

INSECTA MUNDI

A Journal of World Insect Systematics

0257

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Reitter, 1892 (Coleoptera: Scarabaeidae: Scarabaeinae: Onthophagini)

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Date of Issue: October 26, 2012

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Insecta Mundi 0257: 1-7

Published in 2012 by

Center for Systematic Entomology, Inc.

P. O. Box 141874

Gainesville, FL 32614-1874 U. S. A.

<http://www.centerforsystematicentomology.org/>

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On the identity and systematic placement of *Onthophagus viriditinctus* Reitter, 1892 (Coleoptera: Scarabaeidae: Scarabaeinae: Onthophagini)

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Abstract. A re-description and new records of *Onthophagus viriditinctus* Reitter, 1892 (Coleoptera: Scarabaeidae: Scarabaeinae: Onthophagini), an uncommon species from Iran, are provided. The taxonomic position and some nomenclatural problems are discussed. The placement in the subgenus *Exonthophagus* Kabakov, 2006 is proposed. Images of the male, female, aedeagus and drawings of lamella copulatrix of *Onthophagus viriditinctus* and *Onthophagus haroldi* Ballion, 1871, the only other species included in the subgenus, are supplied. A key for distinguishing the two species is provided.

Key words. Coleoptera, Scarabaeidae, *Onthophagus*, *Exonthophagus*, taxonomy, nomenclature, Iran

Introduction

Onthophagus viriditinctus Reitter, 1892 is a localized species (Petrovitz 1980) distributed in central and south-western Iran. Its placement in the subgenus *Palaeonthophagus* Zunino 1979, by Zunino (1979), was questionable. So, I studied a male collected by László Nádai in Iran, as well as material housed in Rudolph Petrovitz's collection (Geneva Museum), and Mario Zunino's collection (Turin Museum). A historical review is here given, along with discussions on some taxonomic and nomenclatural issues. Images and useful characters for the identification and discrimination of this species from the closely related species *Onthophagus haroldi* Ballion, 1871, are also given.

Onthophagus viriditinctus was described by Reitter (1892) from "Schiras in Persien" [Shīrāz, Iran] based on an unspecified number of specimens. A few years later d'Orbigny (1898), probably without seeing specimens, presented a diagnosis for *O. viriditinctus* which is only a short summary of Reitter's original description. d'Orbigny (1898) placed it in his 8th group with other 27 species whose phyletic relationships remain to be studied. Balthasar (1963) stated that the type material was no longer in Reitter's collection in HNHM and that the original description was probably based on a female. Zunino (1978) confirmed the loss of the type material and designated a neotype, a male from "Dasht – arjan w Shiraz Iran" [Shīrāz, Iran], ex Petrovitz collection, deposited in HNHM. Furthermore, he added that the original description by Reitter was probably based on one or more males. The following year Zunino (1979) included the species in the subgenus *Palaeonthophagus* Zunino, 1979, based on a genitalia study. The same systematic view was adopted by Löbl et al. (2006).

Petrovitz (1980) in a posthumous work – the manuscript was submitted in the beginning of 1971 – reported the retrieval of Reitter's type, according to him a female, and provided a re-description of the species based on this and five additional specimens from "Dasht-arjan, w. Shirz" [Fārs province] and "Hossein-abad, nö. Sirjan" [Kermān province].

Finally, the species was included in a checklist of the Scarabaeinae of the world (Krajcik 2006) without discussion.

As far I can ascertain, *O. viriditinctus* has not been considered by any other author.

Abbreviations of collections:

HNHM – Termesztudományi Múzeum Allattára, Budapest (Hungary)
LNCB – László Nádai's private collection, Budapest (Hungary)
MHNG – Muséum d'Histoire Naturelle, Genève (Switzerland)
MRSN – Museo Regionale di Scienze Naturali, Torino (Italy)
SZCM – Stefano Ziani's private collection, Meldola – Forlì (Italy)

***Onthophagus viriditinctus* Reitter, 1892**

(Fig. 1-5)

Onthophagus viriditinctus Reitter, 1892: 183; d'Orbigny 1898: 204; Boucomont and Gillet 1927: 131; Winkler 1929: 134; Balthasar 1963: 583; Zunino 1978: 111; Petrovitz 1980: 603; Krajcik 2006: 141
Onthophagus (Palaeonthophagus) viriditinctus: Zunino 1979: 9; Löbl et al. 2006: 170.

