♀, DEI).- "Sicilia Italia 22.4.[19]33, W. Liebmann" (1 ♂, DEI).- "Sicilia, Randazzo, 3.5.[19]33, W. Liebmann" (11 ♂♂, 4 ♀♀, DEI).- "Sizilien" (1 ♀, SMTD).- "Sic., Palermo, Dr. Balthasar" (1 ♀, NMP). **Slovenia:** "Adelsberg [= Postojna] 13.5.[19]09" (2 ♂♂, 1 ♀, SMTD).- "Marbg. [= Maribor], [leg.] St. Dr. Krause, ex Slg. R. Oberthür (Coll. Tondu) Eing. Nr. 4.1956" (1 ♀, ZMFK). **Croatia:** "Jug., Kroatia, Istria or., Rabac, 15.–17. v. 1890 Wrase" (2 ♀♀, CER).- "No 164 Istrien, San Pietro i.S. 4.6.1911, Schumacher-Spaney S.V." (1 ♂, ZMHB).- "No. 53 Karst, Pared 450 m, Spaney 29.5.[19]11, Schumacher S.V." (1 ♂, ZMHB).- "No. 123 Karst, Divača-Corgnale 450 m, 31.5.[19]11, Spaney-Schumacher S.V." (8 ♂♂, 1 ♀, ZMHB).- "No. 26 Karst, Občina 350 m. 28.5.[19]11, Spaney-Schumacher S.V." (1 ♂, ZMHB).- "YU / Istrien, Rovin E.5.[19]79 leg. Heidenfelder" (3 ♂♂, 1 ♀, SMNS).- "Istrien, Pula Umg. 28.5.[19]74 leg. Oschütz" (1 ♂, SMNS).- "Jugosl./ Istrien, Umag, E.3.[19]78" (1 ♀, CJS).- "19.5.[19]37, Jugoslavia, Dalmatien | Crik-Veniza, in Dung | 599 leg. Pause" (1 ♂, SMTD).- "Istria Noghera" (1 ♀, SMTD).- "Meusel, Croatia | Coll. Schenkling" (1 ♂, 1 ♀, DEI).- "Croatia, coll. Künnemann" (1 ♀, DEI).- "Istria Rse Ver." (1 ♂, 1 ♀, coll. Heyden, DEI).- "Fijume [= Rijeka]" (1 ♀, ZSM).- "Istria." (2 ♂♂, ZSM).- "Kroatien, Halbinsel Istrien, Rovinj, 14.5.1980, leg. F. Bahr" (1 ♂, CLS).- "Pola, Istr., [leg.] Fr. Lang, ex Coll. Missionshaus SVD Steyl, Eing. Nr. 3/59" (1 ♂, 3 ♀♀, ZMFK).-

