Zootaxa 5007 (1): 001–074
https://www.mapress.com/j/zt/

Monograph

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

https://doi.org/10.11646/zootaxa.5007.1.1
http://zoobank.org/urn:lsid:zoobank.org:pub:E563DE1E-BAA0-4908-9521-499CA6BC7BC0

ZOOTAXA

5007

Morphological revision of the Palaearctic species of the nominate subgenus *Meloe* Linnaeus, 1758 (Coleoptera, Meloidae), with description of ten new species

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Magnolia Press
Auckland, New Zealand

Accepted by E. Ruzzier: 18 May 2021; published: 30 Jul. 2021

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(*Zootaxa* 5007)

74 pp.; 30 cm.

30 Jul. 2021

ISBN 978-1-77688-310-3 (paperback)

ISBN 978-1-77688-311-0 (Online edition)

FIRST PUBLISHED IN 2021 BY

Magnolia Press

P.O. Box 41-383

Auckland 1041

New Zealand

e-mail: magnolia@mapress.com

https://www.mapress.com/j/zt

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

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Abstract

A morphological revision of the *Meloe* (*Meloe*) species from the Palaearctic Region, including the Transitional Chinese area is published. Groups and subgroups of species from the Palaearctic Region are defined for the first time and relationships with Afrotropical and Nearctic groups of species are discussed. Twenty-five species are considered, mostly after the examination of the types, with brief descriptions and figures of diagnostic characters. Ten species, from China and the Himalayan region, are described: *Meloe chinensis* **n. sp.**, *M. distincticornis* **n. sp.**, *M. himalayensis* **n. sp.**, *M. kashmirensis* **n. sp.**, *M. kaszabi* **n. sp.**, *M. lateantennatus* **n. sp.**, *M. orientalis* **n. sp.**, *M. poggii* **n. sp.**, *M. shapovalovi* **n. sp.**, and *M. xuhaoi* **n. sp.** Both *Meloe aegyptius* and *M. rathjensi* are referred to *M. proscarabaeus* as subspecies. Four new synonymies are pointed out: *M. sapporensis* Kôno, 1936 and *M. tenuipes* Jakowlew, 1897 = *M. proscarabaeus exaratus* Faldermann, 1832; *M. medogensis* Tan, 1981 = *M. arunachalae* Saha, 1979; *M. patellicornis* Fairmaire, 1887 = *M. lobatus* Gebler, 1832. Lectotype of *M. subcordicollis* is designated. *M. formosensis* is tentatively maintained as distinct species, with the suggestion that it could be a subspecies of *M. gracilior*. *Meloe menoko* is tentatively included

in the intraspecific variability of *M. auriculatus*, a formal synonymy will be made by other authors. *Meloe poteli* is not considered in this revision, being the type is unavailable; other species (*M. modestus, M. longipennis, M. elegantulus*), previously considered in the nominate subgenus are excluded. A key to both sexes of the species is carried out and a catalogue of localities is recorded as Appendix 1. Ecological information about phenology, elevation range, host plants, is summarized in a table, and some biogeographical remarks are proposed.

Key words: Taxonomy, new species, synonymies, keys to species, faunistics, biogeography

Introduction

The blister beetle genus *Meloe* Linnaeus, 1758 is one of the most speciose of the family Meloidae, with about 150 species, mostly in the Palaearctic Region, where are distributed all the 15 described subgenera, three of which are also spread in other biogeographic regions (see Table 1) (for taxonomic information see: Reitter, 1911; Pinto & Selander, 1970; Bologna & Pinto, 1998, 2001; Bologna, 2008, 2020). All subgenera of *Meloe* were recently elevated to the genus level by Sánchez-Vialas *et al*. (2021), but this taxonomic choice is rejected by us, as discussed in another paper in advanced preparation (Salvi *et al*., in preparation).

TABLE 1. Subgenera and species of *Meloe* until now recognized in the World.

Subgenus	Palaearctic & transitional regions	Nearctic & N Neotropical	Afrotropical
Afromeloe K. Schmidt, 1913	3	0	10
Alveomeloe Pripisnova, 1987	2	0	0
Chiromeloe Reitter, 1911	1	0	0
Desertimeloe Kaszab, 1964	2	0	0
Eurymeloe Reitter, 1911	51	1	1
Lampromeloe Reitter, 1911	2(3?)	0	0(1?)
Lasiomeloe Reitter, 1911	1	0	0
Listromeloe Reitter, 1911	1	0	0
Meloe Linnaeus, 1758	25	18	4
Meloenellus Reitter, 1911	4	0	0
Meloegonius Reitter, 1911	2	0	0
Mesomeloe Reitter, 1911	4	0	0
Micromeloe Reitter, 1911	11	0	0
Taphromeloe Reitter, 1911	2	0	0
Treiodous Dugès, 1869	1	5	0
Incertae sedis	5	0	0

Until now, several of these subgenera have been more or less deeply studied taxonomically: *Afromeloe* by Bologna & Pinto (1998); *Desertimeloe* by Kaszab (1964); *Eurymeloe* partially by Bologna (1988) and Ruiz *et al.* (2010); *Lampromeloe* by Di Giulio *et al.* (2014); *Lasiomeloe* by Bologna & Pinto (1995); *Meloe* partially by Pinto & Selander (1970) and Bologna & Pinto (1998); *Meloegonius* by Bologna (1991); *Mesomeloe* partially by Di Giulio *et al.* (2002); *Micromeloe* partially by Kaszab (1981) and Bologna *et al.* (2018); *Taphromeloe* by Bologna (1991) and Bologna & Pinto (1992); *Treiodous* by Pinto & Selander (1970) and partially by Bologna (1991).

Only the nominate and the subgenus *Treiodous* are distributed in North America, with one species of *Eurymeloe* in the Aleutian Islands, a volcanic archipelago that represents a bridge between the Palaearctic and Nearctic regions. The monophyly of *Treiodous* needs confirmation. It possibly includes only some Nearctic species (see also Sánchez-Vialas *et al.*, 2021), while others are related to *M. autumnalis* Olivier, 1797 that was recently referred again to the subgenus *Anchomeloe* Iablokoff-Khnzorian, 1983. The validity of *Anchomeloe* also needs confirmation (Salvi *et al*., in preparation). Meanwhile, the nominate subgenus is monophyletic, according to our molecular phylogenetic study (Salvi *et al.*, in preparation) and the synapomorphic condition of geniculate and greatly modified male middle anten-

nomeres (see Pinto & Selander, 1970) (see also 2.4). The nominate subgenus is represented by numerous species in both Palaearctic and Nearctic regions. But until now, only the New World species were revised (Pinto & Selander, 1970), while those of the Palaearctic and the Transitional Chinese (also named Sino-Himalayan or Sino-Japanese) regions (including Central, Southwestern, and Southern China, and the Himalaya) (see Lomolino *et al.*, 2017) have never been studied comprehensively. The amphi-Pacific distribution of this subgenus (and eventually also that of *Treiodous*) represents an interesting biogeographic study model, that is faced separately with a molecular approach (Salvi *et al.*, in preparation). One species of the nominate subgenus, *M. proscarabaeus* Linnaeus, 1758, is a famous species in Europe because of its medicinal value and was designated "Insect species of the year 2020" for Germany, Austria, and Switzerland (Schuh & Zettel, 2020).

This paper aims to revise morphologically the species of *Meloe* (*Meloe*) from the Palaearctic and the Transitional Chinese regions, point out some morphological groups and subgroups of species, describe some new species, redescribe other species, synonymize a few taxa, and publish a key with diagnostic photos for identification. However, *M. poteli* is not considered in this revision, being the type is unavailable; other three species, *M. elegantulus*, *M. longipennis*, and *M. modestus*, previously considered in the nominate subgenus are excluded. With this study, all known species of the nominate subgenus have now been treated and are identifiable.

Furthermore, adult *Meloe* shows distinctly individual variation, especially in size. Geographic variation of integument sculpture also occurs in species with wide ranges in both Palaearctic and Nearctic Regions. We describe such geographic variation, especially in two Euro-Asiatic species, namely *M. proscarabaeus* and *M. violaceus*, which are spread from the Iberian Peninsula to extreme eastern Asia. Some of these variations were described in the literature as distinct species or subspecies (e.g., Baudi di Selve, 1878a, 1878b), and some of these names are available taxonomically.

Material and methods

A complex of nearly 3000 adult specimens were examined for this study: 20 exx. *M. arunachalae* (including the holotype of the synonym *M. medogensis* at IZCAS; IOC; MABC; MHBU, MHBUa; MNHN; SMNS); 25 exx. *M. auriculatus* (including the male holotype and 1 female syntype at MNHN; MABC, MABCa; MNHN; and photos of the male holotype of the probable synonym *M. menoko*); 2 syntypes *M. bodemeyeri* (MNHB; ZMAN); holotype (MHBU) and 7 paratypes (MABC; MHBU) *M. chinensis* **n. sp.**; 11 exx. *M. coarctatus* (MABC, MABCa; MNHN; NHMW; SKC); holotype (MHBU) and 7 paratypes (MABC; MHBU; MZSU) *M. distincticornis* **n. sp.**; 5 possible syntypes (see text; TARI), 11 exx. (MHBU; MZSU; TARI) *M. formosensis*; holotype (MNHN) and 74 exx. (CAS; MABC; MHBU, MHBUa; MNHN) *M. gracilior*; holotype and 3 paratypes *M. himalayensis* **n. sp.** (MHBU); holotype *M. kashmirensis* **n. sp.** (MABC); holotype (MHBU) and 22 paratypes (MABC; MHBU, MHBUa) *M. kaszabi* **n. sp.**; holotype *M. lateantennatus* **n. sp.** (MHBU); photos of holotype and paratypes *M. kulabensis*; 45 exx. *M. lobatus* (including one syntype or possible holotype and the holotype of its synonym *M. patellicornis*, both at MNHN; MABC; MHBU; MNHB; MNHN; MZSU); holotype (HNHM) and 10 paratypes (HNHM; MABC; MHBU; MNHN) *M. orientalis* **n. sp.**; one syntype (MNHB) and 3 exx. (MNHB) *M. ovalicollis*; holotype (MHBU) and 58 paratypes (MABC; MHBU, MHBUa; MNHN; MSNG) *M. poggii* **n. sp.**; more than 1500 exx. *M. proscarabaeus* [several collections, not listed, mostly of ssp. *M. p. cyanellus*, *M. p. exaratus* (including one specimen compared with type of the synonym *M. tenuipes* at MNHB, and the holotype of the synonym *M. crispatus* at MNHN), *M. p. proscarabaeus*, and *M. p. punctatus*; none of the ssp. *M. p. afghanistanicus* and *M. p. sericeorugosus*; 56 exx. ssp. *M. p. aegyptius* (including holotypes of three synonyms, *M. plicatipennis* in the Lucas' collection and *M. subcyaneus* in the Wollaston's collection, both at MNHN; and *M. siculus* at MRSN); 16 exx. ssp. *M. p. rathjensi* (MABC, MABCa)]; holotype, 2 paratypes, and 5 exx. *M. scabrus* (MHBU); holotype (MNHN) and 3 exx. (MABC; MSNM) *M. semicoriaceus*; holotype (MHBU) and 36 paratypes (MABC, MABCa; MHBU; MNHN; SKC) *M. shapovalovi* **n. sp.**; 2 syntypes (MNHN, among 4 identified as *M. subcordicollis* but which represents two species; see text) and 29 exx. (MABC; MHBU; MNHN; SKC) *M. subcordicollis*; 7 exx. *M. tarsalis* (MABC; MHBU); holotype (BMNH) and about 1000 exx. *M. violaceus* (from several collections, not listed); holotype (MHBU) and 13 paratypes (MABC; MHBU, MHBUa) *M. xuhaoi* **n. sp.**

The following abbreviations used in the text, represent the studied collections (acronyms of collections in alphabetical order): ALC = A. Liberto, Rome, Italy; BMNH = Natural History Museum, London, United Kingdom;

CAS = California Academy of Sciences, San Francisco, USA; CIC = C. Iacovone, Atessa, Italy; EMHU = Entomological Museum, Hokkaido University, Sapporo, Japan; HNHM = Hungarian Natural History Museum, Budapest, Hungary; IOC = I. Orszulik, Czech Rep.; IZCAS = Institute of Zoology, Chinese Academy of Sciences, Beijing, China; JCRC = J-C. Ringenbach, Pau, France; LSUK = Linnean Society, London, United Kingdom; MABC = M. A. Bologna, Università Roma Tre, Rome, Italy (MABCa = the material preserved in alcohol 95%); MCNV = Museo Civico di Storia Naturale, Venice, Italy; MCZR = Museo Civico di Zoologia, Rome, Italy; MHBU = Museum of Hebei University, Baoding, China (MHBUa = the material preserved in alcohol 95%); MHNL = Musée d'Histoire Naturelle de Lyon, Lyon, Paris; MNHB = Museum für Naturkunde Berlin, Germany; MNHN = Muséum National d'Histoire Naturelle, Paris, France; MRSN = Museo Regionale di Storia Naturale, Torino, Italy; MSNG = Museo Civico di Storia Naturale "G. Doria", Genoa, Italy; MSNM = Museo Civico di Storia Naturale, Milan, Italy; MSNV = Museo Civico di Storia Naturale, Verona, Italy; MZH = Finnish Museum of Natural History, Helsinki, Finland; MZSU = Biology Museum (Sun Yat-Sen) University, Guangzhou, China; NHMW = Naturhistorisches Museum, Wien, Austria; NZSI = National Zoological Collection, Zoological Survey of India, Calcutta, India; OSBO = Osservatorio Fitopatologico di Bologna, Bologna, Italy; SKC = Stanislav Krejcik, Unicov, Czech Rep.; SMF = Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt-am-Main, Germany; SMNS = Staatliches Museum für Naturkunde Stuttgart, Stuttgart, Germany; TARI = Taiwan Agricultural Research Institute, Taichung, China; TAUM = Tel Aviv University Museum, Tel Aviv, Israel; ZIN = Russian Academy of Sciences, Zoological Institute, St. Petersburg, Russia; ZMAN = Zoological Museum, Amsterdam, the Netherlands; ZMHB = Museum für Naturkunde der Humboldt-Universität, Berlin, Germany; ZMUC = University of Copenhagen, Zoological Museum, Copenhagen, Denmark; ZMUM = Zoological Museum of the University, Moscow, Russia (with the collections of the Imperial Academy of Sciences).

The morphological terminology we used refers mainly to Pinto & Selander (1970), especially on the male genitalia and the position of antennae; the position of tegmen (ventral view *vs*. dorsal view) is in agreement with Bologna *et al*. (2013). The body length was measured from the labrum to the apex of abdomen. The comparative measurement of the antennal length refers to the straightened whole antenna directed posteriorly across eye towards the apex of the elytron on the same body side. In the treatment for each species, we listed: synonyms and most relevant taxonomic contributions, information on type specimens and locality, synthesis of the distribution, and a short description with figures of diagnostic characters. The examined material and records from literature and collections are respectively indicated above and in Appendix 1.

Morphological study was carried out using a Nikon SMZ1500 stereomicroscope and Olympus SZX 12 stereomicroscope. Photographs were taken with four distinct pieces of equipment: a) Canon EOS 5D Mark III connected to a Canon Macro lens EF 100 mm; b) Leica M205A stereomicroscope equipped with a Leica DFC450 camera which was controlled using the Leica application suite 4.3; c) Zeiss Discovery V12 with Axiocam 105 color, Softwares Zen×64 1.10 2012 (blue edition) to made photos and Zerene Stacker 1.04 to assembly them; d) Visionary Digital LK Lab System (Visionary Digital, Palmyra, VA) equipped with a Canon EOS 6D mark II dSLR camera and an MP-E 65mm f/2.8 1–5× lens (Canon, Tokio, Japan); this device allowed the automatic capture of stacks of images on different focal planes, which were then modified in Adobe Photoshop CS6 and combined with the Helicon Focus 7 software.

Results

1. Bionomics

The bionomics of the nominate subgenus of *Meloe* is poorly known in the Palaearctic Region, except for two species, *M. proscarabaeus* and *M. violaceus*. The information on phenology, elevation, and adult host plants of the species of *Meloe* (*Meloe*) is summarized in Table 2. That on larval development and host bees is summarized by Pinto & Selander (1970), Bologna (1991), and Bologna & Pinto (2001, 2002). Larval vectors or hosts were recorded in several families of wild bees, such as Megachilidae, Halictidae, Andrenidae, Apidae (for a synthesis see: Pinto & Selander, 1970; Kifune *et al*., 1973; Bologna, 1991). The nominate subgenus is a typical element of steppe habitats (as in Fig. 1A, B), like most blister beetles; some species are associated with pastures and glades of open forests, from sea level to high elevation, especially in the Qinghai-Xizang Plateau and the Himalayan Region. The

phenology of Western and Central Palaearctic species is limited to the Spring or early Summer, while in the eastern regions, especially at high elevation, adults of some species are active in Summer or Autumn (Table 2). In others, adults are fairly long-lived, active from Autumn to the following Spring. Adults are seen often in the field feeding on herbaceous plants or ambling clumsily on the ground (as in Fig. 1C–E). During periods of inactivity they hide beneath litter, logs, or rocks (as in Fig. 1F) (Pinto & Selander, 1970). The sexual behaviour of the nominate subgenus includes the synapomorphic phase of "antennation" (see Pinto & Selander, 1970). Courtship differences between *M. proscarabaeus* and *M. violaceus* were described by Bologna & Marangoni (1986). Okano *et al.* (2015) studied the sexual behaviour of *M. coarctatus* and *M. proscarabaeus* from Japan.

FIGURE 1. A. Habitat of *Meloe gracilior* (Mt. Qizimeishan, Enshi, Hubei, China; photoed on Jan. 1, 2015, by H. Xu); B. Habitat of *Meloe poggii* (Pondo, Lhünzhub, Lasha, Xizang, China; photoed on Aug. 8, 2019, by Z. Pan); C. *Meloe proscarabaeus* (♀) ambling on the ground (Dêrong, Sichuan, China; photoed on Apr. 12, 2020, by J. Y. Qiu); D. *Meloe poggii* (♀) feeding plant (same data of B); E. *Meloe xuhaoi* (♂) feeding leaf of *Cirsium monocephalum* (Mt. Simianshan, Jiangjin, Chongqing, China, type locality; photoed on Mar. 10, 2014, by H. Xu); F. a couple of *Meloe gracilior* hidding beneath rocks (same data of A).

2. Taxonomy

2.1 The subgenus *Meloe* and its diagnosis

Subgenus *Meloe* (*Meloe*) Linnaeus, 1758

Meloe Linnaeus, 1758: 419. Type species: *Meloe proscarabaeus* Linnaeus, 1758, by subsequent designation (Latreille, 1810: 430).
Proscarabaeus Schrank von Paula, 1781: 225. Type species: *Meloe proscarabaeus* Linnaeus, 1758, by absolute tautonymy.
Melittophagus Kirby, 1818: 164. Type species: *Pediculus melittae* Kirby, 1802 (= *Meloe violaceus* Marsham, 1802), by monotypy.
Triungulinus Dufour, 1828: 63. Type species: *Triungulinus andrenatarum* Dufour, 1828, by monotypy.
Cnestocera Thomson, 1859: 124. Type species: *Meloe proscarabaeus* Linnaeus, 1758, by original designation.

Diagnosis. Adults of the nominate subgenus generally are large (8–45 mm), uniformly metallic blue or black, more or less metallic or sub-opaque, rarely blue-violet or greenish-blue. They have the scutellum of mesonotum, tarsal pads, and abdominal tergites more developed than those of other subgenera, but these characters are slightly variable in some other subgenera. The pronotum is slightly wider than long, at least 4/5 as long as wide, or longer than wide, and sinuate on sides, never angulate anteriorly. The scutellum has a hind margin usually produced posteriorly but protruded only in few species. Mesepisterna are meeting at midline in most species. Tarsal pads present at least on the fore and middle legs, usually also on the metatarsomeres. Mandibles lack an accessory tooth; the prosthecal emargination is small.

Good diagnostic derived characters are recognizable in first instar larvae of *Meloe* (*Meloe*) (see Pinto & Selander, 1970; Kifune *et al.*, 1973; Bologna & Pinto, 1998, 2001; Di Giulio *et al.*, 2002), which appear deeply adapted in several features to the phoresy on bees. The most evident characters are the legs with a "trident" structure constituted by tarsal claw and modified setae, and the sensory organ of antennal segment II never conical and situated at the apex, that is widened to accommodate it.

Distribution. Europe, North Africa, southwestern Arabic Peninsula, eastern and southern Africa, Palaearctic Asia, North and central America south to northern Venezuela.

Taxonomic Remarks. The nominate subgenus is clearly monophyletic and easy to distinguish among the 15 *Meloe* subgenera by the synapomorphic condition of the male antennae. The antennomeres V–VII are geniculate and enlarged, semicircularly or transversely arranged in males (V somewhat enlarged apically, VI and VII compressed laterally) and broader than other antennomeres but not modified in females. Molecular phylogenetic analyses also confirmed the monophyly of this subgenus (Salvi *et al*., in preparation). In the subgenus *Treiodous*, male antennomeres are slightly enlarged in the middle of some species but are otherwise unmodified.

2.2 Key to the Palaearctic species of *Meloe* (*Meloe*)

The following key aimed at identifying males and females of all species of the nominate subgenus of *Meloe* from the Palaearctic Region and the Transitional Chinese area, with the exclusion of the male of *M. kashmirensis* **n. sp.** and the female of *M. lateantennatus* **n. sp.**, both still unknown.

1. Pronotum not distinctly sinuate laterally in basal half, as long as wide or slightly longer (Figs. 2F; 4E; 5–7G; 8F); head and pronotum usually with deep and large punctures, punctures at least moderately dense, sometimes confluent, coarse or sub-rugose (Figs. 2B, F; 3C; 4B, E; 5–7B, G; 8B, F), rarely (*M. proscarabaeus aegyptius*) fine and sparse; male antennomere VII widest at apical half (Figs. 2D–E; 3D; 4C; 5–8D–E), V distinctly widened to apex on anterior side in dorsal view (Figs. 2C; 5–8C) **2**
- Pronotum sides posteriorly distinctly sinuate laterally in basal half, usually distinctly longer than wide (Figs. 9–11G; 14–15G; 19G) but in some species about as long as wide (Figs. 12–13G; 16–18G; 20–27G); head and pronotum with fine, usually sparse, and always distinct shallow punctures (Figs. 9–21B, G; 23B, G), except in some individuals of species from Himalayan ranges in which punctures are larger and denser (Figs. 22B, G; 24–27B, G); male antennomere VII widest in middle (Figs. 9D–E; 11–22D–E; 24–27D–E), except *M. xuhaoi* (Figs. 10D–E), V not widened to apex on anterior side in dorsal view (Figs. 9–22C; 24–27C) **7**
2. Mesonotal scutellum conically produced and easily visible from dorsal view; pronotum distinctly depressed along basal border (Figs. 7G, 8F). From the Iberian Peninsula through western and middle Asia east to Kamchatka, with isolated populations in the Maghreb mountains . . . . . ***M. violaceus***

- Mesonotal scutellum with posterior margin almost straight, not triangularly shaped, scarcely visible from dorsal view (Figs. 2F; 4E; 5G; 6G), in few individuals it may be angulate; pronotum not distinctly depressed along basal border **3**

3. Protarsomere I slender in ventral view (Fig. 3E); male antennomere V slender, VI inserted near centre of apex of V (Fig. 2C), VI and VII only moderately concave on anterior side (Figs. 2E; 3D; 4C); undersides of tarsomeres with a narrow sparse hairy brush margined with long setiform hairs (Figs. 3F; 4F) **4**

- Protarsomere I robust and widened to apex in ventral view; male antennomere VI excentrically placed at apex of V (Figs. 5C; 6C), VI and VII distinctly concave on anterior side (Figs. 5E; 6E); underside of tarsomeres not as above **6**

4. Antennomeres VIII–IX subequal in size, III subequal to IV (Fig. 2C); temples widened posteriorly (Fig. 2B); pronotal sculpture uniform and dense (Fig. 2F). W Turkey . . . . . ***M. bodemeyeri***

- Antennomneres VIII–IX slender and longer than wide, III longer than IV (Figs. 3D; 4C); temples parallel (Fig. 3C) or widened posteriorly (Fig. 4B); pronotal sculpture with (*M. ovalicollis*, as in Fig. 4E) or without (*M. kulabensis*) two lateral areas without punctures. **5**

5. Temples parallel posteriorly (Fig. 3C); legs slender, mesotibia not curved along external margin, metatarsomere I in lateral view more distinctly widened to apex (Fig. 3F); gonocoxal plate distinctly widened in middle and lobes of gonostyli distinctly elongate (Fig. 3G). Tajikistan . . . . . ***M. kulabensis***

- Temples widened posteriorly (Fig. 4B); legs thicker, mesotibia curved along external margin, metatarsomere I in lateral view less distinctly widened to apex (Fig. 4F); gonocoxal plate scarcely widened in middle and lobes of gonostyli short (Fig. 4G). S Kazakhstan, Kyrgyzstan, Tajikistan . . . . . ***M. ovalicollis***

6. Head and pronotum with punctures deep, wide, sub-rugose (Figs. 6B, G); pronotum slightly emarginated and vaguely depressed at base in middle, sides distinctly convergent at base (Fig. 6G); male antennomere II ca. 1/4 of III, III as long as IV, IV quite short and quite slender, V in posterior view more rectangular and less widened to apex, in dorsal view not so distinctly produced anteriorly, VII in anterior view narrowly sub-hexagonal, with maximal elevation on external side, in dorsal view less produced apically, VIII longer than wide, XI 3× as long as wide (Fig. 6C–E); male genitalia as in Fig. 6H–J. Kashmir . . . . . ***M. semicoriaceus***

- Head and pronotum with punctures variously shaped, from almost smooth and alutaceous (ssp. *M. p. aegyptius*) to variously dense and rugose (other subspecies); pronotum not obviously emarginated or depressed at base, sides more parallel at base (Fig. 5G); male antennomere II ca. 1/3 of III, III longer than IV, IV longer, V in posterior view more sub-trapezoidal and widened to apex, and in dorsal view more produced apically, VII in anterior view sub-oval and slightly wider than above, in front with maximal elevation at centre, in dorsal view distinctly produced apically, VIII as long as wide, XI less than 3× as long as wide (Fig. 5C–E); male genitalia as in Fig. 5H–J. From Portugal to China and Japan, through Eurasia, N Africa and SW Arabian Peninsula . . . . . ***M. proscarabaeus***

7. Males, i.e., antennomeres V–VII geniculate and enlarged, semicircularly or transversely arranged (Figs. 9–22C–E; 23–27C–E) **8**

- Females, i.e., antennomeres V–VII broader than others, but not modified (Figs. 9–16F; 18–22F; 23C; 24–27F) **25**

8. Punctures on head and pronotum very fine and sparse (Figs. 9B, G; 10B, G); both antennomeres V and VI longer than wide, V not distinctly modified, sub-cylindrical, VI sub-triangularly widened to apex in anterior view, VII not transverse, I almost as long as IV, XI distinctly elongate (Figs. 9C–E; 10C–E); legs slender (Figs. 9A; 10A). **9**

- Punctures on head and pronotum variously shaped (Figs. 11–27B, G); both antennomeres V and VI distinctly modified and wider than long, VI transverse, VII hugely transverse and distinctly depressed (Figs. 11–22D–E; 24–27D–E); I longer than IV, XI quite elongate (Figs. 11–22C; 24–27C); legs robust or slender (Figs. 11–22A; 24–27A) **10**

9. Antennae elongate and very slender, nearly reaching apex of elytra (Fig. 10A), antennomere I slightly shorter than III, III–V very slender and cylindrical, VI twice longer than wide, sub-triangularly widened apically in anterior view, VII elongate longitudinally, sides sub-parallel, scarcely depressed (Figs. 10C–E); genitalia as in Figs. 10H–J. China (Chongqing, Zhejiang). . . . . ***M. xuhaoi* n. sp.**

- Antennae shorter than above, only reaching middle of elytra (Fig. 9A), antennomere I as long as III, III–V sub-cylindrical not so slender, VI ca. 1.5× as long as wide, expanded ventro-apically, VII elongate but widened ventrally, sub-trapezoidal in middle (Figs. 9C–E); genitalia as in Figs. 9H–J. China (Hubei, Jiangxi) . . . . . ***M. distincticornis* n. sp.**

10. Antennomere VIII suddenly narrowed at base, sub-globose or ellipsoidal (Figs. 21–22C–E; 24–27C–E); length of last four antennomeres distinctly shorter than total length from I to VII (Figs. 21–22C; 24–27C). **11**

- Antennomere VIII gradually narrowed at base, cylindrical, at most slightly widened at apex (Figs. 11–20C–E); length of last four antennomeres usually sub-equal to or longer than total length from I to VII, but slightly shorter in few species (*M. kaszabi*, *M. lobatus*, and *M. tarsalis*) (Figs. 11–20C) **16**

11. Antennomere VI sub-equal to VII in width; VII transverse, distinctly wider than long in posterior view (Figs. 21D–E); head and pronotum with punctures fine, small, and shallow (Fig. 21B, G). China (Chongqing, Sichuan) . . . . . ***M. chinensis* n. sp.**

- Antennomere VI slightly wider than VII; VII sub-trapezoidal, slightly wider than long in posterior view (Figs. 22D–E; 24–27D–E); punctures on head and pronotum more or less large and deep (Figs. 22B, G; 24–27B, G) **12**

12. Antennae relatively slender, aspect ratio of antennomere VIII > 1.5 (Fig. 26C–E). China (Hubei, Sichuan, Yunnan, E Xizang) . . . . . ***M. shapovalovi* n. sp.**

- Antennae more robust, aspect ratio of antennomere VIII < 1.5, sub-globose (Figs. 22C–E; 24C–E; 25C–E; 27C–E). **13**

13. Body blue or bluish-black or black, shining (Fig. 24A); punctures on head and pronotum relatively small and sparse, distance among punctures less than diameter of puncture (Figs. 24B, G); antennomere IV very transverse, oval, V expanded dorsoapically almost pointed in anterior view, sub-trapezoidal, VII distinctly transverse and more pointed dorsoapically in anterior view (Fig. 24E); distal hook of aedeagus slightly curved at apex (Fig. 24J); gonostyli almost sub-cylindrical not distinctly narrowed on apical third, with a wide light-coloured area on centre (Fig. 24H–I). China (Gansu, Qinghai, Sichuan, Xizang, Yunnan), Nepal, NE India (Sikkim). . . . . ***M. poggii* n. sp.**

- Body black scarcely shining, almost sub-opaque (Figs. 22A; 25A; 27A); without above combination of features **14**

14. Punctures on head and pronotum wide but sparse, distance among punctures more than diameter of puncture (Figs. 27B, G); antennomere IV distinctly transverse, V expanded dorsally in anterior view, less obtusely at apex, VII transverse (Fig. 27E); distal hook of aedeagus slightly larger than proximal one (Fig. 27J). SW China, N India (Sikkim). . . . . ***M. subcordicollis***
- Punctures on head and pronotum wider and denser, distance among punctures less than diameter of puncture (Figs. 22B, G; 25B, G); antennomere IV moderately transverse, V expanded dorsally in anterior view, obtuse at apex, VII less transverse (Figs. 22E; 25E); distal hook of aedeagus not larger than proximal one (Figs. 22J; 25J) **15**

15. Aspect ratio of antennomere XI < 4 (Fig. 22C); gonocoxal plate as long as gonostyli, with two yellow spots (Fig. 22H); dorsal hooks of aedeagus different in shape (Fig. 22J); China (Xizang: Zhêntang). . . . . ***M. himalayensis* n. sp.**
- Aspect ratio of antennomere XI > 4 (Fig. 25C); gonocoxal plate distinctly longer than gonostyli, with three yellow spots (Fig. 25H); dorsal hooks of aedeagus similar in shape (Fig. 25J). China (Xizang) . . . . . ***M. scabrus***

16. Antennomere V distinctly depressed on anterior side (only depressed at apex in *M. arunachalae*), VII distinctly wider than VI in anterior view, ratio of VII/VI width 1.3–1.4 (Figs. 11E; 14–15E; 17E); ratio of XI/X length ca. 1.8 (Figs. 11C; 14–15C; 17C) **17**
- Antennomere V not depressed on anterior side, surface convex, VII moderately wider than or sub-equal to VI in anterior view, ratio of VII/VI width 1.0–1.2 (Figs. 12–13E; 16E; 18–20E); ratio of XI/X length ca. 1.6 (Figs. 12–13C; 16C; 18–20C). . . . **20**

17. Antennomere V widened on both sides in anterior view, scarcely depressed at apex, IV short and transversely sub-oval, not distinctly pointed on dorsal side (Fig. 11D–E). China (SE Xizang), Nepal, Bhutan, N India (from Himanchal Pradesh to Assam) . . . . . ***M. arunachalae***
- Antennomere V transverse, widened on dorsal side in anterior view and distinctly depressed on anterior side, IV not so short and transversely sub-oval in anterior view (Figs. 14–15D–E; 17D–E) **18**

18. Pronotum slightly shorter and wider (aspect ratio ca. 1.05) (Fig. 17F); sides of head broadly concave (Fig. 17B); punctures on head and pronotum slightly sparser (Fig. 17B, F); antennomeres V–VII in anterior view as in Fig. 17E, VIII cylindrical but slightly widened at apex on dorsal side; gonostyli fused in basal 3/4 in ventral view (Fig. 17G). China (Sichuan). . . . . ***M. lateantennatus* n. sp.**
– Pronotum slightly longer and narrow (aspect ratio > 1.1) (Figs. 14–15G); sides of head almost straight (Figs. 14–15B); punctures on head and pronotum slightly denser (Figs. 14–15B, G); antennomeres V–VII in anterior view as in Figs. 14–15E, VIII cylindrical; gonostyli fused in basal 2/3 in ventral view (Figs. 14–15H) **19**

19. Punctures on head and pronotum very fine and smooth (Figs. 14B, G); elytra shinier; antennomere III short and almost globose (Fig. 14C), V more transverse in posterior and anterior views, ca. 1.6 as wide as long (Fig. 14D–E). China (Taiwan) . . . . . ***M. formosensis***
- Punctures on head and pronotum slightly denser and deeper than above (Fig. 15B, G); elytra sub-opaque; antennomere III slightly longer, sub-moniliform (Fig. 15C), V less transverse in posterior and anterior views, ca. 1.4 as wide as long (Fig. 15D–E). China (Central, Eastern, and Southern regions) . . . . . ***M. gracilior***

20. Antennomere VI ca. as wide as VII in posterior and anterior views, at most slightly wider (Figs. 13D–E; 16D–E; 20D–E) . **21**
- Antennomere VI distinctly narrower than VII in posterior and anterior views (Figs. 12D–E; 18D–E; 19D–E). **23**

21. Antennomere VI width ca. twice that of V in posterior and anterior views (Fig. 13D–E), III short and transverse in posterior view (Fig. 13D). Japan . . . . . ***M. coarctatus***
- Antennomere VI width less than twice that of V in posterior and anterior views (Figs. 16D–E; 20D–E), III not so transverse in posterior view (Figs. 16D; 20D). **22**

22. Base of metatarsomere I usually yellow (Fig. 20A); gonostyli with three light-coloured spots at center in ventral view (Fig. 20H); aedeagal distal hook far from apex, close to proximal one, endophallic hook small (Fig. 20J). Russia (E Siberia), China (Hebei, Inner Mongolia, Ningxia, Shaanxi). . . . . ***M. tarsalis***
- Metatarsomere I totally black (Fig. 16A); gonostyli without light-coloured spots (Fig. 20H); aedeagal distal hook positioned more apically and less approached to proximal one, endophallic hook relatively larger than above (Fig. 20J). China (Beijing, Hebei, Inner Mongolia, Shanxi) . . . . . ***M. kaszabi* n. sp.**

23. Pronotum distinctly longer than wide (Fig. 19G). China (Fujian, Yunnan, Zhejiang) . . . . . ***M. orientalis* n. sp.**
- Pronotum ca. as long as wide (Figs. 12G; 18G). **24**

24. Integument shining; punctures on head and pronotum sparse and shallow (Fig. 12B, G); antennomere V not distinctly pointed dorsoapically in anterior view (Fig. 12E), VIII 0.7× as long as IX (Fig. 12C). Korea Peninsula (doubtful), Japan . . . . . ***M. auriculatus***
- Integument only slightly shining, relatively sub-opaque; punctures on head and pronotum denser and deeper (Fig. 18B, G); antennomere V more expanded dorsoapically in anterior view (Fig. 18E), VIII 0.9× as long as IX (Fig. 18C). Siberia, Mongolia, China (except for NW and SW regions), N and S Korea …… . . . . . ***M. lobatus***

25. Pronotum distinctly longer than wide, aspect ratio distinctly > 1.1 . . . . . **26**
- Pronotum about as long as wide, or slightly longer, aspect ratio ≤ 1.1 . . . . . **31**

26. Antennomere III elongate, almost as long as VIII (Figs. 10–11F). **27**
- Antennomere III distinctly shorter than VIII (Figs. 9F; 14–15F; 19F) **28**

27. Antennae filiform, III–VI slender and sub-cylindrical, III twice as long as wide (Fig. 10F) . . . . . ***M. xuhaoi* n. sp.**
- Antennomeres III–VI widened apically, aspect ratio of III 1.5× as long as wide (Fig. 11F). . . . . ***M. arunachalae***

28. Antennomeres slightly thickened, VIII distinctly less than twice as long as wide (Fig. 14F); pronotum almost smooth, punctures small and sparse . . . . . ***M. formosensis***
- Antennomeres slenderer, VIII more than twice as long as wide (Figs. 9F; 15F; 19F); pronotal punctures bigger and denser than above **29**

29. Antennomere IV distinctly widened to apex, width at widest point ca. twice of basal width (Fig. 19F) . . . ***M. orientalis* n. sp.**
- Antennomere IV slender than above, width at widest point distinctly less than twice of basal width (Figs. 9F; 15F) **30**
30. Antennomere XI ca. twice as long as X (Fig. 9F); temple ca. as long as longitudinal length of eye in dorsal view. . . . . ***M. distincticornis* n. sp.**
- Antennomere XI less than twice as long as X (Fig. 15F); temple distinctly longer than longitudinal length of eye in dorsal view . . . . . ***M. gracilior***
31. Antennomere VII ca. as long as VIII (Figs. 21F; 23C; 26–27F) **32**
- Antennomere VII distinctly longer than VIII (Figs. 12–13F; 16F; 18F; 20F; 22F; 24–25F). **35**
32. Protarsi robust, protarsomere I widened apically, aspect ratio < 2.5 . . . . . ***M. chinensis* n. sp.**
- Protarsi slender, sides of protarsomere I parallel, aspect ratio > 2.5 (Fig. 23A) **33**
33. Head and pronotum with vague blue reflexions and denser punctures (Fig. 23B); elytral rugosities distinctly raised (Fig. 23A) . . . . . ***M. kashmirensis* n. sp.**
- Head and pronotum black and with sparser punctures; elytral rugosities vaguely raised **34**
34. Protarsomere I more than 3× as long as wide; antennae relatively shorter, antennomeres more robust, moniliform (Fig. 27F) . . . . . ***M. subcordicollis***
- Protarsomere I less than 3× as long as wide; antennae relatively longer than above, antennomeres slenderer than above (Fig. 26F). . . . . ***M. shapovalovi* n. sp.**
35. Antennomeres VIII to XI short, their total length as long as that of II to V (Figs. 22F; 24–25F) **36**
- Antennomeres VIII to XI elongate, their total length as long as that of II to VII (Figs. 12–13F; 16F; 18F; 20F) **38**
36. Integument shinier, bluish; pronotum relatively smooth, punctures usually distanced from one another; base of metatarsomere I usually reddish-yellow . . . . . ***M. poggii* n. sp.**
- Integument black; pronotum scabrous, punctures bigger and approaching one another forming an irregular sculpture; metatarsomere I totally black **37**
37. Antennomeres VIII–XI relatively slender, X twice as long as wide (Fig. 25F). . . . . ***M. scabrus***
- Antennomeres VIII–XI relatively robust, X 1.5× as long as wide (Fig. 22F) . . . . . ***M. himalayensis* n. sp.**
38. Antennae backwards reaching middle of elytra; protarsi slender, distinctly longer than protibia . . . . . ***M. tarsalis***
- Antennae backwards reaching basal third or quarter of elytra; protarsi relatively robust, slightly longer than protibia **39**
39. Head sub-rectangular, posteriorly almost straight; temples relatively parallel **40**
- Head sub-oval, posteriorly rounded; temples more rounded on sides **41**
40. Antennomere III distinctly longer than II, sub-cylindrical (Fig. 16F); eye in lateral view slenderer and more narrowed at apex . . . . . ***M. kaszabi* n. sp.**
- Antennomere III only slightly longer than II, sub-globose (Fig. 13F); eye in lateral view more oval and rounded at apex . . . . . ***M. coarctatus***
41. Punctures on head and pronotum dense and deep; antennomere VIII as long as IX (Fig. 18F) . . . . . ***M. lobatus***
- Punctures on head and pronotum less dense and less deep; antennomere VIII shorter than IX (Fig. 12F). . . . . ***M. auriculatus***

2.3 Definition of species groups

Among the nominate subgenus, some groups of species in the Nearctic fauna have been identified by Pinto & Selander (1970). These authors recognized five species groups based mostly on larval characters but also a few adult features, especially the shape of antennomeres V–VII and pronotum, and the punctures on the head and pronotum. The heterogeneous Angusticollis Group was divided into six subgroups. Some species of these Nearctic groups or subgroups were close phenetically to the species from Palaearctic Region and the Transitional Chinese area (Pinto & Selander, 1970; Bologna & Pinto, 1998). Below, we discuss some possible relationships. The knowledge of the first instar larvae of Palaearctic *Meloe* (*Meloe*) species is limited to *M. proscarabaeus*, *M. violaceus*, *M. auriculatus* (including the synonym *M. menoko*), and *M. coarctatus*; as for the Afrotropical ones only *M. hottentotus* and *M. rhodesianus* are described. Inferences about the larval characters of the Old World groups of species are consequently reduced, and we limited our discussion to the adult morphology.

2.3.1 Nearctic species

Characters of the five Nearctic groups of species are summarized according to Pinto & Selander (1970), aimed at exploring their relationships with Palaearctic and Afrotropical species.

(a) Americanus Group (*M. americanus* Leach, 1815 and *M. impressus* Kirby, 1837). The adults have body punctures rather small and sparse, pronotum elongate, the apex of the male antennomere V platform, well developed and flattened; the female antennae and the apical four male antennomeres are sub-filiform.

(b) Angusticollis Group (Campanicollis Subgroup: *M. campanicollis* Pinto & Selander, 1970; Occultus Subgroup: *M. exiguus* Pinto & Selander, 1970 and *M. occultus* Pinto & Selander, 1970; Niger Subgroup: *M.*

bitoricollis Pinto & Selander, 1970, *M. dianella* Pinto & Selander, 1970, and *M. niger* Kirby, 1837; Angusticollis Subgroup: *M. angusticollis* Say, 1824; Carbonaceus Subgroup: *M. carbonaceus* LeConte, 1866; Californicus Subgroup: *M. californicus* Van Dyke, 1928, *M. quadricollis* Van Dyke, 1928, and *M. vandykei* Pinto & Selander, 1970). The adults have body punctures relatively coarse and rather densely arranged, the pronotum typically wider than long, the apex of the male antennomere V usually without a well-defined platform, and the female antennae are sub-moniliform.

