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Taxonomic notes on *Onthophagus (Palaeonthophagus) lemuroides*
d'Orbigny, 1898 and *O. (P.) fortigibber* Reitter, 1909 (Coleoptera:
Scarabaeidae: Scarabaeinae: Onthophagini)

Stefano Ziani
via S. Giovanni, 41/a,
47014 Meldola (FC)–Italy.
stefanoziani@alice.it

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Taxonomic notes on *Onthophagus (Palaeonthophagus) lemuroides* d'Orbigny, 1898 and *O. (P.) fortigibber* Reitter, 1909 (Coleoptera: Scarabaeidae: Scarabaeinae: Onthophagini)

Stefano Ziani

via S. Giovanni, 41/a,
47014 Meldola (FC)–Italy.
stefanoziani@alice.it

Abstract. The taxonomic position of *Onthophagus (Palaeonthophagus) lemuroides* d'Orbigny, 1898 and *Onthophagus (Palaeonthophagus) fortigibber* Reitter, 1909 is discussed (Coleoptera: Scarabaeidae: Scarabaeinae: Onthophagini). A key to the species is given. Photos of type specimens of the two taxa and significant chromatic varieties, and drawings of aedeagi are presented.

Key words. Coleoptera, Scarabaeidae, *Onthophagus*, taxonomy, Middle East, Caucasus.

Introduction

Onthophagus lemuroides d'Orbigny, 1898 and *Onthophagus fortigibber* Reitter, 1909 (= *Onthophagus tricuspis* Semenov, 1900, primary junior homonym of *Onthophagus coenobita* var. *tricuspis* Mulsant, 1842) are two species belonging to the subgenus *Palaeonthophagus* Zunino, 1979 (Coleoptera: Scarabaeidae). While *O. lemuroides* is found in the Middle East and *O. fortigibber* in Caucasus and south-eastern Europe, Turkey is the only country where both species are sympatric.

As with other species of *Onthophagus* Latreille, 1802, both *O. lemuroides* and *O. fortigibber* have strong intraspecific variability in placement and size of the elytral spots. It is relatively easy to distinguish typical specimens of the two species based on elytral color patterns alone, but it is not so simple with other chromatic variations. The two species have similar pronotal development in both sexes and the lamellae copulatrices of the male genitalia are almost indistinguishable.

After studying the type series and some noteworthy chromatic varieties, a systematic understanding of the two taxa is proposed, together with a key to morphologically similar species. New external and genitalic characters are provided for distinguishing the two species.

Historical review. *Onthophagus lemuroides* was described by d'Orbigny (1898a) from Iraq and Iran based on an undefined number of specimens—three, according to Zunino (1975). Two years later Semenov (1900) described *O. tricuspis* based on a single male from Caucasus. In the original diagnoses both species were compared to *Onthophagus lemur* (Fabricius, 1781).

In the same year d'Orbigny (1900) published a note in which he considered *O. tricuspis* to be a junior synonym of *O. lemuroides*, based of the original description only. This synonymy was never accepted by the subsequent authors, starting with Olsoufieff (1900) who stated that *O. tricuspis* was closer to *Onthophagus trigibber* Reitter, 1892, a species found in north-western Africa.

Nine years later Reitter (1909) described *Onthophagus fortigibber* based on a single specimen from Caucasus. It was described as a male in the original description but is actually a female according to Zunino (1978). Reitter (1909) compared *O. fortigibber* with *O. trigibber*.

Olsoufieff (1918) was the first to consider *O. fortigibber* a junior synonym of *O. tricuspis*. This last name was considered valid by all the subsequent authors, apparently unaware that *Onthophagus tricuspis* Semenov, 1900 is a primary junior homonym of *Onthophagus coenobita* var. *tricuspis* Mulsant, 1842. Tarasov (2005), Löbl et al. (2006) and Kabakov (2006) re-established the valid name *Onthophagus fortigibber* Reitter, 1909, which was the first available synonym of *O. tricuspis*.

Finally, Bogachev (1930) described *Onthophagus unxovi* from Caucasus which was synonymized with *O. fortigibber* by Tarasov (2005).