"Dalm., VI.[19]37, Knin, Bal.-Fr." (1 ♂, NMP).- "Dalmatia" (1 ♂, 1 ♀, NMP).- "Kroatien, Porec, 21.05.1988, leg. K. Hadulla" (2 ♂♂, 4 ♀♀, CKHa). **Bosnia-Herzegovina:** "Bosna, Korična, O. Leonhard" (1 ♂, DEI).- "Bosnia" (1 ♂, CJS). **Montenegro:** "No 451 Montenegro, Vojnik-Gebirge, Brezovi-do 1000 m, 27.6.[19]11 Schumacher S.V." (3 ♂♂, 1 ♀, ZMHB).- "Castelnuovo [= Herceg-Novi], [leg.] Hummler" (1 ♂, ZMHB).- "Dalm. Castelnuovo M. Hilf 1910, Coll. O. Leonhard" (1 ♀, DEI).- "Petrovac na Moru, Montenegro, April 1969, leg. E. Gersdorf" (1 ♀, CJS). **Serbia:** "Belgrad Serbia" (1 ♀, SMTD).- "Maglič VIII.1913, Montenegro, legit Jan Obenberger" (1 ♀, NMP).- "Sutorina, Paganetti" (1 ♀, NMP). **Macedonia:** "YU Maked., Galicica 1600 m, 20.V.1982, Krätschmer leg." (1 ♀, CJS). **Ukraine:** "Olgino b. Berdjansk, Dnjepr. Gebiet, V/VI 1937, Ukraine, leg. Nikolajew" (15 ♂♂, 15 ♀♀, ZMHB).- "Ukraine, Dnjeprop. obl., Umg. Berdjansk, leg. Nikolajew, 14.VI.1937" (1 ♀, ZMHB).- "Umg. Berdjansk, Dnjeprop. obl., 30.V.1938, leg. Gulikow" (3 ♀♀, ZMHB).- "Ukraine, 24.4.1937, Mekortj. b. Berdjansk, Dnjepropetr. Gebiet, leg. Nikolajew" (6 ♀♀, ZMHB).- "Ukraine, Kamienka, 35 m s. v. Rowenki [= Rovenki], VI.1918, A. Spaney" (1 ♂, 2 ♀♀, ZMHB).- "Süd-Russland, Falzfeinowo a. Dnieprr 12.V.–7.VI.1914, W. Ramme S.G." (5 ♂♂, 1 ♀, ZMHB).- "Ukraine, 9.6.1935, Chomutowsk. Steppe, b. Mariupol, leg. Porischenko" (1 ♂, ZMHB).- "Krim, Simferopol, 24.V.1942, Haltenorth S.G." (1 ♂, 1 ♀, ZMHB).- "Odessa" (1 ♂, SMTD).- "Crimea" (2 ♂♂, NHML).- "Sebastopol Krim 10.4.1903 [leg.] W. Pligiuski" (1 ♀, NMP). **Russia:** "Rostov na Donu, R. m." (1 ♀, NMP).- "Südrussland, Sarepta | H. Rolle Berlin | ex coll. Hopffgarten Mülverstedt." (1 ♀, NMP).- "Terskaja obl., St. Mineralni Wod., 30.IV.1928" (13 ♂♂, 1 ♀, ZMHB).- "Dongebiet, 28.V.–3.VI.1918, A. Spaney" (1 ♀, ZMHB).- "S.O. Russland, Tschernyj-Jar, Wolga, Kracht S.G." (1♂, ZMHB).- "Daghestan (Rossia), Nowyi Birjusjak, leg. Worobjew, 6.6.[19]57" (1 ♂, ZMHB).- "S.E. Russia, Volsk district. R. S. Kozlov. B. M. 1931-39" (2 ♂♂, 2 ♀♀, NHML).- "Transcaspia, Neu-Saratow" (1 ♀, NHML).- "Kaukas. Schneider" (1 ♀, SMTD).- "Caucasus, Alexandrofska, Ryssel S.V. / 18.4.[19]01" (3 ♂♂, ZMHB).- "Caucasus" (1 ♀, NHML; 1 ♂, SMNS). **Kazakhstan:** "Indersk." (2 ♂♂, 1 ♀, coll. E. Y. Western, NHML). **Romania:** "Desert. Deliblát, Banat, Holtz" (4 ♀♀, ZMHB).- "Rumänien, Donaudelta, Unirea [bei Brăila], 11.VI.1988 leg. Hornburg" (1 ♂, 3 ♀♀, COH).- "Roumanie, Comana Vlasca, A. L. Montandon" (1 ♂, DEI).- "Dobroudja. Mangalia. A. L. Montandon" (1 ♂, DEI).