In our opinion, based also on molecular evidence (Salvi *et al.*, in preparation), the Angusticollis Subgroup represents a distinct Group of species (see below) not related to the Campanicollis, Occultus, Niger, Carbonaceous, and Californicus Subgroups, which form the subgroups of the Niger Group in a new amended definition.

(c) Franciscanus Group (*M. franciscanus* Van Dyke, 1928). The adults are most closely related to the Angusticollis Group, differing by lacking of the tarsal pads on the hind legs in both sexes and the mesepisterna do not meet at the midline of the body.

(d–e) Strigulosus Group (*M. strigulosus* Mannerheim, 1852) and Tropicus Group (*M. dugesi* Champion, 1891, *M. nebulosus* Pinto & Selander, 1970, and *M. tropicus* Motschulsky, 1856). The adults of both groups have sparse, fine body punctation and smooth or finely rugulose elytra. The pronotum is typically elongate as that in the Americanus Group. The body punctation is fine and sparse, and the female antennomeres are rather elongate, although the antennae do not attain the sub-filiform conformation of the Americanus Group. Besides, as in the Americanus Group, the male antennomere VII is widest in the middle rather than apically. Males of the Strigulosus Group have a distinct platform at the apex of the antennomere V, as in the Americanus Group; while those of the Tropicus Group more closely resemble those of the Angusticollis and Niger Groups, lacking a well-defined platform on that antennomere.

2.3.2 Afrotropical species

As for the Afrotropical species, Bologna & Pinto (1998) pointed out that *M. rathjensi* Borchmann, 1938 from SW Arabic Peninsula is related to the Palaearctic complex of *M. proscarabaeus* Linnaeus, 1758. We re-examined this species in the present paper, and consider it con-specific with *M. proscarabaeus* (see species account).

(f) Hottentotus Group. The remaining four Afrotropical species [*M. abyssinicus* (Pligинsky, 1930), *M. hottentotus* Péringuey, 1886, *M. monticola* Kolbe, 1897, and *M. rhodesianus* Péringuey, 1904] form a distinct group, more similar phenetically to some eastern Palaearctic and Nearctic species. The pronotum is elongate (slightly shorter in *M. hottentotus*); punctures on the head and pronotum are sparse and fine (deeper in *M. hottentotus*); the male antennomere V bears a distinct platform, the last antennomeres are not sub-filiform in both sexes. Because of these characters, the species of this group are similar to *M. strigulosus* but differ in the shape of male antennomeres. Moreover, they are different from Chinese species (see below). We consider them in a distinct group of species, even if phenetically similar.

2.3.3 Palaearctic species

Species from the Palaearctic Region and the Transitional Chinese area have never been studied in detail. Bologna (1991) considered *M. aegyptius* Brandt & Erichson, 1832, *M. semicoriaceus* Fairmaire, 1891, and *M. rathjensi* Borchmann, 1938 in a group with *M. proscarabaeus* Linnaeus, 1758, and pointed out some synonymies, confirmed by Bologna (2008, 2020). In the present paper, some of the taxa that were listed by Bologna (2008, 2020) are differently evaluated. Bologna (1991) considered *M. violaceus* Marsham, 1802 as in the same group with *M. angusticollis* as confirmed in the present paper.

Based on the antennal and pronotal shape, and body punctation, we divide the Palaearctic species in four groups as follows, and one among them is divided into two subgroups.

(b) Angusticollis Group. As noted above, we consider this Group differently than as defined by Pinto & Selander (1970) and limited to the previous Angusticollis Subgroup. It includes only *M. angusticollis* from North America and one Palaearctic taxon: *M. violaceus* Marsham, 1802 (including *M. semenowi* as synonym). The pronotum is as wide as long or slightly wider (Figs. 7G, 8F); the punctures on the head and pronotum are quite deep and wide, sometimes coarse, variously dense, or almost coalescing (Figs. 7B, G; 8B, F); the male antennomere V without platform, VI and VII are not distinctly transverse, VII is widest at apical half (Figs. 7–8C–E); the scutellum is distinctly protruded posteriad (Figs. 7G; 8F).

(g) Proscarabaeus Group (as partially defined by Bologna, 1991): *M. bodemeyeri* Ganglbauer, 1900, *M. kulabensis* Shapovalov, 2014, *M. ovalicollis* Reitter, 1908, *M. proscarabaeus* Linnaeus, 1758 (polytypic, including *M. aegyptius* Brandt & Erichson, 1832 and *M. rathjensi* Borchmann, 1938 which are here considered as subspecies, and *M. tenuipes* Jakowlew, 1897 as a synonym), and *M. semicoriaceus* Fairmaire, 1891. The pronotum is as wide as long or slightly wider (Figs. 2F; 4E; 5–6G); the punctures on the head and pronotum are deep and wide (except for *M. proscarabaeus aegyptius*), sometimes coarse, more or less dense or almost coalescing (Figs. 2B, G; 3C; 4B, E; 5–6B, G); the male antennomere V without platform, VI and VII are not distinctly transverse, VII is widest at apical half (Figs. 2C–E; 3D; 4C; 5–6C–E); posterior margin of the scutellum is almost straight (Figs. 2F; 4E; 5–6G).

(h) Distincticornis Group, here defined: *M. distincticornis* **n. sp.** and *M. xuhaoi* **n. sp.** The pronotum is elongate, sinuate on sides at base (Figs. 9–10G); the head and pronotum with fine and sparse punctures (Figs. 9–10B, G); the male antennomere V is not distinctly modified, sub-cylindrical, without platform, V and VI are longer than wide, VI is sub-triangularly widened on dorsal side at apex, VII is not transverse, I is almost as long as IV, XI is distinctly elongate (Figs. 9–10C–E); the legs are slender (Figs. 9–10A).

(i) Lobatus Group, here defined: The male antennomeres V and VI are distinctly modified and wider than long, V without apical platform, VI–VII are distinctly depressed on the anterior side, VI is hugely transverse, VII is different in shape in two subgroups, I is longer than IV (Figs. 11–22C–E; 24–27C–E); legs are more or less robust (Figs. 11–27A); punctures on the head and pronotum are variously shaped in the following two subgroups.

Lobatus Subgroup: *M. arunachalae* Saha, 1979, *M. auriculatus* Marseul, 1876 (including *M. menoko* as synonym), *M. coarctatus* Motschulsky, 1858, *M. formosensis* Miwa, 1930, *M. gracilior* Fairmaire, 1891, *M. kaszabi* **n. sp.**, *M. lateantennatus* **n. sp.**, *M. lobatus* Gebler, 1832, *M. orientalis* **n. sp.**, and *M. tarsalis* Jakowlew, 1897. The antennae are slender, the male antennomere VI is sub-equal to or distinctly narrower than VII, VII is transverse, distinctly wider than long in anterior view, VIII is sub-cylindrical (Figs. 11–20C–E). The head and pronotum with fine and sparse punctures (Figs. 11–20B; 11–16G; 17F, 18–20G).

Subcordicollis Subgroup: *M. chinensis* **n. sp.**, *M. himalayensis* **n. sp.**, *M. kashmirensis* **n. sp.**, *M. poggii* **n. sp.**, *M. scabrus* Pan & Ren, 2018, *M. shapovalovi* **n. sp.**, and *M. subcordicollis* Fairmaire, 1887. The antennae are robust, the male antennomere VI is slightly wider than VII, VII is sub-trapezoidal, slightly wider than long in anterior view (but transverse in *M. chinensis*), VIII is widened apically, but slightly slender in *M. shapovalovi* (Figs. 21–22C–E; 24–27C–E). The head and pronotum with dense, large and deep punctures (Figs. 21–27B; 21–22G; 24–27G).

2.4 Species account

In the last edition of Catalogue of Palaearctic Meloidae (Bologna, 2020), 23 species of the nominate subgenus of *Meloe* were listed, and two among them are polytypic. Some synonymies were also pointed out. In the present revision, we describe ten new species from China and the Himalayan ranges, and synonymize or consider as subspecies some species before listed as distinct by Bologna (2008, 2020).

In the present study, we did not consider the following five Palaearctic species that were previously referred to the nominate subgenus (e.g., Bologna, 2008; Pan & Ren, 2018):

(a) *Meloe poteli* Fairmaire, 1897, from China (Jiangxi): this species is not considered because, in the original description, the male antennae are explicitly indicated as simple and not geniculate. Probably, for this reason, Pligінsky (1935) referred it to the subgenus *Mesomeloe*. One of us (MAB) briefly examined the type of *M. poteli* at MNHN in 1984 and 1995 and noted that the middle male antennomeres are greatly modified. We looked for the type at MNHN in September 2017 and requested it in September 2020, but it was not available for study. Possibly Fairmaire (1897) made an error in the description. Consequently, we cannot define now what is *M. poteli* and cannot treat it because the type does not allow adequate study. If it really belongs to the nominate subgenus, one of the newly described species could be referring to it.

(b) *Meloe modestus* Fairmaire, 1887, from China (Yunnan): it was included in the nominate subgenus (see Bologna, 2008) and afterward considered as *incertae sedis* by Bologna (2020). The male holotype (MNHN) is greatly damaged by dermestids, with the head and pronotum partially destroyed, but with undamaged antennae that are neither geniculate nor modified in the middle (Fig. 28A, G).

(c–d) *Meloe longipennis* Fairmaire, 1891, from China (Hubei: Changyang), and *M. elegantulus* Semenov & Arnoldi, 1934, from China (Qinghai-Xizang Plateau, source region of the Yangtze River), both included in the subgenus *Treiodous* Dugès, 1869 by Bologna (2008) and afterward considered as *incertae sedis* by Bologna (2020). In both sexes of these species, the antennae are neither geniculate nor modified. We recently examined one syntype of *M. elegantulus* (HMNH) and tentatively consider it as related to *M. autumnalis* and consequently to the debated subgenus *Treiodous* (see Introduction).

(e) *Meloe proscarabaeus* var. *simplicicornis* Escherich, 1889, from eastern Turkey: we discuss here the taxonomic status of this taxon, which was considered tentatively as a distinct species by Bologna (2008, 2020), after the examination of one paratype (Fig. 28B, H). The male of this infraspecific form of *M. proscarabaeus* has a teratological condition of antennomeres. A similar teratology was described in *Meloe violaceus* (var. *simplex* Fleischer, 1890; see Batelka & Hájek, 2015).

The possibility that *M. modestus* and *M. elegantulus* belong to the subgenus *Treiodous* Dugès, 1869 must be explored. As noted above, the monophyly of this last subgenus in its current definition needs confirmation by molecular studies (Salvi *et al.*, in preparation). The only Palaearctic species referred until now to the subgenus *Treiodous*, *M. autumnalis* Olivier, 1792, differs from the five North American species of this subgenus, which are assigned to two distinct lineages: one with slightly or distinctly widened male middle antennomeres that are laterally compressed (Barbarus Group, *M. barbarus* LeConte, 1861, as in *M. autumnalis*; but in the same group, *M. ajax* Pinto, 1998 has simple male antennae); the other one with simple antennomeres (Laevis Group: see Pinto & Selander, 1970).

We cannot discuss the possibility that *M. longipennis* refer to the subgenus *Mesomeloe* Reitter, 1911 or the subgenus *Treiodous*. The species referred until now to *Mesomeloe* are very heterogeneous. At least one of them (*M. coelatus* Reiche, 1857) is very similar to the females of the nominate subgenus and was erroneously considered in the subgenus *Meloe* by Reitter (1911) under the name *M. aegyptius*.

In the present revision, we identified some new species and new synonymies. All recognized species are discussed in the following.

Proscarabaeus Group

Meloe (*Meloe*) *bodemeyeri* Ganglbauer, 1900

Fig. 2

Meloe Bodemeyeri Ganglbauer in Bodemeyer, 1900: 160.
Meloe (*Proscarabaeus*) *bodenmeyeri* (sic!): Pligінsky, 1913: 107.
Proscarabaeus bodemeyeri: Pligінsky, 1935: 322.
Meloe (*Meloe*) *bodemeyeri:* Bologna, 2008: 402; 2020: 547.

Type locality. "Eski-Chéhir" (= Turkey, Eskişehir).

Type specimens. According to the description (Ganglbaeur, in Bodemeyer, 1900), one single female from "Eski-Chéhir" (W Turkey) was available to the author and represented the holotype. This specimen was looked for at the HHMW and MNHB without success. However, Bodemeyer's description of the travel (1900), in which is included the Ganglbauer's description, recorded other specimens of *M. bodemeyeri* collected in two additional localities of Western Anatolia, namely Bilecik, some km N of the type locality, and Dorilayon, an archaeological area now inside of Eskişéhir. We examined one male specimen from Bilecik in the Pligінsky's collection at MNHB, labelled Type (Fig. 28I) [with the following labels: "99" (white, handwritten), "Asia Minor, Biledjik E. Bodemeyer" (white, printed), "*Meloe Bodemeyeri* Ganglb. Type" (white, handwritten), "*bodemeyeri* Ganglb. W. Pligінskii"]. Possibly it was sent to Ganglbauer by Bodemeyer after the description. We consider it as "compared with type" rather than a true paratype. This specimen was discussed by Pligінsky (1913, 1935), who emphasized the differences with *M. proscarabaeus* and the affinities with *M. ovalicollis* (see Taxonomic remarks). Another Cotype, labelled "Eski-Chéhir v. Bodemeyer", "Type *Meloe Bodemeyeri* Ganglb. Cotype", was briefly examined some years ago at ZNAM.

Description. Body (Fig. 2A) black, quite shining, legs and thorax ventrally with blue tint. Setation black, denser ventrally, dorsally extremely short, elytra almost nude. Body length: 24.0–30.0 mm.

Head (Fig. 2B) distinctly widened posteriorly on temples, sub-trapeizoidal, sides slightly rounded, temples ca. 2.8× as long as longitudinal diameter of eye, distinctly enlarged posteriorly, wider than maximal width of pronotum; surface with punctures middle sized mixed, deep, very dense, interpunctal surface shagreened; eye almost flat, frons depressed, without a distinct longitudinal furrow, vaguely depressed on posterior margin of eye; fronto-clypeal suture widely angulated, clypeus transverse. Fore margin of labrum emarginate in middle; mandibles robust, curved apically with a V-shaped incision, slightly bent below; maxillary and labial palpi unmodified. Male antennomeres (Fig. 2C–E) short, I progressively widened to apex, sub-cylindrical, 3× as long as II, longer than IV; II sub-globose, short; III sub-cylindrical, slightly widened progressively to apex, twice as long as II and sub-equal in length to IV; IV sub-cylindrical; V sub-cylindrical and in dorsal view slender and only slightly widened in antero-apical portion, in posterior view progressively widened to apex; VI in dorsal view inserted near centre of apex of V, only quite thick, slightly widened at base, in posterior view slightly wider than VII, with sides sub-parallel, only a slightly widened at apex; VII in dorsal view scarcely thick, in posterior view sides sub-parallel; VIII 0.6× as long as VII, short and cylindrical, about as long as wide; IX–X sub-cylindrical, IX sub-equal in length to VIII and X slightly longer than IX; XI twice as long as X, sub-cylindrical to middle, then conically narrowed to apex.

Pronotum (Fig. 2F) slightly longer than wide, sub-oval, sides widened from base to past middle, and apically distinctly rounded, medianly with a vague longitudinal depression; base sub-rectilinear, vaguely emarginate in middle, strictly bordered and with transverse depression along base; punctures as on head. Mesonotal scutellum (Fig. 2F) posteriorly sub-rectilinear, mesepisterna meeting in middle. Elytra with humeral dimple quite wide, with distinct vermicular longitudinal rugosities, without punctures. Legs robust, mesotibia only slightly curved along external margin; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomere I in both sexes not distinctly widened in front, in ventral view, undersides of tarsomeres with a narrow sparse hairy brush margined with longer and more robust setae; metatarsomere I in lateral view not widened anteriorly.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely V-incised, rounded in female. Male genitalia as in Figs. 2G–H; gonocoxal plate scarcely widened in middle and lobes of gonostyli short; both aedeagal hooks similar and far from apex.

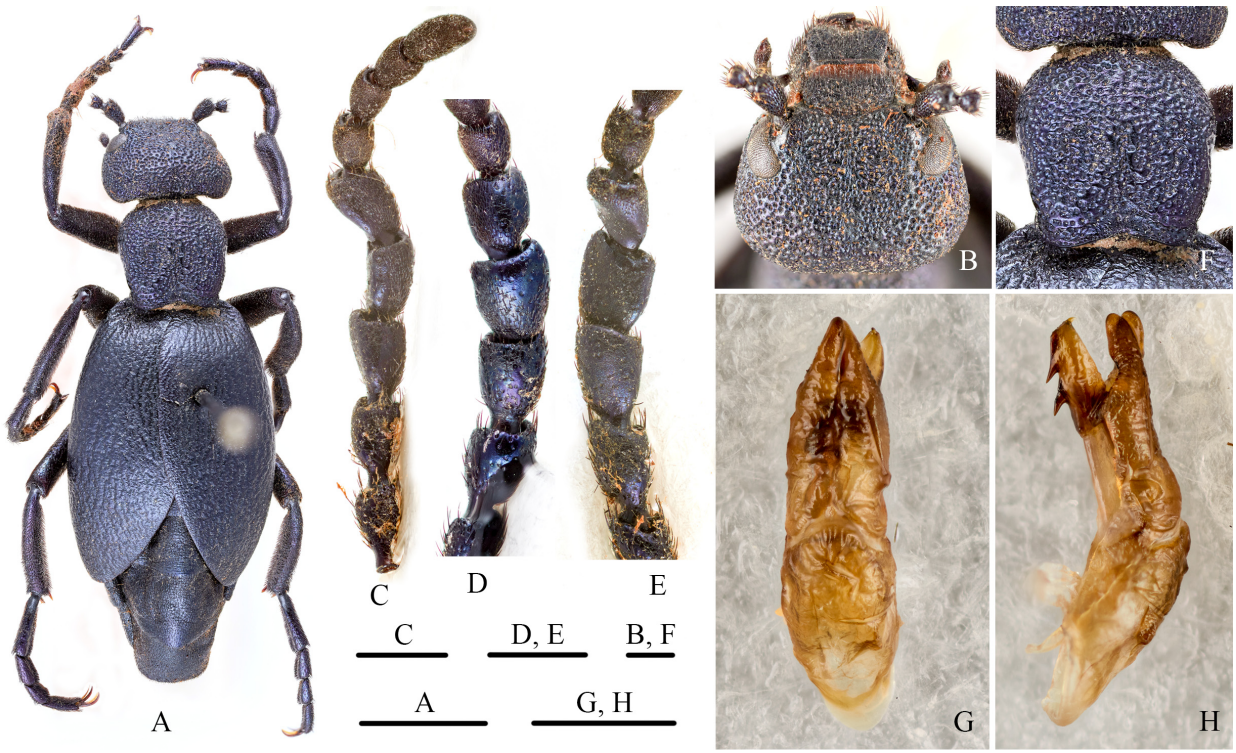

FIGURE 2. *Meloe* (*Meloe*) *bodemeyeri* Ganglbauer, 1900. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. pronotum, male, dorsal view; G. tegmen, ventral view; H. tegmen and aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–H).

Taxonomic remarks. Pligінsky (1913, 1935) correctly pointed out that this species is distinct from *M. proscarabaeus*, as suspected in the literature, and close to *M. ovalicollis*. The main distinctive characters vs. *M. proscarabaeus* are: punctures on head and pronotum (Fig. 2B, F) uniform, smaller, very dense, and elytra longer and with dense vermiculation; head wider posteriorly; male antennomeres distinct, especially antennomere V slenderer and less widened anteroapically in dorsal view, and VI and VII less concave in dorsal view (Fig. 2C); protarsomere I not widened anteriorly. Based on all these characters, *M. bodemeyeri* is more related to *M. ovalicollis* and *M. kulabensis* than to *M. proscarabaeus*.

Pligінsky (1935) compared a cotype of *M. ovalicollis* (we examined) with his specimen of *M. bodemeyeri* from Bilecik (see above) and pointed out that these two species can be distinguished because antennomeres VIII–X of *M. ovalicollis* (Fig. 4C) are slender and longer than wide while that of *M. bodemeyeri* (Fig. 2C) are sub-equal in size. However, this character, which is very difficult to distinguish, concerns only VIII and IX antennomeres. The more distinctive character is the pronotal sculpturing of *M. ovalicollis* (Fig. 4E) which shows two lateral impunctate areas and a deeper middle furrow. Moreover, antennomere III is longer than IV in *M. ovalicollis* (Fig. 4C), whereas they are sub-equal in *M. bodemeyeri* (Fig. 2C). These two species are widely allopatric, but extremely close. To support their taxonomic status and that of *M. kulabensis*, we suggest further molecular analyses on these uncommon species.

We examined some Turkish specimens from HNHM, which were identified by Z. Kaszab as *M. bodemeyeri*, but which belong to *M. proscarabaeus*.

Distribution. Western Turkey. See Appendix 1 for detailed localities.

Meloe (*Meloe*) *kulabensis* Shapovalov, 2014

Fig. 3

Meloe (*Meloe*) *kulabensis* Shapovalov, 2014: 1337; Bologna, 2020: 547.

Type locality. (Tajikistan) “E Bukhara near Kulyab”.

Type specimens: Holotype, ♂: “[Tajikistan,] E Bukhara near Kulyab. Regel 4.V. [18]84.” (ZIN). Paratypes: 6 ♂, 9 ♀, as holotype; 1 ♀, “E Bukhara. Regel [18]84.” (ZIN). None examined.

Description (Synthesized from Shapovalov, 2014). Body (Fig. 3A–B) black with metallic blue tint, head, pronotum, and antennae with violet tint, setation dark, denser ventrally, very short dorsally on head and pronotum, elytra almost nude. Body length: 14.5–20.3 mm.

Head sub-quadrate, about as long as wide (Fig. 3C), wider than pronotum, temples parallel, 3× as long as longitudinal diameter of eye; eye middle sized, sub-transverse, almost flat; frons flat, with a middle longitudinal furrow extended posteriorly from fronto-clypeal suture; punctures large, more or less dense in different populations (see below), deep, coarse, interpunctal surface shagreened or with sparse micro-punctures; fronto-clypeal suture distinctly angulated in middle, clypeus transverse. Labrum emarginate in middle; mandible robust, curved bidentate at apex; maxillary and labial palpi not modified. Male middle antennomeres geniculate and greatly modified in middle (Fig. 3D), extended to anterior third of elytra; antennomere I progressively widened in front, slightly more than twice as long as II, which is sub-globular; III more than twice as long as II, sub-cylindrical, slightly widened to apex, slightly longer than IV; IV distinctly widened anteriorly; V distinctly widened in front and more sub-trapezoidal, dorsally with high profile; VI rounded on dorsal side and almost straight and prolonged on ventral one; VII sub-oval and widened on sides, dorsally arcuate and thick, in dorsal view distinctly widened in antero-apical side; VIII sub-oval, ca. 1.2× as long as wide, ca. 0.7× as wide as VII; IX similar to VIII but slightly slender; X sub-cylindrical, slightly longer than IX; XI less than twice as long as X, less than 3× as long as wide, sub-cylindrical to middle, then curved and narrowing to apex.

Pronotum (Figs. 3A–B) as long as wide, sides widened until fore third, then converging, and anterior sides widely rounded; basal margin sub-rectilinear, with shallow median depression not reaching base of pronotum and projecting slightly beyond its middle; punctures as on head, slightly denser; apical portion of mesonotal scutellum not protruded; mesepisterna meeting at midline. Elytra with humeral dimple shallow; surface with fine and delicate wrinkles, intervals between wrinkles weakly convex, without distinct punctation and with dense microsculpture. Legs quite robust; external metatibial spur spoon-like; tarsal pads golden-yellow on all male legs; protarsomere I slender in ventral view (Fig. 3E), undersides of tarsomeres with a narrow sparse hairy brush margined with long

setiform hairs; metatarsomere I not compressed laterally, slender (Fig. 3F); protarsal claws robust and slightly curved.

Posterior margin of ventrite V with shallow rounded emargination bearing laterally brushes of erect hairs. Male genitalia as in Figs. 3G–H; gonostyli and gonocoxal plate relatively wide, gonocoxal plate slightly widened in middle; gonostyli fused ventrally in basal three-fifths, apical lobes elongate and slightly diverging apically; aedeagal proximal hook more curved than distal one which positioned in middle of proximal hook and apex.

Taxonomic remarks. As discussed above, this species is close to *M. ovalicollis* based on the derived condition of protarsomeres slender and male middle antennomeres shape with V scarcely widened anteriorly and VI–VII slightly concave, and also similarly distinguished from *M. bodemeyeri*.

Distribution: Tajikistan. Until now only known from the type locality.

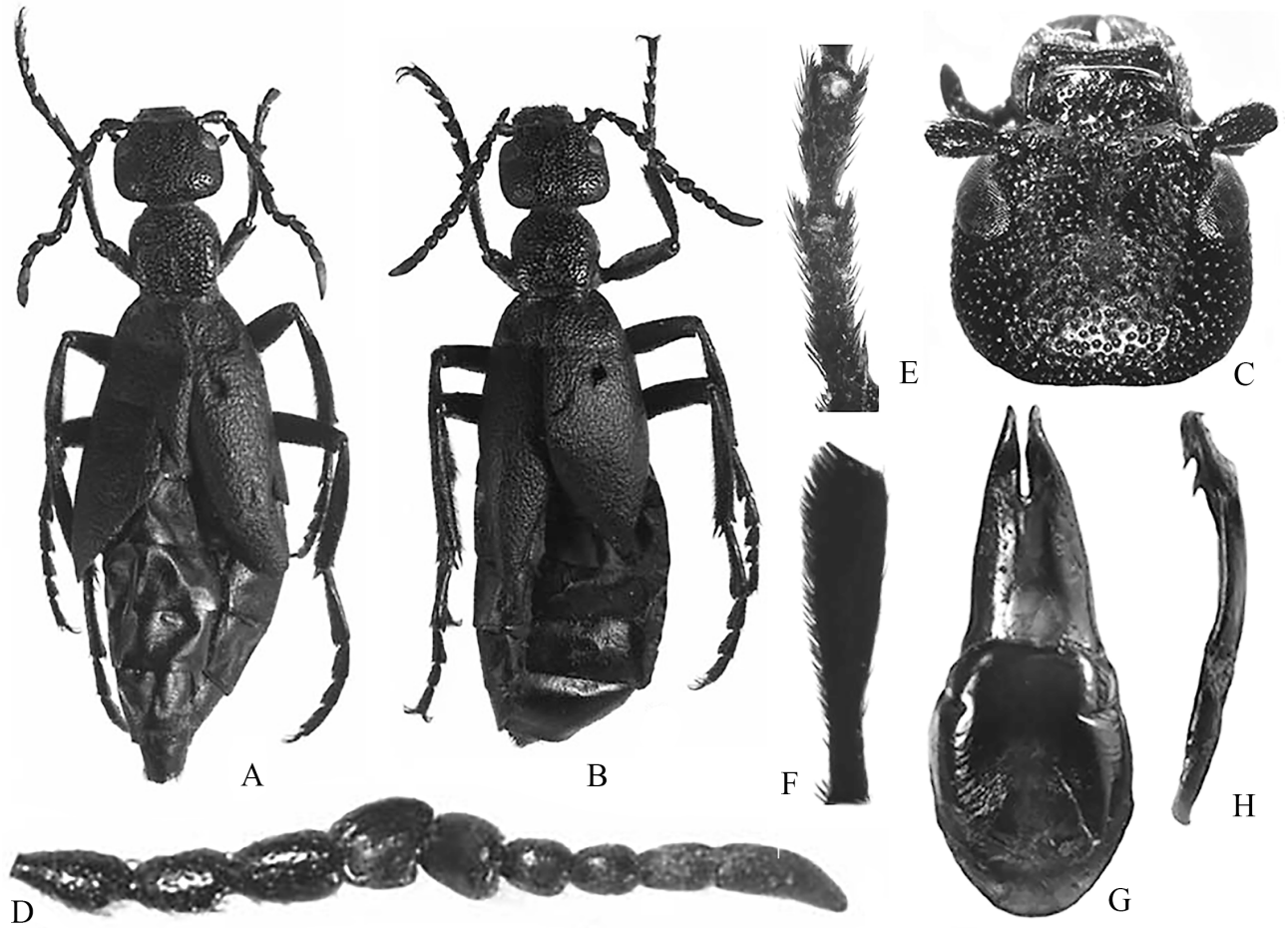

FIGURE 3. *Meloe* (*Meloe*) *kulabensis* Shapovalov, 2014. A. habitus, male; B. habitus, female; C. head, dorsal view; D. antennomeres III–XI, male, anterior view; E. protarsomeres I–II, ventral view; F. metatarsomere I, lateral view; G. tegmen, ventral view; H. aedeagus, lateral view (from Shapovalov, 2014).

Meloe (*Meloe*) *ovalicollis* Reitter, 1908

Fig. 4

Meloe ovalicollis Reitter, 1908: 246; Shapovalov, 2014: 1340.
Proscarabaeus ovalicollis: Pliginsky, 1935: 322.
Meloe proscarabaeus ovalicollis: Axentiev, 1987: 475.
Meloe (*Meloe*) *ovalicollis*: Bologna, 2008: 402; 2020: 547.

Type locality. (Eastern Kyrgystan) "Issyk-Kul".

Type specimens. We examined one syntype from Issy-Kul (or Ysyk Köl) [labelled "Issyk kul" (white, handwritten), "*Meloe ovalicollis* Rttr." (white, handwritten by Reitter), "E. Reitter coll." (white, printed), "*ovalicollis*

Reitt. W. Pliginskii" (white, printed and handwritten)] in the Pliginsky's collection (MNHB) (Fig. 28J) and photos of other syntypes from the same locality and museum (see Pliginsky, 1935).

Description. Body (Fig. 4A) black, quite shining or sub-opaque, legs and thorax ventrally with blue tint. Setation black, denser ventrally, dorsally extremely short, elytra almost nude. Body length: 22.0–35.0 mm.

Head (Fig. 4B) distinctly widened posteriorly on temples (but in some individuals almost parallel), sides slightly rounded, temples ca. 3× as long as longitudinal diameter of eye, slightly enlarged posteriorly, slightly wider than maximal width of pronotum; eye almost flat; frons with a shallow impression near base of antenna, with a fine and short longitudinal furrow, vaguely depressed on inner margin of eye; fronto-clypeal suture widely angulated, clypeus transverse; surface with punctures middle sized mixed with smaller ones, deep, dense, interpunctal surface shagreened, but on frons with a central area with scattered punctures and smooth interpunctal surface. Fore margin of labrum vaguely emarginate in middle; mandibles robust, curved apically with a V-shaped incision; maxillary and labial palpi unmodified. Male antennae reaching fore third of elytra, as in Fig. 4C; antennomere I progressively widened in front, sub-cylindrical, more than twice as long as II, as long as IV; II sub-globose, short; III sub-cylindrical, slightly widened progressively to apex, twice as long as II and longer than IV; IV sub-cylindrical; V in lateral view slender and slightly widened in antero-apical portion, dorsally progressively widened to apex; VI slightly wider than VII, in anterior view only quite thick, dorsally with sides sub-parallel, only slightly widened at apex; VII in anterior view scarcely thick, sides sub-parallel in dorsal view; VIII half as long as VII, short and cylindrical, about as long as wide; IX–X sub-cylindrical, IX sub-equal in length to VIII, X slightly longer; XI twice as long as X, sub-cylindrical until middle and conically narrowed to apex. Female antennae as in Fig. 4D.

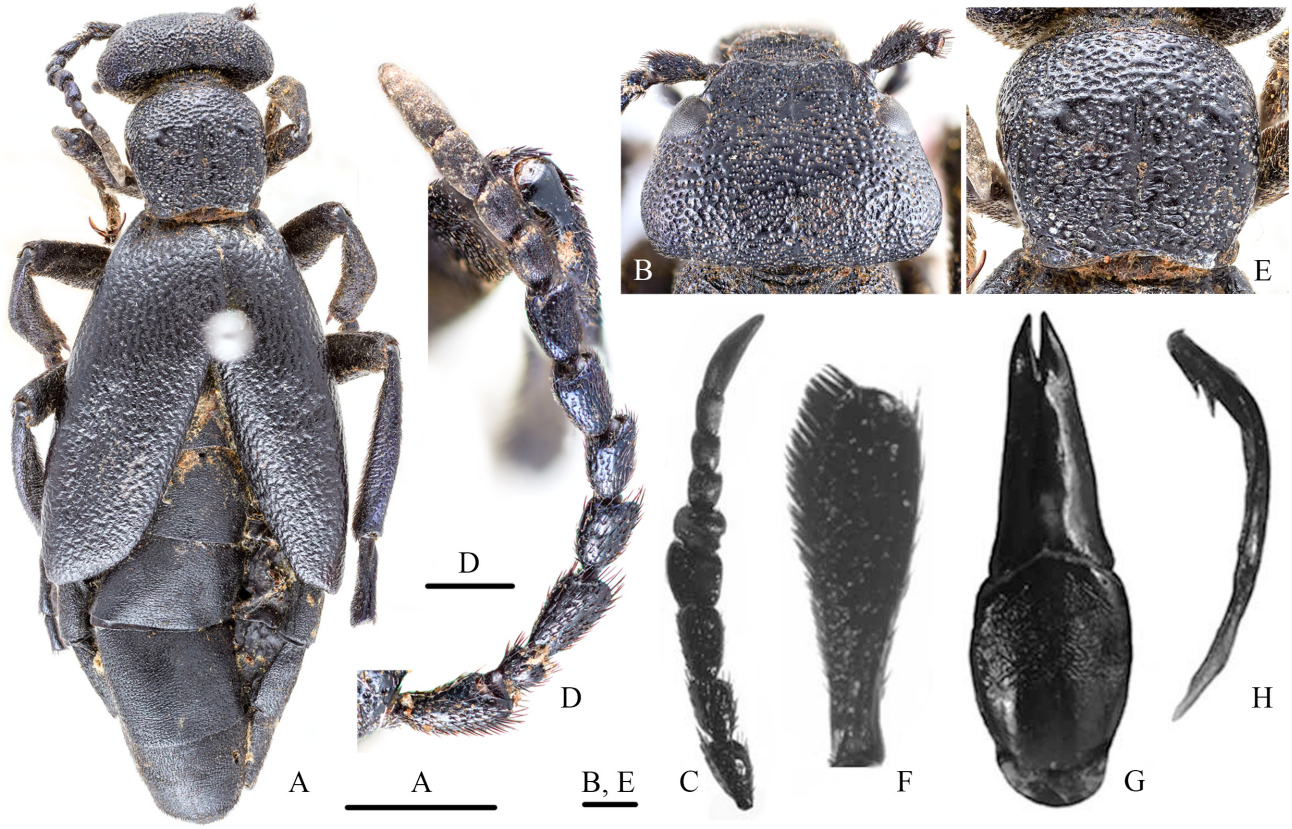

FIGURE 4. *Meloe* (*Meloe*) *ovalicollis* Reitter, 1908. A. habitus, female; B. head, female, dorsal view; C. antennae, male, anterior view; D. antenna, female, dorsal view; E. pronotum, female, dorsal view; F. metatarsomere I, lateral view; G. tegmen, ventral view; H. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B, D, E) (C, F–H: from Shapovalov, 2014).

Pronotum (Fig. 4E) slightly longer than wide, sub-oval, sides widened from base to past middle, and anteriorly distinctly rounded, medianly with a more or less distinct longitudinal depression; base sub-rectilinear, vaguely emarginate in middle, strictly rebordered and without highly distinct depression along base; punctures as on head with a weak central depression and two shallows lateral impunctate areas. Mesonotal scutellum (Fig. 4E) posteriorly sub-rectilinear, mesepisterna meeting at midline. Elytra with humeral dimple quite wide, with distinct vermicular

longitudinal rugosities, without punctures. Legs robust, mesotibia curved along external margin; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomere I in both sexes not distinctly widened in front, in ventral view, undersides of tarsomeres with a narrow sparse hairy brush margined with long setiform hairs; metatarsomere I in lateral view not widened apically (Fig. 4F).

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely V-incised, rounded in female. Male genitalia as in Fig. 4G–H; gonocoxal plate scarcely widened in middle; gonostyli fused ventrally in basal half, lobes short; both aedeagal hooks similar and far from apex.

Taxonomic remarks. As discussed above (see *M. bodemeyeri*), this species is related to *M. bodemeyeri* and *M. kulabensis* because of the shapes of male middle antennomeres, head, and protarsomere I. Interspecific differences are listed in the key.

Differences with *M. proscarabaeus* were clearly described by Reitter (1908) and Shapovalov (2014) and concern especially the more elongate and oval pronotum, head surface densely punctured with three longitudinal impressions, elytra with fine vermiculation without punctures, male middle antennomeres flatter, VII slightly narrower than VI, I as long as IV (but in female longer).

Distribution. Southern Kazakhstan, Kyrgyzstan, Tajikistan. See Appendix 1 for detailed localities.

Meloe (*Meloe*) *proscarabaeus* Linnaeus, 1758

Fig. 5

Meloe proscarabaeus Linnaeus, 1758: 419; Heyden, 1887: 260; Escherich, 1889: 334; Pligінsky, 1911: 44; Miwa, 1928: 74; Tan, 1981: 410; 1992: 577; Ramsay, 2011: 190.
Cantharis proscarabaeus: De Geer, 1775: 3.
Proscarabaeus proscarabaeus: Schrank von Paula, 1781: 226.
Meloe punctatus Fabricius, 1792: 518 [historical homonym, nec Pallas, 1781].
Meloe tecta Panzer, 1793: 14.
Meloe atrata Meyer, 1793: 15.
Meloe brunsvicensis Meyer, 1793: 25.
Meloe volgensis Tauscher, 1812: 148.
Meloe incertus Tauscher, 1812: 149.
Meloe rugipennis Mannerheim, 1825: 31.
Triungulinus andrenatarum Dufour, 1828: 64.
Meloe aegyptius Brandt & Erichson, 1832: 119.
Meloe cyanella Brullé, 1832: 229.
Meloe cyanella var. *caerulans* Brullé, 1832: 230.
Meloe exaratus Faldermann in Ménétriés, 1832: 210.
Proscarabaeus vulgaris Stephens, 1832: 66.
Proscarabaeus rugicollis Stephens, 1832: 66.
Proscarabaeus tectus: Stephens, 1832: 67.
Meloe megacephalus Fischer von Waldheim, 1842: 27.
Meloe plicatipennis Lucas, 1849: 400.
Meloe cyaneus Mulsant, 1857: 47 [homonym, nec Fabricius, 1801]; Escherich, 1889: 333.
Cnestocera proscarabaeus: Thomson, 1859: 124.
Meloe subcyaneus Wollaston, 1864: 514.
Meloe proscarabaeus var. *pannonicus* Baudi di Selve, 1878b: 351.
Meloe proscarabaeus var. *gallicus* Dejean, 1821: 75; Mulsant, 1857: 47; Baudi di Selve, 1878b: 351; Reitter, 1895: 4.
Meloe proscarabaeus var. *tauricus* Baudi di Selve, 1878b: 351; Reitter, 1895: 4.
Meloe proscarabaeus ab. *undulatus* Baudi di Selve, 1878b: 351 (unavailable name).
Meloe siculus Baudi di Selve, 1878b: 352; Pligінsky, 1911: 45.
Meloe crispatus Fairmaire, 1884: 173. Reitter, 1895: 4; Ganglabauer, 1900: 160.
Meloe (*Proscarabaeus*) *proscarabaeus*: Reitter, 1895: 4; Kaszab, 1968a: 772; 1968: 13 (7).
Meloe (*Proscarabaeus*) *simplicicornis*: Reitter, 1895: 4.
Meloe (*Proscarabaeus*) *aegyptius*: Reitter, 1895: 5.
Meloe (*Proscarabaeus*) *violaceus* var. *tectus*: Reitter, 1895: 5.
Meloe (*Proscarabaeus*) *tenuipes* Jakowlew, 1897: 252; Kaszab, 1964: 320, 1969: 321. **n. syn.**
Meloe crispata: Pligінsky, 1911: 45.
Meloe siculus var. *cyanosubsiriata* Pligінsky, 1913: 107.

Meloe (*Proscarabaeus*) *sapporensis* Kôno, 1936: 91. **n. syn.**
Meloe rathjensi Borchmann, 1938: 464.
Meloe proscarabaeus ab. *cyanescens* Csiki, 1953: 117 [replacement name of *Meloe cyaneus* Mulsant, 1857] (unavailable name).
Meloe (*Meloe*) *proscarabaeus*: MacSwain, 1956: 97; Bologna, 1991: 380; Ruiz & Avila, 1993: 143; Du *et al.*, 1997a: 23; 1997b: 55; Pérez-Moreno *et al.*, 2003: 201; Lückmann & Assmann, 2005: 4104; García-París *et al.*, 2006: 343; Vitali, 2012: 49; Tshernyshev, 2014: 182; Bologna *et al.*, 2018: 653.
Meloe (*Meloe*) *proscarabaeus proscarabaeus*: Bologna, 2008: 402; 2020: 547; García-París *et al.*, 2010: 173; Zhao *et al.*, 2012: 37; Pan & Ren, 2018: 76.
Meloe proscarabaeus afghanistanicus Kaszab, 1953: 310.
Meloe (*Proscarabaeus*) *rathjensi*: Kaszab, 1983: 184.
Meloe proscarabaeus sericeorugosus Axentiev, 1987: 474.
Meloe (*Meloe*) *aegyptius*: Bologna, 1991: 386; 2008: 401; 2009: 359; 2020: 547.
Meloe (*Meloe*) *rathjensi*: Bologna & Pinto, 1998: 55; Bologna, 2008: 402; 2020: 548.
Meloe (*Meloe*) *aegyptius subcyaneus*: Bologna, 1994: 76; 2008: 401; 2020: 547.
Lytta proscarabaeus: Hua, 2002: 130.
Meloe (*Meloe*) *proscarabaeus afghanistanicus*: Bologna, 2008: 402; 2020: 547.
Meloe (*Meloe*) *proscarabaeus sapporensis:* Kifune *et al.*, 1973: 57; Bologna, 2008: 402; 2020: 548.
Meloe (*Meloe*) *proscarabaeus sericeorugosus*: Bologna, 2008: 402; 2020: 548.
Meloe (*Meloe*) *simplicicornis*: Bologna, 2020: 548.
Meloe (*Meloe*) *tenuipes*: Bologna, 2008: 402; 2020: 548.