Type locality. “Dasht – arjan w Shiraz Iran” [Fārs, Iran].

Type material. Neotype, a male designated by Zunino (1978), in HNHM according to Zunino (1978) but unavailable.

Diagnostic features. Length 4.5 to 8.0 mm. Head dark brown, with bronze metallic luster; pronotum dark brown, with bronze metallic luster and with a symmetrical yellow mottling on the border, broadest along sides; elytra ochraceous, usually with blackish brown irregular asymmetric spots along 3rd, 5th and 7th interstriae, and a sub-humeral spot on the 8th interstria; epipleura completely ochraceous; pygidium brown, with more or less extended dark yellow spots; legs brown, with femurs clearly lighter than tibiae; pubescence pale yellow.

Head with clypeus barely or not at all emarginate at middle, broadly round on either side, not sinuate near obviously produced genae. Clypeofrontal carina distinct and bent backward both in males and females, close to occipital carina in males, halfway between anterior edge of clypeus and occipital carina in females; occipital carina extended in a lamina bent backward in males, moderately elevate and straight in females. Clypeal and frontal surface with large setiferous irregular punctures in males; females with frontal surface granulate, clypeal surface with very coarse, transversely rugose or sub-rugose punctures. Setae long and erect.

Pronotum convex, clearly declivous anteriorly in males, moderately in females; males with a distinct anteromedian gibbosity, slightly sinuate at middle, females with a moderate, almost vestibular hump. Anterior angles distinctly produced, sides not sinuate behind them. Dorsal surface setiferously punctate, punctures broad, rasp-like, regular in distribution, separated by half to one diameter on disc, gradually more spaced basally; each puncture bears a long pale yellow seta, turned backward. Pronotal disc with an impunctate narrow lanceolate area, which is slightly raised in relief. Lateral margin of pronotum elongately ciliate.

Elytral striae barely impressed, with punctures slightly larger than stria width and barely crenate interstitial sides. Interstriae flat, some specimens with the 4th interstria barely convex, all with rather irregularly distributed granules; the latter smaller than stria punctures; each granule bearing a pale yellow seta, thin, turned backward, clearly shorter than pronotal setae.

Pygidium of the males very long, as long as wide, wider than long in females, with spaced, setiferous punctures; setae pale yellow, thin, shorter than pronotal but longer than interstitial ones. Male's metasternal plate with a deep concave hollow, slightly lengthened, smooth and shiny, with no punctures or pubescence, punctate at sides, punctures with a long pale yellow seta. Female's metasternal plate flat.

Protibiae in males apically sub-truncate, with distal tooth perpendicular to the tibia axis, in females normally shaped, with distal tooth not perpendicular; in males protibial spur short, little longer than the first two tarsal segments combined, and clearly bent outwards, in females protibial spur as long as the first three tarsal segments combined and forward-facing.

Inner angle of males protibial apex without small denticle but with a tuft of short pale yellow bristles, shorter than the spur, down and outwards bent; females without tuft.

Parameres (Fig. 3 and 4) long, straight, apex clearly bent ventrally, apical spatulae strongly diverging, latero-apical and latero-proximal angles sharp, discernible in fronto-lateral view as distinct denticles; proximal denticle strongly bent ventrally, not visible in apical view (Fig. 3).

Lamella copulatrix (Fig. 5) horseshoe shaped, strongly emarginate; left lobe simple, right lobe apically bifurcate, with a sclerotized perpendicular transverse plica, and in outer edge bearing a denticle which is clearly visible ventrally.

Distribution. Based on available data this species is to be localized to central and south-western Iran, Fārs and Kermān provinces.

Material examined. IRAN: “Persia”, 1 female (MHNG); Kermān prov., Husainābād, NO of Sirjān, R. Petrovitz leg. 1 male and 1 female (MHNG); Fārs prov., “Dasht–arjan w Shiraz”, R. Petrovitz leg. 11 males and 6 females (MHNG); Fārs prov., “Dasht–arjan w Shiraz”, R. Petrovitz leg. 1 male and 1 female (MRSN); Fārs prov., 3 km W Sangar, 2000 m, 18.iv.1999, L. Nádai leg. 1 male (LNCB); Fārs prov., Zagros Mts., 25 km W Shīrāz, 26/27.iv.1999, J. Kaláb leg. 1 female (SZCM).