Materials

Abbreviations of collections:

HNHM	–	Termesztudományi Múzeum Allattára, Budapest (Hungary)
LNCB	–	László Nádai private collection, Budapest (Hungary)
MNHN	–	Muséum National d'Histoire Naturelle, Paris (France)
SZCM	–	Stefano Ziani private collection, Meldola–Forlì (Italy)

Onthophagus (Palaeonthophagus) lemuroides d'Orbigny, 1898

(Fig. 1–8)

Onthophagus lemuroides d'Orbigny 1898a: 177; 1898b: 188; 1900: 296; Olsoufieff 1900: 274; 1918: 47; Boucomont and Gillet 1927: 124; Winkler 1929: 1033; Balthasar 1963: 417; Petrovitz 1968: 465; Zunino 1975: 163; Carpaneto 1977: 34; Carpaneto et al. 2000: 231; Tauzin 2001: 42
Onthophagus (Palaeonthophagus) lemuroides: Zunino 1979: 9; Löbl et al. 2006: 168; Kabakov 2006: 190

Type locality. “Mésopotamie, Perse” [Iraq, Iran].

Type material. Lectotype, a male, designated by Zunino (1975), and 2 paralectotypes in MNHN (examined).

Diagnostic features. Length 4.5 to 7.5 mm. Color blackish brown, moderately shiny, with distinct isodiametric microreticulation, head and pronotum of some with cupreous or greenish lustre; elytra ochreous, usually with dark brown symmetrical v-shaped spots, some with spots joined to each other or lacking in some interstriae, some with first interstriae brown along entire length; some with entire elytral surface blackish brown, without ochreous areas, or, vice versa, the whole elytral disc yellow, spots, if present, limited to the sides (Fig. 1–5); pubescence pale yellow.

Head with clypeus broadly round on either side of clear median emargination, can be sinuate near obviously produced genae. Clypeofrontal carina weak or absent in males, moderately elevate but distinct, bent backward in females; occipital carina extended in a lamina ending in a pair of erect horns in major males, reduced to a narrow straight lamina in females and minor males. Clypeal and frontal surface with large setigerous punctures, in males more widely spaced on frons than on clypeus; females only with frontal surface simply punctate, clypeal surface with very coarse, transversely rugose or sub-rugose punctures. Setae long and erected.