Type locality. *Meloe proscarabaeus* Linnaeus: no information, but likely Sweden; *Meloe punctatus* Fabricius, 1792: "in Anglia"; *Meloe tecta* Panzer: "Brunsvigiae…"; *Meloe atrata* Meyer: "Hildesiae…"; *Meloe brunsvicensis* Meyer: "Brunsvigiae…"; *Meloe volgensis* Tauscher: "…Sareptae…"; *Meloe incerta* Tauscher: "…Sareptae…"; *Meloe rugipennis* Mannerheim: "Germany"; *Triungulinus andrenatarum* Dufour: "…environs de Saint-Sever, sur quelques individus de l'Andrena carbonaria…"; *Meloe aegyptius* Brandt & Erichson: "Aegyptus. Prope Alexandriam"; *Meloe cyanella* Brullé: no information; *Meloe cyanella* var. *caerulans* Brullé: no information; *Meloe exaratus* Faldermann: "…province du Caucase"; *Proscarabaeus vulgaris* Stephens: "…Hertfords, …"; *Meloe plicatipennis*: Lucas, 1849: (Algeria) "sur le chemin du lac Houbeira, clans les environs du cercle de Lacalle"; *Proscarabaeus rugicollis* Stephens: "…near London, …Devonshire"; *Meloe cyaneus* Mulsant: "…plupart des parties de la France"; *Meloe subcyaneus* Wollaston: "intermediis Lanzarotae"; *Meloe proscarabaeus* var. *pannonicus* Baudi di Selve: "Illyria, ins. Lusina"; *Meloe proscarabaeus* var. *gallicus* Baudi di Selve: "Parisiis, Gall. or. et mer."; *Meloe proscarabaeus* var. *tauricus* Baudi di Selve: "Podolia austr. ..., Ross. merid."; *Meloe proscarabaeus* ab. *undulatus* Baudi di Selve: "Turkey"; *Meloe siculus* Baudi di Selve, 1878: "Sicilia"; *Meloe crispatus* Fairmaire "Akbès"; *Meloe tenuipes* Jakowlew, 1897: "Province de l'Ussuri: Sidémi"; *Meloe sapporensis* Kôno: "Hokkaido, Sapporo"; *Meloe rathjensi* Borchmann, 1938: (Yemen) "Sanaa und Scho ub bei Sanaa; Asr; Ganaas"; *Meloe proscarabaeus afghanistanicus*: "Afghanistan: Gusalek, Nuristan"; *Meloe proscarabaeus sericeorugosus* Axentiev: "Nepal, Mustang Distr., Thakkhola, Alt-Marpha".

Type specimens. *Meloe proscarabaeus* Linnaeus: LSUK (examined some years ago in the Linnean collection London by one of us); *Meloe punctatus* Fabricius: ZMUC; *Meloe tecta* Panzer: ZMHB; *Meloe atrata* Meyer: unknown; *Meloe brunsvicensis* Meyer: unknown; *Meloe volgensis* Tauscher: unknown; *Meloe incerta* Tauscher: unknown; *Meloe rugipennis* Mannerheim: MZH; *Triungulinus andrenatarum* Dufour: MNHN (not examined); *Meloe cyanella* Brullé and var. *caerulans* Brullé: 1 male with labels *Meloe cyanella* Brullé (handwritten, white) and "414" (rectangular), MNHN (examined); *Meloe exaratus* Faldermann: ZIN; *Proscarabaeus vulgaris* Stephens: BMNH (examined); *Proscarabaeus rugicollis* Stephens: BMNH (examined); *Meloe plicatipennis* Lucas: MNHN (examined); *Meloe cyaneus* Mulsant: MHNL; *Meloe subcyaneus* Wollaston: MNHN (examined); *Meloe proscarabaeus* var. *pannonicus* Baudi di Selve: MRSN (examined); *Meloe proscarabaeus* var. *gallicus* Baudi di Selve: MRSN (examined); *Meloe proscarabaeus* var. *tauricus* Baudi di Selve: MRSN (examined); *Meloe proscarabaeus* ab. *undulatus* Baudi di Selve, 1878: MRSN (examined); *Meloe siculus* Baudi di Selve: MRSN (examined); *Meloe crispatus* Fairmaire: MNHN (examined); *Meloe tenuipes* Jakowlew: ZIN, MNHB (examined); *Meloe rathjensi* Borchmann: (see Kaszab, 1983) types (12 males and females) were not examined because they were probably destroyed during the II World War at the Hamburg Museum (Bologna & Pinto, 1998), but one possible syntype at HNHM and some topotypic specimens were examined; *Meloe proscarabaeus afghanistanicus* Kaszab: Afghanistan: HNHM (not examined); *Meloe proscarabaeus sericeorugosus* Axentiev: SMF (not examined).

Description. Body (Fig. 5A) blue or blue-black, or black sub-shining or sub-opaque, setation black, denser ventrally, very short dorsally on head and pronotum, elytra almost nude. Body length: 8.0–45.0 mm.

Head (Fig. 5B) slightly widened posteriorly, temples ca. twice as long as longitudinal diameter of eye, wider than pronotum; eye middle sized, slightly transverse, almost flat; frons with two vague depressions near antennal base; a weak middle longitudinal furrow from fronto-clypeal suture to centre of head; punctures very variable, from large to small, density varying among different populations (see below), deep, sometimes confluent and coarse, interpunctal surface shagreened or with sparse micro-punctures; fronto-clypeal suture distinctly angulated in middle, clypeus transverse. Labrum widely emarginated in middle; mandible robust, curved and bidentate at apex; maxillary and labial palpi not modified. Male middle antennomeres geniculate and greatly modified (Fig. 5C–E), extended to anterior third of elytra, antennomere I slightly longer than twice length of II, which sub-globular; III more than twice as long as II, sub-cylindrical, slightly widened to apex, longer than IV; IV distinctly widened to apex; V distinctly widened to apex in dorsal view and more sub-trapezoidal, anteriorly distinctly widened to apex; VI slightly transverse in posterior view, rounded on dorsal side, and almost straight and prolonged on ventral one; VII sub-oval and slightly widened on sides in posterior view, apex with maximal elevation on centre, in dorsal view distinctly widened at apex; VIII sub-cylindrical as long as wide, as wide as half of VII; IX similar to VIII but slightly slender and X slightly slender than IX; XI twice as long as X, less than 3× as long as wide, cylindrical until middle and obtusely narrowed to apex; antennomeres V–VII with small differences in some subspecies. Female antennomeres V–VII not modified, widened apically as similar as IV, but VII slightly narrower, other antennomeres similar to male (Fig. 5F).

Pronotum (Fig. 5G) with punctures as on head, slightly wider than long, sides widened until fore third and anterior sides distinctly rounded; basal margin sub-rectilinear, indistinctly depressed to apex; apical portion of mesonotal scutellum (Fig. 5G) not protruded; mesepisterna meeting at midline. Elytra with humeral dimple shallow; surface with vermiculation variable in different populations, from fine and vague to very distinct and sub-rugose. Legs robust; external metatibial spur spoon-like; tarsal pads golden-yellow on all male legs; protarsomere I in both sexes robust and distinctly widened to apex in ventral view with a hairy brush not margined by long setiform hairs; metatarsomeres robust and not compressed laterally; protarsal claws robust and less curved.

Last male abdominal ventrite scarcely depressed in middle, posterior margin distinctly angulated in middle; female last ventrite flat and its posterior margin almost straight. Male genitalia as in Figs. 5H–J; gonocoxal plate widened apically, gonostyli fused ventrally in basal two-thirds, in lateral view narrow with apical lobes long and stout; both aedeagal hooks similar in shape, and far from apex.

Taxonomic remarks. The body colour varies from blue to dark-blue to black. This species is characterized by a great variation in the body sculpture. Several varieties or subspecies have been described on the basis of the integumentary sculpture. These differences seem to represent a cline from West to East, especially the western European (Iberian Peninsula, France, UK, Italy, Tyrrhenian Islands) and northern African populations are distinctly different from the remaining ones. Some Nearctic species with a wide range (e.g., *Meloe niger*, *M. impressus*) have extensive variation in the body sculpture as in *M. proscarabaeus*, but no subspecies have been described. Similar variation, even if not so extensive, occurs in the Palaearctic *M. violaceus*.

As noted in the "Species account", the taxonomic status of *Meloe proscarabaeus* var. *simplicicornis* Escherich, 1889 was considered doubtful in the literature. Escherich clearly indicated this taxon based on males from Armenia (Araxes valley) and eastern Turkey (Erzurum). We examined one paratype at HNHM (Fig. 28B, H).

The polytypy of *M. proscarabaeus* was pointed out by Kaszab (1953) and Axentiev (1987), who described two central Asiatic subspecies and evidenced the distinction of several populations, which however were not formalized as subspecies. We listed above all names referred to *M. proscarabaeus* in the literature. Baudi di Selve (1878a, 1878b) re-evaluated or described some varieties of *M. proscarabaeus* as typical of different regions of the range, which can be considered as subspecies according to the ICZN. Moreover, Jakowlew (1987) described *M. tenuipes* that has been considered as a distinct species, and Kôno (1936) described *M. sapporensis* that was referred as subspecies to *M. proscarabaeus* by Kifune *et al.* (1973). Both taxa are here considered as junior synonyms. A molecular phylogeographic study of this polytypic species could disentangle the systematics of this complex (Salvi *et al.*, in preparation).

According to the differences among populations, we suggest tentatively, as possible subspecies of *M. proscarabaeus*, the following ones:

ssp. *aegyptius* Brandt & Erichson, 1832 n. stat., from eastern Canary Islands (Lanzarote and Fuerteventura), Morocco and western Sahara, Algeria, Tunisia, Italy (Sicily), Libya, Egypt (also Sinai), S Israel (Negev) (Bologna, 2008). See Appendix 1 for detailed localities.

The diagnostic characters are: body black, opaque, in some cases ventrally with blue tint on sides of head and pronotum; head and pronotum with surface sub-alutaceous and almost sericeous, finely shagreened, punctures scarce and distanced (especially at centre), small and shallow; elytra surface very finely shagreened, vaguely vermiculated.

The junior synonymies, *Meloe plicatipennis*, *Meloe subcyaneus*, and *Meloe siculus*, of *M. p. aegyptius* were confirmed after the examination of the types (see above and Israelson *et al.*, 1982; Bologna, 1991, 1994). This taxon represents a southern Mediterranean-Saharan subspecies or eco-phenotype, with the body punctation distinctly sparse. Ranges of this and other subspecies (*M. p. punctatus* and *M. p. exaratus*) are almost parapatric, except in few areas: (a) northern Maghreb, wherein in the mountain zones (Rif, Kabylia) is present *M. p. punctatus* (MNHB), while *M. p. aegyptius* is mostly distributed in steppic and semi-desert regions from Morocco to Tunisia (see Appendix1); (b) Sicily (Italy): the Sicilian populations of *M. p. punctatus* are similar to those of central and southern Italy, even if the body sculpture is even more smooth; the phenotype *M. p. aegyptius* is very uncommon in this island, with few old records, especially in northeastern parts of Sicily (the last one in ca. 1930; Bologna, 1991) (see Appendix 1); (c) Egypt: few populations of *M. proscarabaeus*, with a body sculpture similar to the Near East one (*M. p. exaratus*), were recorded from some localities (Cairo, Siala, Luxor: Alfieri, 1976; El Farafra, 27.06° N 27.97° E: Ghoneim *et al.*, 2012; W Desert, New valley Government: MABC; Cairo: MNHN) in a range overlapping that of *M. p. aegyptius*; (d) Negev (Israel): *M. p. exaratus* is distributed south until Beer Sheva (Nahal Revivim), while *M. p. aegyptius* is spread north to Netzava (Holot Agur; Nahal Lavan) and Gvulot, less than 30 km south of the *M. p. exaratus* populations. This biogeographic and evolutionary intriguing situation needs to be explored by a molecular approach and perhaps represents events of semi-speciation.

The variability of *M. p. aegyptius* is minimal: some individuals, from Canary, western Sahara (phenotype *M. subcyaneus*: see Pardo Alcaide, 1961; Bologna, 1994), and Sicily (phenotype *M. siculus*: see Bologna, 1991), have the body sides with blue tint. According to Pardo Alcaide (1961), the specimens from western Sahara have the pronotum more elongate and with more rounded sides; specimens from Sicily have the antennomere V more widened at apex in posterior view, similar to that of *M. p. punctatus* and the other subspecies. Some individuals from Algeria have the last portion of elytra with more evident vermiculation (phenotype *M. plicatipennis*: see Bologna, 1991).

As noted above, *Meloe* (*Proscarabaeus*) *aegyptius* sensu Reitter (1911) refers to *M.* (*Mesomeloe*) *coelatus* Reiche, 1857.

ssp. *afghanistanicus* Kaszab, 1953, from central Afghanistan (in central Afghanistan was recorded also the nominate form). This subspecies is distinct because of small differences in the shape and length of antennomeres. We did not examine any specimens from Afghanistan. However, according to the detailed description by Kaszab (1953), we suspect that *M. p. afghanistanicus* Kaszab could be a synonym of *M. semicoriaceus* Fairmaire, which is distributed in Kashmir and has similar antennal features.

ssp. *cyanellus* Brullé, 1832 (syn. *M. cyanella* var. *caerulans* Brullé, *M. p.* var. *pannonicus* Baudi di Selve, *M. p.* var. *tauricus* Baudi di Selve), from Istria and Hungary to the whole Balkans, at least until Ukraine and SW Russia. The body is dark blue; punctures are deeper, denser, and coarser than the nominate form. Close to the ssp. *M. p. exaratus*.

ssp. *exaratus* Faldermann, 1832 (syn. *M. p.* ab. *undulatus* Baudi di Selve, *M. crispatus* Fairmaire, *M. sapporensis* Kôno **n. syn.**, *M. tenuipes* Jakowlew **n. syn.**), from Anatolia, Caucasus, Levant, N Egypt, Iran, Central Asia, S Siberia, east until China and N Japan. The body is dark blue or blue-black, similar to the nominate form, but with denser punctures and more rugose elytral vermiculation. Incidentally, we found some Azerbaijan specimens with a phenotype like *M. p. punctatus*, while in the remaining Caucasus, the phenotype *M. p. exaratus* is widely distributed.

The form *M. sapporensis*, described as a distinct species from Japan (Hokkaido; Kôno, 1936) because of the tarsal pads colour, which afterward was considered as a subspecies (Kifune *et al.*, 1973), does not differ from the eastern Asian populations.

Based on the study of a possible syntype (MNHB), *M. tenuipes* Jakowlew, 1897 is treated as a junior synonym

of *M. p. exaratus* and similar to the central Asiatic populations. Already Jakowlew (1897) pointed out that their differences are very small. Thersnyshev & Axentiev (1996) synonymized both *M. tenuipes* Jakowlew, 1897 and *M. tarsalis* Jakowlew, 1897 with *M. lobatus*. Actually, these three taxa are greatly distinct, and *M. tarsalis*, in our opinion, is a distinct species of the Lobatus Group (see below). Shapovalov (pers. comm., 2019), who examined types at ZIN, considered *M. tenuipes* as a synonym of *M. proscarabaeus*.

ssp. *proscarabaeus* Linnaeus, 1758 (syn. *Proscarabaeus tectus* Panzer, *M. atratus* Meyer, *M. brunsvicensis* Meyer, *M. rugipennis* Mannerheim, *M. volgensis* Tauscher, *M. incertus* Tauscher), from the central and eastern Europe to southeastern Russia. The body is dark blue to blue-black; punctures are deep but not coarse even if dense; elytral vermiculation is quite evident.

ssp. *punctatus* Fabricius, 1792 (syn. *Proscarabaeus rugicollis* Stephens; *Proscarabaeus vulgaris* Stephens; *Triungulinus andrenatarum* Dufour; *M. cyaneus* Mulsant nec Fabricius, not available name; *M. p.* var. *gallicus* Dejean; *M. p.* ab. *cyanescens* Csiki), from Portugal, Spain, France, Belgium, Switzerland, England, Italy, W Mediterranean islands, and with isolated populations in northern Maghreb. The body is blue-azure; punctures are relatively dense and not distinctly rugose, elytral vermiculation is shallow. In northern Italy, northern France, Belgium, and England, some individuals have the punctures intermediate with the nominate form; in Sicily, most individuals (described by Pligінsky, 1913 as *M. siculus* var. *cyanosubsiriata*) have very fine punctures, almost as in the ssp. *M. p. aegyptius*.

ssp. *rathjensi* Borchmann, 1938 n. stat., from southwestern Arabia and Yemen. This subspecies is similar to *M. p. exaratus* with reduced morphological differences. The pronotum is about as wide as long; the head and pronotum densely punctuate, punctures are crowded and confluent in part; the male antennomeres VI and VII are less widened on anterior side, almost parallel; protarsal claws are thin and distinctly curved (Fig).

ssp. *sericeorugosus* Axentiev, 1987, from Nepal. The author noted some differences in the shape of male antennomeres VI and VII, that appear uncertain. The elytra are cinereous and with fine vermiculation; the protarsomere I less flattened and less widened to the apex. The last character is typical in *M. ovalicollis* Reitter, from Kazakhstan and Kyrgyzstan.

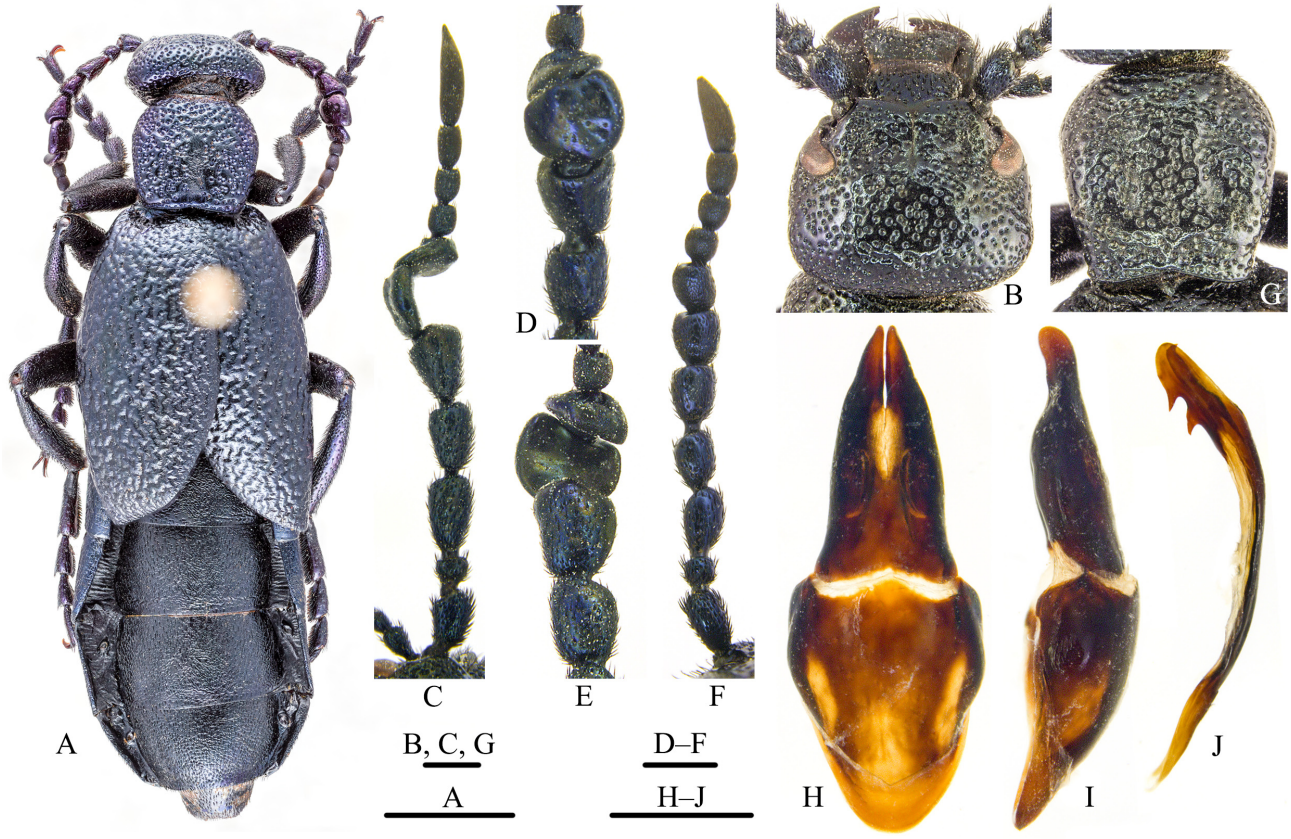

FIGURE 5. *Meloe* (*Meloe*) *proscarabaeus* Linnaeus, 1758. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Distribution. From western Mediterranean, through Europe and Asia, east to Japan, Arabian Peninsula, northern Africa; widely distributed in Palaearctic Region. See Appendix 1 for details.

Meloe (*Meloe*) *semicoriaceus* Fairmaire, 1891

Fig. 6

Meloe semicoriaceus Fairmaire, 1891b: cii; Saha, 1979: 130; Anand, 1989: 30; Akbar *et al.*, 2017: 70.
Meloe (*Meloe*) *semicoriaceus*: Bologna, 2008: 402; 2020: 548; Bologna *et al.*, 2018: 654.

Type locality. "Montagnes de Kashmir".

Type specimens: Holotype male (MNHN) examined, with the following labels: "Kashmir" (handwritten by Fairmaire); "*Meloe semicoriaceus* Fairm. Kashmir" (handwritten by Fairmaire); "Museum Paris, collection Léon Fairmaire 1906"; "Holotypus *Meloe semicoriaceus* Fairm. M. Bologna des."; "*Meloe semicoriaceus* Fairm. M. Bologna det, 1987" (all printed and handwritten).

Description. Body (Fig. 6A) blue-black, especially on venter and legs, or black sub-shining, setation black, denser ventrally, very short dorsally on head and pronotum, elytra almost nude. Body length: 17.0–22.0 mm.

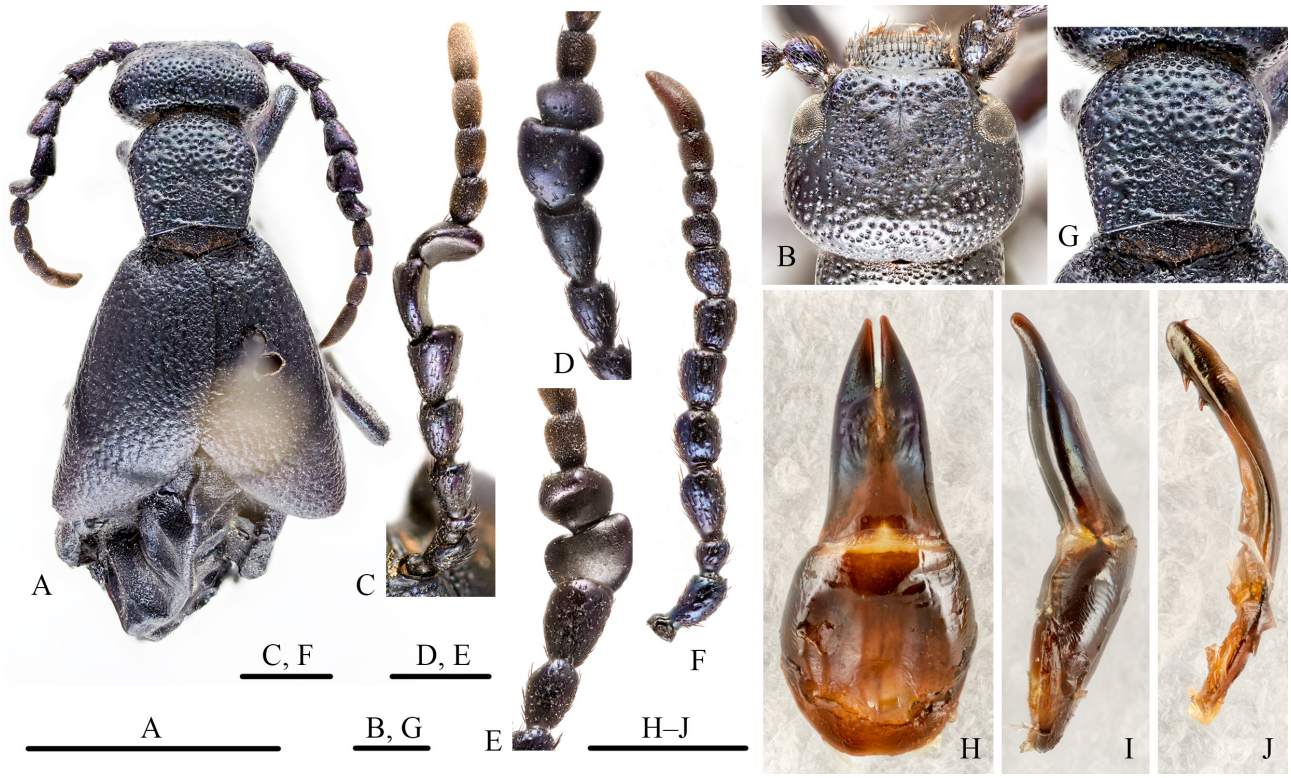

FIGURE 6. *Meloe* (*Meloe*) *semicoriaceus* Fairmaire, 1891. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Head (Fig. 6B) slightly widened posteriorly, temples ca. 3× as long as longitudinal diameter of eye, wider than pronotum; eye middle sized, sub-transverse, almost flat; frons flat, with two vague depressions near antennal base, where is slightly raised; tracks of a middle longitudinal furrow from fronto-clypeal suture to centre of head; punctures deep, wide, sub-rugose sometimes confluent, interpunctal surface shagreened or with sparse micro-punctures; fronto-clypeal suture distinctly angulated in middle, clypeus transverse. Labrum vaguely emarginate in middle; mandible robust, curved and apparently unidentate at apex; maxillary and labial palpi not modified. Male middle antennomeres geniculate and greatly modified in middle (Figs. 6C–E), extended to anterior third of elytra, antennomere I slightly more than twice as long as II; II ca. quarter of III, III as long as IV, IV quite short and slender, V in posterior view sub-rectangular and scarcely widened to apex, in dorsal view not distinctly produced anteriorly, VII

in anterior view narrowly sub-hexagonal, apex with maximal elevation on dorsal side, in dorsal view only slightly widened at apex, VIII longer than wide, XI 3× as long as wide, cylindrical until middle and obtusely narrowed to apex, distinctly longer than IX–X together. Female antennae as in Fig. 6F.

Pronotum (Fig. 6G) with punctures as on head, slightly wider than long, sides distinctly convergent at base, sides distinctly rounded anteriorly; basal margin slightly emarginate and vaguely depressed at base in middle; apical portion of mesonotal scutellum (Fig. 6G) not protruded; mesepisterna meeting at midline. Elytra with humeral dimple shallow; surface with vermiculation very distinct and sub-rugose. Legs robust; external metatibial spur spoon-like; tarsal pads golden-yellow on all male legs; protarsomere I in both sexes robust and distinctly widened in front in ventral view with a hairy brush not marginate by long setiform hairs; metatarsomere I not compressed laterally.

Abdominal last male ventrite scarcely depressed in middle, posterior margin distinctly angulated in middle. Male genitalia as in Fig. 6H–J.

Taxonomic remarks. The validity of this species needs confirmation by molecular phylogenetic studies because it is very similar to *M. proscarabaeus*, even if with differences in antennal features. In particular, it seems very similar to *M. proscarabaeus afghanistanicus*, of which we did not examine specimens, and which could represent its synonym.

Distribution: Kashmir. See Appendix 1 for detailed localities.

Angusticollis Group

Meloe (*Meloe*) *violaceus* Marsham, 1802

Figs. 7–8

Meloe proscarabaeus Sulzer, 1761: 92 [nec Linnaeus, 1758].
? Meloe aprilina Meyer, 1793: 21. Uncertain taxon.
Pediculus melittae Kirby, 1802: 168 (see comments in García-París *et al.*, 2010: 174).
Meloe violaceus Marsham, 1802: 482; Baudi di Selve, 1878a: 849; 1878b: 352; Escherich, 1889: 335; Matsumura, 1907: 21, pl. 57, f. 9; Okamoto, 1924: 184; Miwa, 1928: 73; Ramsay, 2011: 189.
Meloe similis Marsham, 1802: 482.
Melittophagus melittae: Kirby, 1818: 164.
Proscarabaeus violaceus: Stephens, 1829: 20.
? Meloe rufipes Bremi-Wolf, 1856: 199. Uncertain taxon.
Cnestocera violacea: Thomson, 1864: 342.
? Meloe prolifericornis Motschulsky, 1872: 48. Uncertain taxon.
Meloe strigosa Motschulsky, 1872: 48.
Meloe violaceus var. *simplex* Fleischer in Escherich, 1890: 23.
Meloe similis var. *angusticolis* Rey, 1892: 137 [nec Say, 1824]; Reitter, 1895: 5.
Meloe (*Proscarabaeus*) *violaceus*: Reitter, 1895: 5; Kaszab, 1968a: 772.
Meloe (*Proscarabaeus*) *semenowi* Jakowlew, 1897: 251; Kifune & Baba, 1959: 6; Kaszab, 1968b: 14.
Meloe violacea: Pligінsky, 1911: 45.
Meloe violaceus ab. *montanus* Reitter, 1911: 383 [nec LeConte, 1866] (unavailable name).
Meloe violaceus ab. *montanuus* Kaszab, 1958: 190 [not necessary replacement name of *Meloe violaceus* ab. *montanus* Reitter, 1911] (unavailable name).
Meloe violaceus ab. *tenuicollinus* Kaszab, 1958: 191 [not necessary replacement name of *Meloe violaceus* var. *angusticollis* Rey, 1892] (unavailable name).
Meloe (*Meloe*) *violaceus*: MacSwain, 1956: 97; Bologna, 1991: 388; 2008: 402; 2020: 548; Ruiz & Avila, 1993: 143; Pérez-Moreno *et al.*, 2003: 201; Lückmann & Assmann, 2005: 4104; García-París *et al.*, 2006: 344; 2010: 173; Vitali, 2012: 50; Tshernyshev, 2014: 182; 2017: 330; Bologna *et al.*, 2018: 654.
Lytta violaceus semenowi: Hua, 2002: 130.
Meloe (*Meloe*) *semenowi*: Bologna, 2008: 402; 2020: 548.

Type locality. *Meloe aprilina* Meyer ?: "Goettingae…, latere australi montis Heimberg"; *Pediculus melittae* Kirby: "in *Melittis* semel lectus" "Barhamiae"; *Meloe violaceus* Marsham: no record but likely England; *Meloe similis* Marsham: no record but likely England; *Meloe rufipes* Bremi-Wolf ?"…bei Zürich…"; *Meloe strigosus* Motschulsky ?: "Kamtschatka"; *Meloe prolifericornis* Motschulsky ?: "Géorgie"; *Meloe violaceus* var. *simplex* Fleischer:

"Brünn"; *Meloe similis* var. *angusticolis* Rey: no record; *Meloe semenowi* Jakowlew: "environs d'Irkutsk (E Siberia, Russia)"; *Meloe violaceus* ab. *montanus* Reitter: no record.

Type specimens. Two syntypes of *M. violaceus* were examined at BMNH several years ago by one of us (MAB).

Description. Body (Figs. 7–8A) blue or blue-violet, darker in mountain populations, rarely with greenish reflexions, sub-shining; setae black, ventrally denser and dorsally extremely short and sparse especially on elytra. Body length: 10.0–40.0 mm.

Head (Figs. 7–8B) quite widened posteriorly on temples, rarely almost not widened, sides slightly rounded, temples ca. 2.5–3× as long as longitudinal diameter of eye, and slightly wider than maximal width of pronotum; eye almost flat, frons with a shallow impression near raised antennal base, with a fine longitudinal furrow from fronto-clypeal suture to almost centre of head and vaguely depress on inner margin of eye; fronto-clypeal suture angulated, clypeus transverse; surface with punctures middle sized, more or less dense, but with quite dispersed small punctures in east Asian populations, interpunctal surface shagreened. Fore margin of labrum emarginated in middle; mandibles robust, curved apically with a V-shaped incision; maxillary and labial palpi unmodified. Male antennae reaching fore third of elytra, as in Figs. 7–8C–E; antennomere I progressively widened to apex, sub-cylindrical, more than twice as long as II and 0.8× as long as III; II sub-globose, short; III sub-cylindrical, slightly widened progressively to apex, ca. 2–2.5× as long as II and longer than IV; IV sub-cylindrical, robust; V robust, but in dorsal view a few widened antero-apically, in posterior view progressively widened to apex; VI in dorsal view only quite thick, in posterior view with sides sub-parallel, only a few widened to apex; VII in dorsal view scarcely thick, in posterior view sides sub-parallel, but a few widened on one side; VIII as long as half of VII, short and cylindrical, about as long as or slightly longer than wide; IX–X sub-cylindrical, sub-equal in length, and slightly longer than VIII; XI ca. 2–2.3× as long as X, sub-cylindrical until middle and conically narrowed to apex. Female antennae as in Fig. 7F, V–VI similar to IV in shape, VII slightly shorter and narrower.

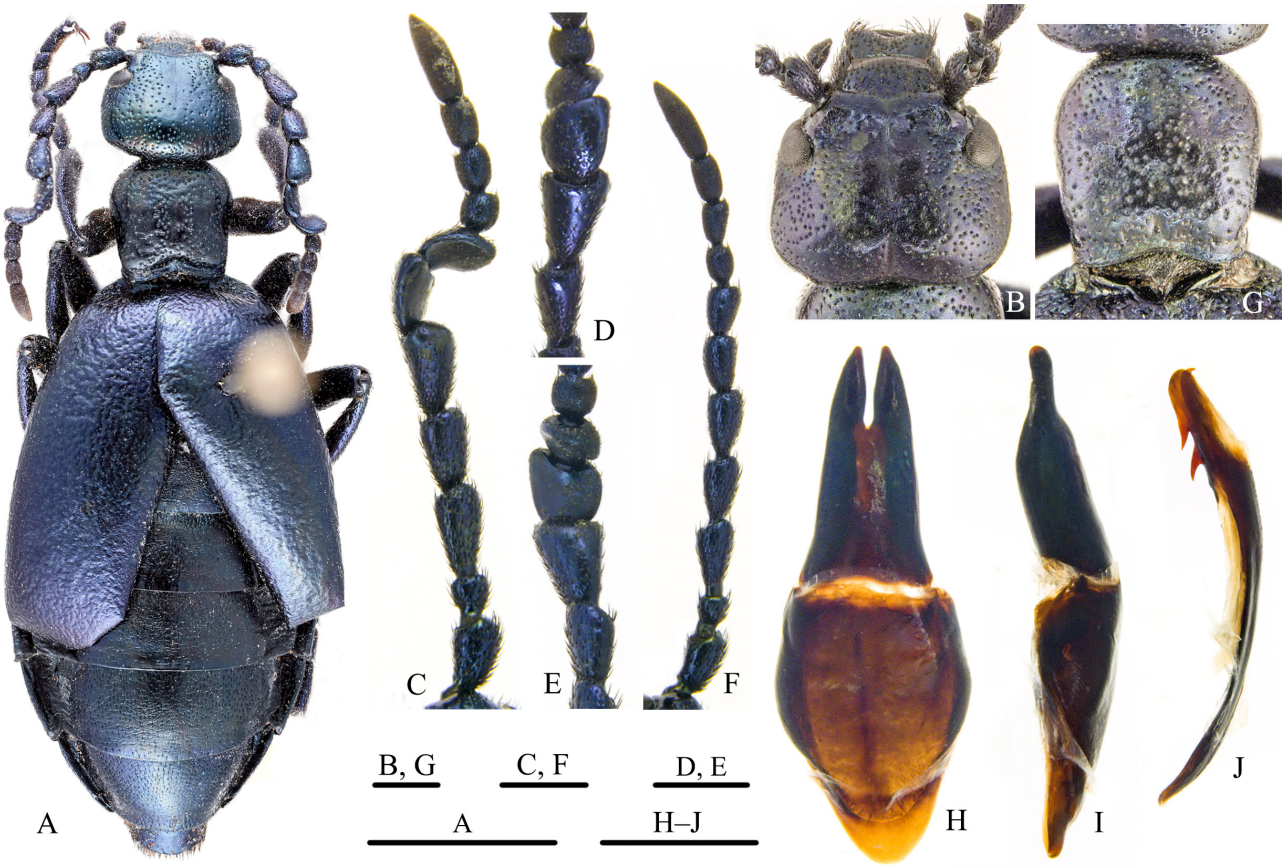

FIGURE 7. *Meloe* (*Meloe*) *violaceus* Linnaeus, 1758. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Pronotum (Figs. 7G; 8F) slightly wider than long, sides widened from base to past middle, with fore angles distinctly rounded, base distinctly angulated in middle, strictly rebordered and with a distinct transverse depression along base; punctures as on head with tracks of one middle depression. Mesonotal scutellum (Figs. 7G; 8F) distinctly protruded posteriorly, conically elongated; mesepisterna meeting in middle. Elytra with humeral dimple quite wide, with fine vermicular rugosities scarcely raised. Legs robust, but slender in few Japanese individuals; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-shaped, inner one pointed; all male tarsomeres with pads of light short setae.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Figs. 7H–J; 8G–I; gonocoxal plate only slightly widened in middle, gonostyli fused ventrally in basal three-fifths, in lateral view narrow with apical lobes short and stout; both aedeagal hooks similar and far from apex.

Taxonomic remarks. This species is very close to the Nearctic *M. angusticollis* Say, 1824, especially because of the protruded mesonotal scutellum and the antennal shape.

Motschulsky (1872) briefly described *Meloe strigosa* from Kamtschatka and considered it is close to *M. violaceus*, but with longer and more "tailed" middle antennomeres and finer punctures on the head and pronotum. However, Escherich (1888) proposed the synonymy of *Meloe strigosa* Motschulsky, 1872 with *M. violaceus*.

The synonymy with *M. prolifericornis* Motschulsky, 1872, proposed by Escherich (1888), is probably erroneous. In the description, its type locality was indicated as "Géorgie", which could refer to the USA state rather than to the Caucasian country. This place is located within the distribution ranges of *M. angusticollis* that is closely similar to *M. violaceus*. In the same page, Motschulsky (1872) described other North American species. Axentiev (1987) considered *M. prolifericornis* as a subspecies of *M. proscarabaeus* without explanation.

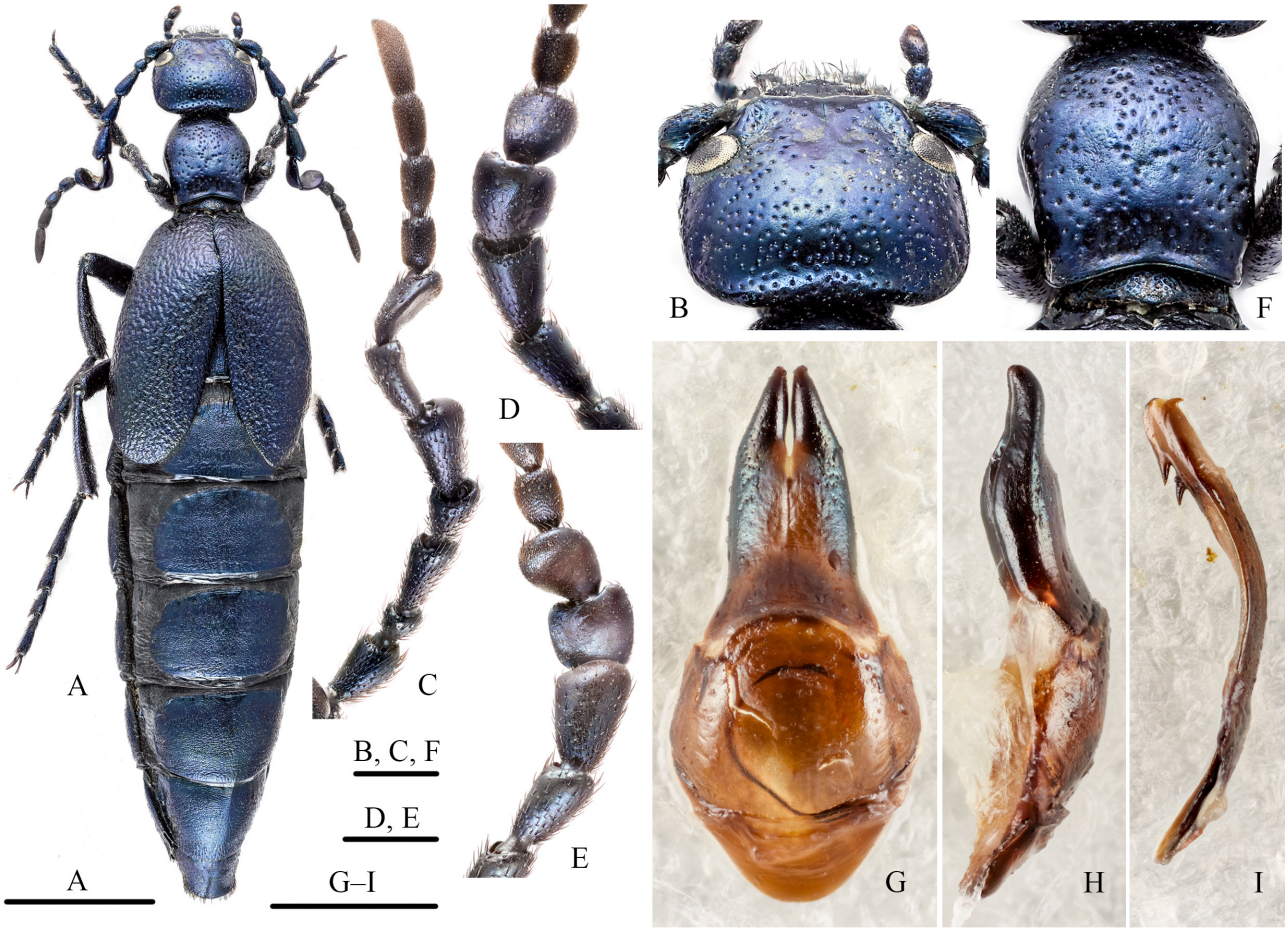

FIGURE 8. *Meloe* (*Meloe*) *violaceus* Linnaeus, 1758 (Japanese phenotype, previously considered as *M. semenowi*). A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. pronotum, male, dorsal view; G–H. tegmen: G. ventral view; H. lateral view; I. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–I).

Three researchers, Tshernyshev (2017), Shapovalov (pers. com., 2019), and Okano (pers. com., 2020), considered *M. semenowi* as a junior synonym of *M. violaceus* and evaluated the variation of antennal characters as continuous through Siberia to northeastern Asia. According to our observation, the size of the pronotum and antennomeres of *M. violaceus* varies. In the individuals from eastern Russia, northern China, North Korea, and Japan (MHBU; MNHB), the antennomeres III–V, pronotum, and legs are slenderer, similarly to the description of *M. strigosa* and *M. semenowi*. These "slender" individuals (Fig. 8) are mixed with the typical ones (Fig. 7). Furthermore, based on a molecular phylogenetic study (Salvi *et al*., in preparation), *M. semenowi* resulted conspecific with *M. violaceus*, and consequently, we confirm this synonymy.

Distribution. From western Mediterranean, through Europe, Central Asia, Kamtchatka, northwestern Africa, east to Far East of Russia, northern China, and Japan. See Appendix 1 for detailed localities.

Distincticornis Group

Meloe (*Meloe*) *distincticornis* n. sp.

Fig. 9

Type locality. China, Jiangxi Province, Shangrao City, Yushan County, Mt. Sanqingshan.

Type specimens. Holotype: ♂, with the following labels: "江西上饶三清山 [Jiangxi, Shangrao, Mt. Sanqingshan], 2007.4.15–20, 采集人 石磊 [Shi Lei leg.]" (white, rectangle, printed); "En-001154, 中山大学生物博物馆 [Biological Museum of Sun Yat-sen University]" (white, rectangle, printed); "HOLOTYPE, *Meloe* (*Meloe*) *distincticornis* **n. sp.**, det. Pan & Bologna" (red, rectangle, printed and handwrittern) (MHBU).

Paratypes: 2 ♀, idem., "En-001153" / "En-124280" (MHBU; MZSU); 1 ♂ (greatly damaged) and 1 ♀, "China, W Hubei, Muyuping NW env., 31.5 N 110.35 E, 21.V.2005, J. Turna leg." (MABC); 1 ♀, "China, W Hubei, Muyuping NW env., 31°27 N 110°22 E, 1500 m, 3.V.2006, J. Turna leg." (MABC); 2 ♀, "China, W Hubei, Dashennongjia mts., 31.5 N 110.3 E, 2500–3000 mts., 21/24.VI.2001, J. Turna leg." (MABC). All paratypes have the label "PARATYPE, *Meloe* (*Meloe*) *distincticornis* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten).