Discussion

Was the original description of *O. viriditinctus* based on a male or a female? *Onthophagus viriditinctus* was described by Reitter (1892) on material coming from Shīrāz, in Iran. Unfortunately he did not specify the number or sex of the specimens of his new species. Knowing the number and gender of these specimens is important to resolve some nomenclatural problems. In the original description are clues that help us answer these questions. Reitter (1892) wrote that “Endsporn der Vorderschienen kurz und gekrümmt” [protibial spur short and bent], and “der Endzahn derselben an den Seiten nicht nach vorne gerückt, ähnlich wie bei *Caccobius*” [(tibial) distal tooth not faced forwards, similar to *Caccobius*]. These two sentences suggest that the specimen on which the description was based was male, as suspected by Zunino (1978). However a few lines before he wrote “...die Stirnleiste schwach, gebogen, in der Mitte befindlich” [clypeofrontal carina barely bent, placed at middle], which is a females character, since males have the clypeofrontal carina very close to the occipital carina. In describing this character, Reitter was certainly studying a female, as suspected by Balthasar (1963) and Petrovitz (1980). Furthermore, the length of *O. viriditinctus* is reported as ranging from 7.5 to 8.0 mm, which adds weight to there being more than one specimen. Therefore, it is probable that *O. viriditinctus* was described by Reitter (1892) from more than one specimen, representing both sexes.

Is the type material of Reitter to be considered lost? Consequently, is the neotype designation by Zunino (1978) valid? Otto Merkl, head of the Department of Coleoptera of the Hungary Natural History Museum, Budapest, has confirmed (pers. comm., iv.2012) that in Reitter’s collection it is not possible to locate the original type material of *O. viriditinctus*. Petrovitz (1980) stated that he had discovered Reitter’s type of *O. viriditinctus*. Actually, in Petrovitz’s collection (MHNG) there is a female with a label “Persia” [Iran] handwritten by Reitter, and a red printed label with “Typus”, probably added by Petrovitz. The comparison of the handwriting on the locality label with that of dozens of Reitter’s type specimens previously examined allows me to assign beyond doubt the handwriting as Reitter’s. Could we consider this specimen as a syntype on which the description of *O. viriditinctus* is based? I do not believe so. Reitter’s locality label, in itself, is not enough to consider the specimen syntypic. In addition, Reitter’s label is simply “Persia”, whereas the original description precisely defines the locality as Shīrāz.

Therefore the neotype designation by Zunino (1978) has to be considered valid. Unfortunately, the neotype, deposited by Zunino in HNHM (Zunino 1978), was unavailable (Merkl, pers. comm., vi.2012). In my opinion, there is no need to designate another neotype. A neotype is a name-bearing specimen that serves, in the case of doubt, as a reference for the name. As far as I know, the identity of *O. viriditinctus* has never been questioned, it has never been synonymized with any other species, and no other species has ever been synonymized with it. In addition, external characters of *O. viriditinctus* “sensu auctorum” match those in the original description, so it is reasonable to assert that Reitter’s species is the taxon as understood by current literature based concepts. *Onthophagus viriditinctus* has only one close relative, *O. haroldi*, but below I present the characteristics that enable their clear and unambiguous separation.

Does *O. viriditinctus* really belong in the subgenus *Palaeonthophagus*? Zunino (1979) placed it in *Palaeonthophagus* based only on male and female genital armatures. The shape of its lamella copulatrix (Fig. 5) closely matches the morphology of those of *Palaeonthophagus* species, i.e. horseshoe shaped lamina more or less marginate at one side. However, the parameres (Fig. 3 and 4) are different, similar to those of some species in the genus *Euonthophagus* Balthasar, 1959. Furthermore, other

male characters, such as the protibiae being sub-truncate apically, with distal tooth perpendicular to the tibial axis - somewhat resembling those of males of *Caccobius* Thomson, 1859 (Scarabaeidae; Onthophagini genus) - the inner angle of protibial apex with a tuft of short bristles bending downward and outward, the metasternal plate with a deep concave hollow, and the pygidium as long as wide, definitively exclude this species from the subgenus *Palaeonthophagus*.