- "Jassy [= Iasi]" (3 ♂♂, ZSM).- "Bukarest" (1 ♂, ZSM). **Bulgaria:** "Mandra, Bulgarien, 5.5.1933, leg. Fuss" (1 ♂, NMP).- "Bulgarien, Kitschevo, N Varna 28.V.1995, leg. H. Kalz" (1 ♀, CHKa).- "BG, Sveti Vlas, 16.V.2005, leg. H. Müller" (3 ♂♂, 6 ♀♀, CHM).- "Bulgaria, Sveti Vlas, 08.05.-19.05.[20]05 leg. W. Richter" (6 ♂♂, 2 ♀♀, CWR).- "Bulgarien, Umg. Sozopol, 9.6.-20.6.1978, leg. Bringmann" (1 ♀, CER).- "SO-Bulgarien, südl. Sosopol, Umg. Kavacite, 30. Mai 1982, leg. H. Wendt" (1 ♂, ZMHB).- "SO-Bulgarien, südl. Burgas, Umg. Acheloi, 1./2.VI.1982, leg. H. Wendt" (1 ♀, ZMHB).- "Bulgarien, U. Nessebar, 4.6.[19]67, K. Ermisch leg." (1 ♀, ZMHB).- "Bulgarien, Primorsko, 12.6.[19]85, leg. Kriska" (1♂, CER).- "SO-Bulgarien: Zarewo (= Mičurin), 13.V.2002, leg. E. Rößner" (1 ♀, CER).- "SO-Bulgarien, Strandža-Gebirge: Malko Tarnovo, 14.V.2002, leg. E. Rößner" (1♂, CER).- "Sofia" (1 ♀, SMTD).- "Bulgaria, 55 km SE Burgas, Lozenec 13.V.2002, leg. L. Schmidt" (1 ♂, 1 ♀, CLS).- "Bulgaria, 35 km NW Burgas, 5 km W Ajtos, Trockenhang, 18.V.2002, leg. L. Schmidt" (1 ♂, 1 ♀, CLS).- "Bulgaria, 37 km SE Burgas, Jasna poljana, Viehweide, 17.V.2002, l. L. Schmidt" (2 ♂♂, CLS).- "Mandra, Bulgaria, 20.5.1933, Fuss leg." (1 ♂, 4 ♀♀, ZMFK). **Greece:** "Graecia, L. Salvator." (1 ♂, NMP).- "Ossa, Graecia" (1 ♂, 1 ♀, NMP).- "Greece (C. Macedonia) 258 m, Lake Kerkini env., Akitoschori N 41°16’72,5’’/E 023°10’15,3’’, 15.IV.2003 leg. O. Hillert" (1 ♂, 1 ♀, COH).- "Griechenland, Prionia Gebirge, Olymp, 1000 m, 27.VI.-17.VII.1995, leg. T. Kriska" (1 ♂, CER).- "12.4.[19]84 N.Griech. westl. Kavalla, 300 m, Schafskot, Fery leg." (1 ♀, CHF).- "13.4.[19]84 Griech., Larissa, Schafskot, Fery leg." (1 ♂, CHF).- GR, Makedonien, Nomós Kavála, 10 km N Pale á Kavála, 600 m, Macchie + Kastanienwald 20.IV.1994, leg. Schawaller" (1 ♀, SMNS).- "GR, Ossa, Oros, 500 m, Stomio, 27.5.1990, Persohn leg." (1 ♂, SMNS).- "GR – Thessalie, Stomio 5.7.2006, Heise leg." (1 ♂, CEH).- "GR; 5 km ö Kato Vermion, 1000 m, Baehr 1.5.[19]83" (2 ♀♀, CJS).- "GR Vermion Oros, Kato Vermion 1300 m, Krätschmer lg. IV.1977" (1 ♂, CJS).- "Graecia/ Thessalia, Ossa Oros/ Stomio 1000 m/ 27.V.1990, Persohn leg." (1 ♂, 1 ♀, CJS).- "GR: 10 km w. Veria. 700 m. Baehr 30.4.[19]83" (1 ♂, CJS).- "Greece/ Monodéndri, Vikou-Gebirge 03.–06.V.1993 leg. Ringel" (1 ♀, CHR).– "GR, Peloponnes, 1400 m, Exohori, Prov. Messinia, 2.7.2005, leg. W. Ziegler" (2 ♂♂, 2 ♀♀, CWZ).- "Griechenland, Peloponnesos: Araxos (30 km w Pátrai), 26.–31.V.1993, leg. E. Rößner" (1♂, CER).- "Balkan,