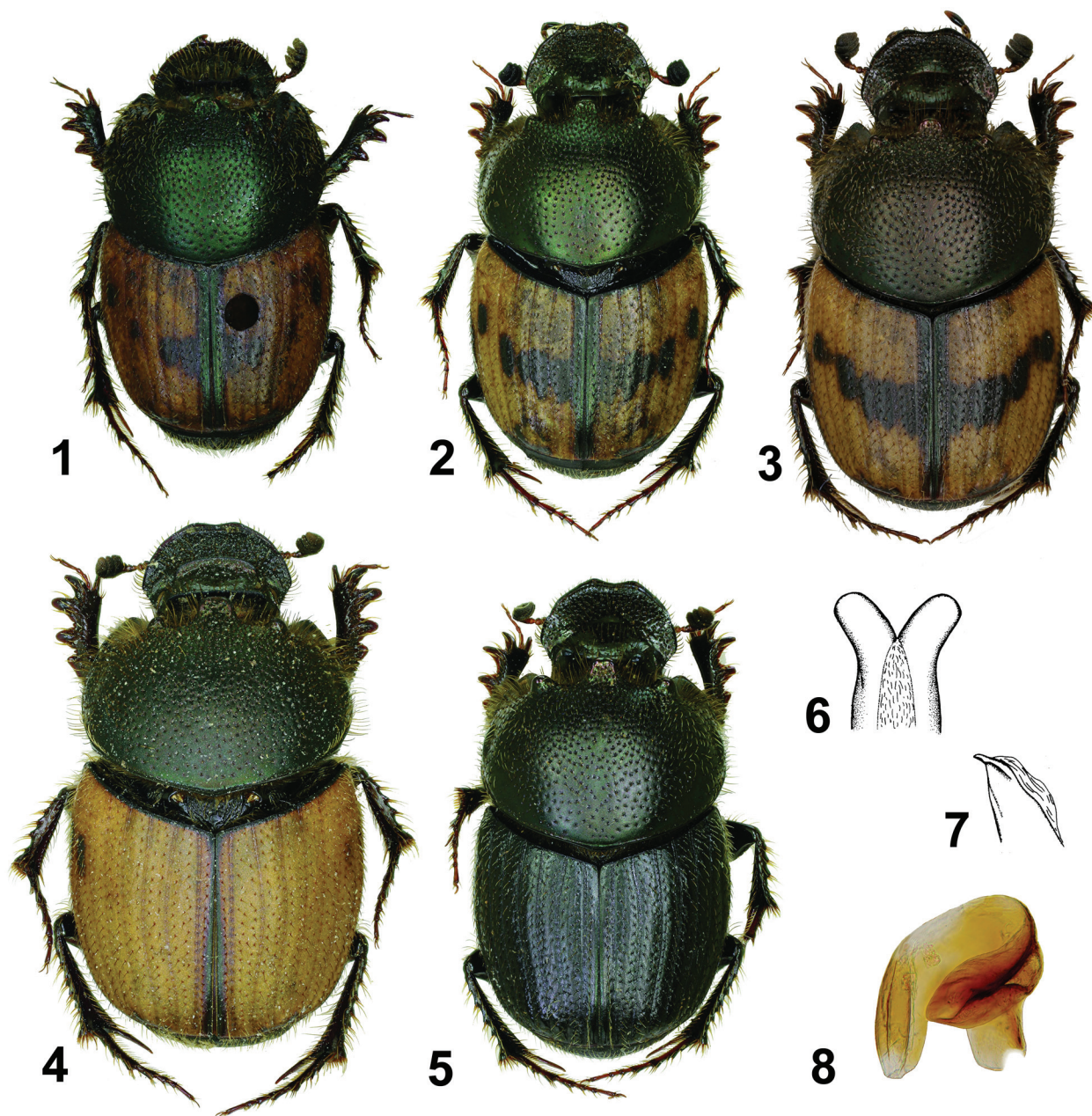
Pronotum convex, declivous anteriorly, with distinct anterolateral tubercle on either side and with an anteromedian round prominence, clearly projecting further forward than the anterolateral tubercles. Anterior angles distinctly produced, sides not or very indistinctly sinuate behind them. Dorsal surface setigerously punctate, punctures broad, sub-regular in distribution, separated by 1-3 diameters on disc, becoming sparser toward base; each puncture bears a small granule at its anterior margin, and a long pale yellow seta.

Elytral striae shiny, barely impressed, with punctures slightly larger than stria width and barely crenating interstitial sides. Interstriae flat to barely convex, sometimes the 4th interstria more convex than the others, all, except the sutural interstria, rather regularly biserially granulate; granules slightly smaller than stria punctures; posterior margin of each granule with a small, indistinct, setigerous puncture; setae pale yellow, thin, shorter than pronotal ones.

Pygidium with widely spaced, setigerous punctures; setae yellow, long, thin.

Inner angle of protibial apex with a small denticle strongly curved downward in males, females lacking denticle.

Parameres (Fig. 6–7) short, slightly sinuate along sides, latero-apical spatulae not bent ventrally, obviously diverging apically, without latero-proximal denticle, latero-apical angle round. Lamella copulatrix (Fig. 8) typical of the subgenus *Palaeonthophagus*, horseshoe shaped and clearly emarginate at one side, right lobe with a strongly sclerotized plica ventrally bent.



Figures 1-8. *Onthophagus (Palaeonthophagus) lemuroides* d'Orbigny, 1898. 1) Lectotype male. 2) Male (IR-Lorestān, Nehāvand Kosio Āb, 1860 m). 3) Male (TR-Malatya, 10 km S Tepehan, 1200 m). 4) Female (TR-Gümüşhane, Bayburt, 2000 m). 5) Male (TR- Malatya, Reşadiye geçidi, 1510 m). 6) Parameres, dorsal view (drawing by Ivo Gudenzi). 7) Parameres, lateral view (drawing by Ivo Gudenzi). 8) lamella copulatrix.