These four structural features are shared only by males of *Onthophagus haroldi* Ballion, 1871 (Fig. 6-10), found in north-eastern Iran, northern Afghanistan, central Asia, western China - Tibet and Xinjiang - and western Siberia (Löbl et al. 2006; Kabakov 2006). Moreover, the parameres of the two species are both elongated with spatulate apices (Fig. 3, 4, 8, 9).

Kabakov (2006) established the monospecific subgenus *Exonthophagus* for *O. haroldi*. *Onthophagus viriditinctus* can be placed in the same subgenus, with the new nomenclatural association: *Onthophagus (Exonthophagus) viriditinctus* Reitter, 1892. As noted by Kabakov (2006), the subgenus *Exonthophagus* is based solely on male characters. In contrast, the external morphology of females is similar to females belonging to other subgenera of *Onthophagus*, particularly *Palaeonthophagus*. Nevertheless, the establishment of *Exonthophagus* seems to be justified, and the group deserves at least subgeneric rank.

A key to the *Exonthophagus* species is provided below. Characters of the aedeagus and lamella copulatrix have not been included. Because of high intraspecific variability in the integument coloration shown in many species of Onthophagini, also in this case I prefer to avoid their use in identifying species.

According to their original descriptions (Olsoufieff 1907; Protsenko 1968), *Onthophagus haroldi* var. *viridilimbatus* Olsoufieff, 1907 and *O. haroldi* ab. *dioriticus* Protsenko, 1968 are merely chromatic variations, and were treated in this way by Boucomont and Gillet (1927), Winkler (1929), Balthasar (1963), Kabakov (2006), Krajcik (2006), and Löbl et al. (2006), and by Kabakov (2006), respectively. However, as an infrasubspecific name, "*dioriticus* Protsenko, 1968" is not available name according to Article 45.5 of the International Code of Zoological Nomenclature (ICZN 1999).

Key to males of the subgenus *Exonthophagus* Kabakov, 2006

1. Protibial apex sub-truncate, with a tuft of short bristles at the inner angle, bent down and outwards; metasternal plate with a deep concave elongate hollow; pygidium as long as wide **2. (subg. *Exonthophagus* Kabakov)**

 Not all the above characters present simultaneously
 **males of all other *Onthophagus* subgenera**

2. Pronotal punctures large, separated by 1-2 times their diameter on disc [character shared by females]; 8th elytral interstria clearly concave behind humeral callus which forms an evident bump [character shared by females]; major males occipital carina ending in a small vertical horn; male clypeofrontal carina halfway between occipital carina and anterior edge of clypeus; male pronotum obviously declivous anteriorly but without distinct anteromedian protuberance; north-eastern Iran, Afghanistan, Central Asia, south-western China, west Siberia ***O. (E.) haroldi* Ballion**

 Pronotal punctures close, separated by 0.5-1.0 times their diameter on disc [character shared by females]; 8th elytral interstria indistinctly concave behind humeral callus [character shared by females]; major males occipital carina with a posteriorly bent erect lamina; male clypeofrontal carina very close to the occipital one; male pronotum declivous anteriorly, with a distinct anteromedian gibbosity more or less slightly sinuate at middle; central and south-western Iran ***O. (E.) viriditinctus* Reitter**