Corfu. Paganetti [19]03" (1 ♂, DEI).- "16.4.[19]84 Corfu, Roda, Pferdekot, Fery leg." (1 ♂, 1 ♀, CHF).- "Rhodes" (1 ♂, NMP). **Turkey:** "Europ. Türkei: Istranca-dag bei Demirköy, Paß, 700 m, Heinz leg. 2.V.1973" (1 ♀, CJS).- "Constantinopel V.1898, W. Gottwald S.V." (1 ♂, ZMHB).- "Kleinasien, Biga, 22.4.[19]16, Dr. Bauer S.G." (1 ♂, ZMHB).- "Asia minor, Biledjek, v. Bodemeyer" (1♂, ZMHB).- "Angora. Asia min., V. M. Duchon" (4 ♂♂, 2 ♀♀, ZMHB).- "Türkei (Centr.), Puturgi bei Malatya, 10.VI.1993, leg. Kriska" (1 ♂, COH).- "Turcia m., Prov. Antalya, 20 km NE Demirtas, Hochebene 1400 m, 36°31'32'' N, 32°23'26'' E, 28.V.2006, leg. A Kopetz" (2 ♀♀, CAK).- "Türkei, Anatolien, Nohutlu (90 km sö von Malatya), ca. 1700 m, 5.–9.VI.1993, leg. A. Schröder" (3 ♂♂, 3 ♀♀, CER).- "Ararat, Wagn[er]." (1 ♂, ZMHB).- "Tauria, Part. | 26959" (1 ♂, ZMHB).- "Kleinasien, Anatolien | Kollektion Dr. Fuchs" (1 ♀, CJS).- "O. Türkei 20.–26.VI.[19]75, 30–40 km ö Bingöl, leg. D. Berhauer" (1 ♀, CJS).- "Kleinasien, Anatolien | Kollektion Dr. Fuchs" (3 ♂♂, 3 ♀♀, NSMW).- "v. Bodemeyer, Klein-Asien, Eski-Chehir [= Eskişehir] | Kollektion Dr. Fuchs" (1 ♂, NSMW).- "Asia minor, Burna, v. Bodemeyer | Kollektion Dr. Fuchs" (1 ♀, NSMW).- "Asia minor, Sultan Dagh, v. Bodemeyer" (1 ♂, NMP).- "Klein-Asien, Eski-Chehir, v. Bodemeyer" (2 ♂♂, NMP).- "Eski Chehir, Coll. Purkyně." (1 ♂, NMP).- "Asia minor, Ak-Chehir, v. Bodemeyer" (1 ♂, 1 ♀, NMP).- "v. Bodemeyer, Anatolia, Asia minor" (1 ♂, NMP).- "Anatolia, Asie Mineure, Coll. Obenberger" (3 ♂♂, 3 ♀♀, NMP).- "v. Bodemeyer, Klein Asien, Bulghar Maaden" (1 ♂, 1 ♀, NMP). **Georgia:** "Borshom Caucasus, O. Schneider" (1 ♀, coll. Heyden, DEI). **Iran:** "N. Iran 2.VI.[19]77, 40 km s Sari | Elb., leg. D. Bernhauer" (1 ♂, CJS).- "Persia Astrabad [= Gorgan]" (4 ♂♂, 4 ♀♀, SMTD).- "N-Iran, Prov. Teheran, C-Elburz, Damavand Mt. Gosfand Sara, Larijan, 35° 52' N 52° 07' E, 2300 m, 29.05.2008, leg. A. Skale (11a)" (4 ♂♂, 3 ♀♀, CAS).- "Elbrus Geb., Persien, Rttr." (2 ♂♂, NMP).- "Persien, Luristan, v. Bodemeyer" (2 ♂♂, NMP). **Azerbaijan:** "Lenkoran, Dr. Martin, ex Slg. R. Oberthür (Coll. Tondu) Eing. Nr. 4.1956" (2 ♀♀, ZMFK).