Description. Body (Fig. 9A) black with basal seven antennomeres and legs dark-blue, subopaque; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 17.0–22.0 mm.

Head (Fig. 9B) narrow, parallel on temples, temples distinctly converging posteriorly, ca. 1.8× as long as longitudinal diameter of eye, and slightly narrower than maximal width of pronotum; eye scarcely convex; frons widely bi-depressed, with a middle, fine longitudinal, short furrow positioned on raised central area, extended from fronto-clypeal suture less than to posterior margin of eye; surface with punctures small and fine, dispersed, interpunctal surface sub-opaque; fronto-clypeal suture almost sub-arcuate; clypeus transverse. Fore margin of labrum scarcely emarginate in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified. Male antennae slender, reaching middle of elytra, as in Figs. 9C–E; antennomere I progressively widened to apex, sub-cylindrical, more than twice as long as II and about as long as III; II sub-globose, short; III sub-cylindrical, slender, slightly widened progressively to apex, ca. twice as long as II and almost as long as IV; IV sub-cylindrical, slender; V slender, sub-cylindrical, scarcely widened at apex and in dorsal view almost not widened in antero-apical portion; VI slightly longer than wide, expanded apically on dorsal side, VII elongate but widened dorsal side sub-trapezoidal in middle, more distinctly in anterior view; VIII 0.8× as long as VII, slender and cylindrical, ca. 2.5× as long as wide; IX–X cylindrical, IX ca. as long as VIII, X distinctly longer than VIII; XI ca. 1.6× as long as X, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennae as in Fig. 9F; antennomere II sub-globose; III–V sub-cylindrical and widened apically; VI–IX sub-cylindrical, slender; VIII ca. 1.5× as long as III.

Pronotum (Fig. 9G) ca. 1.1× as long as wide, distinctly sinuate posteriorly, sides basally parallel and after middle suddenly widened, largely converging in front, base slightly emarginate in middle, strictly rebordered and with a shallow transverse depression along base, with a shallow middle longitudinal depression; punctures slightly wider than on head, similarly dispersed. Mesonotal scutellum (Fig. 9G) not protruded posteriorly, almost straight, mesepisterna meeting at midline. Elytra with humeral dimple shallow, with very fine vermicular rugosities. Legs very slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomere I slender; metatarsomere I very slender and in female with reduced pads.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Fig. 9H–J; gonocoxal plate widened in apical third; gonostyli fused ventrally in basal half, in lateral view slender, apical lobes long; both aedeagal hooks similar in shape, and distal one positioned slightly closer to apex than to proximal one, almost in middle.

Etymology. The name of this new species refers to the very distinctive shape of the male antennomeres.

Taxonomic remarks. Very close to *M. xuhaoi* **n. sp.**, but easily distinguishable by the shape of male antennomeres VII (Fig. 9D–E), and also by shorter female antennae (Fig. 9F).

Distribution. China (Hubei, Jiangxi). See Appendix 1 for detailed localities.

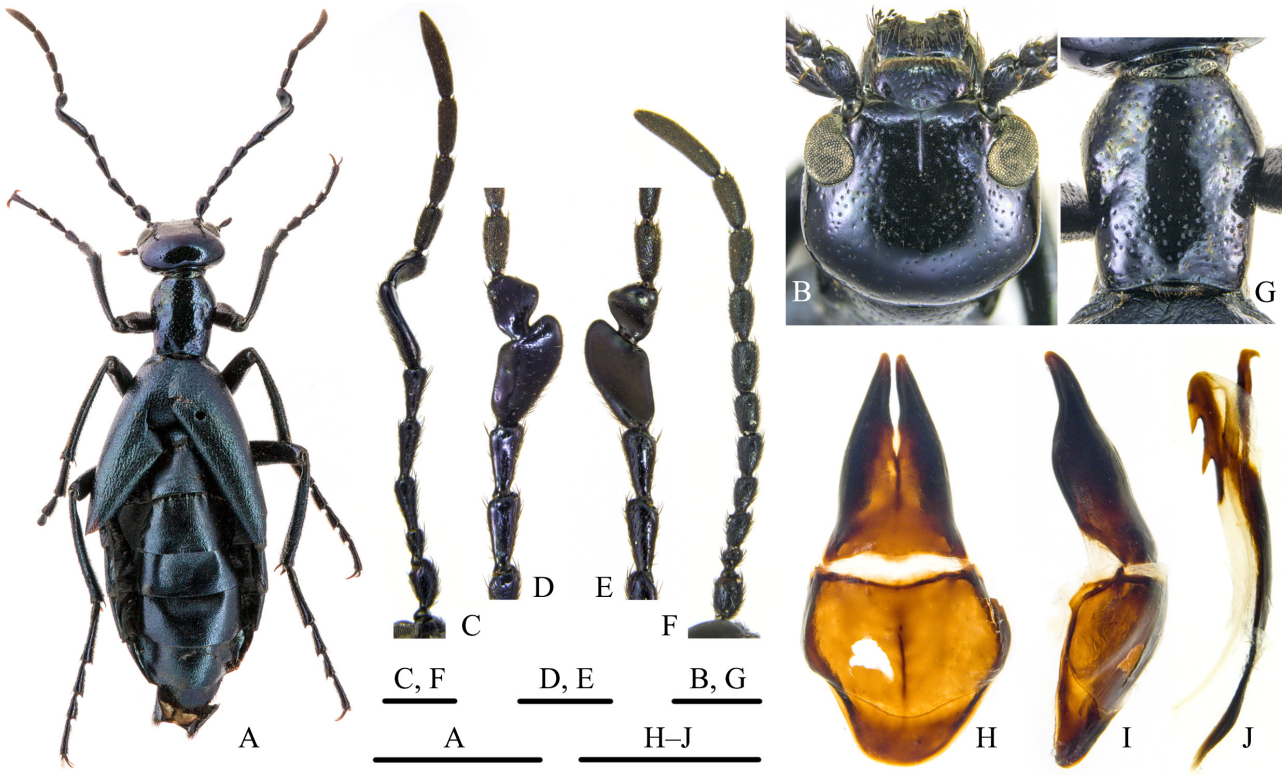

FIGURE 9. *Meloe* (*Meloe*) *distincticornis* **n. sp.** A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Meloe (*Meloe*) *xuhaoi* n. sp.

Fig. 10

Type locality. China, Chongqing, Jiangjin, Mt. Simianshan.

Type specimens. Holotype: ♂, with the following labels: "2014-III-10, 重庆江津四面山二台 [Chongqing, Jiangjin, Mt. Simianshan, Ertai], 邱见玥 许浩 [Qiu Jianyue, Xu Hao leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed); "HOLOTYPE, *Meloe* (*Meloe*) *xuhaoi* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten) (MHBU).

Paratypes: 2 ♂ and 4 ♀, "2014-III-10, 重庆江津四面山二台 [Chongqing, Jiangjin, Mt. Simianshan, Ertai], Elev. 1000 m, 许浩 邱见玥 [Xu Hao, Qiu Jianyue leg.], 河北大学博物馆 [Museum of Hebei University]" (whrite, rectangular, printed)" (1 ♂ MABC; 1 ♂ and 4 ♀ MHBUa); 2 ♀, "2014-III-16, 重庆江津四面山二台 [Chongqing, Jiangjin, Mt. Simianshan, Ertai], Elev. 1000 m, 许浩 邱见玥 [Xu Hao, Qiu Jianyue leg.]" (MHBUa); 1 ♀, "2015-I-14, 重庆江津四面山二台 [Chongqing, Jiangjin, Mt. Simianshan, Ertai], Elev. 1000 m, 许浩 邱见玥 [Xu Hao, Qiu Jianyue leg.]" (MHBUa); 1 ♂ and 1 ♀, "重庆江津 [Chongqing, Jiangjin], 朱玉香 [Zhu Yuxiang leg.], 2001.5.22" (white, rectangular, printed and handwritten) (MHBU); 1 ♂, "浙江 [Zhejiang]" (white, rectangular, handwritten) (MHBU); 1 ♀, "浙江松阳 [Zhejiang, Songyang], 1987.3.5" (brown, rectangular, printed and handwritten), "2194" (white, rectangle, handwritten) (MHBU). All paratypes with the label "PARATYPE, *Meloe* (*Meloe*) *xuhaoi* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten).

Description. Body (Fig. 10A) black, dark blue, subopaque; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 11.5–22.5 mm.

Head (Fig. 10B) narrow, parallel on temples, temples distinctly converging posteriorly, ca. twice as long as longitudinal diameter of eye, and sub-equal to maximal width of pronotum; eye quite convex; frons widely depressed, with a middle, fine longitudinal, short furrow extended from fronto-clypeal suture less than to posterior margin of eye; fronto-clypeal suture sub-arcuate; clypeus transverse; surface with punctures small and fine, very dispersed, interpunctal surface sub-opaque. Fore margin of labrum scarcely emarginated in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified. Antennae elongate and very slender, nearly reaching apex of elytra backward. Male antennae as in Fig. 10C–E, antennomere I progressively widened to apex, sub-cylindrical, more than twice as long as II and slightly shorter than III; II sub-globose, short; III sub-cylindrical, slender, slightly widened progressively to apex; IV sub-cylindrical, slender, ca. 3× as long as II and slightly longer than III; V slender, sub-cylindrical, scarcely widened at apex and in dorsal view almost not widened in antero-apical portion; VI twice longer than wide, sub-triangularly widened on side at apex; VII elongate longitudinally, sides sub-parallel in posterior view, scarcely depressed in anterior view; VIII about as long as VII, slender and cylindrical, 3× as long as wide; IX–X cylindrical, IX slightly longer than VIII, X distinctly longer than VIII; XI nearly twice as long as X, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennae distinctly slender, as in Fig. 10F, antennomeres V–VII slender, sub-cylindrical and slightly widened progressively to apex; V ca. as long as IV, and also VII; VI slightly longer and wider than V; other antennomeres similar to male.

Pronotum (Fig. 10G) ca. 1.1× as long as wide, distinctly sinuate posteriorly, sides basally parallel and after middle progressively widened, largely converging to apex, base emarginated in middle, strictly rebordered and not depressed along base, with a shallow middle depression; punctures scarcely larger than on head, similarly dispersed. Mesonotal scutellum (Fig. 10G) not protruded posteriorly, almost straight. Mesepisterna meeting at midline. Elytra with humeral dimple shallow, with very fine vermicular rugosities. Legs distinctly slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomere I slender; metatarsomere I very slender and in female with reduced pads.

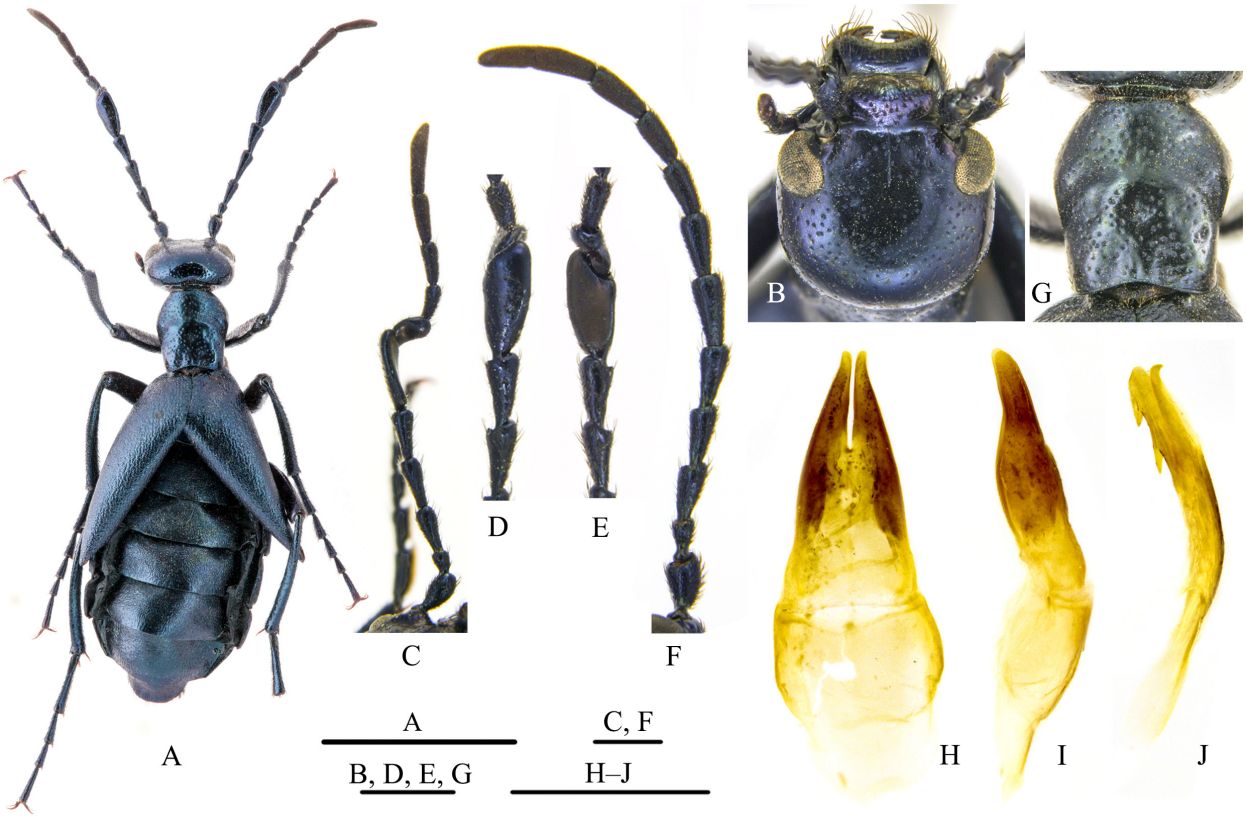

FIGURE 10. *Meloe* (*Meloe*) *xuhaoi* **n. sp.** A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Figs. 10H–J; gonocoxal plate widened subapically; gonostyli fused ventrally in basal two-thirds, in lateral view narrow and slender, apical lobes long; both aedeagal hooks similar in shape, and distal one positioned closer to apex than to proximal one.

Etymology. This new species is named after Dr. Hao Xu, Mianyang Teachers' College, who supported us with several blister beetle specimens, especially this new species.

Taxonomic remarks. Strictly close to *M. distincticornis*, can be distinguished by the antennal shape, especially the shape of male antennomere VII (Figs. 10D–E) and the slenderer female antennae (Fig. 10F).

Distribution. China (Chongqing, Zhejiang). See Appendix 1 for detailed localities.

Lobatus Group

Lobatus Subgroup

Meloe (*Meloe*) *arunachalae* Saha, 1979

Fig. 11

Meloe arunachalae Saha, 1979: 128, figs. 1, 2, 118; Axentiev, 1987: 474.
Meloe medogensis Tan, 1988: 290, 292; Hua, 2002: 130; Pan & Ren, 2018: 79. **n. syn.**
Meloe (*Meloe*) *arunachalae*: Bologna, 2008: 402; 2020: 547.
Meloe (*Treiodous*) *medogensis*; Bologna, 2008: 404.
Meloe (*Meloe*) *medogensis*: Bologna, 2020: 547.

Type locality. "India. Arunachal (Assam): Kameng Div., Tawang". Type locality of the synonym *M. medogensis*: "Xizang, Mêdog".

Type specimens. The holotype of *M. arunachalae*, housed at NZSI, was not examined.

The examined female holotype (Fig. 28C, K) of *M. medogensis* has the following labels: "西藏墨脱 [Xizang, Mêdog], 2400 m" (white, rectangular, printed and handwritten), "1982.VII.2, 采集者 韩寅恒 [Han Yinheng leg.]" (white, rectangular, printed and handwritten), "HOLOTYPE" (red, rectangular, printed), "IOZ(E)217535" (blue, rectangular, printed), "*Meloe medogensis* **sp. nov.** 鉴定者：谭娟杰 [det. Tan Juanjie], 1985" (white, rectangular, printed and handwritten) (IZCAS). The information on the holotype of *M. medogensis* is wrong in the description (Tan, 1988): the holotype is female, rather than male, and it was collected in July, not in October. The erroneous information of the sex is the cause of the inclusion of this species in the subgenus *Treiodous* by Bologna (2008).

Description. Body (Fig. 11A) black, vaguely blue on sides and legs, quite shining; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 8.0–27.5 mm.

Head (Fig. 11B) short, temples distinctly converging posteriorly, ca. 1.5× as long as longitudinal diameter of eye, slightly wider than maximal width of pronotum; eye quite convex; frons flat, vaguely depressed anteriorly, with a middle, fine longitudinal, short furrow extended from fronto-clypeal suture to middle of head, with a vague depression on inner margin of eye; surface with punctures small and fine, very dispersed, interpunctal surface shagreened, frons almost impunctate; fronto-clypeal suture sub-arcuate; clypeus transverse. Fore margin of labrum almost sub-rectilinear in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified. Male antennae (Figs. 11C–E), short in basal portion and slender in apical one, reaching middle of elytra; antennomere I sub-cylindrical, progressively widened to apex, twice as long as II; II short, slender at base and widened at apex; III sub-cylindrical but distinctly widened to apex, slightly longer than II and twice as long as IV; IV shorter than wide, and transversely sub-oval in anterior view, not distinctly pointed on dorsal side; V short, transverse, sub-isosceles-trapezoidal, widened on both dorsal and ventral sides in posterior view, depressed on anterior side; VI greatly transverse, 2.5× as wide as long, sub-gibbose on ventro-apical portion, transversely depressed on anterior side; VII ca. 1.2× as wide as VI in anterior view, distinctly depressed at centre of anterior side, transversely sub-hexagonal; VIII–XI about as long as I–VII; VIII slightly more than twice as long as wide, and ca. 0.7× as long as VII, slender and sub-cylindrical; IX–X sub-cylindrical, IX 1.25× as long as VIII, X slightly longer than IX; XI ca. 1.7× as long as X, and ca. 6× as long as wide, sub-cylindrical over middle and apically conically narrowed and slightly curved. Female antennae quite short (Fig. 11F), reaching basal third of elytra; IV sub-cylindrical and

widened to apex, slightly shorter than III; V–VII sub-cylindrical and widened to apex, V ca. as long as III, slightly longer than VI and shorter than VII; VIII ca. as long as III; other antennomeres similar to male.

Pronotum (Fig. 11G) ca. 1.2× as long as wide, distinctly sinuate posteriorly, sides basally almost parallel and after middle progressively widened, obliquely converging to apex, base emarginate in middle, very strictly rebordered and not depressed along base, with a shallow middle depression, from centre to base; punctures as on head, similarly dispersed, interpunctal surface shagreened. Mesonotal scutellum (Fig. 11G) not distinctly protruded posteriorly; mesepisterna meeting at midline. Elytra with humeral dimple shallow, with very fine vermicular rugosities. Legs distinctly slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomere I slender; metatarsomere I very slender and in female with reduced pads, almost absent.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Figs. 11H–J: gonocoxal plate widened in middle; gonostyli in lateral view narrow and slender, apical lobes long and slender, in ventral view slightly divergent, fused in basal two-thirds; both aedeagal hooks similar, small and slender, distal hook positioned at point equidistant to apex and proximal hook.

Taxonomic remarks. Among the species of the Lobatus Subgroup, *M. arunachalae* is close to *M. formosensis* and *M. gracilior* because of the very slender legs, and the fine and dispersed punctation, but can be distinguished by its male antennomere V that is widened on both sides in posterior and anterior views (Figs. 11D–E).

After the examination of the holotype (Fig. 28C, K) and other specimens of *M. medogensis* (IZCAS, MHBU) and the comparison with the description, figures, and new specimens of *M. arunachalae*, we assume that these geographically approximate taxa are synonyms because of several morphological features, especially the shape of male antennae.

Distribution. China (southeastern Xizang), Nepal, Bhutan, northern India. See Appendix 1 for detailed localities.

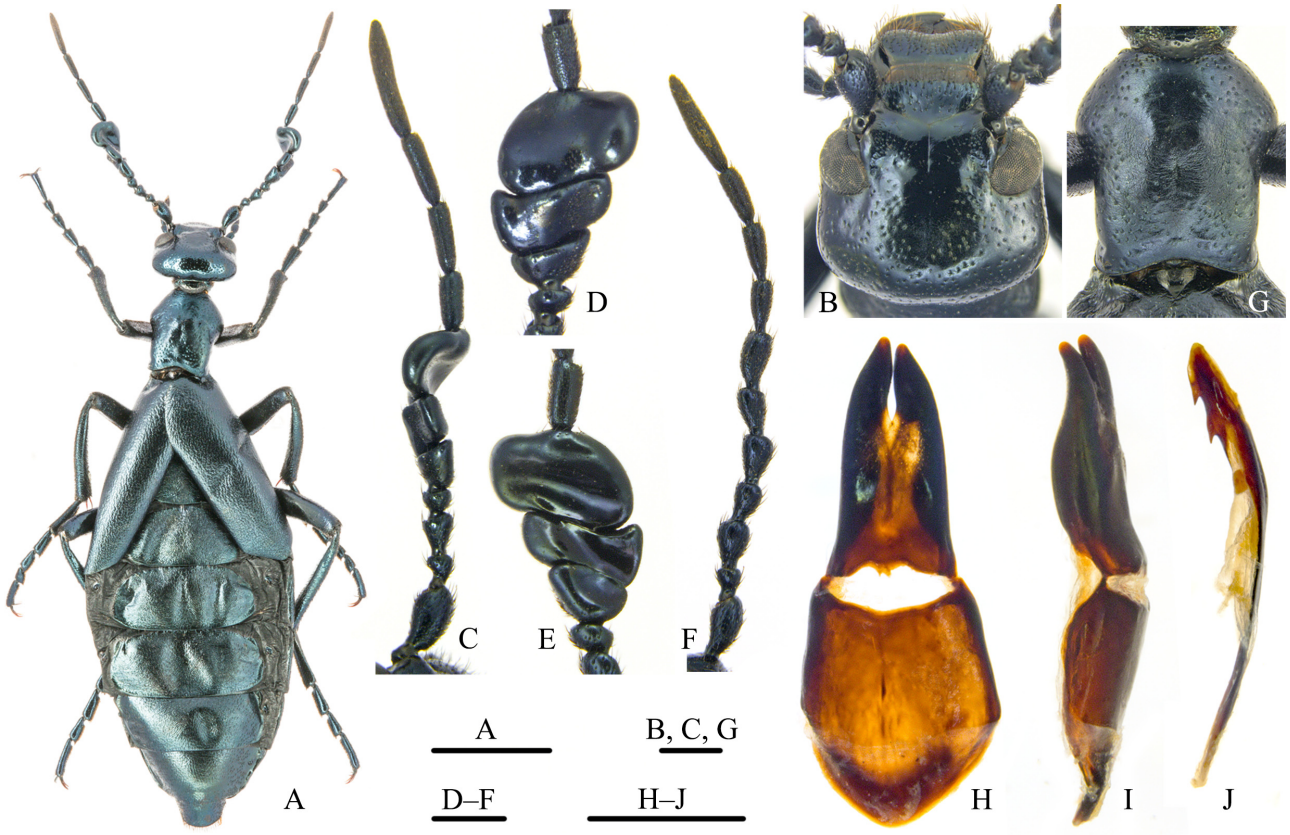

FIGURE 11. *Meloe* (*Meloe*) *arunachalae* Saha, 1979. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Meloe (*Meloe*) *auriculatus* Marseul, 1876

Fig. 12

Meloe auriculatus Marseul, 1876: 480; Escherich, 1889: 333; Miwa, 1928: 71; Kurosawa, 1985: 413, pl. 70, f. 8; Hua, 2002: 130.
Meloe (*Proscarabaeus*) *auriculatus*: Kôno, 1936: 92.
Meloe (*Proscarabaeus*) *menoko* Kôno, 1936: 92.
Meloe (*Meloe*) *auriculatus*: Kifune *et al.*, 1973: 60 (larvae); Bologna, 2008: 402; 2020: 547.
Meloe (*Meloe*) *menoko*: Kifune *et al.*, 1973: 60; Bologna, 2008: 402; 2020: 547.
Meloe menoko: Kurosawa, 1985: 413, pl. 70, f. 7.

Type locality. (Japan) "Hiogo (= Hyogo), Osaka". The type locality of the synonym *M. menoko* is (Japan) "Hokkaido (Jozankei)".

Type specimens. The examined male holotype has the following labels: "*Meloe auriculatus*, Osaka, Lewis 74" (round, yellow, handwritten by Marseul) (MNHN) (Fig. 28D, L). Mesotarsi partially broken. Just close to the holotype, there is a female syntype (MNHN).

We also examined photos of the male holotype and one male paratype of *M. menoko* (EMHU) (see taxonomic remaks).

Description. Body (Fig. 12A) dark blue, shining; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 14.0–22.0 mm.

Head (Fig. 12B) short, sides converging posteriorly, ca. 1.8× as long as longitudinal diameter of eye, wider than maximal width of pronotum; eye only slightly convex, frons flat, not depressed, frontal furrow not visible; fronto-clypeal suture sub-rectilinear, clypeus transverse; surface with punctures small and fine, relatively dispersed, interpunctal surface shagreened, frons almost impunctate. Fore margin of labrum almost sub-rectilinear in middle; mandibles quite robust, curved, apically slightly bidentate; maxillary and labial palpi unmodified. Male antennae (Fig. 12C–E) reaching almost middle of elytra; antennomere I sub-cylindrical, progressively widened to apex, 3× as long as II and slightly longer than III; II sub-globose, very short, wider than long; III sub-cylindrical, widened to apex, ca. 2.2× as long as II and ca. twice as long as IV; IV short, shorter than wide, transversely sub-oval, not distinctly pointed on dorsal side; V short, transverse, sub-oval, widened and almost pointed on one side in anterior view; VI greatly transverse, 3× as wide as long, sub-gibbose on ventro-apical portion and depressed on anterior side, VII slightly wider than VI in anterior view, distinctly depressed at centre, transversely sub-hexagonal; VIII–XI about as long as I–VII, VIII more than twice as long as wide, VIII slightly shorter than VII, slender and cylindrical, 3× as long as wide; IX–X cylindrical, IX slightly longer than VIII, X distinctly longer than VIII; XI ca. 2.2× as long as X, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennae shorter, as in Fig. 12F.

Pronotum (Fig. 12G) ca. 1.2× as long as wide, distinctly sinuate posteriorly, sides sub-parallel at base, widest at apical third, converging anteriorly, base only slightly emarginate in middle, very strictly rebordered and almost not depressed along base, with two oblique lateral depressions on fore half; punctures slightly wider than on head, less dispersed, interpunctal surface shagreened. Mesonotal scutellum (Fig. 12G) not protruded posteriorly; mesepisterna meeting at midline. Elytra with humeral dimple well visible, with very interpunctal vermicular rugosities. Legs slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomere I slender; metatarsomere I slender.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Fig. 12H–J; gonocoxal plate widened in middle; gonostyli in lateral view narrow and slender, apical lobes long and slender, in ventral view slightly divergent; both aedeagal hooks similar and far from apex.

Taxonomic remarks. Kôno (1936) listed some characters to distinguish *M. menoko* from *M. auriculatus*: male antennomere III distinctly longer than wide and VII more reniform. Actually, these characters correspond to those of *M. auriculatus*. Recently, Ohnishi *et al.* (2021), according to molecular study, pointed out that *M. menoko* could be synonymized to *M. auriculatus.* After the comparison between the holotype of *M. auriculatus* (MNHN) and photos of the types of *M. menoko* (sent to us by the colleague R. Okono, Japan) and some topotypic Japanese specimens from the Osaka Prefecture, we considered *M. menoko* as a junior synonym of *M. auriculatus*. This synonymy will be formalized by Okano (in press) who clarified it before us.

This species was recorded from several areas of China. However, these records belong to *M. lobatus*, a very close species.

Distribution. Korea Peninsula (?), Japan. See Appendix 1 for detailed localities.

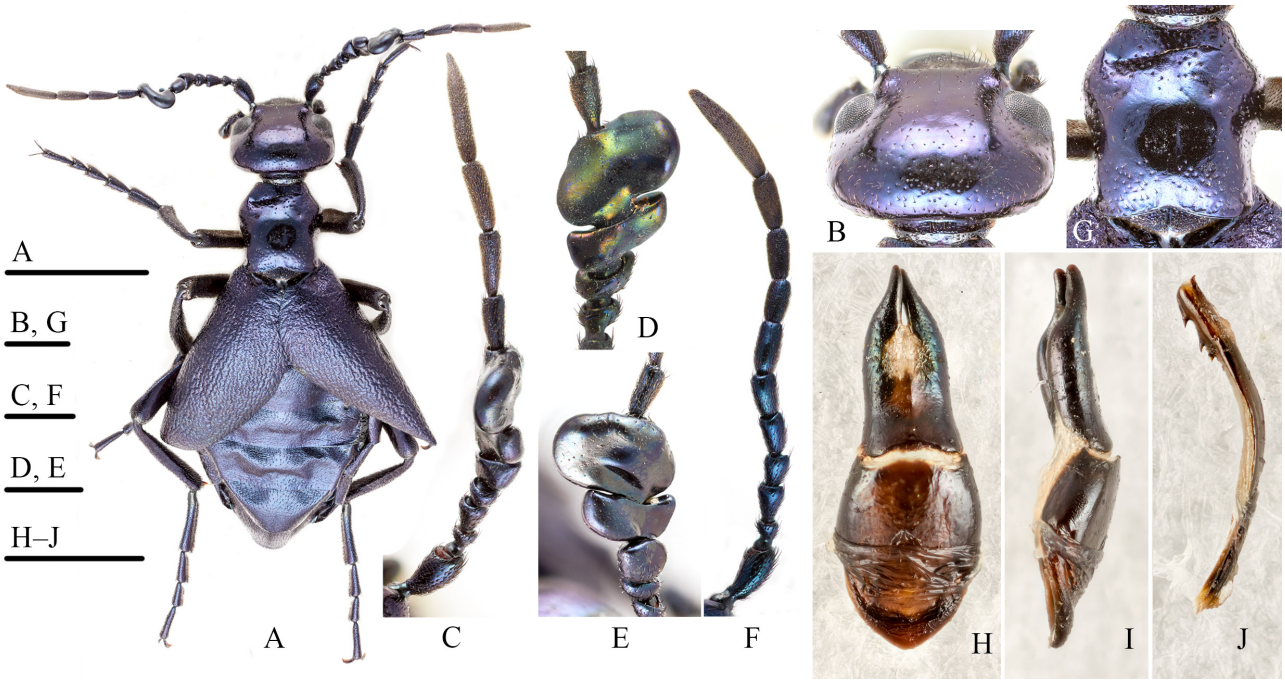

FIGURE 12. *Meloe* (*Meloe*) *auriculatus* Marseul, 1876. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Meloe (Meloe) coarctatus Motschulsky, 1858

Fig. 13

Meloe coarctata Motschulsky, 1858: 35.
Meloe coarctatus: Marseul, 1876: 481; Harold, 1877: 359; Heyden, 1879: 355; Matsumura, 1907: 19, pl. LVII, f. 5; Miwa, 1928: 72; Kurosawa, 1985: 413, pl. 70, f. 6.
Meloe (*Proscarabaeus*) *coarctata*: Pliginsky, 1914: 255.
Meloe (*Proscarabaeus*) *coarctatus*: Kôno, 1936: 93.
Meloe (*Meloe*) *coarctatus*: Kifune *et al.*, 1973: 57; Bologna, 2008: 402; 2020: 547.

Type locality. "Japan".

Type specimens. ZMUM, not examined.

Description. Body (Fig. 13A) blue, shining, rarely dark blue; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 14.0–22.0 mm.

Head (Fig. 13B) short, sides converging posteriorly, ca. 1.8× as long as longitudinal diameter of eye, wider than maximal width of pronotum; eye convex, in lateral view sub-oval quite large, with ventral apex narrowed but suboval near maxillae; frons flat in middle with two longitudinal, parallel frontal depressions on sides, frontal furrow short, extended from fronto-clypeal suture to level of half eye; fronto-clypeal suture distinctly angulated in middle; clypeus transverse; surface with punctures middle-sized, shallow, relatively dispersed posteriorly, approached anteriorly near base of antennae, almost impunctate on rest of frons, interpunctal surface shagreened. Fore margin of labrum widely emarginated in middle; mandibles quite robust, curved, apically vaguely bidentate; maxillary and labial palpi unmodified. Male antennae (Fig. 13C–E) reaching almost middle of elytra; antennomere I slender, subcylindrical, progressively widened and vaguely curved to apex, 3.5× as long as II and 3× as long as III; II sub-globose, very short, as wide as long; III very short, just longer than II, ca. as wide as long, widened to apex, more than twice as long as IV; IV short, shorter than wide, transversely oval in anterior view, not distinctly pointed on dorsal side; V obliquely rectangular, transverse in anterior view, ca. 1.2× as wide as maximal length, widened and pointed

on dorsal side in anterior view; VI twice width of V; VII sub-equal in width to VI in anterior view, greatly transverse, ca. 4× as wide as long, irregularly rectangular, depressed on anterior side, VII transverse, bean-shaped, depressed at centre; VIII–XI about as long as I–VII; VIII half as long as VII, slender and cylindrical, ca. 2.3× as long as wide; IX–X cylindrical, IX 1.5× as long as VIII, X distinctly longer than IX; XI ca. 2.2× as long as X, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennae slightly shorter (Fig. 13F).

Pronotum (Fig. 13G) ca. 1.3× as long as wide, distinctly sinuate posteriorly, sides slightly widening from base until apical quarter, oblique anteriorly, base slightly emarginate in middle, very strictly rebordered and scarcely depressed along base; punctures as wide than on head denser, interpunctal surface shagreened. Mesonotal scutellum (Fig. 13G) not protruded posteriorly; mesepisterna meeting at midline. Elytra with humeral dimple well visible, with distinct vermicular rugosities. Legs quite slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomeres less slender than meso- and metatarsomeres, protarsomere I moderately robust; metatarsomere I very slender.

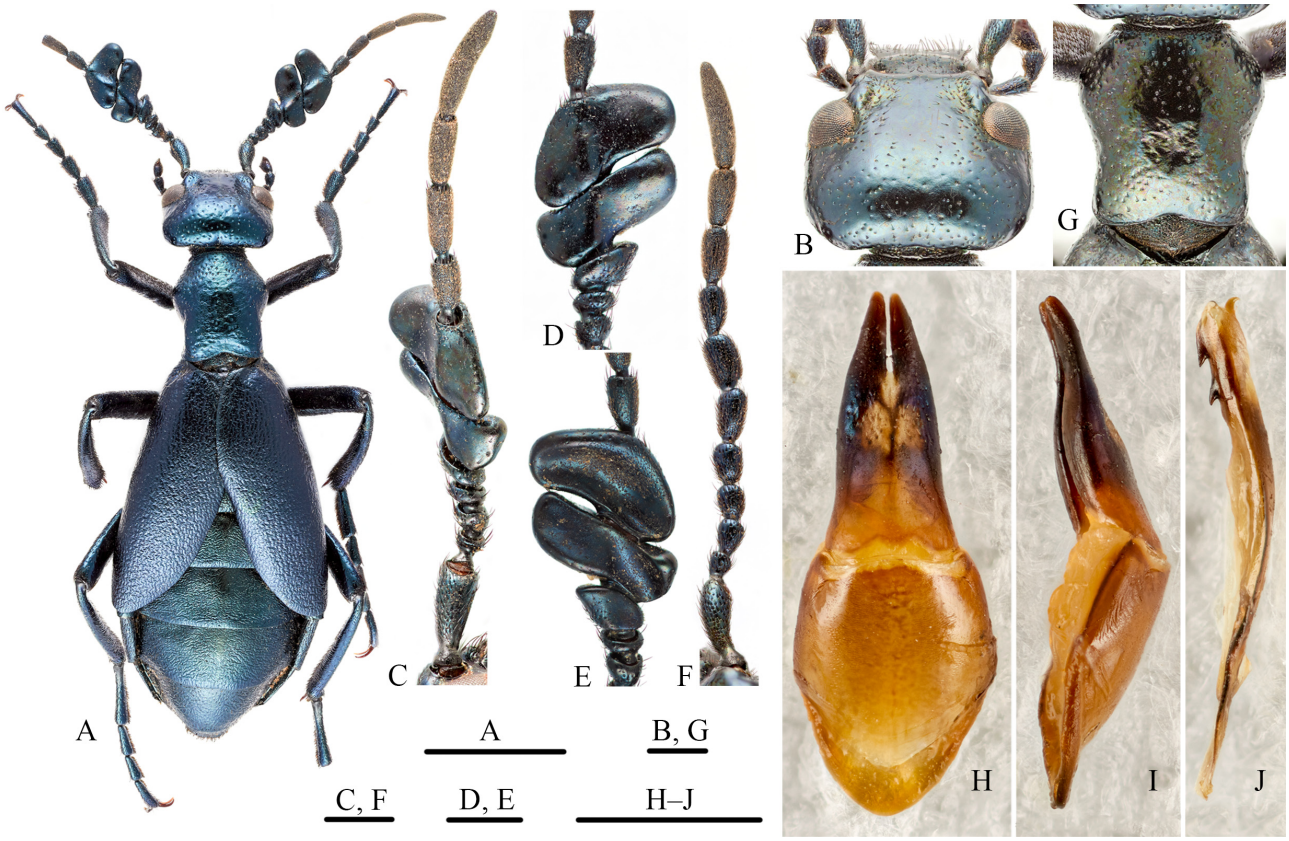

FIGURE 13. *Meloe* (*Meloe*) *coarctatus* Motschulsky, 1858. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Figs. 13H–J; gonocoxal plate widened in middle, gonostyli in lateral view narrow and slender, apical lobes long and slender, in ventral view slightly divergent; both aedeagal hooks similar and far from apex.

Taxonomic remarks. This species is highly distinctive, especially because of the shape of antennomeres in which II–IV are very short.

Distribution. Japan. See Appendix 1 for detailed localities.

Meloe (*Meloe*) *formosensis* Miwa, 1930

Fig. 14

Meloe formosensis Miwa, 1930: 12, figs. 1, 2; Hua, 2002: 130.
Meloe (*Meloe*) *formosensis*: Bologna, 2008: 402; 2020: 547.

Type locality. "Formosa, Musha", now Wushe, Taiwan Island.

Type specimens. In the description, Miwa (1930) listed "2 males and 3 females from the Entomological Museum, Government Research Institute in Tahikou, Formosa". Explicitly, he indicated one "Type specimen", that was considered as Holotype by us, from "Musha, from 15, April to 18, May 1919" (T. Okuni, J. Sonan, K. Miyake, and M. Yoshino). The other listed specimens, that we consider as paratypes, are: 1 male and 1 female from "Mt. Arisan 24, April, 1928" (J. Sonan) and 1 male and 1 female from "Sankakuho 25, May, 1927" (K. Fakuda).

We examined two males and three females in the TARI materials from the same localities published by Miwa (1930) but their labels with partially different data. The Holotype from Musha (which now is Wushe) is a female with broken antennae, identified by Miwa, but with the label data slightly different: "18.V and 15.VI.1919". We suspect that Miwa (1930) made an error in the transcription of data. One male and one female from Arisan, both with the identification labels by Miwa, were collected on 20–23.X.1919 and are not paratypes but only topotypic. The remaining pair from Sankakuho, without the Miwa's identification label, have the exact date (25.V.1927) of the paratypes recorded by Miwa (1930), and are probably paratypes.

Description. Body (Fig. 14A) dark blue, shining; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 14.0–25.0 mm.

Head (Fig. 14B) short, sides distinctly parallel, largely rounded posteriad, temples ca. 1.5× as long as longitudinal diameter of eye, slightly wider than maximal width of pronotum; eye quite convex; frons distinctly depressed, with a middle, fine longitudinal, short furrow extended from fronto-clypeal suture to middle of eye, with a vague depression on inner margin of eye; surface with punctures small and fine, very dispersed, interpunctal surface shagreened, frons almost impunctate; fronto-clypeal suture sub-rectilinear, clypeus transverse. Fore margin of labrum almost sub-rectilinear in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified, last male palpomere very widened at apex, securiform. Male antennae (Fig. 14C–E) short in basal portion and slender in apical one, reaching middle of elytra; antennomere I sub-cylindrical, progressively widened to apex, twice as long as II and ca. 1.5× as long as III; II sub-globose, short; III sub-cylindrical, distinctly widened to apex, ca. 1.2× as long as II and 1.5× as long as IV; IV short, shorter than wide, transversely sub-oval in anterior view, not distinctly pointed on dorsal side; V short, as long as III, transverse, sub-trapezoidal and widened on dorsal side in anterior view; VI greatly transverse, ca. 2.5× as wide as long, sub-gibbose on ventro-apical portion; VII distinctly wider than VI and transversely sub-hexagonal in anterior view, distinctly depressed at centre of anterior side; VIII–XI about as long as I–VII; VIII about as long as VII, slender and cylindrical, nearly 3× as long as wide; IX–X cylindrical, IX slightly longer than VIII, X distinctly longer than VIII; XI ca. 1.6× as long as X and 6.5× as long as wide, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennomeres slightly shorter (Fig. 14F); V–VII sub-cylindrical, slightly compressed, VI slightly longer than V and shorter than VII.

Pronotum (Fig. 14G) ca. 1.2× as long as wide, distinctly sinuate posteriorly, sides sinuate and gibbose in basal half, after middle progressively widened, obliquely greatly converging to apex, base emarginate in middle, strictly rebordered and more or less evidently depressed along base in different individuals, with a lateral oblique depression on each side in middle; punctures slightly wider than on head, similarly dispersed, interpunctal surface shagreened. Mesonotal scutellum (Fig. 14G) slightly protruded posteriorly; mesepisterna meeting at midline. Elytra with humeral dimple shallow, with very fine vermicular rugosities. Legs distinctly slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomere I slender; metatarsomere I very slender and in female with slightly reduced pads.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Figs. 14H–J; gonocoxal plate widened in middle; gonostyli narrow and slender in both ventral and lateral views, fused ventrally in basal two-thirds, apical lobes long and slender, in ventral view slightly divergent; both aedeagal hooks similar in shape, distal hook slightly smaller than proximal one, slightly distanced from proximal hook.

Taxonomic remarks. This species is very similar and phylogenetically close to *M. gracilior* and differs only

in the following characters: shiner blue integument with sparser and finer punctation; male antennomere III slightly shorter and more sub-globose (Fig. 14C); antennomere IV shorter (Figs. 14C–E). The validity of this species must be tested molecularly. It could represent an insular subspecies of *M. gracilior*, which is spread also in Fujian Province, facing Taiwan Island.

Distribution. China: Taiwan. See Appendix 1 for detailed localities.