Acknowledgments

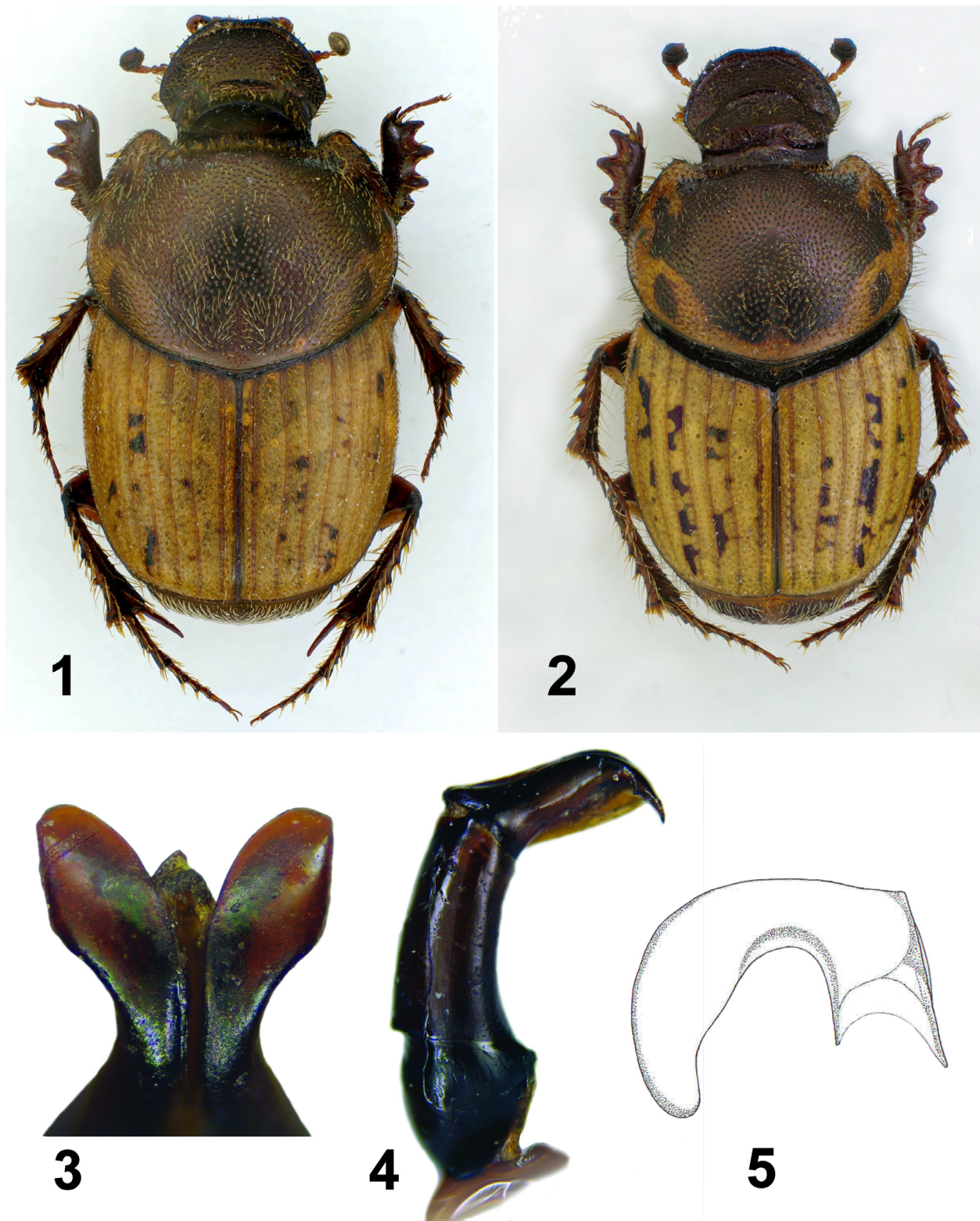
Thanks to: Tristão Branco (Porto, Portugal), for much advice on this matter; Giulio Cuccodoro (Muséum d'Histoire Naturelle, Genève, Switzerland), Otto Merkl (Termesztudományi Múzeum

Allattára, Budapest, Hungary) and Luca Picciau (Museo Regionale di Scienze Naturali, Torino, Italy), for loans of material from collections under their care and other information; Augusto Degiovanni (Bubano di Mordano, Bologna, Italy) who took all the photos, and Gabriele Fiumi (Forlì, Italy) who made them publishable; Ivo Gudenzi (Forlì, Italy) for the drawings; Mario Zunino (Dipartimento di Scienze dell'Uomo, dell'Ambiente e della Natura, Università degli Studi di Urbino, Italy) for some information. Special thanks to Lázló Náday (Budapest, Hungary) who let me study specimens from his private collection and for other support, Alexander Napolov (Riga, Latvia), for the kind assistance in Russian translation, and Darren J. Mann (Oxford University Museum of Natural History, England) and Paul Schoolmeesters (Herent, Belgium) who read and improved the last version of the manuscript.