Not localised: "L. Chamboy, 8.8.38" (1♂, ZMHB).- "Transcaspien | Coll. Döttling" (1 ♀, SMNS).- "Wan 22.4.12" (1 ♂, 1 ♀, ZSM).- "Kasp. Meer-Geb., Petrowsk, 1897 Korb" (1 ♂, ZSM).

Redescription. Body length: 8–13 mm, body oval, weakly convex, dull; head and pronotum black with dark green metallic sheen, rarely cupreous or intensively metallic green; elytra yellow with rows of asymmetric dark spots sometimes arranged in stripes; ventral face, pygidium and legs black with very weak metallic sheen, rarely cupreous; dorsal pilosity short and light.

Head. Antenna brown, clavus black; anterior edge of clypeus reflexed, with transverse wrinkles, head coarsely punctate to granulate between frontal carina and vertex.

Pronotum. Lateral margins behind anterior angles straight or convex, anterior angles weakly rounded, posterior angles sinuate, basis with complete and distinct marginal line (Fig. 2AJ); punctation coarse, dense, very dense and granulate beside anterior angles, on midline and beside posterior angles with narrow smooth impunctate sections.

Elytra. Yellow, base narrowly dark, sutural interval widely or completely dark with green sheen, epipleura completely light; spots black without or with only very weak green sheen, asymmetric (Fig. 2I, 2J), base always without spots, spots mostly confluent (Figs. 2K–M), sometimes condensed into symmetric stripes (Figs. 2N, 2O), or covering the intervals almost entirely (Fig. 2O); intervals chagreened, punctation even, granulate; striae shallow, weakly punctate, 7th stria weakly curved.

Pygidium. Base with marginal line, dull, punctation fine, moderately dense and simple, superficial.

Aedeagus. Figs. 3A, 3B, 3Q–AB; lamella copulatrix: 3AG–AK, 3AP–AT (see Table 1).

Remarks. We searched for the collection J. G. Kugelann (1753–1815) to find the type specimens of his *Copris medius*. According to Horn et al. (1990: 218) his beetle collection was passed to Hoffmann at Warsaw. The collection Kugelann is currently preserved at the Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw. According to information of the curator, Mrs. D. Mierzwa (personal communication, 2008), there is no specimen in the collection under either the name '*Copris* [*Onthophagus*] *medius*' or *O. vacca*. Consequently it must be assumed that the type material was lost or destroyed. For an unambiguous definition of *O. medius* and in order to differenciate between the two European species of the *O. vacca* complex, we designate here a neotype for *O. medius*. We chose for neotype a male from Poland (Lyck = Ełk).

Male, *major form*: Reflexed portion of anterior edge of clypeus bluntly truncate, rarely weakly sinuated (Fig. 2Q); frontal carina absent, impunctate on this spot; carina of vertex with large lamella with 1st sides

basally parallel, apically with a sharply pointed horn being almost rectagular erect and with s-shape arch (lateral view) (Fig. 2AF–AG); Pronotum on anterior declivity smooth, medially with a deep impression, marginal line of base beside posterior angles complete (Fig. 2AJ).

Male, *minor form*: Anterior edge of clypeus sinuate (Fig. 2S); frontal carina weakly indicated to slightly elevate, curved; carina of vertex with a small lamella being slightly elevated at middle; pronotum anteriorly with rugose punctures, medially with a pair of small, smooth convexities, marginal line of base beside posterior angles complete.

Female, *major form*: Anterior edge of clypeus weakly sinuate; frontal carina distinct, elevate, weakly curved; carina of vertex low, as wide as entire posterior edge of head, each end blunt and weakly elevated (Figs. 2X, 2AC); pronotum at anterior marginal declivity widely smooth and only sparsely punctate, medially with a slightly anteriorly produced and medially slightly incised convexity, beside it on each side with a weak convexity, marginal line of base beside posterior angles complete (Fig. 2AJ).

Female, *minor form*: Anterior edge of clypeus weakly sinuate; frontal carina short, elevate; carina of vertex wide and low, without or only with slightly indicated elevated ends (Figs. 2Y, 2AE); pronotum anteriorly with rugose punctures, medially with a slightly transeverse smooth convexity, basal marginal line complete.