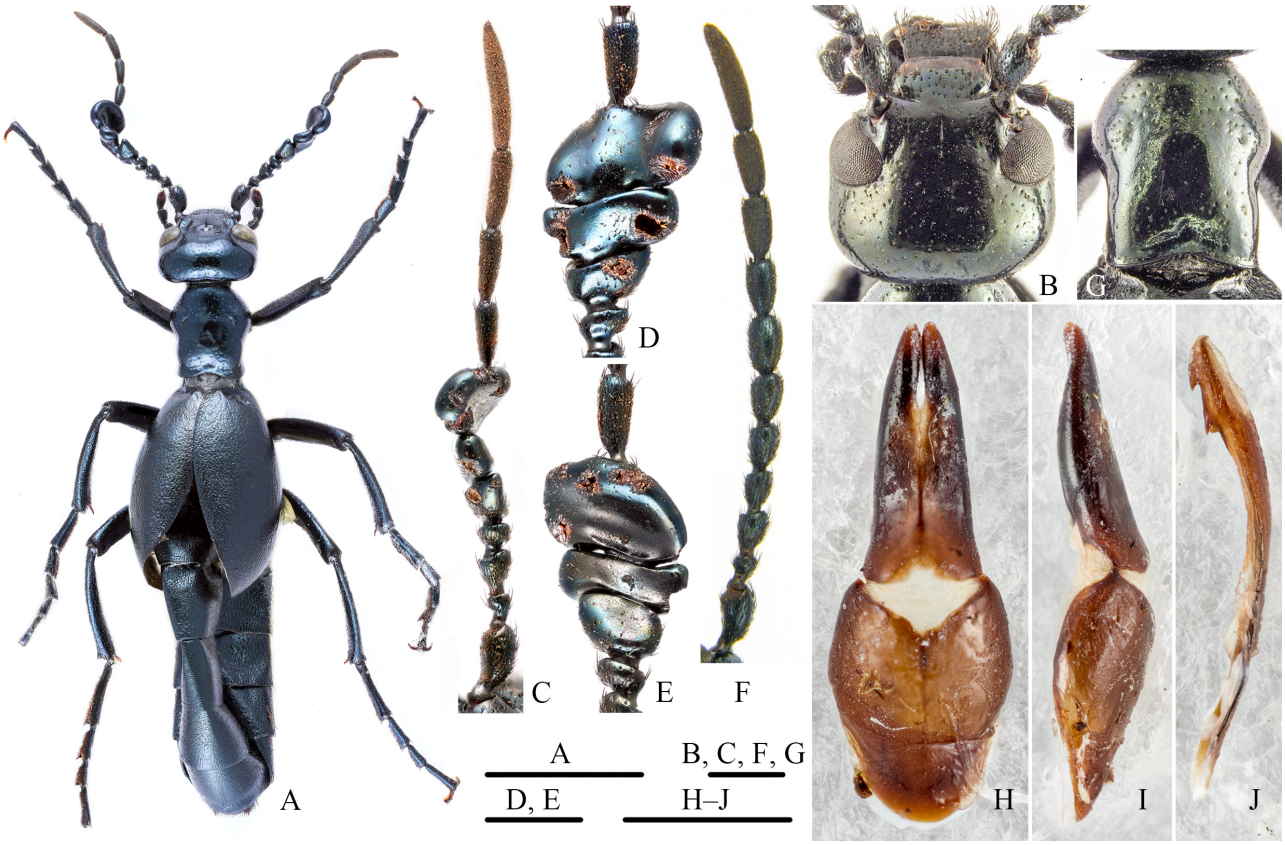

FIGURE 14. *Meloe* (*Meloe*) *formosensis* Miwa, 1930. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J) (C–E: bited by dermestids).

Meloe (*Meloe*) *gracilior* Fairmaire, 1891

Fig. 15

Meloe gracilior Fairmaire, 1891a: xxii; Hua, 2002: 130.
Meloe (*Meloe*) *gracilior*: Bologna, 2008: 402; 2020: 547.

Type locality. "Chang-Yang" (= Changyang Tujia Autonomous County, Yichang City, Hubei, China).

Type specimens. Male holotype (MNHN, examined some years ago), labelled "Changyang"; "*Meloe gracilior* Fairm".

Description. Body (Fig. 15A) dark blue, or almost black, shining; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 12.0–26.0 mm.

Head (Fig. 15B) short, sides distinctly parallel, largely rounded posteriad; temples ca. 1.2× as long as longitudinal diameter of eye, slightly wider than maximal width of pronotum; eye quite convex; frons depressed, with a short middle, fine longitudinal furrow extended from fronto-clypeal suture to less than middle of eye, with a vague depression on inner margin of eye; surface with punctures small and fine, dispersed, interpunctal surface shagreened, frons almost impunctate; fronto-clypeal suture sub-rectilinear, clypeus transverse. Fore margin of labrum almost sub-rectilinear in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified,

last male palpomere very widened at apex, securiform. Male antennae (Fig. 15C–E), short in basal portion and slender in apical one, reaching middle of elytra; antennomere I sub-cylindrical, progressively widened to apex, ca. twice as long as II and ca. 1.4× as long as III; II sub-globose, short; III sub-cylindrical, widened to apex, ca. 1.4× as long as II or IV; IV short, shorter than wide, transversely sub-oval in anterior view, not distinctly pointed on dorsal side; V short, transversely sub-trapezoidal in anterior view, widened on dorsal side in anterior view; width of VI and VII variable, VI greatly transverse, ca. 2.5× as wide as long in anterior view, sub-gibbose on ventro-apical portion; VII distinctly wider than VI and transversely sub-hexagonal in anterior view, distinctly depressed at centre of anterior side; VIII–XI about as long as I–VII, VIII about as long as VII, slender and cylindrical, ca. 3× as long as wide; IX–X cylindrical, IX slightly longer than VIII, X distinctly longer than VIII; XI ca. 1.7× as long as X and ca. 6.8× as long as wide, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennomeres shorter than male (Fig. 15F), reaching basal third of elytra; III–VII widened apically, V–VII slightly compressed; VIII–IX sub-cylindrical, VIII distinctly longer than III, XI ca. 5.6× as long as wide.

Pronotum (Fig. 15G) ca. 1.1× as long as wide, distinctly sinuate posteriorly, sides sinuate and gibbose in basal half, after middle progressively widened, obliquely greatly converging to apex, base emarginate in middle, strictly rebordered and scarcely depressed along base, with a lateral sub-oblique depression on each side in middle; punctures slightly wider than on head, similarly dispersed, interpunctal surface shagreened. Mesonotal scutellum (Fig. 15G) slightly protruded posteriorly; mesepisterna meeting at midline. Elytra with humeral dimple shallow, with very fine vermicular rugosities. Legs distinctly slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomere I slender; metatarsomere I very slender.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Figs. 15H–J; gonocoxal plate widened in middle; gonostyli slightly divergent and fused in basal two-thirds in ventral view, in lateral view narrow and slender, apical lobes long and slender; both aedeagal hooks similar in shape, distal hook slightly smaller than proximal one, and positioned at point equidistant to apex and proximal hook.

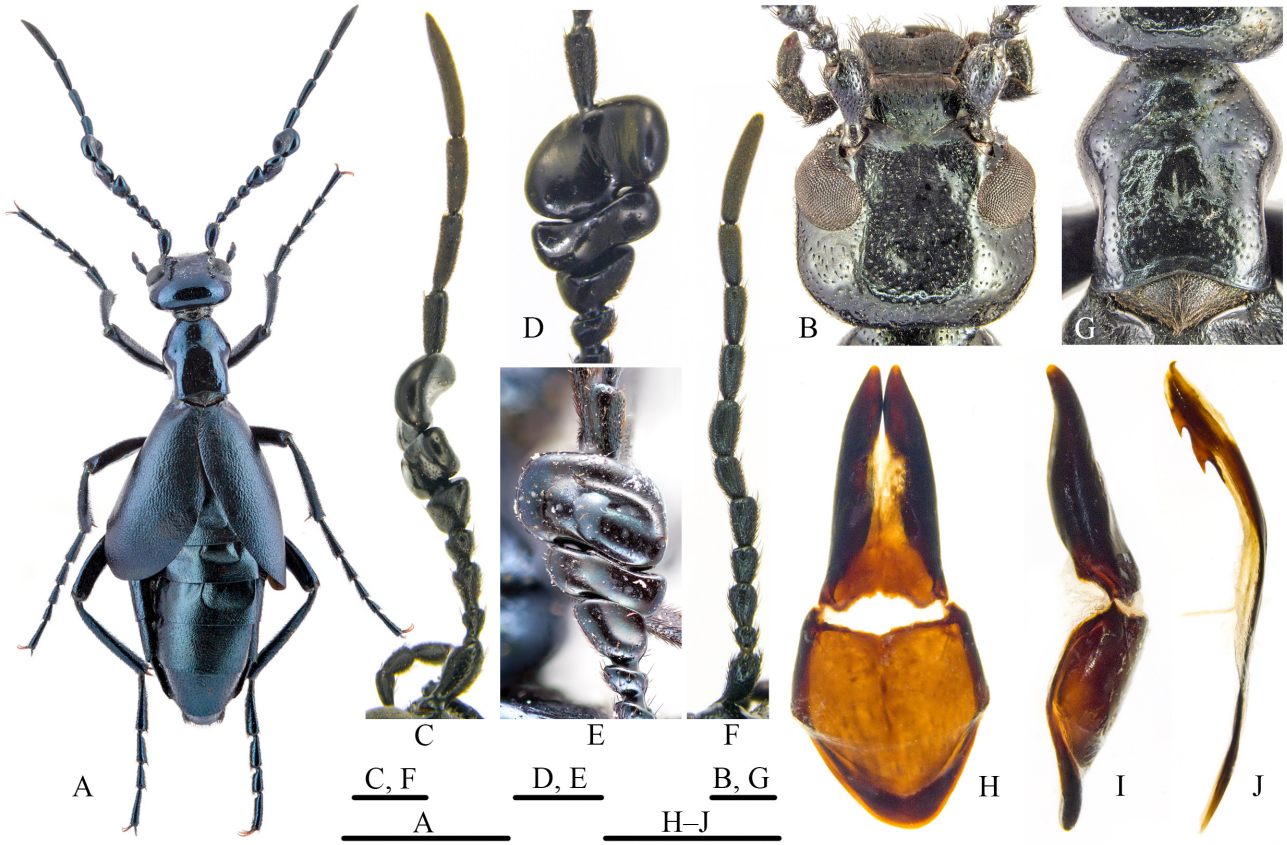

FIGURE 15. *Meloe* (*Meloe*) *gracilior* Fairmaire, 1891. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Taxonomic remarks. See the comments concerning *M. formosensis.* In a few specimens, mixed with regular ones, punctures on the head and pronotum are very fine, similar to *M. formosensis*. Furthermore, the width of male antennomere VII shows intraspecific variation, distinctly or slightly wider than VI in posterior or anterior view, but never sub-equal to or narrower than VI (Figs. 15D–E). Such a variability of this character is also present in *M. auriculatus* (Figs. 12D–E) and *M. lobatus* (Figs. 18D–E).

Distribution. China (Central, Eastern, and Southern regions). See Appendix 1 for detailed localities.

Meloe (*Meloe*) *kaszabi* n. sp.

Fig. 16

Type locality. China, Beijing, Mentougou, Xiaolongmen.

Type specimens. Holotype: ♂, "北京门头沟小龙门 [Beijing, Mentougou, Xiaolongmen], 1975-IX-5, 陈合明 [Chen Heming leg.]" (white, rectangular, printed), "HOLOTYPE, *Meloe* (*Meloe*) *kaszabi* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten) (MHBU).

Paratypes: 2 ♂, "北京农业大学植保系 [Beijing Agricultural University, Department of Plant Protection], 北京百花山 [Beijing, Mt. Baihuashan], 李法圣 [Li Fasheng leg.], 1961-IX-5/7" (white, rectangular, printed) (MHBU); 1 ♂, "北京农业大学植保系 [Beijing Agricultural University, Department of Plant Protection], 北京百花山 [Beijing, Mt. Baihuashan], 杨集昆 [Yang Jikun leg.], 1960-IX-8" (white, rectangular, printed) (MHBU); 1 ♂, "北京昌平黑山寨 [Beijing, Changping, Heishanzhai], 2007-IX-6, 陈育 [Chen Yu leg.], 中国农业大学标本馆 [Museum of China Agricultural University]" (white, rectangular, printed) (MHBU); 1 ♂ and 1 ♀, "2020.X.6, 北京怀柔石门台营地 [Beijing, Huairou, Shimentai Campsite], N40°28'44" E116°39'35", Elev. 200 m, 胡子渊采 [Hu Ziyuan leg.]" (white, rectangular, printed) (MHBUa); 1 ♀, "2015-IX-19, 河北黑龙山场部 [Hebei, Heilongshan Forest Farm], 牛一平 闫艳 [Niu Yiping & Yan Yan leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed), "N41°18'4" E116°6'57", Alt. 1335 m, 河北大学博物馆 [Museum of Hebei University]" (MHBU); 9 ♂ and 1 ♀, "2008-8-31, 内蒙古额尔古纳 [Inner Mongolia, Ergun], 石福明 [Shi Fuming leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed) (MHBU); 1 ♀, "内蒙古 [Inner Mongolia], 阎承守 [Yan Chengshou leg.]" (white, rectangulare, printed) (MHBU); 1 ♂, "China: Shanxi Prov., Ningwu County, Ximafang, 04-IX-2011, alt. 1430 m, C., M., P., P., & Z. leg." (white, rectangulare, printed) (MABC, but very damaged by dermestid attack after the photos); 2 ♀, "China: Shanxi Prov., Jiaocheng County, Pangquangou N.R., Erhezhuang, 10/11-IX-2011, alt. 1700 m, PENG Zhong leg." (white, rectangular, printed) (MHBU); 1 ♂, "庞泉沟保护区 [Pangquangou Conservation Area], 2019-08-27" (white, recangular, printed) (MHBU). All paratypes with the label "PARATYPE, *Meloe* (*Meloe*) *kaszabi* **n. sp.**, det. Pan & Bologna" (red, rectangulare, printed and handwritten).

Description. Body (Fig. 16A) blue, shining, rarely dark blue; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 9.5–22.0 mm.

Head (Fig. 16B) short, sides parallel, converging posteriorly; temples ca. twice as long as longitudinal diameter of eye, wider than maximal width of pronotum; eye quite convex, in lateral view slender and sub-oval with ventral apex rounded; frons flat in middle with two parallel frontal depressions on sides, frontal furrow short, extended from fronto-clypeal suture to level of posterior margin of eye; surface with punctures middle-sized, shallow, uniformly distributed, approached anteriorly near base of antennae, almost impunctate on rest of frons, interpunctal surface shagreened; fronto-clypeal suture distinctly angulated in middle; clypeus transverse. Fore margin of labrum widely emarginate in middle; mandibles quite robust, curved, apically vaguely bidentate; maxillary and labial palpi unmodified. Male antennae (Fig. 16C–E) reaching almost middle of elytra; antennomere I slender, sub-cylindrical, progressively widened and vaguely curved to apex, ca. 2.7× as long as II and 1.6× as long as III; II sub-globose, very short, as wide as long; III distinctly longer than II, sub-cylindrical and widened after middle to apex, slightly longer than IV; IV short, shorter than wide, transversely oval in anterior view, not distinctly pointed on dorsal side; V in anterior view obliquely sub-trapezoidal, transverse, ca. 1.4× as wide as maximal length, obtusely widened on dorsal side in anterior view; VI transverse, ca. 1.6× as wide as V in anterior view, sub-selliform, distinctly depressed in middle; VII sub-equal in width to VI in anterior view, greatly transverse, ca. 1.5× as wide as long, bean-shaped, depressed at centre of anterior side; VIII–XI distinctly shorter than I–VII; VIII 0.75× as long as VII, slender and cylindrical, ca. twice as long as wide; IX–X sub-cylindrical, IX 1.2× as long as VIII, X slightly longer than IX; XI ca. 1.8× (1.6× in some specimens) as long as X, and usually distinctly more than 5× as long as wide but shorter (ca.

4.9×) in some specimens, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennae slightly shorter (Fig. 16F), reaching basal third of elytra; IV–VII not transverse, sub-cylindrical; IV ca. as long as III; V slightly longer than IV and VI, but shorter than VII; VIII short, distinctly shorter than VII.

Pronotum (Fig. 16G) almost as long as wide, distinctly sinuate posteriorly, sides slightly widening from base until more than middle, converging anteriorly, base slightly emarginate in middle, very strictly rebordered and almost not depressed along base; punctures as wide as those on head, more dispersed, interpunctal surface shagreened. Mesonotal scutellum (Fig. 16G) not protruded posteriorly, almost straight; mesepisterna meeting at midline. Elytra with humeral dimple well visible, with distinct vermicular rugosities. Legs quite slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomeres less slender than meso- and metatarsomeres, protarsomere I moderately robust; metatarsomere I very slender.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Figs. 16H–J; gonocoxal plate widened just after middle; gonostyli in ventral view robust and not slender, slightly divergent, and fused in basal two-thirds, in lateral view narrow and slender, apical lobes long and slender, quite curved dorsally; both aedeagal hooks similar and far from apex, distal hook slightly smaller than proximal one and positioned at point equidistant to apex and proximal hook.

Etymology. This new species is named after Zoltán Kaszab, the Hungarian specialist, who was the first teacher of one of us (MAB) in the study of Meloidae and vastly improved the taxonomy of this family.

Taxonomic remarks. This new species is relatively close to *M. coarctatus* from Japan, but distinct because of the shape of the eye in lateral view, which is slender and sub-oval, more narrowed at apex, antennomere III distinctly longer than II and sub-cylindrical (Fig. 16C), VII bean-shaped (Fig. 16D–E), IX ca. as long as X (Fig. 16C).

Distribution. Northern China. See Appendix 1 for detailed localities.

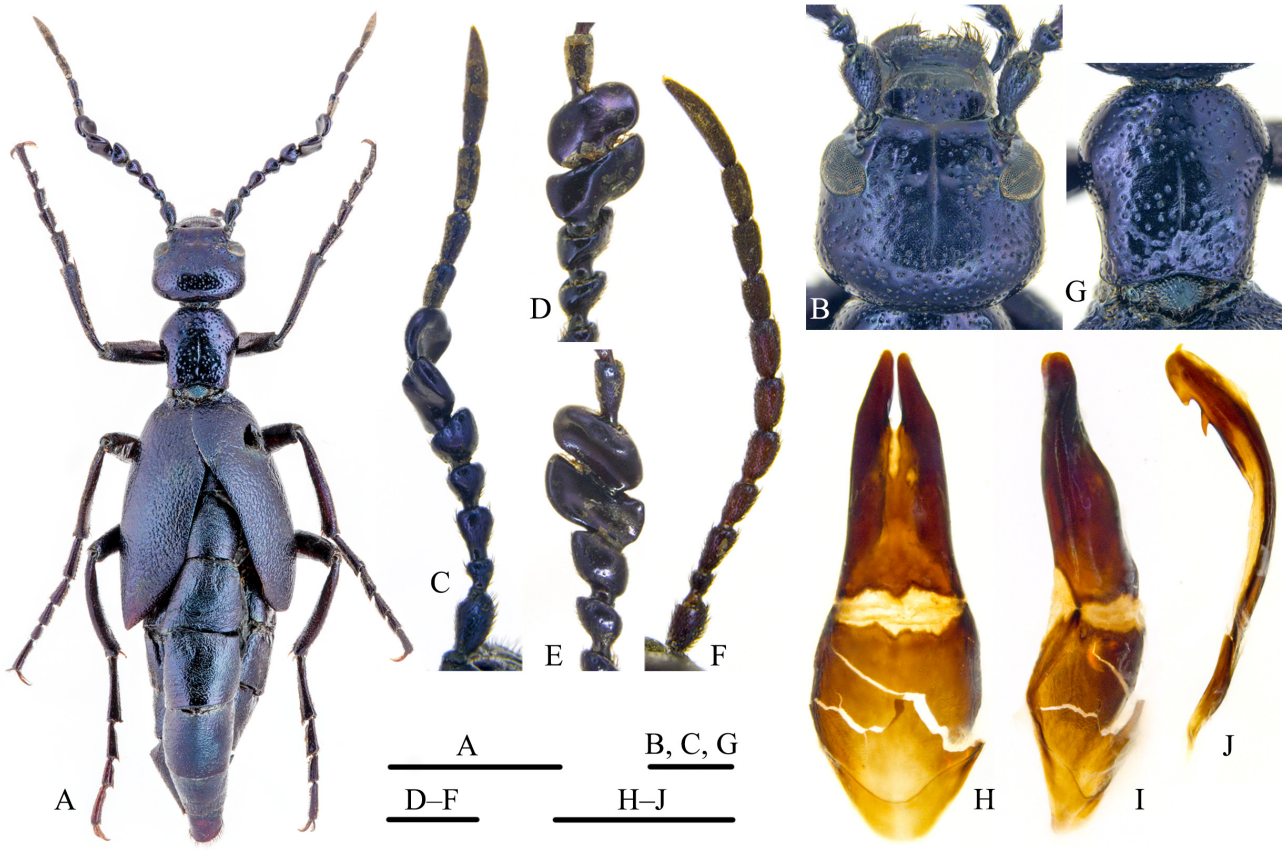

FIGURE 16. *Meloe* (*Meloe*) *kaszabi* **n. sp.** A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

***Meloe* (*Meloe*) *lateantennatus* n. sp.**
Fig. 17

Type locality. China, Sichuan, Guangyuan City, Qingchuan County, Qingxi Zhen, Liangchahe.

Type specimens. Holotype: ♂, "2013.V.6, 川青溪镇两岔河 [Sichuan, Qingxi Zhen, Liangchahe], Elev. 1428 m, 孟祥伟、赵丽、杨俊 [Meng Xiangwei, Zhao Li, Yang Jun leg.], 西华师大标本馆 [Museum of China West Normal University]" (white, rectangular, printed), "HOLOTYPE, *Meloe* (*Meloe*) *lateantennatus* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten) (MHBU).

Description. Body (Fig. 17A) black, quite shining; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: ca. 20.0 mm.

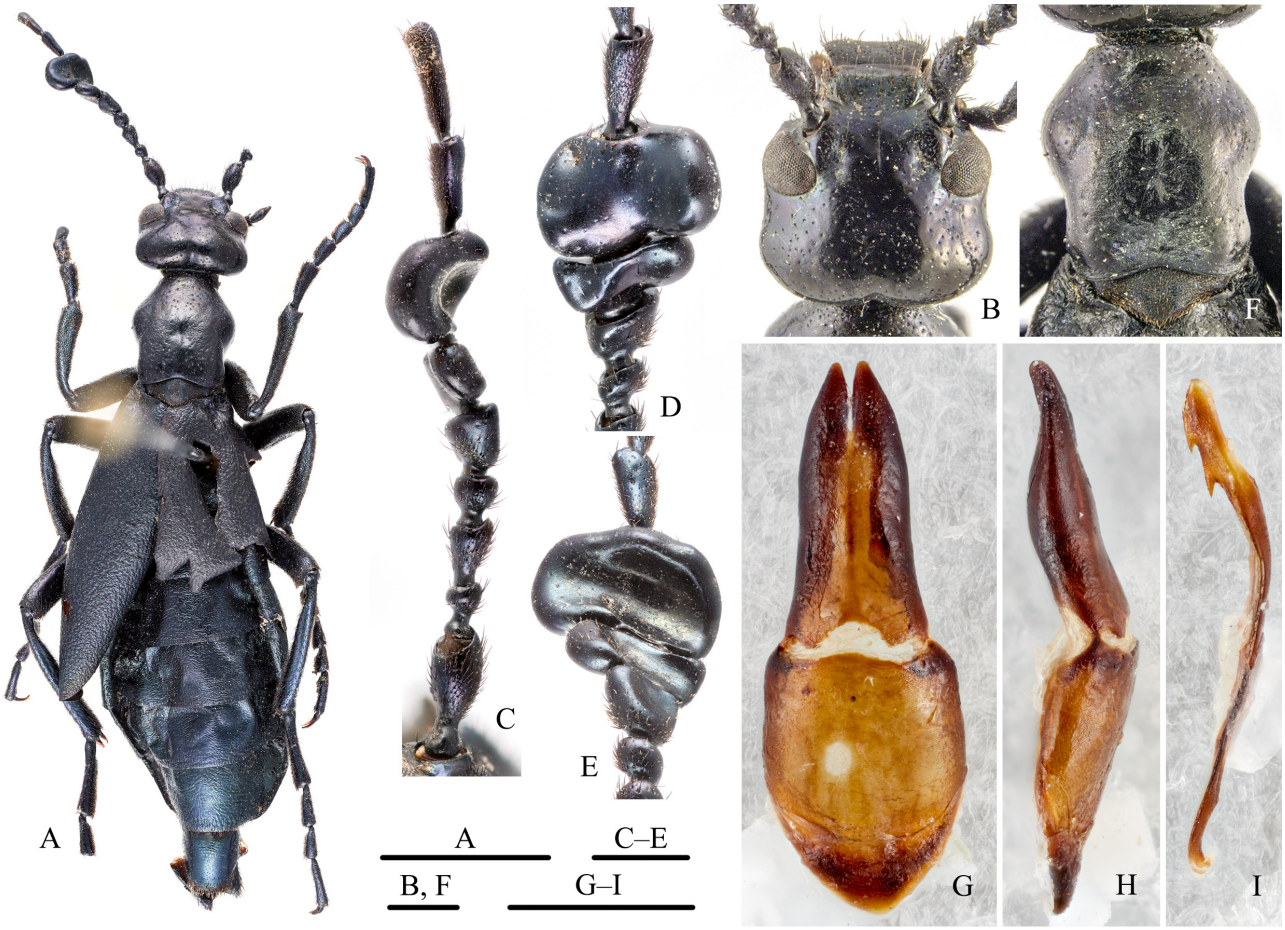

FIGURE 17. *Meloe* (*Meloe*) *lateantennatus* **n. sp.** A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. pronotum, male, dorsal view; G–H. tegmen: G. ventral view; H. lateral view; I. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–I).

Head (Fig. 17B) transverse, sub-rectangular, sides broadly concave, temples sub-gibbose at apex and suddenly rounded, ca. twice as long as longitudinal diameter of eye, sub-equal in width to pronotum; eye large, distinctly convex; frons depressed especially on both sides, raised near fore margin of eye, and with a shallow sub-oval depression at centre, frontal longitudinal middle furrow short; punctures small and fine, sparse, interpunctal surface shagreened; frons with an impunctate wide middle area and dense punctures close to antennal bases; occiput distinctly depressed in middle; fronto-clypeal suture widely angulate; clypeus transverse. Fore margin of labrum sub-arcuate in middle; mandibles quite robust, curved, apically slightly bidentate; maxillary and labial palpi unmodified. Male antennae (Fig. 17C–E) reaching almost middle of elytra; antennomere I sub-cylindrical, distinctly widened to apex, ca. twice as long as II; II sub-globose, short, slightly shorter than III; III sub-cylindrical at base and distinctly widened to apex, ca. 1.2× as long as IV; IV short, shorter than wide, transversely sub-oval in anterior view, not distinctly pointed on dorsal side; V ca. 0.8× as long as wide, distinctly trapezoidal, widened and almost pointed on dorsal side in anterior view, evidently depressed; VI greatly transverse, ca. 2.1× as wide as long, sub-gibbose on

fore inner apex and depressed medianly in anterior view; VII distinctly wider than VI in anterior view, distinctly depressed at centre of anterior side, transversely sub-hexagonal; VIII–XI about as long as I–VII, VIII cylindrical but slightly widened at apex on dorsal side, ca. 2.6× as long as wide; IX–X cylindrical, progressively longer, IX and X ca. 1.2× as long as VIII; XI ca. 1.8× as long as X and ca. 7× as long as wide, sub-cylindrical over middle and conically narrowed to apex and slightly curved.

Pronotum (Fig. 17F) ca. as long as wide (aspect ratio 1.03), greatly sinuate posteriorly, converging before middle, distinctly widened in middle, oblique on fore third; base widely emarginate in middle, very strictly rebordered and almost not depressed along base, with two lateral depressions from middle to fore third; punctures as on head, but slightly deeper and wider, interpunctal surface less shagreened than on head. Mesonotal scutellum (Fig. 17F) widely sub-conical posteriad and slightly protruded posteriorly; mesepisterna meeting at midline. Elytra with humeral dimple wide, with vermicular rugosities not raised. Legs slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all male tarsomeres with pads of light short setae; protarsomere I slender; metatarsomere I slender.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised. Male genitalia as in Fig. 17G–I; gonocoxal plate slightly widened in middle, almost sub-parallel on apical half; gonostyli slightly divergent and fused in basal three-fourths in ventral view, in lateral view narrow and slender at apex, slightly curved, apical lobes long and slender; both aedeagal hooks similar, distal hook smaller than proximal one, positioned far from apex and almost in middle between apex and proximal hook.

Etymology. The name of this species refers to the widened middle male antennomeres.

Taxonomic remarks. This species is very close to *M. gracilior* and distinguished by the few characters listed in the key, especially by the shorter pronotum (Fig. 17F), the shape of male gonostyli (Fig. 17G), and the slenderer aedeagal hooks (Fig. 17I).

Distribution. China (Sichuan). Until now known only from the type locality.

Meloe (*Meloe*) *lobatus* Gebler, 1832

Fig. 18

Meloe lobatus Gebler, 1832: 57; Matsumura, 1911: 128.
Meloe granulifera Motschulsky, 1872: 47; Heyden, 1886: 296; Escherich, 1889: 334.
Meloe patellicornis Fairmaire, 1887b: 325; Escherich, 1889: 334; Reitter, 1895: 4; Reymond, 1938: 15; Borchmann, 1941: 23; Tan, 1992: 577; 2002: 362; Hua, 2002: 130. **n. syn.**
Meloe (*Proscarabaeus*) *bellus* Jakowlew, 1897: 250.
Meloe lobata: Kolbe, 1886: 212; Fairmaire, 1887b: 326; Pligínsky, 1911: 45; Miwa, 1928: 73.
Meloe (*Proscarabaeus*) *lobata*: Reitter, 1895: 5;
Meloe (*Proscarabaeus*) *lobatus*: Kôno, 1936: 93; 1940: 61.
Meloe autumnalis [nec Oliver, 1792]: Tan & Ma, 1997: 738.
Meloe (*Meloe*) *auriculatus* [nec Marseul, 1876]: Hua, 2002: 130; Zhao *et al.*, 2012: 37; Pan & Ren, 2018: 76.
Meloe (*Meloe*) *lobatus*: Tshernyshev & Axentiev, 1996: 55; Bologna, 2008: 402; 2020: 547.
Meloe (*Meloe*) *bellus*: Bologna, 2008: 402.
Meloe (Meloe) patellicornis: Bologna, 2008: 402; Pan *et al.*, 2011: 730.

Type locality. "Sibérie Orientale". Type locality of *Meloe granulifera*: Sibérie Orientale. Type locality of *Meloe patellicornis*: "Pékin" (= Beijing, China). Type locality of *Meloe bellus*: "Province de l'Ussuri: Sidémi" (located in Primorye of Russia).

Type specimens. In the historical collection of MNHN, we examined one male labelled "*Meloe lobatus* type", which probably is the holotype. Tshernyshev & Axentiev (1996) erroneously considered that the type "is probably lost". We did not examine the types of both synonyms *M. granulifera* and *M. bellus*, probably housed at ZMUM and ZIN, respectively. The holotype of *M. patellicornis* at MNHN (Fig. 28E, M) was studied. Information on the holotype of *M. bellus* was reviewed by Tshernyshev & Axentiev (1996).

Description. Body (Fig. 18A) dark blue, almost sub-opaque; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 10.0–22.0 mm.

Head (Fig. 18B) short, sides distinctly parallel, sub-quadrate posteriad, only largely rounded; temples slightly longer than longitudinal diameter of eye, only slightly wider than maximal width of pronotum; eye quite convex;

frons flat, distinctly depressed on both sides, with short, fine middle longitudinal furrow extended from fronto-clypeal suture to almost level of posterior margin of eye, with a small depression on posterior margin of eye; surface with punctures middle-sized and quite dense and deep, interpunctal surface shagreened, frons impunctate only in a narrow fore-middle area; fronto-clypeal suture angulate, clypeus transverse. Fore margin of labrum widely arcuate in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified. Male antennae (Fig. 18C–E) short in basal portion and slender in apical one, reaching almost middle of elytra; antennomere I sub-cylindrical, progressively widened to apex, ca. twice as long as II and distinctly longer than III; II sub-globose, very short, ca. as long as wide; III sub-cylindrical, widened to apex, ca. 1.3× as long as II and IV; IV short, as long as II, shorter than wide, transversely sub-oval in anterior view, not pointed on dorsal side; V short, transverse, sub-trapezoidal, widened on dorsal side in anterior view, apical margin ca. 1.2× as wide as basal margin; VI greatly transverse, ca. twice as wide as long in anterior view, protruded and selliform on ventro-apical portion; VII distinctly wider than VI, transversely sub-hexagonal and distinctly depressed on anterior side; VIII–XI about as long as I–VI; VIII distinctly shorter than VII, sub-cylindrical but slightly widened to apex, ca. 1.8× as long as wide, 0.8× as long as IX; IX–X sub-cylindrical, X slightly longer than IX; XI ca. 1.8× as long as X, more than 5× as long as wide, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennae shorter than male (Fig. 18F), reaching basal third of elytra; antennomeres sub-cylindrical, VIII–XI ca. as long as II–VII; IV–VII not modified, only slightly compressed; III–VI similar in length, and slightly shorter than VII.

Pronotum (Fig. 18G) ca. as long as wide, distinctly sinuate posteriorly, sides sinuate in basal half, after middle widened, converging to apex, base only slightly emarginate in middle, strictly rebordered and quite depressed along base, with a lateral depression on each side in middle; punctures slightly wider than on head, slightly more dispersed, interpunctal surface shagreened. Mesonotal scutellum (Fig. 18G) only very slightly protruded posteriorly; mesepisterna meeting at midline. Elytra with humeral dimple shallow, with distinct vermicular rugosities. Legs relatively slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all tarsomeres with pads of light short setae; protarsomere I slender; metatarsomere I slender.

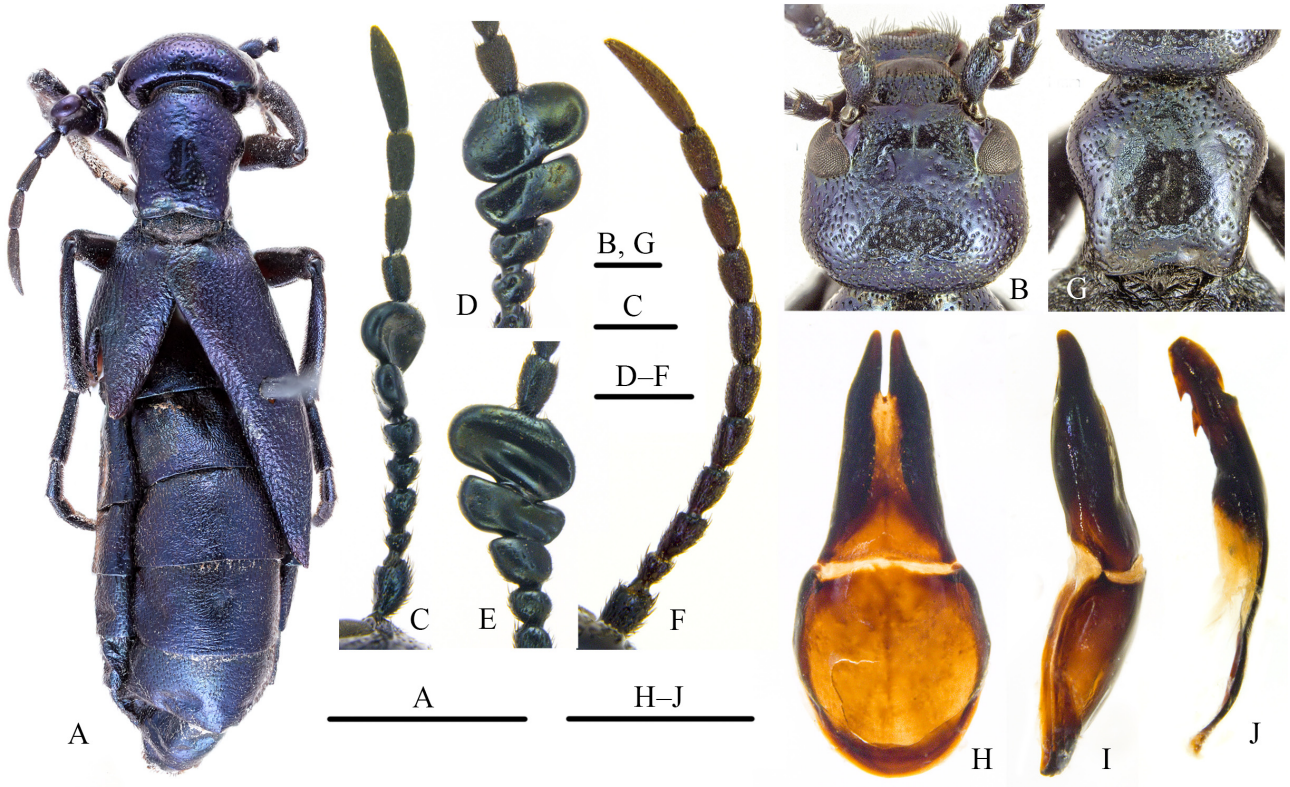

FIGURE 18. *Meloe* (*Meloe*) *lobatus* Gebler, 1832. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Figs. 18H–J; gonocoxal plate widened in middle; gonostyli in ventral view slightly divergent, fused in basal two-thirds, and with an irregular light-coloured area at centre, in lateral view narrow and slender, apical lobes long and slender; aedeagal distal hook slightly more robust than proximal one, and positioned at point equidistant to apex and proximal hook.

Taxonomic remarks. This species is quite variable in body punctation. The distinction with *M. auriculatus* from Japan needs molecular confirmation even if antennal characters seem distinctive. As pointed out above, the synonymy of *Meloe patellicornis* Fairmaire, 1887 was confirmed by the holotype examination. *Meloe granulifera* was synonymized by Reitter (1895). According to Tshernyshev & Axentiev (1996) and Shapovalov (pers. comm., 2019), *M. bellus* Jakowlew, 1897 is a junior synonym of *M. lobatus* Gebler, 1832. Tshernyshev & Axentiev (1996) also synonymized *M. tenuipes* Jakowlew, 1897 and *M. tarsalis* Jakowlew, 1897 with *M. lobatus*, but both synonymies are rejected by us.

Distribution. Russia (eastern Asian territory), Mongolia, China (except for Northwestern and Southwestern regions), North Korea, South Korea, Japan (?). See Appendix 1 for detailed localities.

Meloe (*Meloe*) *orientalis* n. sp.

Fig. 19

Type locality. "Fukien, Kuatun" (= Guadun, Wuyishan, Nanping, Fujian, China).

Type specimens. Holotype: ♂, "CHINA: Fukien, Kuatun, 2–6.XI.1946, leg. Tsung-sen" (white, rectangular, printed), "HOLOTYPE, *Meloe* (*Meloe*) *orientalis* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed) (HNHM).

Paratypes: 1 ♀, idem. (HNHM); 2 ♀, "CHINA: Fukien, Kuatun, 12–21.IV.1946, leg. Tsung-sen" (white, rectangular, printed) (HNHM); 1 ♂, "2018.VIII.26, 云南屏边大围山 [Yunnan, Pingbian, Mt. Daweishan], N22.90608° E103.69723°, Elev. 2065 m, 魏中华采 [Wei Zhonghua leg.]" (white, rectangular, handwritten) (MHBU). 2 ♂, 4 ♀, "Museum Paris, Chekiang, Hangtchéou, A. Pichon 1925)" (rectangular white, printed) (1 MABC, 4 MNHN). All paratypes with the label "PARATYPE, *Meloe* (*Meloe*) *orientalis* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten).

Description. Body (Fig. 19A) dark blue, almost sub-opaque; setae black, ventrally denser and dorsally extremely short and sparse; elytra almost nude. Body length: 11.0–23.0 mm.

Head (Fig. 19B) transverse, sides parallel, sub-quadrate posteriad, largely rounded; temples ca. 1.5× as long as longitudinal diameter of eye, slightly wider than maximal width of pronotum; eye convex; frons flat, distinctly depressed on both sides, with short, fine middle longitudinal furrow extended from fronto-clypeal suture to almost middle of head, with a small depression on centre of head; surface with punctures middle-sized, shallow and dispersed, interpunctal surface shagreened, frons impunctate in depressed areas; fronto-clypeal suture distinctly angulate; clypeus transverse. Fore margin of labrum slightly arcuate in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified. Male antennae (Fig. 19C–E) reaching middle of elytra, short in basal portion and slender in apical one; antennomere I sub-cylindrical, progressively widened to apex, ca. 2.3× as long as II and 1.5× as long as III; II sub-globose, short, almost as long as wide; III sub-cylindrical, progressively widened to apex, ca. 1.5× as long as II and almost 1.4× as long as IV; IV very short, shorter than wide, transversely sub-oval in anterior view, slightly longer than II; V short, sub-trapezoidal, widened on dorsal side in anterior view; VI greatly narrower, ca. 2.4× as wide as long in anterior view, protruded and selliform on ventro-apical portion; VII distinctly longer and wider than VI, transversely sub-triangular and distinctly depressed in anterior view; VIII–XI ca. as long as I–VII; VIII slightly shorter than VII, slender and sub-cylindrical, ca. twice as long as wide, 0.8× as long as IX; IX–X sub-cylindrical, X slightly longer than IX; XI nearly twice as long as X and ca. 5.8× as long as wide, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennae slightly shorter than male (Fig. 19F); III–VI widened apically; IV–VII slightly compressed; VIII distinctly longer than III; XI ca. 5.6× as long as wide.

Pronotum (Fig. 19G) ca. 1.15× as long as wide, distinctly sinuate posteriorly, sides arcuate in basal half, after middle greatly widened, almost obliquely converging to apex, base emarginate in middle, strictly rebordered and scarcely depressed along base; punctures as on head, slightly more dispersed, interpunctal surface shagreened. Mesonotal scutellum (Fig. 19G) slightly protruded posteriorly; mesepisterna meeting at midline. Elytra with humeral

dimple, with vermicular rugosities very fine. Legs slender; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all tarsomeres with pads of light short setae; protarsomere I relatively slender; metatarsomere I very slender.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Fig. 19H–J; gonocoxal plate widened in middle; gonostyli in ventral view slightly divergent and fused in basal two-thirds, in lateral view shorter and slender at apex, apical lobes long; both aedeagal hooks similar and far from apex, distal hook positioned at point equidistant to apex and proximal hook.

Etymology. The name of this new species refers to the eastern distribution of this species in the Palaearctic Region.

Taxonomic remarks. This species is similar to *M. lobatus*, especially for the shape of antennae, but could be distinguished by its longer pronotum (aspect ratio more than 1.1, as in Fig. 19G), that is similar to *M. gracilior* (Fig. 15G).

Distribution. China (Fujian, Yunnan, Zhejiang). See Appendix 1 for detailed localities.