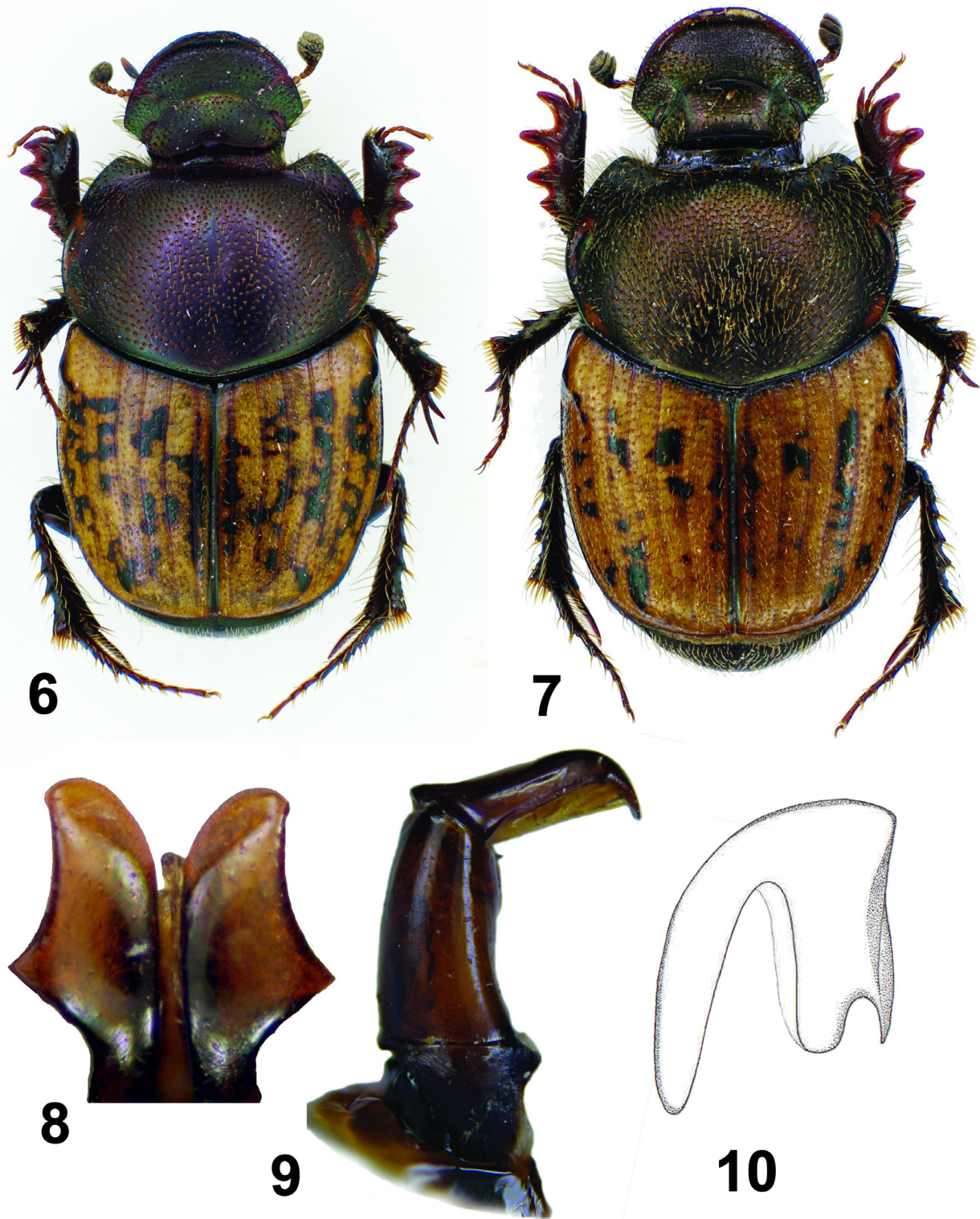
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Received June 12, 2012; Accepted August 16, 2012.



Figures 1-5. *Onthophagus (Exonthophagus) viriditinctus* Reitter, 1892. **1)** Male (IR-Fārs prov., 3 km W Sangar, 2000 m). **2)** Female (IR-Fārs prov., Zagros Mts., 25 km W Shīrāz). **3)** Parameres, apical view. **4)** Parameres, lateral view. **5)** Lamella copulatrix.



Figures 6-10. *Onthophagus (Exonthophagus) haroldi* Ballion, 1871. **6)** Male (UZ-Aktau Mts., Chasmah vill., 1000 m). **7)** Female (UZ-Tjan Shan, Chatkalski range-Chimgan vill.). **8)** Parameres, apical view. **9)** Parameres, lateral view. **10)** Lamella copulatrix.