Species pattern of distribution and phenology

The ranges of *O. vacca* and *O. medius* overlap, both being widely distributed in the western Palaearctic (Fig. 4). Beyond their wide sympatry, there are some significant differences: *O. vacca* is mainly concentrated in southern and south-central Europe expanding its range towards northern Africa (Morocco and Algeria). In central Europe, *O. vacca* seems to be absent north of 50° latitude (Fig. 4A). It seems to be more thermophilous than *O. medius* as it is found in the Apennine Peninsula and in south-central Europe mainly at lower altitudes, lacking completely on the Alps, while it occurs also in higher mountains in southern Europe. Many records from central Europe originate from last century and their current distribution there seems to be limited to the Pannonic plain. *Onthophagus medius* has a much wider distribution in the humid and temperate climate and occurs much further north than *O. vacca* (Fig. 4B) while it is absent from areas with Mediterranean climate including several larger and more distant Mediterranean islands such as Corsica, Sardinia, Crete, and Aegean Islands. In southern Europe it occurs exclusively in medium and higher altitudes.

This distributional and the ecological differentiation of both taxa is linked to the seasonal occurrence of the both species. *Onthophagus vacca* seem to overwinter as adults and occur quite early in the year with peak activity during April and May (Fig. 5). According to their more northern and mountainous distribution, adults of *O. medius* emerge later in the year compared to *O. vacca*. They have a generally shorter period of activity that peaks during May.

Acknowledgements

We are grateful to Silvia Fabrizi (NHML) for help with the laboratory analysis, to Norman MacLeod for helpful advice and discussions on the morphometric analysis, to Stefano Ziani (Meldola/Forli) for discussions and help with literature, to Conrad Gillet (NHML) and Astrid Pizzo (Torino) for providing additional specimens for DNA sequencing, to Zdzislawa Stebnicka (Krakow) for advice about the Kugelann collection, to Tristão Branco for the helpful comments on the manuscript, and to numerous colleagues (see abbreviations) for providing dry material from their collections for examination, in particular to Max Barclay (NHML) for his help in arranging the loan of Linnean types. DA was supported, in part, by the German Science Foundation (DFG/AH175/1-1/ 1-2).

References cited

Balthasar, V. (1963) *Monographie der Scarabaeidae und Aphodiidae der palaearktischen und orientalischen Region. Coleoptera: Lamellicornia. Bd. 2, Coprinae (Onitini, Oniticellini, Onthophagini).* Tschechoslowakische Akademie der Wissenschaften, Prague, 627 pp, Taf. I–XVI.

Baraud, J. (1985) *Coléopteres Scarabaeoidea. Faune du Nord de l'Afrique du Maroc au Sinai.* Encyclopédie Entomologique XLVI, Lechevalier, Paris, 651 pp.

Baraud, J. (1992) *Coléopteres Scarabaeoidea d'Europe.* Fauna de France 78. Fédération francaise des Sociétés de Sciences naturelles, Paris et Société linnéenne, Lyon, 856 pp.

Erichson, W.F. (1848) *Naturgeschichte der Insecten Deutschlands. Erste Abtheilung. Coleoptera. Band 3.* Nicolaische Buchhandlung, Berlin, 968 pp.

Fischer von Waldheim, G. (1844) Spicilegium entomographiae Rossicae. *Bulletin de la Societé Impérile des Naturalistes de Moscou*, 17 (1), 3–144, pls. 1–3.

Fourcroy, A.F. de (1785) *Entomologia Parisiensis; sive catalogues Insectorum quae in agro Parisiensi reperiuntur; secundum methodum Geoffroeanam in sectiones, genera et species distributus.* Pars 1. Via et Aedibus Serpentineis, Paris, vii + [1] + 231 pp.

Gistel, J. (1857) *Achthundert und zwanzig neue oder unbeschriebene wirbellose Thiere*. Schorner, Straubing, 94 pp.

Horion, A. (1958) *Faunistik der Mitteleuropäischen Käfer. Lamellicornia (Scarabaeidae – Lucanidae). Bd. VI*. A. Feyel, Überlingen-Bodensee, 287 pp.