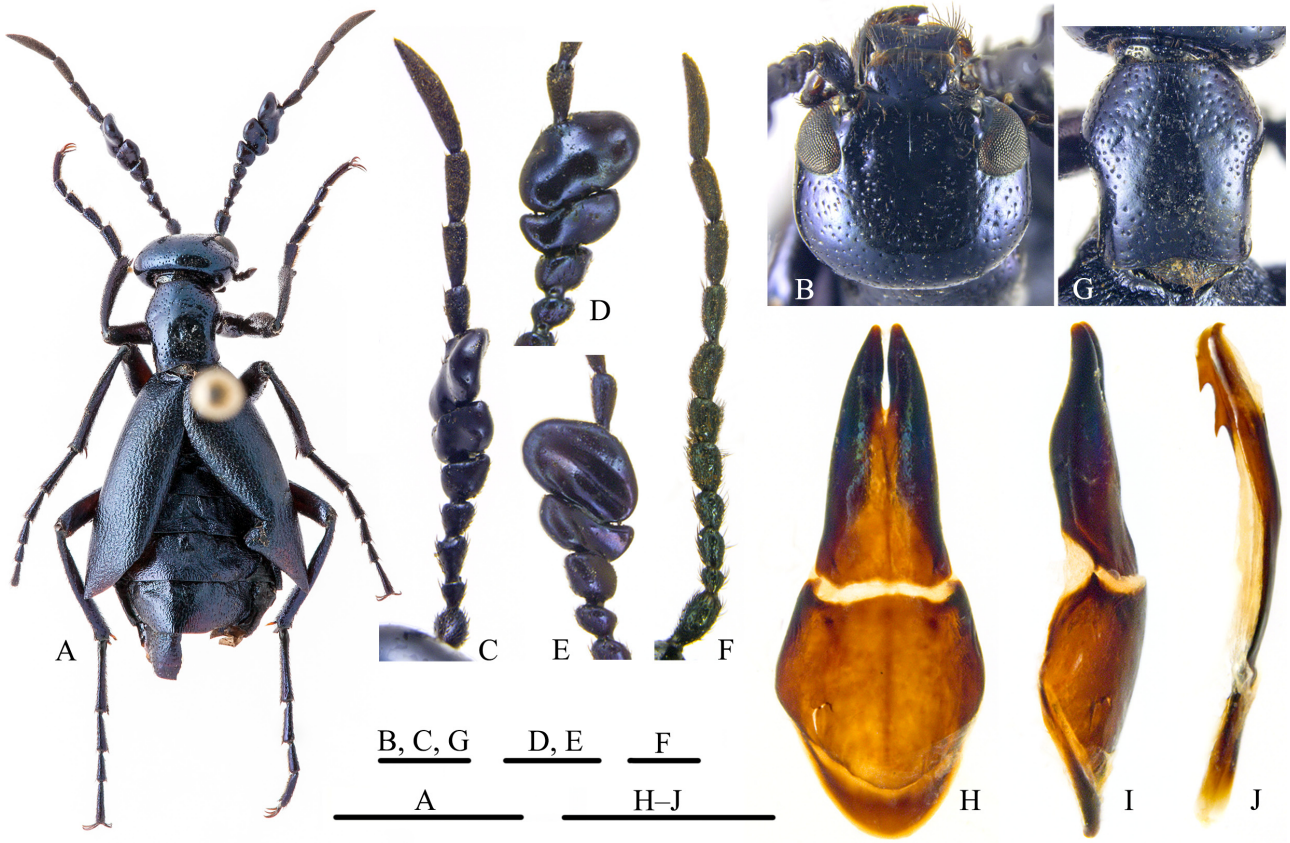

FIGURE 19. *Meloe* (*Meloe*) *orientalis* **n. sp.** A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Meloe (*Meloe*) *tarsalis* Jakowlew, 1897

Fig. 20

Meloe (*Proscarabaeus*) *tarsalis* Jakowlew, 1897: 249.
Meloe tarsalis: Pliginsky, 1911: 45.
Meloe (*Meloe*) *tarsalis*: Bologna, 2008: 402; 2020: 548.

Type locality. (Russia, East Siberia) "Transbaïcalie: riv. Irhirik".

Type specimens. We did not examine the types of this species, which probably are deposited at ZIN.

Description. Body (Fig. 20A) dark blue, shining; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 9.5–21.5 mm.

Head (Fig. 20B) short, sides distinctly parallel, sub-quadrate posteriad, only largely rounded; temples ca. 1.8× as long as longitudinal diameter of eye, distinctly wider than maximal width of pronotum; eye only slightly convex; frons flat, distinctly depressed on both sides, with a short, fine middle longitudinal furrow extended from fronto-clypeal suture to almost level of posterior margin of eye, continuing in a small longitudinal middle depression, short longitudinal depression on posterior margin of eye; surface with punctures middle-sized and quite dense and deep, interpunctal surface shagreened, frons impunctate only in a narrow fore-middle area; fronto-clypeal suture widely angulate, clypeus transverse. Fore margin of labrum widely arcuate in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified. Antennae slender, reaching middle of elytra. Male antennae as in Fig. 20C–E; antennomere I sub-cylindrical, progressively widened to apex, ca. 1.8× as long as II and ca. 1.3× as long as III; II sub-globose, short, longer than wide; III sub-cylindrical, widened to apex, ca. 1.35× as long as II and as 1.25× as long as IV; IV short, sub-cylindrical and slightly expanded to apex in anterior view; V in anterior view sub-ogival, ca. 1.5× as wide as long, very elongate on dorsal side; VI in anterior view ca. 1.6× as wide as V, greatly transverse, sub-rectangular, ca. 1.7× as wide as long, sub-selliform on ventro-apical portion; VII slightly longer than and almost as wide as VI, sub-oval almost sub-rectangular in anterior view; VIII–XI sub-equal to II–VII in length; VIII slightly shorter than VII, slender and cylindrical, ca. 2.4× as long as wide, 0.9× as long as IX; IX–X cylindrical, X distinctly longer than VIII; XI slender, ca. 5.4× as long as wide, nearly twice as long as X, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennomeres IV–VII not transverse, sub-cylindrical, slightly compressed, IV slightly shorter than III and as long as VI, V longer than IV and slightly shorter than VII; other antennomeres similar to male (Fig. 20F).

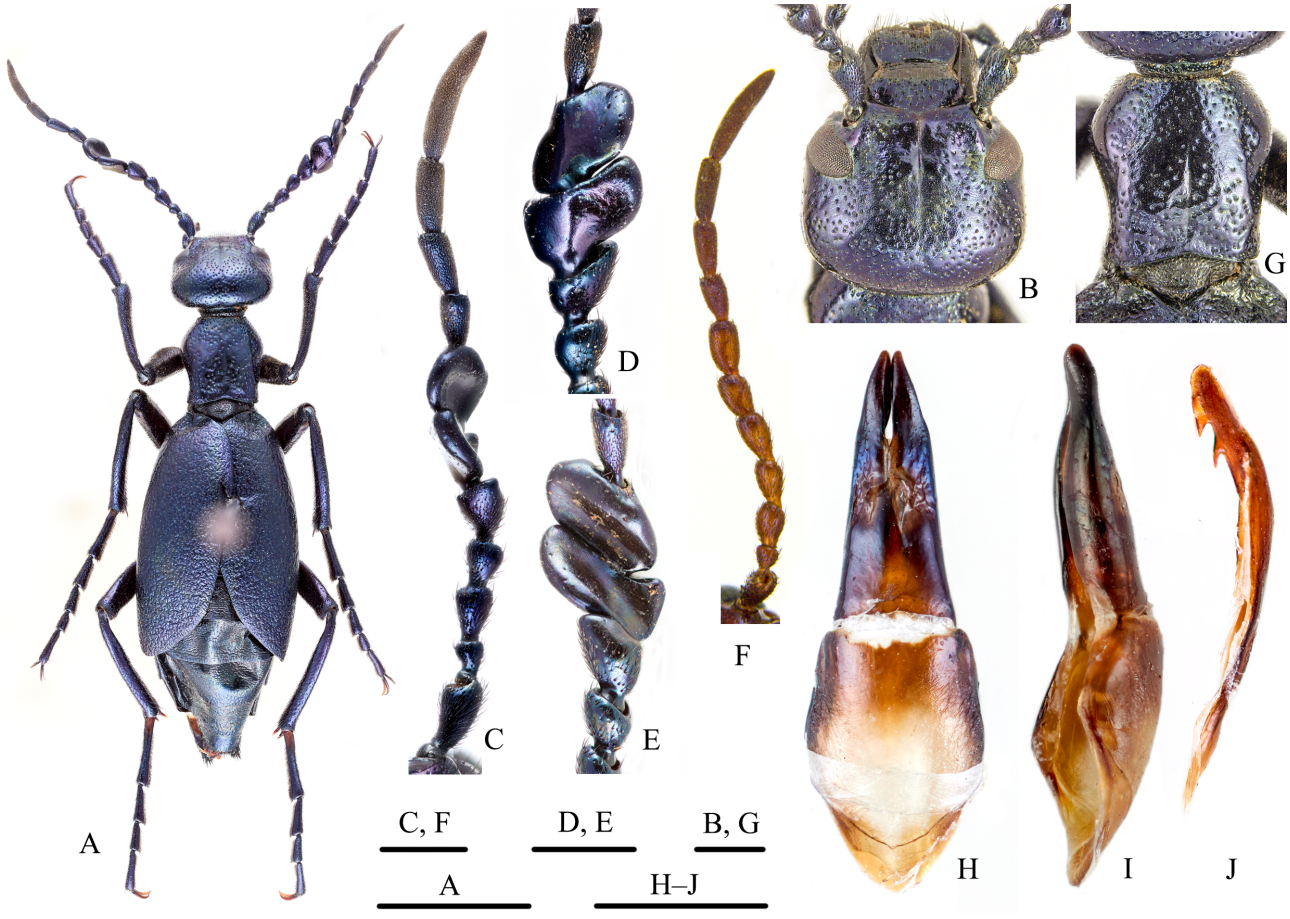

FIGURE 20. *Meloe* (*Meloe*) *tarsalis* Jakowlew, 1897. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Pronotum (Fig. 20G) ca. as long as wide, quite sinuate posteriorly, sides sinuate in basal half, after middle widened, converging to apex, base only widely emarginate in middle, strictly rebordered and almost not depressed along base, without distinct lateral depressions on sides in middle; middle longitudinal furrow well visible along a small middle depression; punctures slightly wider than on head, slightly more dispersed, interpunctal surface shagreened. Mesonotal scutellum (Fig. 20G) distinctly, broadly protruded posteriorly; mesepisterna meeting at midline. Elytra with humeral dimple distinct, with narrow but distinct vermicular rugosities. Legs relatively slender; meso- and metatibial slightly arcuate; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all tarsomeres with pads of light short setae, narrow and short on metatarsomeres; protarsomere I relatively robust; metatarsomere I slender, with base strictly orange-yellow, but total black in few cases.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Figs. 20H–J; gonocoxal plate elongate and scarcely widened in middle; gonostyli in ventral view with three yellow spots at centre, scarcely sclerotized in middle and fused in basal two-thirds, in lateral view with distinct sinuate apex and lobes robust; aedeagal hooks similar in size, proximal one more curved, distal hook far from apex, close to proximal one.

Taxonomic remarks. This species was synonymized with *M. lobatus* by Tshernyshev & Axentiev (1996), but this synonymy is rejected by us because these species are clearly distinguished by antennal features.

Distribution. Russia (East Siberia), northern China. See Appendix 1 for detailed localities.

Subcordicollis Subgroup

***Meloe* (*Meloe*) *chinensis* n. sp.**
Fig. 21

Type locality. China, Sichuan, Daocheng County.

Type specimens. Holotype: ♂, "2008.VIII.18–19, 四川稻城县 [Sichuan, Daocheng County], 3700 m, 郜振华 周勇 [Gao Zhenhua, Zhou Yong leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed), "HOLOTYPE, *Meloe* (*Meloe*) *chinensis* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten) (MHBU).

Paratypes: 2 ♂ and 3 ♀, idem. (1 MABC; 4 MHBU); 1 ♀, "2015-V-12, 川小寨沟保护站 [Sichuan, Xiaozhaigou], 魏中华 [Wei Zhonghua leg.], 西华师大标本馆 [Museum of China West Normal University]" (white, rectangular, printed) (MHBU); 1 ♀, "重庆江津四面山 [Chongqing, Jiangjin, Mt. Simianshan], 2017.6, 采集人：罗笑颜 [Luo Xiaoyan leg.]" (white, rectangular, printed) (MHBU). All paratypes with the label "PARATYPE, *Meloe* (*Meloe*) *chinensis* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten).

Description. Body (Fig. 21A) black, shining but elytra sub-opaque; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 14.5–29.5 mm.

Head (Fig. 21B) short, sides distinctly parallel, sub-quadrate posteriad, largely rounded and distinctly converging posteriad on occiput, ca. twice as long as longitudinal diameter of eye, wider than maximal width of pronotum; eye only slightly convex; frons flat, distinctly depressed except near fronto-clypeal suture, with a well visible, middle, fine longitudinal furrow extended from fronto-clypeal suture to almost level of posterior margin of eye, positioned in a longitudinal middle depression; vague depression on posterior margin of eye; surface with punctures small, quite fine and shallow, relatively dense, interpunctal surface shagreened, frons scarcely punctate; fronto-clypeal suture widely angulate, clypeus transverse. Fore margin of labrum widely arcuate in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified. Antennae reaching basal third of elytra. Male antennae as in Fig. 21C–E; antennomeres VIII–XI distinctly shorter than I–VII; antennomere I sub-cylindrical, widened to apex, ca. twice as long as II and slightly longer than III; II widened at apex but not distinctly sub-globose, longer than wide; III ca. 1.25× as long as II, and ca. 1.3× as long as IV, sub-oval and slightly expanded anteriorly at apex; IV short, sub-oval but almost transverse, wider than long in posterior view; V in anterior view sub-ogival, very elongate on dorsal side, ca. as long as IV; VI in anterior view greatly transverse, sub-rectangular, ca. 1.4× as wide as V, and ca. 1.6× as wide as long, selliform on ventro-apical portion; VII longer and sub-equal in width than VI, sub-oval almost sub-rectangular in anterior view; VIII shorter than VII, slender and sub-cylindrical,

ca. 1.7× as long as wide, and ca. 0.8× as long as IX; IX–X sub-cylindrical, X distinctly longer than VIII; XI slender, ca. 5.4× as long as wide, and ca. 1.7× as long as X, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennomeres slightly shorter (Fig. 21F); IV–VII sub-globose, wider than VIII–XI; III, V, VII, and VIII similar in length, and distinctly longer than IV or VI.

Pronotum (Fig. 21G) ca. as long as wide, sinuate posteriorly, sides sinuate in basal half, after middle widened, widely converging to apex, base widely emarginate in middle, strictly rebordered and not depressed along base, with a longitudinal well visible depression on basal half with a short longitudinal furrow at its bottom; punctures similar to those on head but slightly more dispersed, interpunctal surface shagreened. Mesonotal scutellum (Fig. 21G) with a short apically rounded posterior protrusion; mesepisterna meeting at midline. Elytra with humeral dimple highly distinct, with narrow but distinct vermicular rugosities. Legs relatively slender; meso- and metatibial slightly arcuate; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all tarsomeres with pads of light short setae, narrow and short on metatarsomeres; protarsomere I relatively robust; metatarsomere I slender, totally black.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Fig. 21H–J; gonocoxal plate elongate and scarcely widened in middle; gonostyli in lateral view progressively narrowed at apex, fused ventrally basal seven-tenths; aedeagal distal hook smaller than proximal one and closer to apex than to proximal one.

Etymology. This new species is named after "China", where it is distributed.

Taxonomic remarks. The shape of male antennae is almost the same as in the other species of this subgroup, except for the distinctly transversally widened antennomere VII (Fig. 21D–E), that is similar to the species of the Lobatus Subgroup (Figs. 11–20D–E). Furthermore, its pronotum (Fig. 21G) is smooth, with small and sparse punctures, similar to the species in the Lobatus Subgroup. For the above characters, *M. chinensis* is positioned tentatively in the Subcordicollis Subgroup and it will be tested in future molecular phylogenetic analysis.

Distribution. China (Chongqing, Sichuan). See Appendix 1 for detailed localities.

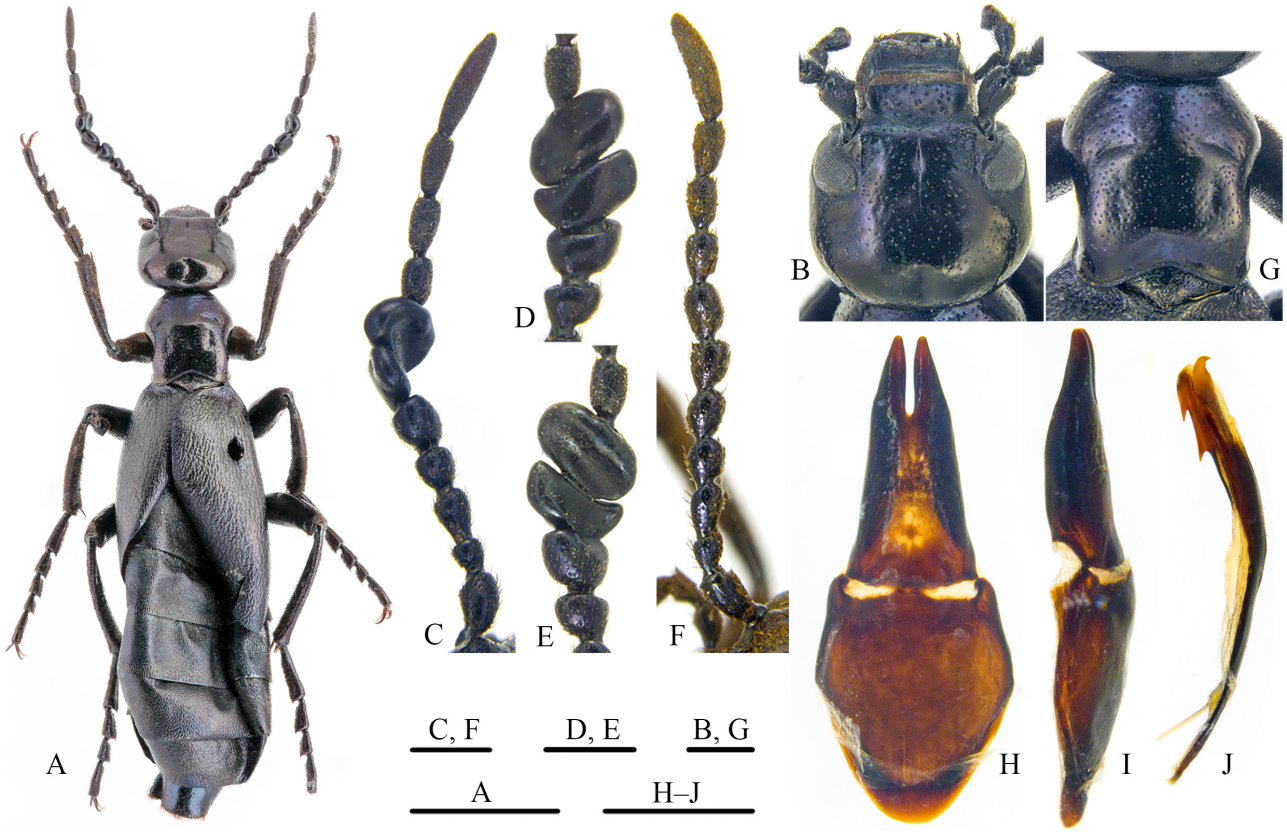

FIGURE 21. *Meloe* (*Meloe*) *chinensis* **n. sp.** A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

***Meloe* (*Meloe*) *himalayensis* n. sp.**
Fig. 22

Type locality. China, Xizang, Dinggyê, Zhêntang

Type specimens. Holotype: ♂, "2014-VIII-4, 西藏定结陈塘镇 [Xizang, Dinggyê, Zhêntang], 任国栋 白兴龙 单军生 [Ren Guodong, Bai Xinglong & Shan Junsheng leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed), "N27°54.876' E87°37.523', Alt. 4249 m, 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed), "HOLOTYPE, *Meloe* (*Meloe*) *himalayensis* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten) (MHBU).

Paratypes: 3 ♀, idem., with the additional label "PARATYPE, *Meloe* (*Meloe*) *himalayensis* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten) (MHBU).

Description. Body (Fig. 22A) black, shining, basal antennomeres and legs with vague blue tint, sub-opaque; metatarsomere I yellow brown at base; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 14.0–21.5 mm.

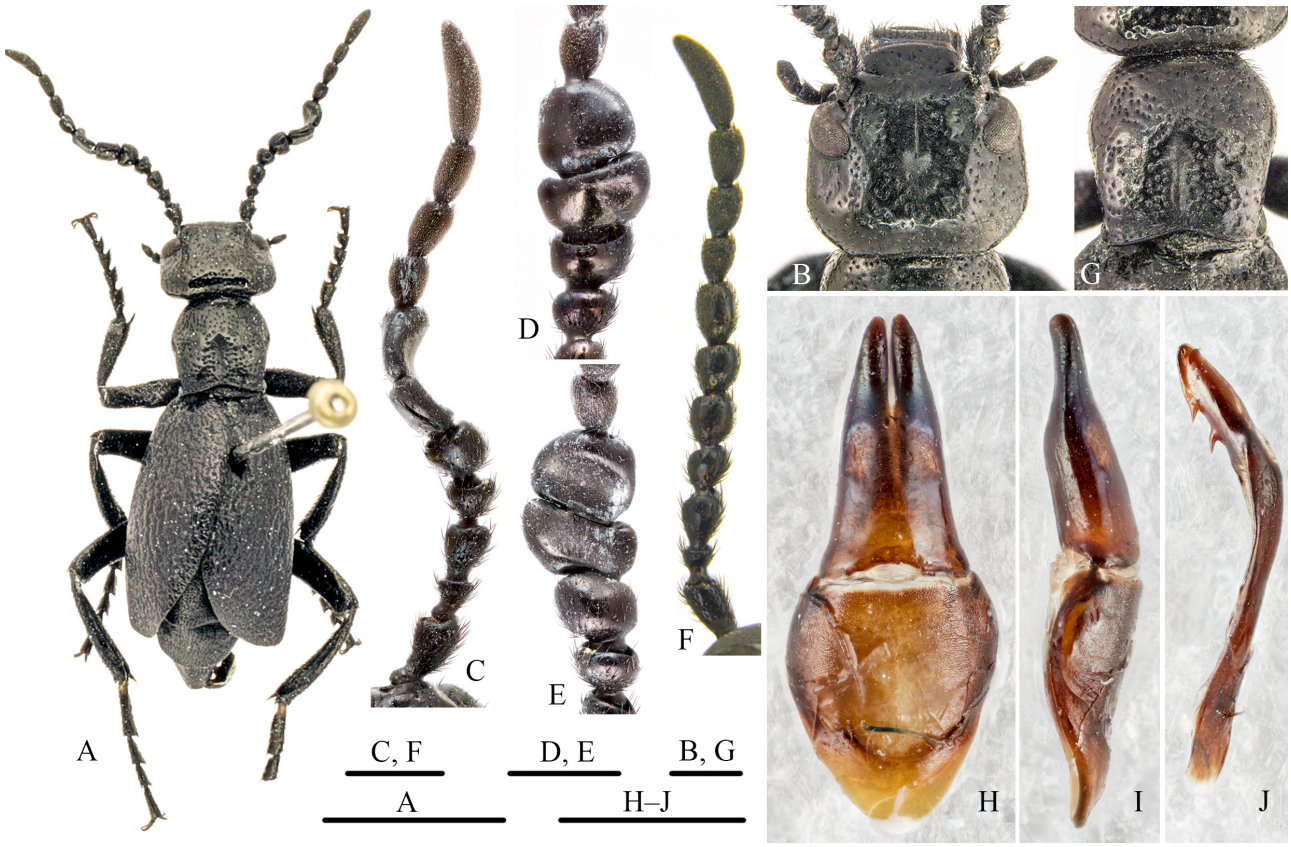

FIGURE 22. *Meloe* (*Meloe*) *himalayensis* **n. sp.** A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Head (Fig. 22B) sub-rectangular, wider than long, temples slightly widened, and only slightly curved posteriad; ca. twice as long as longitudinal diameter of eye, slightly wider than maximal width of pronotum; eye scarcely convex; frons with two lateral depressions close to each eye, with a middle longitudinal line at bottom of a longitudinal furrow from fronto-clypeal suture to basal third of head; fronto-clypeal suture slightly angulate in middle; punctures large and irregular, sparse, but denser in few individuals. Labrum with anterior margin scarcely emarginate; maxillary and labial palpi not modified; mandibles robust. Male antennae short, reaching basal third of elytra, as in Fig. 22C–E; antennomere I short, sub-oval widened to apex, ca. twice as long as II and slightly longer than III; II short, sub-globose; III sub-moniliform, widened to apex; IV shorter than III, transverse and sub-globose in anterior view; V sub-rectangular, sub-parallel on dorsal and ventral sides in anterior view; VI in anterior view transverse, sub-trapezoidal, not distinctly selliform, ca. 1.38× as wide as V and 1.13× as wide as VII; VII slightly longer than VI,

sub-trapezoidal, transversely depressed in anterior view; VIII short, sub-moniliform, ca. 0.7× as long as VII and ca. 1.25× as long as wide; IX–X sub-cylindrical, narrower than VIII, progressively longer; XI similar in width to X but twice as long, ca. 3.6× as long as wide, sub-cylindrical, narrow in apical third. Female antennae shorter, only reaching base of elytra, as in Fig. 22F; antennomeres V and VI sub-moniliform, V slightly longer and wider than VI; VII elongate, slightly widened apically; IX–XI relatively shorter than male.

Pronotum (Fig. 22G) ca. 1.05× as long as wide, sides sinuate posteriorly, distinctly widest at apical third, posterior margin emarginate in middle; strictly rebordered and quite depressed along base; sub-oval depressed at centre of disc, and with a short longitudinal furrow in middle; punctures similar to those on head, but slightly denser. Mesonotal scutellum distinctly protruded posteriad, almost triangular, clearly visible (Fig. 22G). Elytra with distinct humeral dimple, with vermicular rugosities. Legs relatively robust; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all tarsomeres with pads of light short setae, darker on metatarsomeres, smaller on female metatarsomeres.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite shallowly emarginate, rounded in female. Male genitalia as in Figs. 22H–J; gonocoxal plate widened in middle; gonostyli sub-triangular in ventral view, fused in basal two-thirds, and with two small light-coloured areas on centre, apical lobes long in lateral view; aedeagal hooks different in shape, distal hook positioned slightly closer to proximal one than to apex.

Etymology. The name of this new species refers to its distribution area, the Himalayas.

Taxonomic remarks. The new species is very close to *M. scabrus* and distinguished by a few characters of the male antennae and genitalia listed in the key.

Distribution. China (Xizang). Until now known only from the type locality.

Meloe (*Meloe*) *kashmirensis* n. sp.

Fig. 23

Meloe (*Meloe*) cfr. *lobatus* Gebler, 1832: Bologna *et al.*, 2018: 654.

Type locality. Northern Pakistan, Kaghan Valley.

Type specimens. Holotype: ♀, "Northern Pakistan, Kaghan V., VI.1991 [S. Prespl leg.]" (white, rectangular, handwritten); "*Meloe* (*Meloe*) *kashmirensis* Bologna & Pan" (red, rectangular, printed and handwritten) (MABC).

Description. Body (Fig. 23A) black with vague dark blue tones, quite shining; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 29.0 mm.

Head (Fig. 23B) short, sides distinctly parallel, sub-quadrate posteriad, only largely rounded, ca. 2.3× as long as longitudinal diameter of eye, wider than maximal width of pronotum; eye quite convex, frons flat, not distinctly depressed, with very short middle, fine longitudinal furrow extended from fronto-clypeal suture to almost level of fore margin of eye, without depressions on posterior margin of eye; fronto-clypeal suture angulate, clypeus transverse; surface with punctures middle-sized and relatively dispersed, interpunctal surface shagreened, frons impunctate only in a narrow fore-middle area. Fore margin of labrum widely arcuate in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified, last palpomere very widened at apex, securiform. Female antennae as in Fig. 23C.

Pronotum (Fig. 23B) ca. 1.3× as long as wide, distinctly sinuate posteriorly after middle widened, converging to apex, base quite emarginate in middle, strictly rebordered and quite depressed along base, with a small lateral sub-oblique depression on each side in middle; punctures slightly wider than on head, similarly dispersed, interpunctal surface shagreened. Mesonotal scutellum (Fig. 23B) only slightly protruded posteriorly; mesepisterna meeting at midline. Elytra with humeral dimple shallow, with distinct vermicular rugosities. Legs relatively robust; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all tarsomeres with pads of light short setae; protarsomere I slender; metatarsomere I slender.

Abdominal tergites largely sclerotized; last ventrite margin rounded.

Etymology. This new species is named after the Kashmir, the mountain area where it is distributed.

Taxonomic remarks. Even if we have studied one single female, we decided to describe it because it represents the single species of the Lobatus Group in the western Himalaya range (Kashmir) with *M. arunachalae* (Himachal

Pradesh). We tentatively include it in the Subcordicollis Subgroup because of the pronotum length, the body punctures, and the antennal pattern. *M. kashmirensis* is similar to *M. shapovalovi* from southwestern China and differs because of the following characters: body black with blue reflexions shinier, head and pronotum punctures denser, elytral rugosities higher; frons flat, not depressed, temples more parallel and posteriorly not progressively rounded, almost sub-quadrate; antennae elongate.

Distribution. Northern Pakistan. Until now known only from the type locality.

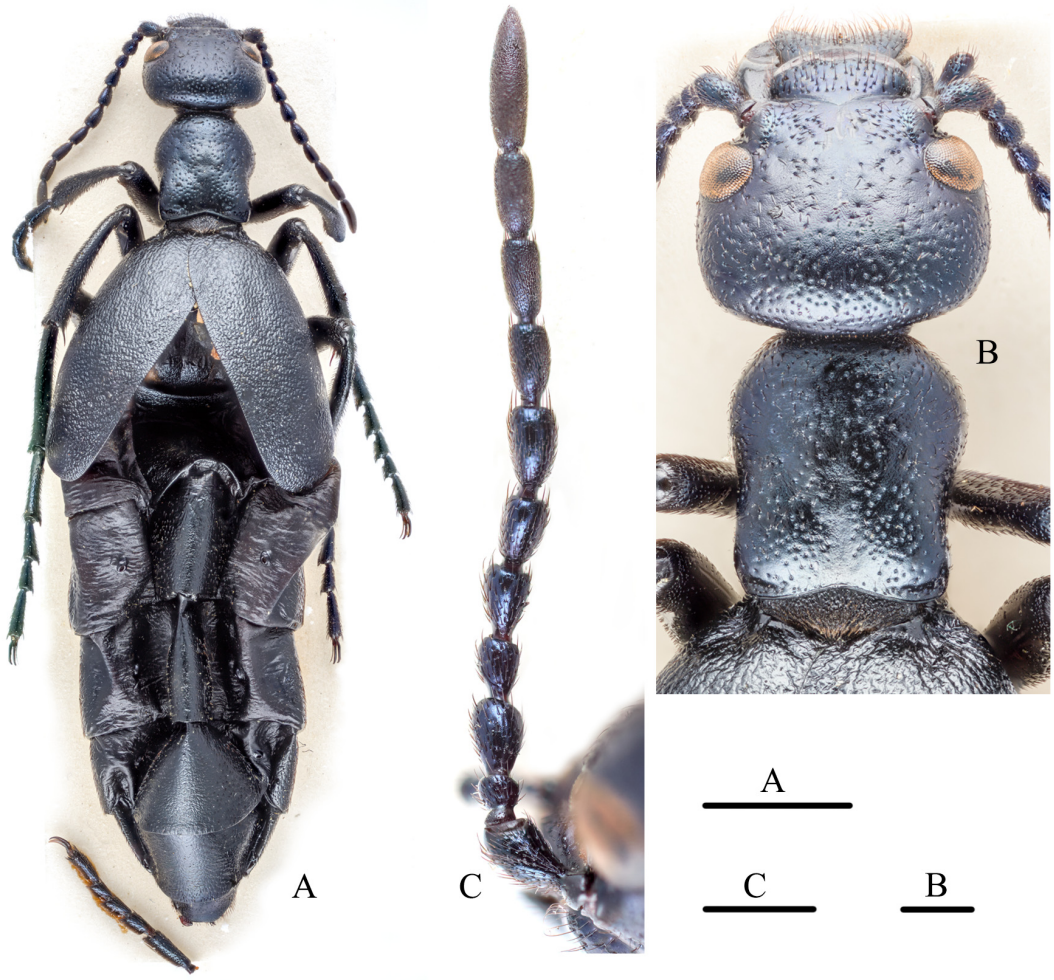

FIGURE 23. *Meloe* (*Meloe*) *kashmirensis* **n. sp.** A. habitus, female; B. head and pronotum, female, dorsal view; C. antenna, female, dorsal view. Scale bars: 5 mm (A); 1 mm (B, C).

***Meloe* (*Meloe*) *poggii* n. sp.**
Fig. 24

Type locality. China, Xizang, Changdu City, Baxoi County.

Type specimens. Holotype: ♂, "2007-9-30, 西藏八宿 [Xizang, Baxoi], 石福明 [Shi Fuming leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed), "HOLOTYPE, *Meloe* (*Meloe*) *poggii* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten) (MHBU).

Paratypes: 1 ♂ and 1♀, "2009-VII-22, 西藏八宿县然乌镇 [Xizang, Baxoi County, Ra'og Town], 任、巴、周 [Ren, Ba & Zhou leg.], 河北大学博物馆 [Museum of Hebei University]", "N29.5695 E96.7632, 4191 m, 河北大学博物馆 [Museum of Hebei University]" (both white, rectangular, printed) (MHBU); 1 ♀, "2009-VII-25, 西藏八宿然乌镇 [Xizang, Baxoi, Ra'og Town], 任、巴、周 [Ren, Ba & Zhou leg.], 河北大学博物馆 [Museum of Hebei University]", "N29.3687 E96.9171, 4500 m, 河北大学博物馆 [Museum of Hebei University]" (both white, rectangular, printed) (MHBU); 1 ♂, "2007-VII-21, 西藏八宿县益庆乡 [Xizang, Baxoi County, Yiqing], 任、巴、周 [Ren, Ba & Zhou leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed)

(MHBU); 1 ♂, "2004-VIII-1, 西藏索县荣布乡 [Xizang, Sog County, Rongbo], 巴义彬、石爱民 [Ba Yibin & Shi Aimin leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed) (MHBU); 1 ♂, "2011-VII-27, 西藏江达卡贡雪集拉 [Xizang, Jomda, Kagong], 4240 m, 任国栋等 [Ren Guodong *et al.* leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed) (MHBU); 1 ♂, "2016-VIII-9, 西藏江达玉龙镇 [Xizang, Jomda, Yulong], 李秀敏等 [Li Xiumin *et al.* leg.]" (white, rectangular, printed), "N31°22.014' E97°48.436', Elev. 4164 m" (white, rectangular, printed) (MABC); 1 ♂ and 1 ♀, "2016.VIII.9, 西藏昌都市妥坝乡珍嘎村 [Xizang, Qamdo City, Toba, Zhenga], N31°17.006' E97°33.729', Elev. 4017 m, 李秀敏等 采 [Li Xiumin *et al.* leg.]" (white, rectangular, printed) (MHBUa); 1 ♀, "2019.VIII.8, 西藏拉萨市林周县旁多村 [Xizang, Lhasa City, Lhünzhub County, Pondo], N30°13'04.64" E91°18'49.95", Elev. 4083 m, 潘昭、王兰蕊等 采 [Pan Zhao, Wang Lanrui *et al.* leg.]" (white, rectangular, printed) (MHBUa); 3 ♀, "2019.VIII.19, 西藏日喀则市岗巴县杰龙村 [Xizang, Xigazê City, Gamba County, Jielong], N28°23'58.7" E88°26'19", Elev. 4493 m, 潘昭、王兰蕊等 采 [Pan Zhao, Wang Lanrui *et al.* leg.]" (white, rectangular, printed) (MHBUa); 1 ♂, "2019.VII.31, 西藏边坝县马秀乡塘嘎 [Xizang, Banbar County, Marxog, Tangga], N31°01.410' E94°37.152', Elev. 4400 m, 任国栋等 采 [Ren Guodong *et al.* leg.]" (white, rectangular, printed) (MHBUa); 1 ♀, "2019.VIII.4, 西藏当雄羊八井夏乌拉 [Xizang, Damxung, Yangbajain, Xiawula], N30°02.356' E90°36.251', Elev. 4169 m, 任国栋等 采 [Ren Guodong *et al.* leg.]" (white, rectangular, printed) (MHBUa); 1 ex. (damaged), "2019.VIII.11, 西藏丁青觉恩乡金卡村 [Xizang, Dêngqên, Jue'en, Jinka], N31°13.292' E95°58.300', Elev. 3700 m, 任国栋等 采 [Ren Guodong *et al.* leg.]" (white, rectangular, printed) (MHBUa); 1 ♂, "2019.VII.30, 西藏洛隆孜托镇土布克 [Xizang, Lhorong, Zito, Tubuke], N30°32.515' E95°46.774', Elev. 4206 m, 任国栋等 采 [Ren Guodong *et al.* leg.]" (white, rectangular, handwritten) (MHBUa); 1 ♀, "2018.VIII.21, 西藏巴青雅安镇G317嘎改 [Xizang, Baqên, Ya'ngando, Gagai], N31°47.565' E94°29.932', Elev. 4135 m, 白兴龙等 采 [Bai Xinglong *et al.* leg.]" (white, rectangular, handwritten) (MHBUa); 2 ♂, "2014.VII.8, 青海玉树杂多扎青 [Qinghai, Yushu, Zadoi, Zhaqing], 石福明 采 [Shi Fuming leg.]" (white, rectangular, handwritten) (MHBU); 1 ♂, "2019.VIII.18, 青海麦秀林场二沟 [Qinghai, Maixiu, Ergou], N35°16.513' E101°55.380', Alt. 3020 m, 白兴龙、马明敏 采 [Bai Xinglong & Ma Mingmin leg.]" (white, rectangular, printed) (MHBUa); 1 ♀, "2018-VII-23–VIII-10, 甘肃连城国家保护区 [Gansu, Liancheng National Nature Reserve], 郭欣乐 [Guo Xinyue leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed) (MHBU); 1 ♂, "050282(1), 康定孔玉乡 [(Sichuan), Kangding, Kongyu]" (white, rectangular, handwritten) (MABC); 1 ♀, "2016.VIII.16, 四川康定市呷巴乡铁索村 [Sichuan, Kangding City, Gaba, Tiesuo], N29°54.731' E101°35.322', Elev. 3450 m, 李秀敏等 [Li Xiumin *et al.* leg.]" (white, rectangular, printed) (MHBUa); 1 ♀, "2016.VI.2, 四川康定雅家梗中国高山植物园 [Sichuan, Kangding, Yajiageng, Gaoshan Botanical Garden], N29°55.773' E101°57.877', Elev. 3039 m, 郭向博 [Guo Xiangbo leg.]" (white, rectangular, printed) (MHBUa); 1 ♂, "2016.VIII.14, 四川理塘县村戈乡托仁村 [Sichuan, Litang County, Cunge, Tuoren], N30°03.028' E100°22.038', Elev. 4040 m, 李秀敏等 [Li Xiumin *et al.* leg.]" (white, rectangular, printed) (MHBUa); 1 ♂, "2016.VIII.6, 四川白玉县河坡乡格学村 [Sichuan, Baiyu County, Hepo, Gexue], N31°22.899' E98°53.359', Elev. 3000 m, 李秀敏等 [Li Xiumin *et al.* leg.]" (white, rectangular, printed) (MHBUa); 1 ♀, "2018.VIII.24, 四川德格县雀儿山 [Sichuan, Dege County, Mt. Que'ershan], N31°57.485' E98°52.001', Elev. 4158 m, 白兴龙等 [Bai Xinglong *et al.* leg.]" (white, rectangular, handwritten) (MHBUa); 1 ♂, "SW Sichuan, valley 5 km W–10 km NW Kelnodong, btw. 31°58'N-98°37'E/31°59'N-98°34'E, 3600–4100 m, 27–29.VI.2018, J. Kalab, forest-clarings" (white, rectangular, printed) (MABC); 4 ♂ and 6 ♀, "2008-9-25, 四川九龙洪坝 [Sichuan, Jiulong, Hongba], 石福明 [Shi Fuming leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed) (MHBU); 1 ♂ and 3 ♀, "2005-9-7/9, 四川雅江德差 [Sichuan, Yajiang, Decha], 石福明 [Shi Fuming leg.], 河北大学博物馆 [Museum of Hebei University]" (white, rectangular, printed) (MHBU); 2 ♂ and 3 ♀, "云·苍山东 [Yunnan, eastern Mt. Cangshan], 3400 m, 96.09.08" (white, rectangular, handwritten) (MHBU); 1 ♂, "云南省牦牛坪随机 [Yunnan, Maoniuyping, random], 2450 m, 2008.08.15 黄忠 [Huang Zhong leg.], 西南林学院 [Southwest Forestry College]" (white, rectangular, printed) (MHBU); 1 ♂, "云南老君山 [Yunnan, Mt. Laojunshan], 3100 m, 03.08.17, 毛本勇 [Mao Benyong leg.]" (white, rectangular, printed) (MHBU); 1 ♀, "Nepal centralis, Kali Gandaki Valley, vic. (= nr.) Kalopani, 2550 m, 8/9.VIII.1977, H. & L Epstein leg., INHELP 1977" (white, rectangular, printed), "Museo civico di Genova" (white, rectangular, printed), "*Meloe* (*Meloe*) sp.n. aff., *arunachalae* M. Bologna det. 1994" (white, rectangular printed and handwritten) (MSNG); 4 ♀, "Pangboche to Phortse, 4000 m, 24.IX.1989 [S. Lovari leg.]" (white, rectangular, handwritten) (MABC); 1 ♀, "Mt. Everest, 4200 m, Pherichi, 17.IX.1989 [S. Lovari leg.]" (white, rectangular, handwritten) (MABC); 1 ♂, "Sikkim, Jalep, Aôut 1901" (white, rectangular, printed), "Muséum Paris ex coll. R. Oberthur" (white, rectangular, printed) (MNHN); 1 ♂, "Sikkim, au dela du Jalep, Aôut 1901" (white, rectangular, printed), "Muséum Paris ex coll. R.

Oberthur" (white, rectangular, printed) (MNHN). All paratypes with the label "PARATYPE, *Meloe* (*Meloe*) *poggii* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten).

Description. Body (Fig. 24A) blue, blue-blackish or black, shining, basal antennomeres shining, last four sub-opaque; metatarsomere I usually yellow-brown at base, but total black in few individuals; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 10.0–25.0 mm.

Head (Fig. 24B) sub-rectangular, wider than long, temples sub-parallel or rounded, only slightly curved posteriad; ca. twice as long as longitudinal diameter of eye, slightly wider than maximal width of pronotum; eye scarcely convex; frons with two lateral depressions close to each eye, with a middle longitudinal line at bottom of a longitudinal furrow from fronto-clypeal suture to centre of head or more posterior; fronto-clypeal suture sub-rectilinear or scarcely sub-arcuate; punctures relatively small and quite sparse, denser in few individuals. Labrum with anterior margin scarcely emarginated; maxillary and labial palpi not modified; mandibles robust. Antennae short, reaching base of elytra; male antennae as in Fig. 24C–E: antennomere I short, sub-oval widened to apex, ca. 1.6× as long as II and slightly longer than III; II short, transverse; III sub-moniliform, widened to apex; IV shorter than III, transverse and sub-oval in anterior view; V sub-trapezoidal in anterior view, widened to apex and quite pointed on dorsal side; VI in anterior view transverse, sub-trapezoidal not distinctly selliform, ca. 1.5× as wide as V and 1.15× as wide as VII; VII slightly longer than VI, sub-rectangular, transversely depressed; VIII short, sub-moniliform, ca. as long as III; IX–X sub-cylindrical, narrower than VIII, progressively longer; XI similar in width to X but nearly twice as long, sub-cylindrical, narrow in apical third. Female antennae (Fig. 24F) similar to male except sub-cylindrical antennomeres V–VII, V slightly longer than VI and distinctly shorter than VII.

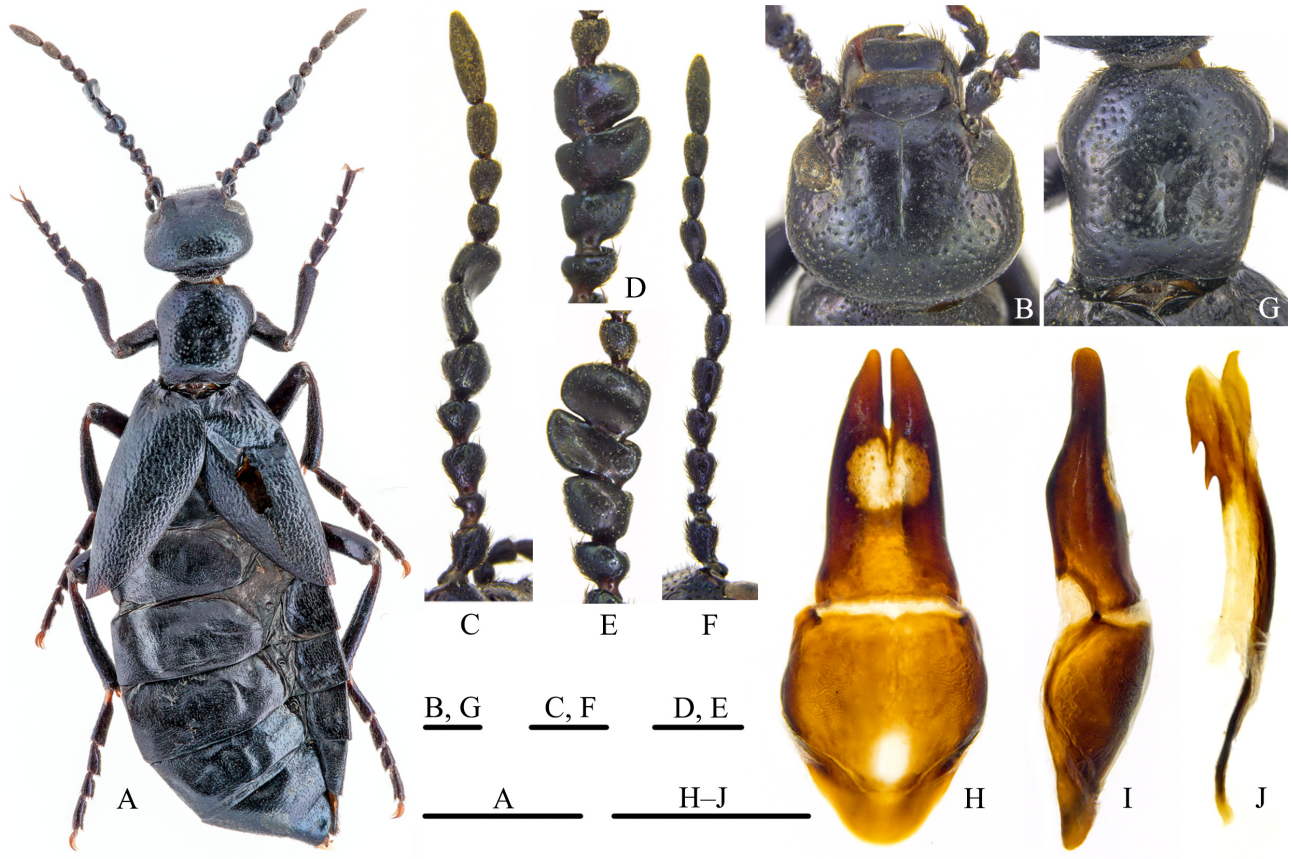

FIGURE 24. *Meloe* (*Meloe*) *poggii* **n. sp.** A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Pronotum (Fig. 24G) 1.05× as long as wide, sides sinuate posteriorly, distinctly widest at apical third, posterior margin emarginate in middle; strictly rebordered and quite depressed along base; punctures similar to those on head, but slightly denser. Mesonotal scutellum distinctly protruded posteriad, almost triangular, clearly visible (Fig. 24G). Elytra with humeral dimple highly distinct, with vermicular rugosities. Legs relatively robust; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all tarsomeres with pads of light short setae, darker on metatarsomeres, smaller on female metatarsomeres.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite shallowly emarginated, rounded in female. Male genitalia as in Figs. 24H–J; gonocoxal plate widened in middle; gonostyli fused ventrally in basal two-thirds, and with a wide light-coloured area on centre, almost sub-cylindrical not distinctly narrowed on apical third; aedeagus slender, distal hook smaller than proximal one, and positioned far from apex.

Etymology. This new species is named after Roberto Poggi, former Director of the Natural History Museum of Genova, who supported us in several occasions providing interesting blister beetle material. The first identified specimen of the new species (MSNG) was sent to us for study by him.

Taxonomic remarks. *M. poggii* forms a natural group with *M. himalayensis*, *M. kashmirensis*, *M. scabrus*, *M. shapovalovi*, and *M. subcordicollis*, from the high elevational areas of the Qinghai-Xizang Plateau (2000–5000 m a.s.l.). This species is distinct from the remaining ones of the Subcordicollis Subgroup by its blue shining body (Fig. 24A). Furthermore, *M. poggii* has smaller and sparser punctures (Fig. 24B, G), and other differences in male antennal shape (Figs. 24C–E) and genitalia (Figs. 24H–J) listed in the key.

Distribution. China (Gansu, Qinghai, Sichuan, Xizang, Yunnan), Nepal, northeastern India (Sikkim). See Appendix 1 for detailed localities.

Meloe (*Meloe*) *scabrus* Pan & Ren, 2018

Fig. 25

Meloe (*Meloe*) *scabrus* Pan & Ren, 2018: 77; Bologna, 2020: 548.

Type locality. (China) "Comai, Xizang".

Type specimens. All types were examined (MHBU). The male holotype and one female paratype with the following labels: "2010.VIII.14; Comai, Xizang; Yongsheng Pan & Yunchun Li leg.; Museum of China West Normal University" (white, rectangular, printed in Chinese), "HOLOTYPE (and PARATYPE respectively), *Meloe* (*Meloe*) *scabrus* Pan & Ren det. 2016" (red/yellow, printed and handwritten). Another male paratype with the following labels: "2014.VIII.8; Comai, Xizang; Guodong Ren, Xinglong Bai & Junsheng Shan leg.; Museum of Hebei University" (white, rectangular, printed in Chinese), "28°27.594'N 91°25.643'E, Alt. 4262 m; Museum of Hebei University" (white, rectangular, printed in Chinese), "PARATYPE, *Meloe* (*Meloe*) *scabrus* Pan & Ren det. 2016" (yellow, rectangular, printed and handwritten).

Description. (see Pan & Ren, 2018 for more details). Body (Fig. 25A) black sub-opaque, antennae and legs slightly metallic blue; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Maximal length: 15.5–32.5 mm.

Head (Fig. 25B) sub-quadrate, approximately 0.8× as long as wide, temples sub-parallel, only slightly curved posteriad and ca. 1.8× as long as longitudinal diameter of eye, slightly wider than maximal width of pronotum; eye sub-reniform, weakly narrowed ventrally, with antero-dorsal margin slightly sinuate, just behind antennal insertion; frons rugulose, with a finely impressed median furrow from fronto-clypeal suture to centre of head, and with an inconspicuous depression in middle, between eyes; fronto-clypeal suture obtusely angulate; clypeus posteriorly with large punctures and anteriorly almost smooth; punctures large, irregular, and dense (its diameter distinctly wider than distance between punctures), inconspicuous at centre. Labrum with anterior margin distinctly emarginated; maxillary and labial palpi not modified; mandibles curved and progressively narrowed on apical half. Antennae similar in length in both sexes, reaching base of elytra; male antennae as in Figs. 25C–E, antennomere I sub-equal in length to III, sub-cylindrical and widened to apex; II sub-globose, sub-equal in length to IV; III sub-moniliform, widened to apex; IV sub-globose; V in anterior view sub-trapezoidal, ca. as long as IV; VI in anterior view transverse, not distinctly selliform, ca. 1.6× as wide as V and ca. 1.03× as wide as VII, and slightly longer than V; VII

in anterior view sub-rectangular, slightly longer than VI, transversely depressed; VIII slightly shorter than III and ca. 0.7× as long as VII, sub-moniliform; IX–XI sub-cylindrical, similar in width, but narrower than VIII; XI sub-fusiform, nearly 1.8× as long as X and ca. 4.2× as long as wide; female antennomeres similar to male except V–VII not transversely modified (Fig. 25F), V similar to III but slightly shorter, VI slightly narrower and longer than V, VII sub-elongate-moniliform, ca. as wide as V but longer.

Pronotum (Fig. 25G) ca. 1.05× as long as wide, sides sinuate posteriorly, widest at apical third posterior margin distinctly sinuate in middle; strictly rebordered and almost not depressed along base; punctures similar to those on head, but slightly denser, interpunctal surface sub-opaque; disc with a shallow sub-rounded depression at centre. Mesonotal scutellum distinctly protruded posteriad, almost triangular, clearly visible (Fig. 25G). Elytra with humeral dimple highly distinct, obsolescently rugose. Legs relatively robust; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all tarsomeres with pads of light short setae, lacking on female metatarsomere.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, male ventrite V shallowly emarginated, rounded in female. Male genitalia as in Figs. 25H–J; gonocoxal plate slightly longer than gonostyli, widened in middle; gonostyli fused in basal two-thirds and with three sub-rounded yellow spots in middle in ventral view, apical lobes robust and ca. a quarter entire length in lateral view; aedeagal hooks similar in shape, distal hook positioned slightly closer to apex than to proximal hook, and slightly smaller than proximal one; endophallic hook small and slender.

Taxonomic remarks. This species is clearly related to the others of the Subcordicollis Subgroup but differs by the deep and dense punctation of the head and pronotum (Figs. 25B, G) and some antennal details. Differences between this species and *M. himalayensis* were discussed above.

Distribution. China (Xizang). See Appendix 1 for detailed localities.

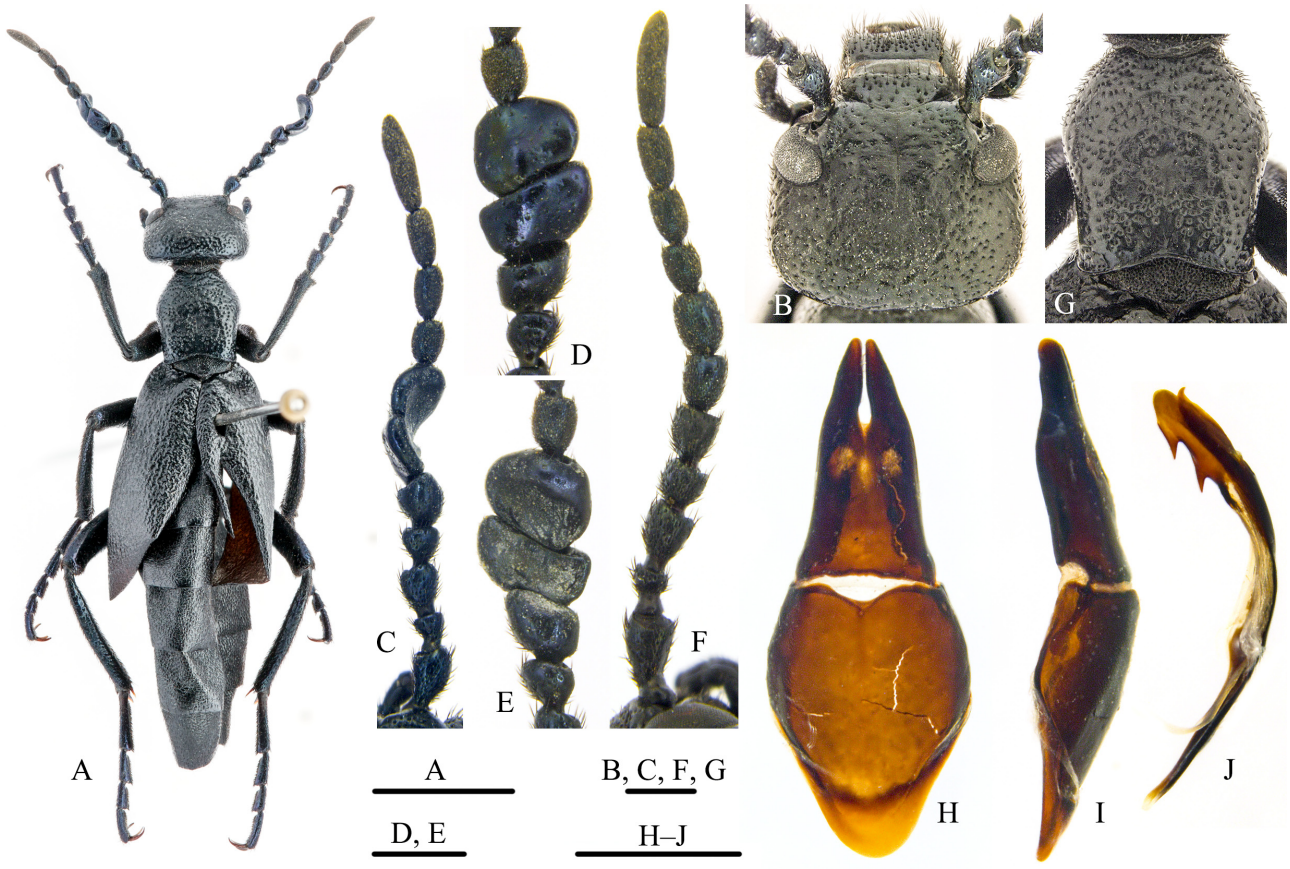

FIGURE 25. *Meloe* (*Meloe*) *scabrus* Pan & Ren, 2018. A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

***Meloe (Meloe) shapovalovi* n. sp.**
Fig. 26

Meloe subcordicollis Fairmaire, 1887a: 129 (pars).
"Meloe subcordicollis 2", Shapovalov det. on a label pinned with type specimen (MNHN).

Type locality. China, Yunnan, Qiaojia County, Yaoshan Town.

Type specimens. Holotype: ♂, "2010-VII-30, 云南巧家县药山镇 [Yunnan, Qiaojia County, Yaoshan Town], 2700–3200 m, 徐吉山等 [Xu Jishan *et al.* leg.]" (white, rectangular, printed), "HOLOTYPE, *Meloe* (*Meloe*) *shapovalovi* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten) (MHBU).

Paratypes: 1 ♂ and 6 ♀, idem. (1 MABC; 6 MHBU); 1 ♂ (Fig. 28F, N) and 1 ♀ syntype of *M. subcordicollis*, with the labels: "Yunnan, R. P. Delavay" (white, rectangular, printed), "*Meloe subcordicollis* Faim" (white, rectangle, handwritten), "Ex Musaeo, ARM. DAVID, 1900" (white, rectangular, printed), "SYNTYPE" (red, rectangular, printed), "*Meloe* "*subcordicollis*" sp. 2 ♀, A. Shapovalov det. 2014" (white, rectangular, printed and handwritten) (MNHN); 1 ♀, "滇·大理花甸坝 [Yunnan, Dali, Huadianba], 2900 m, [20]06.06.05–7" (white, rectangular, printed) (MHBU); 1 ♂, "China, NE Yunnan, Qiaojia SE env., 26°52'54" N 103°00'01" E, 1700–2500 m, 29.8.98, L. & R. Busninsky" (white, rectangular, printed) (SKC); 1 ♂, "China, NE Yunnan, Qiaojia Co., Yao Shan Mts., 27°11'16"N 103°01'03"E, 2400–3900 m, 19–30.7.1998, L. & R. Busninsky" (white, rectangular, printed) (SKC); 1 ♂, "China, N Yunnan prov., Deqen env., ca. 4200 m, Bai Ma Xue Shan pass, 12–13.VIII.1998, O. Safránek & M. Trýzna" (white, rectangular, printed) (SKC); 1 ♂ "Chine, Yunnan, réçu de Lou-Nan, 1931" (white, rectangular, printed), "Muséum Paris ex coll. R. Oberthur" (white, rectangular, printed) (MNHN); 1 ♂ and 1 ♀ (without antennae), "Thibet, Yaregong, P. Soulie, 1900" (white, rectangular, printed), "Muséum Paris ex coll. R. Oberthur" (white, rectangular, printed) (MNHN); 3 ♂ and 6 ♀, "W Hubei, Dashennongjia Mts., 31.5N 110.3E, 2100–2900 m, 10–14.6.2002 J. Turna leg." (MABC); 2 ♀, idem., 21–24.6.2001 (MABC); 2 ♀, "Hubei, Shennongjia Forest, Shennong Peak area, 31°27'16"N-110°17'07"E, 2400–2600 m, 16.6.2017, Liu & P. Audisio" (MABCa); 2 ♀, "Thibet, Chasseurs de Ta-tsien-lou, Eté 1892" (white, rectangular, printed), "Muséum Paris ex coll. R. Oberthur" (white, rectangular, printed) (MNHN); 1 ♂ (left antenna partially damaged), "Ta-tsien-lou, Chasseurs indigens, 1893" (white, rectangular, printed), "Muséum Paris ex coll. R. Oberthur" (white, rectangular, printed) (MNHN); 1 ♂, "Lou-Tsie Kiang, 1901, R.P. Génesteir" (white, rectangular, printed), "Muséum Paris ex coll. R. Oberthur" (white, rectangular, printed) (MABC); 1 ♀ (both antennae broken, but metatarsomere I very long), "Mou Pin, R.P. Déjean 1898" (white, rectangular, printed), "Muséum Paris ex coll. R. Oberthur" (white, rectangular, printed) (MNHN); 1 ♂, "China, E Tibet, 4312 m, Tsongo (Basum Tso), 90 km W Gyamda, A. Wrzecionko leg., 18.6.2007" (white, rectangular, printed) (SKC); 1 ♀, "China, SE-Tibet, Zayu Co., upper basins of the W & E branch of Taron river (Irrawaddy), 3800–4600 m, 28°35'–43'N 97°40'–58'E, 22–29.6.1999, L. & R. Busninsky" (white, rectangular, printed) (SKC). All paratypes with the label "PARATYPE, *Meloe* (*Meloe*) *shapovalovi* **n. sp.**, det. Pan & Bologna" (red, rectangular, printed and handwritten).

Description. Body (Fig. 26A) black, antennae and legs with vague blue tint, shining especially on head and pronotum; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 14.0–27.0 mm.

Head (Fig. 26B) transverse, sides distinctly parallel, sub-quadrate posteriad, only largely rounded, ca. twice as long as longitudinal diameter of eye, only slightly wider than maximal width of pronotum; eye convex, frons flat, distinctly depressed on both sides, with short middle, fine longitudinal furrow extended from fronto-clypeal suture to almost middle of head, with a small depression on centre of head; fronto-clypeal suture distinctly angulate, clypeus transverse; surface with punctures fine, shallow and very dispersed, interpunctal surface shagreened, frons impunctate in depressed areas. Fore margin of labrum widely arcuate in middle; mandibles quite robust, curved, apically bidentate; maxillary and labial palpi unmodified. Male antennae (Fig. 26C–E), short in basal portion and slender in apical one, VIII–XI ca. as long as II–VII, reaching basal third of elytra; antennomere I sub-cylindrical, progressively widened to apex, ca. twice as long as II and 1.5× as long as III; II sub-globose or vaguely transverse, very short, almost as long as wide; III sub-cylindrical vaguely sub-oval to apex, almost 1.2× as long as IV; IV almost as long as wide, in anterior view transversely sub-oval, slightly longer than II; V short, as long as IV, in anterior view sub-trapezoidal, widened on dorsal side; VI in anterior view transverse, 1.6× as wide as long, 1.3× as wide as V and 1.08× as wide as VII, protruded and selliform on ventro-apical portion; VII longer than VI, ca. 1.2× as wide as long, sub-trapezoidal in anterior view, distinctly depressed in middle; VIII slightly shorter than VII, slender and cylindri-

cal, ca. 1.86× as long as wide; IX–X sub-cylindrical, IX slightly longer than VIII and ca. as long as X; XI ca. 4× as long as wide, slightly less than twice as long as X, sub-cylindrical over middle and conically narrowed to apex and slightly curved. Female antennae similar to male except without transversely modified V–VII (Fig. 26F); V widened apically, slightly longer than VI and as long as VII; VI widest, widened apically; VII sub-cylindrical, as wide as V.

Pronotum (Fig. 26G) ca. 1.04× as long as wide, sinuate posteriorly, sides arcuate in basal half, after middle widened, almost obliquely converging to apex, basal margin only slightly emarginated in middle, strictly rebordered and more or less depressed along base; disc usually with a shallow sub-oval depression and a short furrow at centre; punctures as on head, slightly more dispersed, surface almost impunctate. Mesonotal scutellum (Fig. 26G) almost triangular, visible; mesepisterna meeting in middle. Elytra with shallow humeral dimple, with vermicular rugosities very fine. Legs relatively robust; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all metatarsomeres with pads of light short setae, lacking or extremely reduced in female middle and posterior legs; protarsomere I relatively robust; metatarsomere I slender.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite widely incised, rounded in female. Male genitalia as in Fig. 26H–J; gonocoxal plate sub-parallel on apical half sides, longer and wider than gonostyli; gonostyli fused ventrally in basal two-thirds, apical lobes slender and relatively shorter; both aedeagal hooks similar and distal one positioned at point equidistant to apex and proximal hook.

Etymology. This new species is named after Andrej Shapovalov, a Russian entomologist, who studied some species of the nominate subgenus of *Meloe* and suggested to us some interesting information on this group. He first identified one specimen among the types of *M. subcordicollis* (MNHN) isolated as a distinct species, named on the label "*subcordicollis* sp. 2".

Taxonomic remarks. This species is distinguished from the remaining members of the Subcordicollis Subgroup because the male antennomere VIII is not subglobose (Figs. 26C–E) and the metatarsomere I is longer than II+III (Fig. 26A).

Distribution. China (Hubei, Sichuan, Xizang, Yunnan). See Appendix 1 for detailed localities.

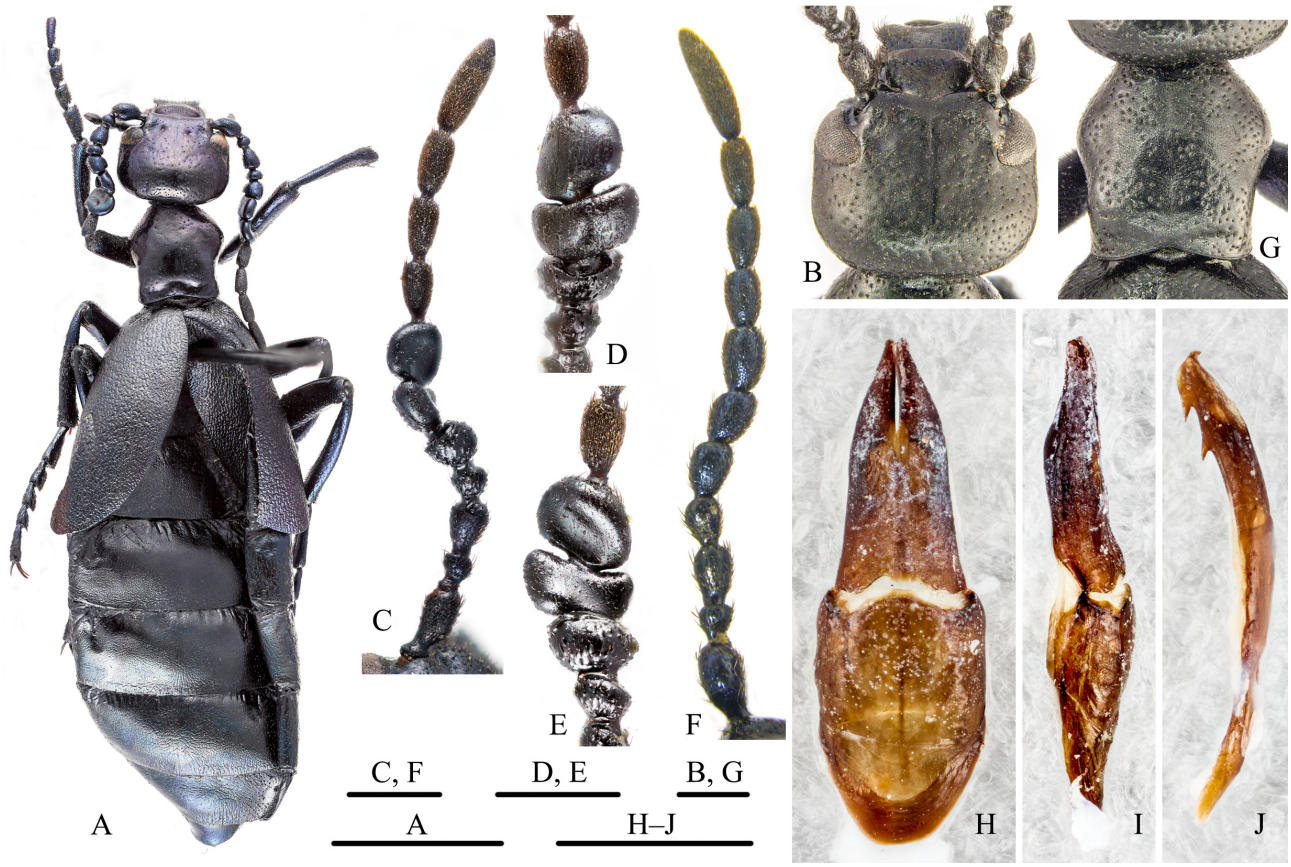

FIGURE 26. *Meloe* (*Meloe*) *shapovalovi* **n. sp.** A. habitus, male; B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Meloe (*Meloe*) *subcordicollis* Fairmaire, 1887

Fig. 27

Meloe subcordicollis Fairmaire, 1887a: 129; Pic, 1935: 8; Tan, 1981: 410; Hua, 2002: 130; Tan & Ma, 2005: 343; Li & Wang, 2007: 280; Li *et al.*, 2008: 80.
Meloe (*Meloe*) *subcordicollis*: Bologna, 2008: 402; 2020: 548; Pan & Ren, 2018: 78.
Meloe subcordicollis 1 Shapovalov det. on a label pinned with type specimen (MNHN).

Type locality. "Chine, Yunnan".

Type specimens. 1 ♂ syntype (designated by us as lectotype) (MNHN) (Fig. 27A): "Yunnan David" (white, small, rectangular, handwritten by L. Fairmaire), "*Meloe subcordicollis* Fairmaire Yunnan (white, rectangular, handwritten by L. Fairmaire), "SYNTYPE" (red, rectangular, printed); "*Meloe subcordicollis* sp. 1 ♂ A. Shapovalov det. 2014" (white, rectangular, handwritten and printed), with posterior and left protarsi broken; 1 ♀ syntype (MNHN) with the labels: "Yunnan, R. P. Delavay" (white, rectangular, printed), "Ex Musaeo, ARM. DAVID, 1900" (white, rectangular, printed), "*Meloe subcordicollis* Faim" (white, rectangle, handwritten), "SYNTYPE" (red, rectangular, printed), "*Meloe* "*subcordicollis*" sp. 1 ♀, A. Shapovalov det. 2014" (white, rectangular, printed and handwritten).

Description. Body (Fig. 27A) black, relatively shining or sub-opaque in some individuals; setae black, ventrally denser and dorsally extremely short and sparse, elytra almost nude. Body length: 12.5–24.0 mm.

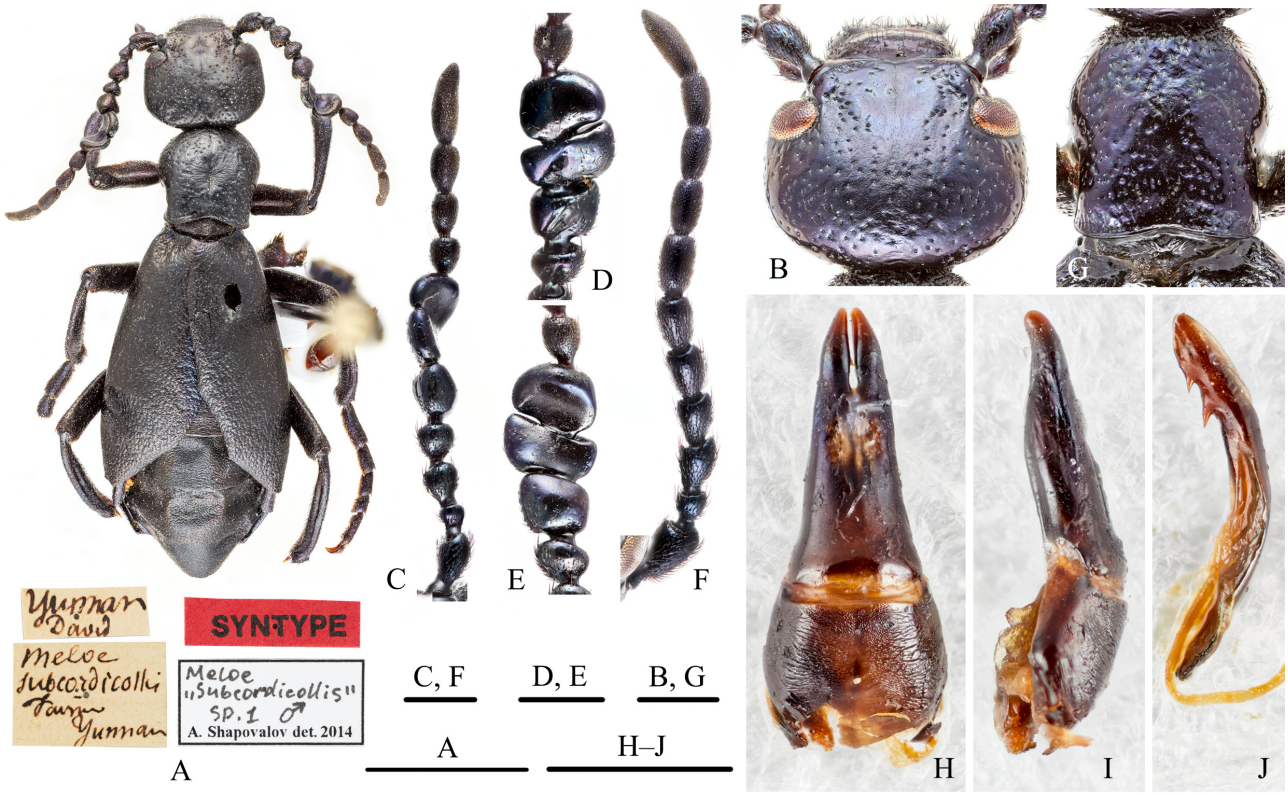

FIGURE 27. *Meloe* (*Meloe*) *subcordicollis* Fairmaire, 1887. A. habitus, male, lectotype (with type labels); B. head, male, dorsal view; C. antenna, male, dorsal view; D–E. antennomeres IV–VIII, male: D. posterior view; E. anterior view; F. antenna, female, dorsal view; G. pronotum, male, dorsal view; H–I. tegmen: H. ventral view; I. lateral view; J. aedeagus, lateral view. Scale bars: 5 mm (A); 1 mm (B–J).

Head (Fig. 27B) sub-rectangular, wider than long, temples sub-parallel, only slightly curved posteriad, more rounded in some individuals; ca. 1.5× as long as longitudinal diameter of eye, slightly wider than maximal width of pronotum or sub-equal; eye scarcely convex; frons with two lateral depressions close to each eye, with tracks of an indistinct and short middle longitudinal line in fore portion, in some individuals with a vague longitudinal shallow depression on centre of head; punctures relatively small and quite sparse; fronto-clypeal suture sub-rectilinear or slightly angulate. Labrum with anterior margin scarcely emarginate; maxillary and labial palpi not modified; mandibles robust. Male antennae as in Fig. 27C–E; antennomere I short, sub-oval widened to apex, ca. 1.5× as long

as III and ca. twice as long as II; II short, sub-globular; III sub-moniliform, widened to apex; IV distinctly shorter than III, in anterior view transverse and sub-oval; V in anterior view sub-trapezoidal, widened dorsoapically and obtusely pointed; VI in anterior view transverse, sub-trapezoidal not distinctly selliform, ca. 1.35× as wide as V and 1.1× as wide as VII; VII slightly longer than VI, in anterior view sub-hexagonal, transverse, depressed; VIII quite short, sub-moniliform, ca. 0.85× as long as VII; IX–X sub-cylindrical, narrower than VIII, progressively longer; XI similar in width to X but twice as long, sub-cylindrical, narrow in apical third. Female antennae (Fig. 27F) reaching to basal third of elytra, similar to male except V–VII only slightly compressed; V ca. as long as VII, wider than IV; VI narrower and slightly shorter than V; VII as wide as VI.

Pronotum (Fig. 27G) almost as long as wide, sides slightly sinuate posteriorly, distinctly widest at apical third, posterior margin emarginated in middle; strictly rebordered and quite depressed along base; punctures similar to those on head, but slightly denser on fore third. Mesonotal scutellum widely protruded posteriad, almost triangular, clearly visible (Fig. 27G). Elytra with humeral dimple highly distinct, with vermicular rugosities. Legs relatively robust; both protibial and mesotibial spurs pointed; metatibial spurs different, external one spoon-like, inner one pointed; all tarsomeres with pads of light short setae, darker on metatarsomeres.

Abdominal tergites largely sclerotized; penultimate male ventrite largely arcuate, last male ventrite shallowly emarginated, rounded in female. Male genitalia as in Fig. 27H–J; gonocoxal plate as long as gonostyli, sub-parallel on apical half of sides; gonostyli fused ventrally in basal two-thirds, more or less narrowed in apical third; dorsal hooks of aedeagus different in shape, distal one not curved at apex and positioned at point equidistant to apex and proximal hook.

Taxonomic remarks. Among the syntypes of *M. subcordicollis* at MNHN (as in Fig. 28I–J), we detected two distinct species. The second species was already separated by A. Shapovalov and bears the labels "*M. subcordicollis* sp. 2" (Fig. 28I). It is described in this paper as *M. shapovalovi*.

According to the records from the literature, this species appears to be distributed widely in China. Actually, we suspect that most literature records refer to other species, and they cannot be considered without confirming the identification. Based on the examined material, *M. subcordicollis* seems distributed with certainty only in the Qinghai-Xizang Plateau (Sichuan, Xizang, Yunnan, and Sikkim).

Distribution. Southwestern China, northeastern India (Sikkim). See Appendix 1 for detailed localities.

3. Biogeography

As pointed out in the Introduction, the nominate subgenus is spread in the whole Palaearctic Region (including the main islands: Canary archipelago, Mediterranean islands, Japanese archipelago, and Taiwan Island), the transitional Chinese area, the Nearctic Region, south to the transitional central American area, and part of the Afrotropical Region, specifically in eastern and southern Africa, from Ethiopia to South Africa and Namibia, but excluding the main African islands such as Madagascar and Sokotra.

Some Palaearctic species have a wide elevational distribution (see Table 2), such as *M. proscarabaeus* which is usually distributed from the sea level to ca. 1800 m a.s.l. (with some populations extending to 3000 m a.s.l.), or *M. violaceus* which becomes a mountain species in the southern areas of the range as in the Mediterranean. Most of the Chinese species of the Lobatus Group are mountain species, which can reach very high elevations, up to 5000 m a.s.l., in all Himalayan sub-ranges. The species distributed in the Transitional Chinese area have clear Palaearctic affinities and can be considered as Palaearctic elements spread in mountain areas of this transitional area.

In the Palaearctic Region, we recognized the presence of four species groups:

(a) The Angusticollis Group is Holarctic and in Eurasia includes only *M. violaceus*, widely distributed from the Iberian Peninsula to Kamtchatcka and Japan. According to our taxonomic hypothesis discussed above, differing from Pinto & Selander (1970), this Group is represented in North America only by *M. angusticollis*, the vicariant of *M. violaceus* in the Nearctic Region; a similar biogeographic pattern of close species or semi-species is well known, for example in some mammal species (reindeer, elk, moose, lynx, volverine, etc.). The remaining ten species of the Group, as defined by Pinto & Selander (1970), belong to the Niger Group and are divided into four subgroups. This result supports the hypothesis of a trans-Beringian dispersion of the Group from Palaearctic to North America, or *vice-versa*, possibly during the Miocene or Pliocene (Salvi *et al.*, in preparation).

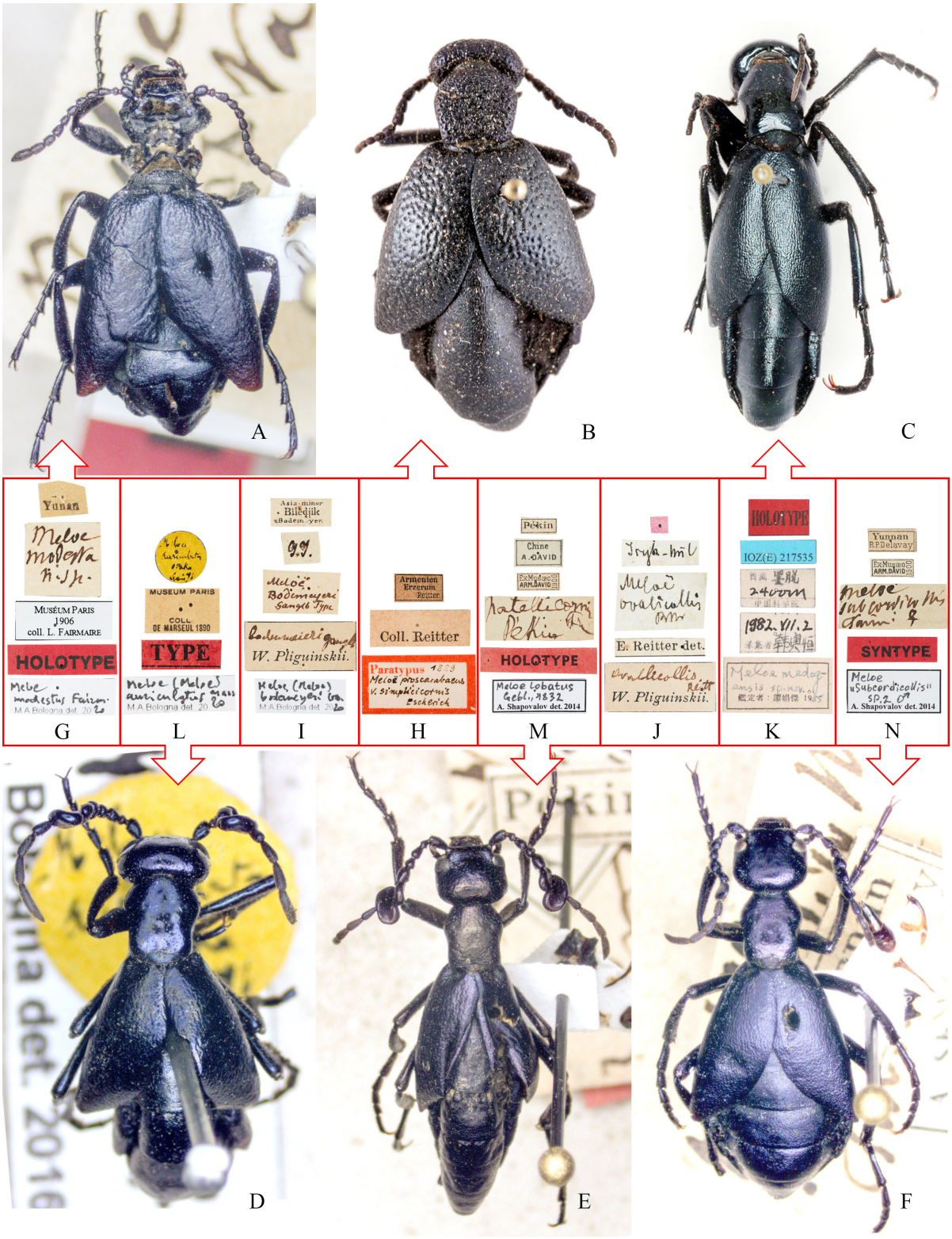

FIGURE 28. Type specimens and type labels of some *Meloe* spp. A–F. Type specimens: A. *M. modestus* Fairmaire, holotype, male (MNHN); B. *M. proscarabaeus* var. *simplicicornis* Escherich, paratype, female (HNHM); C. *M. medogensis* Tan, holotype, female (IZCAS); D. *M. auriculatus* Marseul, holotype, male (MNHN); E. *M. patellicornis* Fairmaire, syntype, male (MNHN); F. *M. subcordicollis*, syntype, male (sp. 2, as *M. shapovalovi* **n. sp.**; MNHN). G–N. Type labels: G. *M. modestus* (labels of A); H. *M. proscarabaeus* var. *simplicicornis* (labels of B); I. *M. bodemeyri* Ganglbauer, compared with type (MNHB); J. *M. ovalicollis* Reitter, syntype (MNHB); K. *M. medogensis* (labels of C); L. *M. auriculatus* (labels of D); M. *M. patellicornis* (labels of E); N. *M. subcordicollis* (sp. 2, as *M. shapovalovi* **n. sp.**; labels of F).

(b) The Proscarabaeus Group is strictly Palaearctic and includes five species, one of which could represent only a subspecies of *M. proscarabaeus*. In particular, *M. proscarabaeus* is widely distributed from the Iberian Peninsula and with the ssp. *M. p. rathjensi*, in the Afrotropical/Palaearctic transitional area of the western Arabian mountains, from Mecca to southern Yemen. This group is not related to the Afrotropical Hottentotus Group.
(c) The Distincticornis Group is endemic to China and includes only two well differentiated species distributed in central and eastern China.

TABLE 2. Phenology, elevation (m a.s.l.), adult host plants of the species of Palaearctic *Meloe* (*Meloe*) (data from literature and collection labels) [*Meloe (M.) poteli* is excluded].

Species/subspecies	Elevation range (m a.s.l.) approx.	Phenology (months)	Host plants
M. arunachalae	2170–3900	II–VII, IX/X, XII	no record
M. auriculatus	0–340	VII–XI	*Ixeris dentata*, *Prenanthes tanakae*, *Sonchus olearaceus* (Asteraceae), and *Rumex japonicus* (Polygonaceae) (Kifune *et al.*, 1973 as *M. menoko*)
M. bodemeyeri	790-850	IV–V	no record
M. chinensis	3700	V–VI, VIII	no record
M. coarctatus	0-1900?	III–VI	*Ixeris dentata*, *Prenanthes tanakae*, *Sonchus olearaceus* (Asteraceae), and *Rumex japonicus* (Polygonaceae) (Kifune *et al.*, 1973)
M. distincticornis	1500–3000	V–VI	no record
M. formosensis	0–2500	II–VI, X	no record
M. gracilior	510–1700	I, IV–V, VII, IX–XI	no record
M. himalayensis	4250	VIII	no record
M. kashmirensis	2500	VI	no record
M. kaszabi	200–1700	VIII–X	no record
M. kulabensis	600	V	no record
M. lateantennatus	1430	V	no record
M. lobatus	500–4500	I–V, VII–X, XII	*Camellia oleifera* (Hua, 2002)
M. orientalis	2070	IV, VIII	no record
M. ovalicollis	1100–1610	V, VII	no record
M. poggii	2550–4500	VI–IX	no record
M. proscarabaeus	0–2600 (various ssp.); 2300–2400 (ssp. *rathjensi*), 3400 (ssp. s*ericeorugosus*); 0–300 (ssp. *aegyptius*)	II–VIII (other ssp.); IV–V, VII (ssp. *exaratus*); I–V, X (ssp. *aegyptius*); XII–I, III (ssp. *rathjensi*)	Several herbacoeus plants, mainly Asteraceae, Ranunculaceae, Leguminosae (Bologna, 1991; pers. obs.); *Ixeris dentata* and *Prenanthes tanakae* (Leguminosae), *Sonchus olearaceus* (Asteraceae), and *Rumex japonicus* (Polygonaceae) (Kifune *et al.*, 1973)
M. scabrus	3060–4260	VII–IX	no record
M. semicoriaceus	1640–3350	II, IV, VI	*Taraxacum officinale* (Akbar *et al.*, 2017)
M. shapovalovi	1700–4600	VI–VIII	no record
M. subcordicollis	2000–5000	VI–VIII, X	(alpine meadow)
M. tarsalis	1170	VI, VIII–IX	no record
M. violaceus	200–4190	IV–VIII	Several herbacoeus plants, mainly Asteraceae, Leguminosae (pers. obs.)
M. xuhaoi	1000	I, III, V	*Cirsium monocephalum* (Vant.) Lévl. (pers. obs. by H. Xu, see Fig. 1E)

(d) The Lobatus Group is phenetically similar to the Afrotropical Hottentotus Group and some Nearctic groups, such as the Impressus, Strigulosus, and Tropicus Groups, because of the slender pronotum and the transverse modified antennomeres. According to molecular evidence (Salvi *et al.*, in preparation), we judge these characteristics as not representing true phylogenetic affinities but only morphological similarities. Consequently, incidental amphi-Pacific affinities cannot be surely defined now in this group of species.