Horn, W., Kahle, I., Friese, G. & Gaedike, R. (1990) *Collectiones entomologicae. Ein Kompendium über den Verbleib entomologischer Sammlungen der Welt bis 1960, Teil I: A bis K.* Akademie der Landwirtschaftswissenschaften der Deutschen Demokratischen Republik, Berlin, 220 pp.

Kabakov, O.N. (2006) *Plastinčatousye žuki podsemejstva Scarabaeinae (Insecta: Coleoptera: Scarabaeidae) fauny Rossii I sopredelnych stran.*Tovariščestvo naučnych izdanij KMK, Moscow, 374 pp.

Krell, F.-T. (1996) Type catalogue of some Scarabaeoidea species discribed by Linnaeus (Insecta: Coleoptera). *The Linnean*, 12, 13–20.

Kugelann, J.G. (1792) Verzeichnis der in einigen Gegenden Preussens bis jetzt entdeckten Käfer-Arten, nebst kurzen Nachrichten von denselben. *Neues Magazin für die Liebhaber der Entomologie*, 1 (3), 257–306.

Linnaeus, C. (1767) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus differentiis, synonymis, locis.* Editio duodecima, reformata. Tome I. Pars II. Laurentii Salvii, Stockholm [2] + 533–1327 + [37] pp.

Löbl, I., Krell, F.-T., Ziani, S. & Král, D. (2006) Onthophagini. *In*: Löbl, I. & Smetana, A. (eds.), *Catalogue of Palaearctic Coleoptera, Vol. 3*. Apollo Books, Stenstrup, pp. 159–176.

Martin-Piera, F. & López-Colón, J. I. (2000) *Coleoptera, Scarabaeoidea I.* Fauna Iberica, Volume 14. Museo Nacional de Ciencias Naturales, Madrid, 526 pp.

Motschulsky, V. de (1845) Remarques sur la collection de Coléoptères Russes. *Bulletin de la Societé Impériale de Naturalistes de Moscou*, 18 (1–2), 3–127.

Mulsant, E. (1842) *Histoire naturelle des Coléoptères de France. Lamellicornes*. Maison Libraire, Paris, viii + 626 pp., 3 pls.

Panzer, G.W.F. (1796) *Fauna Insectorum Germanicae initia; oder Deutschlands Insecten.* Dritter Jahrgang. [Heft 37]. Felssecker, Nuremberg, 24 pp. + 24 pls.

Schrank, F. von Paula (1798) *Fauna Boica. Durchgedachte Geschichte der in Baiern einheimischen und zahmen Thiere. Erster Band*. Stein'sche Buchhandlung, Nuremberg, xii + 720 pp.

Seabra, A.F. de (1907) *Estudos sobre os animaes uteis e nocivos á Agricultura. IV: esboco monographico sobre os Scarabaeidos de Portugal (Coprini).* Direccao Geral de Agricultura, Publicacoes do Laboratorio de Pathologia Vegetal, Lisbon, 176 pp., 7 pls.

Stebnicka, Z. (1983) Superfamilia: Scarabaeoidea Latreille, 1802. *In*: Burakowski, B., Mroczkowski, M. & Stefanska, J. (eds.), *Chrząszcze - Coleoptera. Tom 9, Scarabaeoidea, Dascilloidea, Byrrhoidea i Parnoidea.* Katalog Fauny Polski, Warsaw, pp. 7–160.

Sturm, J. (1800) *Verzeichniss meiner Insecten-Sammlung, oder Entomologisches Handbuch für Liebhaber und Sammler.* Erstes Heft. Nuremberg, xvi + 112 pp., 2 pls.

Zunino, M. (1978) L'amatura genitale negli Onthophagini: techniche di preparazione e criteri di studio (Coleoptera, Scarabaeoidea). *Bollettino della Societa entomologica Italiana*, 110, suppl. 90, 21–26.

Zunino, M. (1979) Gruppi artificiali e gruppi naturali negli *Onthophagus* (Coleoptera, Scarabaeoidea). *Bollettino del Museo di Zoologia della Universita di Torino*, 1, 1–18.