Both subgroups, the Lobatus Subgroup and the Subcordicollis Subgroup, are endemic to the eastern Palaearctic Region and the Transitional Chinese area. One species is widely distributed from eastern Russia to northeastern China and Korea (*M. lobatus*), another is widely spread through China (*M. gracilior*), while the remaining species are endemic to narrower areas. Interestingly, in the Himalaya range, from Kashmir to Yunnan and Sichuan mountains, we recognize eight endemic species belonging to both subgroups [(i) *M. arunachalae*; (ii) *M. chinensis*, *M. himalayensis*, *M. kashmirensis*, *M. poggii*, *M. scabrus*, *M. shapovalovi*, and *M. subcordicollis*]. Two species are endemic to Japan (*M. auriculatus* and *M. coarctatus*) and one from the Taiwan Island (*M. formosensis*).

Acknowledgements

This study was supported by the National Natural Science Foundation of China (No. 31702040), Scientific Research Project of Colleges and Universities in Hebei Province (No. BJ2020044), and by the University Roma Tre, Department of Science (grants of Departments of Excellence—L. 232/2016—art.1, commi 314–337 awarded to Dept. of Science—University Roma Tre—Rome—Italy for 2018–2022).

We wish to thank all naturalists who permitted and helpfully supported us to study Meloidae preserved in their institutions or private collections, or generously supported our research with some interesting specimens: Max Barclay (BMNH); Ben Brugge (ZMAM); Wan-Zhi Cai, Ding Yang (China Agricultural University, Beijing, China); Lada Černý (Praha, Czech Republic); Chang-Chin Chen (Tianjin New Wei San Industrial Co., Ltd., Tianjin, China); Loris Galli (Genova, Italy); Zhi-Zhong Gao (Xinzhou Teachers University, Xinzhou, China); Pier Mauro Giachino (already MRSN); Zi-Yuan Hu (PaleoDiary Science Education, Beijing, China); Cesare Iacovone (Atessa, Italy); Bernd Jager (MNHB); David H. Kavanaugh (CAS); Stanislav Krejcik (Unicov, Czech Rep.); Leonardo Latella (MSNV); Chi-Feng Lee (TARI); Li-Zhen Li (Shanghai Normal University, Shanghai, China); Andrea Liberto (Rome, Italy); Ariel-Leib Friedman (TAUM); Sandro Lovari (Universty of Siena, Siena, Italy); Antoine Mantilleri (MNHN); the late Ottó Merkl (HNHM); Nikolai B. Nikitsky (ZMUM); Hong Pang, Dan-Dan Zhang (MZSU); Roberto Poggi (MSNG); the late Carlo Pesarini (MSNM); the late Jan Probst (Wien, Austria); Pier Paolo Rapuzzi (Cialla di Prepotto, Italy); Guo-Dong Ren, Fu-Ming Shi (Hebei University, Baoding, China); Jean-Claude Ringenbach (Pau, France); Harald Schillhammer (NHMW); Sayeh Serri (Hayk Mirzayans Insect Museum, Iranian Research Institute of Plant Protection, Tehran, Iran); Wolfgang Schawaller (SMNS); Ai-Min Shi (China West Normal University, Nanchong, China); Hai-Tian Song (Fujian Provincial Department of Forestry, Fuzhou, China); Jaroslav Turna (Kostelec na Hané, Czech Rep.); Marco Uliana (MCNV); Xin-Pu Wang (Ningxia University, Yinchuan, China); Hao Xu, Jian-Yue Qiu (Mianyang Teachers' College, Mianyang, China); Ji-Shan Xu (Dali University, Dali, China); Jin-Chen Yang (Luoyang, China); Cai-Xia Yuan (Yan'an University, Yan'an, China); Kui-Yan Zhang, Hong-Zhang Zhou, Tian-Hong Luo (IZCAS); Ting-Ting Zhang (Shandong Agricultural University, Tai'an, China); Alberto Zilli (already MCZR).

We address special thanks to: Andrej Shapovalov (Russia) for the taxonomic discussion and the kind information; Alessandra Riccieri (University Roma Tre, Rome, Italy) and Daniele Salvi (University of L'Aquila, L'Aquila, Italy) for the contribution in parallel molecular studies; John Pinto (Waldport, OR, USA) and Jeffrey Huether (Geneva, NY, USA) for their suggestions and support providing North American specimens; Marashito Saito (Mikunicho, Sakai-shi, Japan) and Ryokuse Okano (Japan) for the photos of types of *M. menoko* and specimens of *M. auriculatus* and *M. coarctatus*; Hao Xu and Jian-Yue Qiu (Mianyang Teachers' College, Mianyang, China) for the habitat photos of *M. proscarabaeus*, *M. gracilior*, and *M. xuhaoi*; Shuo Shi (Hebei Normal University, Shijiazhuang, China) for the identification of the host plans of *M. xuhaoi.* Thanks to the reviewer who greatly improve the first MS with several suggestions. Special thanks to Letizia Di Biase and Diana Cont, and especially to Marco Molfini (all from University Roma Tre), for their assistance in the preparation of several photos.

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APPENDIX 1. Catalogue of localities

In this Appendix the species are listed alphabetically rather than shared in the groups of species.

***Meloe* (*Meloe*) *arunachalae* Saha, 1979**

China: Xizang (Hua, 2002; Bologna, 2008, 2020; all as *M. medogensis*): Gyirong, NW Kabang, N28°23.112' E85°26.152' (MHBUa); Gyirong, E Jifu, N28°22.556' E85°20.946' (MHBUa); Mêdog (Tan, 1988; Pan & Ren, 2018 both as *M. medogensis*); Nyingchi, Bomi, Pailong (MHBU); Yadong, Xiayadong (MHBU).

Nepal. Nepal (Bologna, 2008, 2020); Taplejung Distr., Simbua Khola, Yalung, below Pass Anda Deorali (Axentiev, 1987); idem, S-Gunsa, (Axentiev, 1987); Solukhumbu Distr., Sanam (?) (MABC; SMNS); Mustang Distr., night banks of Lethe-Khola, nr. Lethe (SMNS); Manaslu env., Tsum valley, Chokangparo env. (IOC); Manaslu env., Lho (IOC); Manaslu env., Namrung (IOC).

Bhutan. Bhutan (Bologna, 2008, 2020); Susuma (Saha, 1979); Wang du, Phodrung (Saha, 1979); N Bhumtang, Jakar (MABC).

India. Arunachal Pradesh, Uttarakhand, Uttar Pradesh (Bologna, 2008, 2020); Himanchal Pradesh, Spiti, Tso-Ti (MNHN); Uttar Pradesh, Bodrinath (SMNS); Sikkim, btw. Padamtsin and Lingtou (MNHN); Arunachal (Assam): Kameng Div., Tawang (Saha, 1979, type loc.); Indian eastern Himalayas (Axentiev, 1987).

***Meloe* (*Meloe*) *auriculatus* Marseul, 1876**

Korea Peninsula. Korea (Miwa, 1928). Dobtful record.

Japan. Japan (Escherich, 1889; Hua, 2002; Bologna, 2008, 2020 also as *M. menoko*; Pan & Ren, 2018). Hokkaido (Miwa, 1928; Kurosawa, 1985): Koshikawa, Syari-cho, Syari-gun (MABC); Ikushina-syuen, Syari-cho, Syari-gun (MABC); Syuen-nishi, Syari-cho, Syari-gun (MABC); Syuen, Syari-cho, Syari-gun (MABC); Jozankei (Kôno, 1936 as *M. menoko*); Hokkaido, Hitsuijigooko, Sapporo City, 43°00'38"N 141°29'45"E (MABC, MABCa); Sapporo (Kôno, 1936 as *M. menoko*); Hokkaido, Sapporo, Jozankei, N43.07500 E141.08362 (Ohnishi *et al*., 2021 as *M. menoko*); Hokkaido, Sapporo, Hitsujigaoka, N43.00778 E141.41500 (Ohnishi *et al*., 2021 as *M. menoko*). Honshu (Miwa, 1928; Kôno, 1936; Kurosawa, 1985). Tohoku: Amori, Shingo, Herai, N40.41008 E140.98381 (Ohnishi *et al*., 2021 as *M. menoko*); Iwate, Kuriyagawa (Kifune *et al.*, 1973 as *M. menoko*); Iwate, Mt. Niiyama (Kifune *et al.*, 1973 as *M. menoko*); Iwate, Morioka, Yabukawa, N39.77486 E141.27858 (Ohnishi *et al*., 2021 as *M. menoko*). Kanto: Tokyo and Nikko Alps (MNHN); Tokyo (MNHN); Tokyo, Hachioji, Mt. Takao (MNHN); Kofu plain (MNHN). Chubu: Niigata pref. (Kifune & Baba, 1959); Nagano, Komagane (Kifune *et al.*, 1973 as *M. menoko*); Nagano, Miniamiminowa (Kifune *et al.*, 1973 as *M. menoko*); Nagano, Hase (Kifune *et al.*, 1973 as *M. menoko*); Nagano, Matsumoto, Iriyamabe, N36.21611 E138.09167 (Ohnishi *et al*., 2021 as *M. menoko*); Nagano, Kiso, Yabuhara, N36.00667 E137.79194 (Ohnishi *et al*., 2021 as *M. menoko*); Nagano, Fujimi, Sakai, N35.90972 E138.31361 (Ohnishi *et al*., 2021 as *M. menoko*). Kansai: Osaka, Hyogo (Marseul, 1876, type loc.; MNHN); Osaka, Minoo (MABC). Shikoku: Tokushima, Yoshinogawa, Yamakawa, N34.00618 E134.21103 (Ohnishi *et al*., 2021). Kyushu (Kurosawa, 1985): Fukuoka, Kashii (Kifune *et al.*, 1973); Nagasaki, Omura, Hara, N32.94528 E129.98972 (Ohnishi *et al*., 2021); Miyazaki, Gokase, Kuwanouchi, N32.71397 E131.19979 (Ohnishi *et al*., 2021).

Incorrect records. China. Northeast Territory (Hua, 2002; Bologna, 2008, 2020); "Northern, Central, East China" (Hua, 2002; Bologna, 2008, 2020); Inner Mongolia (Hua, 2002; Bologna, 2008, 2020; Pan & Ren, 2018); Ningxia (Zhao *et al.*, 2012); Xizang (Hua, 2002; Bologna, 2008, 2020; Pan & Ren, 2018). Liaoning (Li, 1992, as *M. menoko*).

***Meloe* (*Meloe*) *bodemeyeri* Ganglbauer, 1900**

Turkey. Turkey (Bologna, 2008, 2020): Eskişehir (MNHB; ZMAN; Bodemeyer, 1900; type loc.); Dorilayon (Bodemeyer, 1900); Bilecik (Bodemeyer, 1900; Pligінsky, 1913).

***Meloe* (*Meloe*) *chinensis* n. sp.**

China. Chongqing: Jiangjin, Mt. Simianshan (MHBU). Sichuan: Daocheng (MABC; MHBU; type loc.); Beichuan, Xiaozhaigou (MHBU).

***Meloe* (*Meloe*) *coarctatus* Motschulsky, 1858**

Japan. Japan (Motschulsky, 1858, type loc.; Harold, 1877; Pligінsky, 1914; Bologna, 2008, 2020; NHMW). Hokkaido (Miwa, 1928). Honshu (Matsumura, 1907; Miwa, 1928; Kurosawa, 1985). Tohoku: Iwate, Kuriyagawa (Kifune *et al.*, 1973); Iwate, Mo-

rioka, Yabukawa, N39.77486 E141.27858 (Ohnishi *et al*., 2021). Kanto: Ibaraki, Ishioka, Handa, N36.19667 E140.20389 (Ohnishi *et al*., 2021); Ibaraki, Ushiku, Kessoku, N35.96250 E140.17694 (Ohnishi *et al*., 2021); Ibaraki pref., Tsukuba city (SKC); Tochigi, Nikko, Chugushi, N36.77000 E139.45417 (Ohnishi *et al*., 2021); Tokyo, Hachioji, Minami-assakawa, N35.62639 E139.22972 (Ohnishi *et al*., 2021); Tokyo, Oshima, Motomachi, N34.74917 E139.39472 (Ohnishi *et al*., 2021); Tokyo, Kozu, Takigawa, N34.21194 E139.13333 (Ohnishi *et al*., 2021); Tokyo and Nikko Alps (MABC; MNHN); Tsushima (MNHN); Izu Islands (Kurosawa, 1985). Chubu: Niigata, Myoko, Sekiyama, N36.89967 E138.13536 (Ohnishi *et al*., 2021); Niigata, Sado, Tassha, N38.06263 E138.28830 (Ohnishi *et al*., 2021); Niigata, Sado, Saruhachi, N37.93822 E138.41725 (Ohnishi *et al*., 2021); Niigata, Sado, Maruyama, N37.92397 E138.45563 (Ohnishi *et al*., 2021); Niigata, Sado, Kanaishimbo, N38.08694 E138.34972 (Ohnishi *et al*., 2021); Sado (Kurosawa, 1985); Yamanashi, Shôsenkyô (Kifune *et al.*, 1973); Nagano, Hase (Kifune *et al.*, 1973); Nagano, Kawakami, Kawahake, N35.90944 E138.61306 (Ohnishi *et al*., 2021); Nagano, Togakushi, N36.75250 E138.05944 (Ohnishi *et al*., 2021); Nagano, Omi, N36.47556 E138.08361 (Ohnishi *et al*., 2021); Nagano, Azumino, Akashina, N36.33583 E137.94000 (Ohnishi *et al*., 2021); Nagano, Matsumoto, Iriyamabem, N36.21611 E138.09167 (Ohnishi *et al*., 2021); Nagano, Omachi, Taira, N36.49058 E137.73789 (Ohnishi *et al*., 2021); Nagano, Tatsuno, Yokokawa, N35.95250 E137.87361 (Ohnishi *et al*., 2021); Nagano, Ina, Araiuchinokaya, N35.82833 E137.87028 (Ohnishi *et al*., 2021); Nagano, Kiso, Yabuhara, N36.00667 E137.79194 (Ohnishi *et al*., 2021); Nagano, Iida, Kamimura, N35.42300 E138.04631 (Ohnishi *et al*., 2021); Aichi, Nagoya, Heiwa-koen, N35.17423 E136.97460 (Ohnishi *et al*., 2021). Kansai: Mie, Odai, Kamisuga, N34.38556 E136.37583 (Ohnishi *et al*., 2021); Hyogo, Kamikawa, Kawakami, N35.15333 E134.69111 (Ohnishi *et al*., 2021). Chugoku: Tottori, Yonago, Yodoe, N35.41806 E133.45389 (Ohnishi *et al*., 2021); Okayama, Takahashi, Bitchu, N34.82167 E133.40000 (Ohnishi *et al*., 2021); Hiroshima, Kure, Tochibara, N34.27111 E132.59333 (Ohnishi *et al*., 2021); Hiroshima, Yuki, N34.49667 E132.28306 (Ohnishi *et al*., 2021); Yamaguchi, Yoshida, N34.13889 E131.46583 (Ohnishi *et al*., 2021). Shikoku (Kurosawa, 1985): Ehime, Kumakogen, Shibukusa, N33.69000 E133.03500 (Ohnishi *et al*., 2021); Ehime pref., Saiyou Shi, Mt. Ishizuki, Kamatsu-Cho (MABC); Ehime, Saijo, Komatsu, N33.79056 E133.06250 (Ohnishi *et al*., 2021); Ehime pref., Omsu (MABCa). Kyushu (Heyden, 1879; Miwa, 1928; Kôno, 1936; Kurosawa, 1985): Nagasaki (Marseul, 1876); Tsushima (Kurosawa, 1985); Kumamoto, Tamana, Tsuiji, N32.96806 E130.52972 (Ohnishi *et al*., 2021); Miyazaki, Gokase, Sankasho, N32.69722 E131.18167 (Ohnishi *et al*., 2021); Miyazaki, Kobayashi, Sukishimoda, N32.04750 E131.14806 (Ohnishi *et al*., 2021); Miyazaki, Aya, Minamimata, N32.02556 E131.17806 (Ohnishi *et al*., 2021).

Incorrect record. China. Liaoning (Li, 1992).

***Meloe* (*Meloe*) *distincticornis* n. sp.**

China. Hubei: W Hubei, Muyuping NW env., 31.5N 110.35E (MABC); idem, 31.27N 110.22E (MABC); W Hubei, Dashennongjia Mts., 31.5 N 110.3 E (MABC). Jiangxi: Shangrao, Mt. Sanqingshan (MHBU; MZSU, type loc.).

***Meloe* (*Meloe*) *formosensis* Miwa, 1930**

China. Taiwan (Hua, 2002; Bologna, 2008, 2020): Wushe (= Musha: Miwa, 1930, type loc.; TARI); Mt. Alishan (= Arisan) (Miwa, 1930; TARI; MZSU); Sankakuho (Miwa, 1930; TARI); Taichung, Anmashan (TARI); Haulien, Pilu (TARI); Hsinchu, Guanwu (MHBU).

***Meloe* (*Meloe*) *gracilior* Fairmaire, 1891**

China. Chongqing: Chengkou, Dongan, Xinglong (MHBUa); Chengkou, Dongan, Huang'anba Natural Reserve (MHBUa); Jiangjin, Mt. Simianshan, Dawopu, N28°34'56.24" E106°21'03.20" (MHBUa). Fujian: N Fujian, Fenshui Guan, 27.9 N-117.85 E (MABC); Fujian, Shaowu City (CAS); Fuzhou, Sandiejing (MHBU). Gansu: Tianshui, Qinzhou, Liziyuan Forest Farm, N34°17'29.65" E105°51'41.09"/N34°17'8.71" E105°49'22.99" (MHBUa). Guangdong: Shixing, Chebaling (MHBU). Guizhou: Pin Fa (MABC; MNHN). Hubei (Hua, 2002; Bologna, 2008, 2020): W Hubei, Muyuping NW env., 31°27'N-110°22'E (MABC); idem, 31.5°N-110.35°E (MABC; MHBU); Enshi, Xuanen, Mt. Qizemeishan Natural Reserve (MHBU; MHBUa); Enshi, Badong, Songziyuan, N31°20'26" E110°24'47" (MHBUa); Changyang (Fairmaire, 1891a, type loc.); Yichang, Yiling, Wuduhe, N31.128512° E111.182421° (MHBUa). Hunan: Zhangjiajie, Sangzhi, Tianpingshan Natural Reserve, N29.780209° E110.085599°/N29.768856° E110.088053° (MHBUa); Shaoyang, Suining, Huangsang National Natural Reserve, N26.379808° E110.102094° (MHBUa). Jiangxi (MNHN). Shaanxi: Hanzhong, Mt. Tiantaishan, N35°15'38.14" E107°4'19.43"/N33°15'25.53" E107°4'28.84"/N33°15'25.53" E107°4'20.38" (MHBUa); Hanzhong, Lüeyang, Wulongdong National Forest Park, N33°31'2.22" E106°14'43.98" (MHBUa); Baoji, Feng County, Tangzang, N34°5'45.05" E106°37'52.27"/N34°5'51.72" E106°37'53.98" (MHBUa). Zhejiang: Yuyao, Mt. Simingshan (MHBU).

***Meloe* (*Meloe*) *himalayensis* n. sp.**
China. Xizang: Dinggyê, Zhêntang, N27°54.876' E87°37.523' (MHBU, type loc.).

***Meloe* (*Meloe*) *kashmirensis* n. sp.**
Pakistan. Kaghan (Bologna *et al.*, 2018 as *Meloe* sp.; MABC, type loc.).

***Meloe* (*Meloe*) *kaszabi* n. sp.**
China. Beijing: Mt. Baihuashan (MHBU); Mentougou, Xiaolongmen (MHBU, type loc.); Changping, Heishanzhai (MHBU); Huairou, Shimentai Campsite, N40°28'44" E116°39'35" (MHBUa). Hebei: Chicheng, Mt. Heilongshan, N41°18'4" E116°6'57" (MHBU). Inner Mongolia (MHBU): Ergun (MHBU). Shanxi: Ningwu, Ximafang (MABC); Jiaocheng, Pangquangou, Erhezhuang (MHBU); Pangquangou (MHBU).

***Meloe* (*Meloe*) *kulabensis* Shapovalov, 2014**
Tajikistan. Tajikistan (Bologna, 2020). Kulab (= Kulyab) E Bukhara near Kulyab (Kulab) (Shapovalov, 2014, type loc.); E of Buchara (Shapovalov, 2014).

***Meloe* (*Meloe*) *lateantennatus* n. sp.**
China. Sichuan: Qingxi, Liangchahe (MHBU, type loc.).

***Meloe* (*Meloe*) *lobatus* Gebler, 1832**
Russia. West Siberia (Bologna, 2020); Sud Siberia, Tuva (Tshernyshev & Axentiev, 1996); East Siberia (MNHN; Motschulsky, 1872 as *M. granulifera*); Siberia (Escherich, 1889 as *M. granulifera;* Reitter, 1895; Matsumura, 1911); East Siberia, Far East (Kôno, 1936, 1940; Bologna, 2008, 2020); Far East, Primorie (Tshernyshev & Axentiev, 1996; Tshernyshev, 2009); Transbajkal (Kolbe, 1886; Fairmaire, 1887b, both as Daourie (= Dauria); Tshernyshev & Axentiev, 1996); Transkajkalja, Zabaikalsky (Pliginsky, 1911); Amur (Kolbe, 1886; Heyden, 1886 as *M. granulifera*); Chabaroska (Heyden, 1886 as *M. granulifera*); Nerchinsk (Gebler, 1832 type loc.; Tshernyshev & Axentiev, 1996); Primorye, Sidemi (Jakowlew, 1897 as *M. bellus*); Lazorsky Nature Reserve (Tshernyshev, 2009); Sachalin (Kôno, 1934); Sachalin, Galkinowraskoe (Matsumura, 1911); Sakhalin (Miwa, 1928); Sachalin Is., Dolinsk (as Garukino) and Konuma (Kôno, 1936); Curili Is., Kunashiri (Kôno, 1934); Curili Is. (Kôno, 1934, 1936).
Mongolia. Mongolia (Tshernyshev & Axentiev, 1996; Bologna, 2008, 2020; Tshernyshev, 2009).
China. China (Tshernyshev & Axentiev, 1996): N China (Kôno, 1936). Manchuria (MNHN). Anhui (Tan, 1992; Hua, 2002; Pan *et al.*, 2011, all these authors as *M. patellicornis*): Ngan-Hoei (MNHN). Beijing (Fairmaire, 1887b; Escherich, 1889; Reitter, 1895; Hua, 2002; Tan, 2002; Bologna, 2008, 2020; Pan *et al.*, 2011; all these authors as *M. patellicornis*). Fujian (Hua, 2002; Bologna, 2008, 2020; Pan *et al.*, 2011, all these authors as *M. patellicornis*): Chongan, Sangang (MHBU); Shanghang, Mt. Meihuashan, N25°19.213' E116°56.073' (MZSU); Mt. Wuyishan (Tan, 2002 as *M. patellicornis*); Shaowu (Tan, 2002 as *M. patellicornis*); Fukien, Bei Kuatun-Fukien, 27.40° n. Br. Und 117.40° ö. L. am Shaowu-Fukien (Borchmann, 1941 as *M. patellicornis*); Guizhou (MABC; MNHN): Kouy-Yang (MNHN); Pin Fa (MNHN). Hebei (Tan, 1992 as *M. patellicornis*): Yi County, Yangguzhuang (MHBU); Zhangjiakou (as Kalgan), Tchahar (Reymond, 1938 as *M. patellicornis*). Heilongjiang (Bologna, 2008, 2020): Kokusan (= Keshan; Kôno, 1940). Hubei: Shennongjia (MHBU); Shennongjia, Xiangxiyuan (Tan & Ma, 1997 as *M. autumnalis*); Xingshan, Longmenhe (Tan & Ma, 1997 as *M. autumnalis*). Hunan: Jiangyong (MHBU). Jiangsu (Tan, 1992, 2002; Hua, 2002; Pan *et al.*, 2011, all as *M. patellicornis*). Jiangxi (Tan, 1992, 2002; Hua, 2002; Pan *et al.*, 2011, all as *M. patellicornis*). Liaoning: Kaigen (= Kaiyuan; Kôno, 1940). Ningxia: Yanchi, Mamu (MHBU); Yanchi, Mt. Mahuangshan (MHBU). Shaanxi: Ganquan, Qingquangou (MHBU). Shandong: Taian (MHBU). Shanxi (Tan, 1992; Hua, 2002, both as *M. patellicornis*): Pangquangou (MHBU). Sichuan (Tan, 1992, 2002, both as *M. patellicornis*): Litang (Tan, 1992 as *M. patellicornis*); Yajiang (Tan, 1992 as *M. patellicornis*); Mt. Gongga (Tan, 1992 as *M. patellicornis*); Maerkang (Tan, 1992 as *M. patellicornis*). Yunnan (Tan, 1992; Hua, 2002; Pan *et al.*, 2011, all these authors as *M. patellicornis*; Bologna, 2008 as *M. patellicornis*; Bologna, 2020): Deqin, Mt. Baimaxueshan (Tan, 1992 as *M. patellicornis*). Zhejiang (Tan, 2002 as *M. patellicornis*): Pan'an, Mt. Dapanshan, N28°59'49" E120°32'4" (MHBU).
Korea Peninsula. Korea (Fairmaire, 1887b; Miwa, 1928; Kôno, 1934, 1936, 1940; Tshernyshev, 2009; Tshernyshev & Axentiev, 1996).
North Korea. North Korea (Tshernyshev, 2009; Bologna, 2008, 2020); Chongjin (as Seisin) (MABC); Täsogsan (MNHB); Mjohjangsan (MABC; MNHB); Kumgangsan, Onjongri (MABC; MNHB).

South Korea. South Korea (Bologna, 2008, 2020); Seul (Kolbe, 1886; Kôno, 1936); Pingan (Kolbe, 1886); Suigen (Kôno, 1936); Querpart Is. (Kôno, 1934).
Japan. Japan (Bologna, 2008, 2020; Tshernyshev, 2009). Hokkaido (Miwa, 1928; Kôno, 1934; Tshernyshev & Axentiev, 1996). Dobtful records, possibly referable to *M. auriculatus*.

***Meloe* (*Meloe*) *orientalis* n. sp.**
China. Fujian: Guadun (HNHM, type loc.). Yunnan: Pingbian, Mt. Daweishan, N22.90608° E103.69723° (MHBU). Zhejiang: Hangzhou (MABC; MNHN).

***Meloe* (*Meloe*) *ovalicollis* Reitter, 1908**
Kazakhstan. Syr-Darya Karatau Mt. Range, Karatau State Nature Reserve, 32 km W of Sholakkorgan (= Chulakkurgan) Vill., 43°47′3.75″N, 68°46′41.24″E (Shapovalov, 2014); Semirech'e (Krasnov) (Shapovalov, 2014).
Kyrgyzstan. Kyrgyzstan (Bologna, 2008, 2020; MNHB). Issyk-Kul (Reitter, 1908, type loc.; Pliginsky, 1935; MNHB); Naryn (Shapovalov, 2014).
Tajikistan. Gorno-Badakhshan Autonomous Region, Darvaz Mt. Range, Sagirbat mine; Dzhirgitalskii Dist., N slope Peter the Great Mt. Range env. Mingbulak kishlak (Shapovalov, 2014).

***Meloe* (*Meloe*) *poggii* n. sp.**
China. Gansu: Liancheng National Nature Reserve (MHBU). Qinghai: Yushu, Zadoi, Zhaqing (MHBU); Maixiu, Ergou, N35°16.513' E101°55.380' (MHBUa). Sichuan: Baiyu, Hepo, Gexue, N31°22.899' E98°53.359' (MHBUa); Dege, Mt. Queershan, N31°57.485' E98°52.001' (MHBUa); SW Sichuan, valley 5 km W–10 km NW Kelnodong, btw. 31°58'N-98°37'E/31°59'N-98°34'E (MABC); Kangding, Gaba, Tiesuo, N29°54.731' E101°35.322' (MHBUa); Kangding, Yajiageng, Gaoshan Botanical Garden, N29°55.773' E101°57.877' (MHBUa); Jiulong, Hongba (MHBU); Litang, Cunge, Tuoren, N30°03.028' E100°22.038' (MHBUa); Yajiang, Decha (MHBU). Xizang: Banbar, Marxog, Tangga, N31°01.410' E94°37.152' (MHBUa); Baqên, Ya'ngando, Gagai, N31°47.565' E94°29.932' (MHBUa); Baxoi (MHBU, type loc.); Baxoi, Ra'og, N29.3687° E96.9171° (MHBU); Baxoi, Yiqing (MHBU); Damxung, Yangbajain, Xiawula, N30°02.356' E90°36.251' (MHBUa); Dêngqên, Jue'en, Jinka, N31°13.292' E95°58.300' (MHBUa); Jomda, Kagong (MHBU); Lhasa, Lhünzhub, Pondo, N30°13'04.64" E91°18'49.95" (MHBUa); Lhorong, Zito, Tubuke, N30°32.515' E95°46.774' (MHBUa); Qamdo, Toba, Zhenga, N31°17.006' E97°33.729' (MHBUa); Sog, Rongbo (MHBU); Xigazê, Gamba, Jielong, N28°23'58.7" E88°26'19" (MHBUa). Yunnan: E Mt. Cangshan (MHBU); Maoniuping (MHBU); Mt. Laojunshan (MHBU).
Nepal. Kali Gandaki valley, nr Kalopani (MSNG); btw. Pangboche and Phortse (MABC); Mt. Everest, Pherichi (MABC).
India. Sikkim: Jelep La (MNHN); further the Jelep La (MNHN).

***Meloe* (*Meloe*) *proscarabaeus* Linnaeus, 1758**
The range of this species is very wide and extends from eastern Canary Islands to northern Japan and from southern Scandinavian peninsula and central Siberia to northern Africa, with isolated populations in southern Arabian peninsula.

M. proscarabaeus is recorded from the following states (Bologna, 2008 and 2020 for a synthesis): Portugal, Spain (including eastern Canary and Baleares islands), France, Ireland, Great Britain, Luxembourg, Belgium, The Netherlands, Switzerland, Italy (including islands), Malta, Germany, Austria, Czech Republic, Slovakia, Hungary, Denmark, Slovenia, Croatia, Bosnia Herzegovina, Serbia, Montenegro, Macedonia, Albania, Greece (including islands), Bulgaria, Romania, Moldavia, Poland, Norway, Sweden, Finland, Estonia, Latvia, Lithuania, Belarus, Ukraine, Georgia Armenia, Azerbaijan, Russia (Central European Territory, North European Territory, South European Territory, West Siberia, East Siberia, Far East), European and Asiatic Turkey, Syria, Lebanon, Israel, Jordan, Iran, Turkmenistan, Uzbekistan, Kazakhstan, Tajikistan, Kyrgyzstan, China, Mongolia, North Korea, South Korea, Japan, SE Saudi Arabia, Yemen, N Morocco, N Egypt. We examined one specimen from Tonkin, Bachan (MNHN), where it is possible its presence, being the species distributed in SE China.

Records of this common species are very numerous in both collections and literature. Consequently, we summarized the distribution indicating only the states for each subspecies, except for three with scarce information (*M. p. aegyptius, M. p. rathjensi, M. p. sericeorugosus*). Records from India (Anand, 1976, 1980) and specifically from Bihar (Anand, 1989) need to be confirmed, even if the identification was made by Blair.

ssp. *aegyptius* Brandt & Erichson, 1832: Italy. Sicily (MCZR; MNHN; MRSN; Reitter, 1895; Pliginsky, 1914, both as *M. siculus*; Bologna, 2008, 2009); Peloritani Mts. (MABC; MSNM; MSNV); Messina (MSNG); Messina, Forte di San Jachiddu (MABC); Peloritani, Curcuraci (MABC). **Spain.** Canary Islands (Bologna, 2008, 2020); Lanzarote Is. (Wollaston, 1864, 1865,

both as type loc. as *M. subcyaneus*); Fuerteventura Is., Barranco de Pecanescal (MABC; Bologna, 1994); Fuerteventura Is., Jardia Risco del Paro (ALC). **Morocco.** Morocco and W Sahara (Pligінsky, 1911; Bologna, 2009; MNHB as *M. siculus*); Rabat (MSNV); plaine de Sous (MNHN); Essaouira (MSNM); Bou Scoura (MSNM); Casablanca (HNHM); Oualidia (MABC). **Algeria**. Algeria (Bologna, 2008). **Tunisia.** Tunisia (Bologna, 2008); Kasserine (MCNV); Nabeul (CIC); Maktar (MNHN); Kairouan, hajeb El Ayun (MABC). **Libya.** Libya (Bologna, 2008). Tripolitania (MSNM; MSNV); N Tripolitania (Bologna, 1991, 2009); Sabratah (MSNM; Bologna, 2009); Tarabulus (MABC; MSNM; Bologna, 2009); Al Aziziyah (JCRC; Bologna, 2009); Leptis Magna (OSBO; Bologna, 2009); Cyrenaica (MSNG); Darnah (Dodero, 1925; Gridelli, 1930; Zavattari, 1934; all as *M. violaceus* var. *siculus*; Bologna, 2009); Tobruq (Gridelli, 1930, Zavattari, 1934; all as *M. violaceus* var. *siculus* Bologna, 2009); Marmarica coast (Bologna, 1991, 2009). **Egypt.** Egypt (MSNV; Brandt & Erichson, 1832; Reitter, 1895; Bologna, 2008, 2009). Marsa Matrouth (Alfieri, 1976 as *M. violaceus*; MCNV; MSNM); Ikingi Maryut (Alfieri, 1976 as *M. violaceus*). **Israel-Palestine.** Israel (Bologna, 2008); Negev, Kemelin, Nizzana (MABC); W Negev, Holot Agur (MABCa; TAUM); Nahal Lavann (TAUM), Gvulot (TAUM).

ssp. *afghanistanicus* Kaszab, 1953 (possible synonym of *M. semicoriaceus*): central Afghanistan.

ssp. *cyanellus* Brullé, 1832: Istria, Balkans, Hungary at least to Ukraine and SW Russia.

ssp. *exaratus* Faldermann, 1832 (including *M. sapporensis* Kôno, 1936 and *M. tenuipes* Jakowlew, 1897): Anatolia, Caucasus, Levant, N Egypt (El Farfra; W Desert, New valley Government; Cairo; Siala; Luxor: see Alfieri, 1976), Iran, Central Asia, S Siberia, E to Mongolia, China ("Manchuria", Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Guizhou, Inner Mongolia, Jilin, Liaoning, Ningxia, Qinghai, Sichuan, Xinjiang, Xizang, Zhejiang), Russian Far East, Japan (Hokkaido, Chubu, Kansai, Shikoku).

ssp. *punctatus* Fabricius, 1792: Portugal, Spain, France, Belgium, Switzerland, England, Italy, W Mediterranean islands.

ssp. *proscarabaeus* Linnaeus, 1758: Central and E Europe to SE Russia.

ssp. *rathjensi* Borchmann, 1938: Saudi Arabia. Bahah, Bani Hassan, 20°03'02"N 41°26'47"E (MABCa). **Yemen**. Yemen (BMNH; Bologna & Turco, 2007; Bologna, 2008, 2020); Sanaa (Borchmann, 1938, type loc.; Kaszab, 1983; Bologna & Pinto, 1998); Sana'a, Sheraton Hotel (MABC; Bologna & Turco, 2007); Scho nr. Sanaa, Asr, Ganaas (Borchmann, 1938; Bologna & Pinto, 1998); Jebel Jihaf (Kaszab, 1983; Bologna & Pinto, 1998).

ssp. *sericeorugosus* Axentiev, 1987: Nepal. Mustang distr., Thakkhola (Axentiev, 1987, type loc.); Mustang distr., Thaksang (Axentiev, 1987).

***Meloe* (*Meloe*) *scabrus* Pan & Ren, 2018**

China. Xizang (Bologna, 2020): Comai (MHBU; Pan & Ren, 2018, type loc.); Comai, N28°27.594' E91°25.643' (MHBU; Pan & Ren, 2018); Shannan, Lhakang (MHBU); Namling, Gyamco (MHBU); Qamdo (MHBU); Qamdo, Markam (MHBU).

***Meloe* (*Meloe*) *semicoriaceus* Fairmaire, 1891**

Kashmir. Kashmir (MNHN; Fairmaire, 1891b, type loc.; Saha, 1979; Anand, 1989; Bologna, 2008, 2020; Bologna *et al.*, 2018); Sind Valley, Gund (MSNM; Bologna *et al.*, 2018); probably Srinagar (see Bologna *et al.*, 2018); Jammu-Kashmir, Distr. Dumar, c. Astore Chilam, Das (MABC); Kashmir Himalayas: Srinagar, CITH, N33°58'01.00" E74°48'01.00" (Akbar *et al.*, 2017). Generically listed among the Indian species by Anand (1980).

Incorrect records. Iran, Bushehr, by Saha (1979) (see Bologna, 2008).

***Meloe* (*Meloe*) *shapovalovi* n. sp.**

China. Hubei: W Hubei, Dashennongjia Mts., 31.5N 110.3E (MABC); Shennongjia Forest, Shennong Peak area, 31°27'16"N 110°17'07"E (MABCa). Sichuan: S Sichuan, 10 km SW Butuo, 27.38N-102.48E (MABC); YariGong Xiang (MNHN); Kangding (as Ta-tsien-lou) (MNHN); Nujiang (as Lou-Tse Kiang) (MNHN); Muping (as Mou Pin), Baoxing, Ya'an (MNHN). Yunnan: Lou-Nan (MNHN); Qiaojia, Yaoshan, N28°21.412' E99°04.052' (MHBU, type loc.); Qiaojia SE env., 26°52'54"N 103°00'01"E (SKC); Qiaojia Co., Yaoshan Mts., 27°11'16"N 103°01'03"E (SKC); Dali, Huadianba (MHBU); Deqen env., Mt. Baimaxueshan pass. (SKC). Xizang: Zayu Co., upper basins of the W & E branch of Taron river (Irrawaddy), 28°35'–43'N 97°40'–58'E (SKC); Tsongo (Basum-Tso), 90 km W Gyamda (SKC).

***Meloe* (*Meloe*) *subcordicollis* Fairmaire, 1887**

China. Gansu (Tan, 1981; Hua, 2002; Pan & Ren, 2018; Bologna, 2020): Skansa (Pic, 1935); Wen County, Qiujiaba, Shiyazi-liang (Tan & Ma, 2005). Guizhou (Hua, 2002; Bologna, 2008, 2020; Pan & Ren, 2018): Daozhen (Li *et al.*, 2008); Jiangkou (Li *et al.*, 2008); Mt. Leigongshan (Li & Wang, 2007). Hunan (Hua, 2002; Bologna, 2008, 2020; Pan & Ren, 2018). Inner Mongolia

(Hua, 2002; Bologna, 2008, 2020; Pan & Ren, 2018). Jiangxi (Hua, 2002; Bologna, 2008, 2020; Pan & Ren, 2018). Sichuan (MNHN): Sé Pin-Lou Chan, Ya Tcheou (= Ya'an) (MNHN); Litang env. (MABC); S Sichuan, 10 km SW Butuo, 27.38N-102.48E (MABC). Xizang (Hua, 2002; Bologna, 2008, 2020): Nyalam (Pan & Ren, 2018); Zham (Tan, 1981); E Tibet, Lao Shan pass, rd. Markam-Zogang, 10 km W Markam, 29.42N-98.32E (MABC); S Tibet, Everest E slope, Sakyetang–Kanchung Glacier (MABC); SE Tibet, NE Lhasa, Lashatal (MABC); Tibet, Lao Shan pass, road Markam-Zogang, 10 km W Markam, 29°42'N 98° 32'E (MABC, SKC); SE Tibet, Chola Shan pass, road Yanjing-Markam, 50 km S of Markam, 29°16'N 98°38'E (SKC); SE Tibet, Zhong La Shan pass, 5 km E of Markam (SKC). Tibet Tay-ho (MNHN). Yunnan (Fairmaire, 1887a, type loc.; Tan, 1981; Hua, 2002; Bologna, 2008, 2020; Pan & Ren, 2018; MNHN): Deqin, Mt. Baimaxueshan (MHBU); Atentse (= Deqin) (MNHN); Ta pin-tze (= Huangping, Heqing, Dali) (MNHN). Some localities recorded in the literature are doubtful and should be verified.

India. Sikkim, Gnatong (MNHN).

***Meloe* (*Meloe*) *tarsalis* Jakowlew, 1897**

Russia. East Siberia (Bologna, 2008, 2020): Transbaikal Irhirik riv. (Jakowlew, 1897, type loc.).

China. Hebei: Xinglong, Yanshi (MHBU); Weichang, Siheyong, Laohugou, N41°51'36.0" E117°43'58.5" (MABC). Inner Mongolia: Bayan Obo (MHBU). Ningxia: Guyuan (MHBU). Shaanxi: Ganquan, Qingquangou (MHBU).

***Meloe* (*Meloe*) *violaceus* Marsham, 1802**

The range of this species is very wide and extends from Portugal to eastern Siberia, Kamtchatka and Japan, and from Arctic Circle in Scandinavia to northwestern African mountains and Himalaya.

Meloe violaceus is recorded from the following states (see for a synthesis Bologna, 2008, 2020, who did not record the species from China and Japan): Portugal, N Spain, Andorra, France, Ireland, Great Britain, Luxembourg, Belgium, The Netherlands, Switzerland, Italy (including islands), Germany, Austria, Czech Republic, Slovakia, Hungary, Denmark, Slovenia, Croatia, Bosnia Herzegovina, Serbia, Montenegro, Macedonia, Albania, Greece (including islands), Bulgaria, Romania, Moldavia, Poland, Norway, Sweden, Finland, Estonia, Latvia, Lithuania, Belarus, Ukraine, Georgia, Armenia, Azerbaijan, Russia (Central European Territory, North European Territory, South European Territory, West Siberia, East Siberia), European and Asiatic Turkey, Iran, Turkmenistan, Uzbekistan, Kazakhstan, Tajikistan, Kyrgyzstan, China (NE China, Hebei, Xinjiang, Xizang: Yadong County), Korea, Japan (Hokkaido, Kanto, Chubu), N Morocco, N Algeria.

The distribution in Afghanistan and Kashmir (Anand, 1989; Bologna, 2008), Himalaya (Anand, 1989) or generically as India (Anand, 1976, 1978, 1980) need to be confirmed (see Bologna *et al.*, 2018), even if the identification, partially made by Wellman, seems reliable.

***Meloe (Meloe) xuhaoi* n. sp.**

China. Chongqing: Jiangjin, Mt. Simianshan, Ertai (MABC; MHBU; MHBUa, type loc.); Jiangjin (MHBU). Zhejiang (MHBU): Songyang (MHBU).