Distribution. Turkey, Iraq, Iran (Löbl et al. 2006). Syria (Kabakov, 2006)

Material examined. IRAN: "Persia", 1 male (paralectotype, MNHN); Eşfahān prov., Zāghel, 21.v.1977, 1 male (Baraud collection, MNHN); "Dasht-Arghan", 30.iv.1971, R. Naviaux leg. 1 male (Baraud collection, MNHN); Lorestān prov., Zagros Mts., Nehāvand Kosio Āb, 1860 m, 6.v.2008, T. Hác, K. Székely and K. Vig leg. 8 males and 6 females (LNCB), and 2 males (SZCM); Lorestān prov., Bongale, 1600 m, 15.iv.1999, L. Nadai leg. 1 female (SZCM); Büyer Ahmad prov., 3 km N Sisaht, 2700 m, 10.v.1998, G. Fábíán and K. Székely leg. 1 male (SZCM); Lorestān prov., 10 km SW Dorud, 1400 m, 10.v.2002, D. Gianasso leg. 1 female (SZCM); Lorestān prov., Kuh-e Oshturan, 2000 m, 22.v.2005, G. Sama leg.

1 female (SZCM); Lorestān prov., Azna, Arak, 2083 m, 22.v.2005, G. Sama leg. 1 male (SZCM). IRAQ: “Mesopotamie”, 1 male and 1 female (lectotype and paralectotype, MNHN). SYRIA: “Syrie”, 1 female (Baraud collection, MNHN). TURKEY: Niğde prov., Aladağlar, 2000 m, 26.vii.1990, C. Thomè leg. 1 female (Baraud collection, MNHN); Adıyaman prov., Nemrut Dağı, 1.v.1998, 1 male (SZCM); Malatya prov., Reşadiye geçidi, 1510 m, 13.iv.2004, S. and R. Ziani leg. 64 males and 45 females (SZCM); Malatya prov., 10 km S Tepehan, 1200 m, S. and R. Ziani leg. 1 male and 2 females (SZCM); Gümüşhane prov., Bayburt, 2000 m, 3.vii.1992, S. and R. Ziani leg. 2 males and 4 females (SZCM); Erzurum prov., Kop Dağı geçidi–Kandilli, 2500 m, 3.vii.1992, S. and R. Ziani leg. 4 males and 3 females (SZCM); Hakkâri prov., Uludere, 16.iv.2006, S. and R. Ziani leg. 1 female (SZCM); Siirt prov., 10 km N Şirnak, 1500 m, 16.iv.2006, S. and R. Ziani leg. 1 female (SZCM).

Remarks. The record of *O. lemuroides* from Syria appears doubtful. Kabakov (2006) stated to have examined two females labelled generically Syria, and “Syrie” is also on the label of a specimen I studied in MNHN. Most probably Syria is to be considered in its historical sense, i.e. those territories once encompassed in the Ottoman Empire, presently belonging to Turkey.

Onthophagus (Palaeonthophagus) fortigibber Reitter, 1909

(Fig. 9–14)

Onthophagus tricuspis Semenov, 1900: 93 [type locality: “Caucasus centralis: Mlety” [Mleta, Georgia]; type material: holotype male, fixed by monotypy, not examined, in Russian Academy of Science, S. Petersburg, according to Balthasar 1963], not *O. coenobita* var. *tricuspis* Mulsant, 1842: 128; Olsoufieff 1900: 274; d’Orbigny 1900: 296 (as junior synonym of *O. lemuroides*); Reitter 1906: 729; Olsoufieff 1918: 81; Boucomont 1924: 114; Boucomont and Gillet 1927: 129; Winkler 1929: 1031; Balthasar 1963: 560; Petrovitz 1963: 238; 1968: 465; Carpaneto 1977: 40; Dzhambazishvili 1979: 145; Rössner 1991: 267; Carpaneto et al. 2000: 231; Tauzin 2001: 113

Onthophagus (Palaeonthophagus) tricuspis: Baraud 1992: 384

Onthophagus fortigibber Reitter, 1909: 79; Olsoufieff 1918: 81 (as junior synonym of *Onthophagus tricuspis* Semenov, 1900); Medvedev 1965: 188; Zunino 1978: 84 (as junior synonym of *O. tricuspis*); Rössner, 1991: 267 (as junior synonym of *O. tricuspis*)

Onthophagus (Palaeonthophagus) fortigibber: Shokhin 2000: 6; Löbl et al. 2006: 167; Kabakov 2006: 193; Shokhin 2007: 124

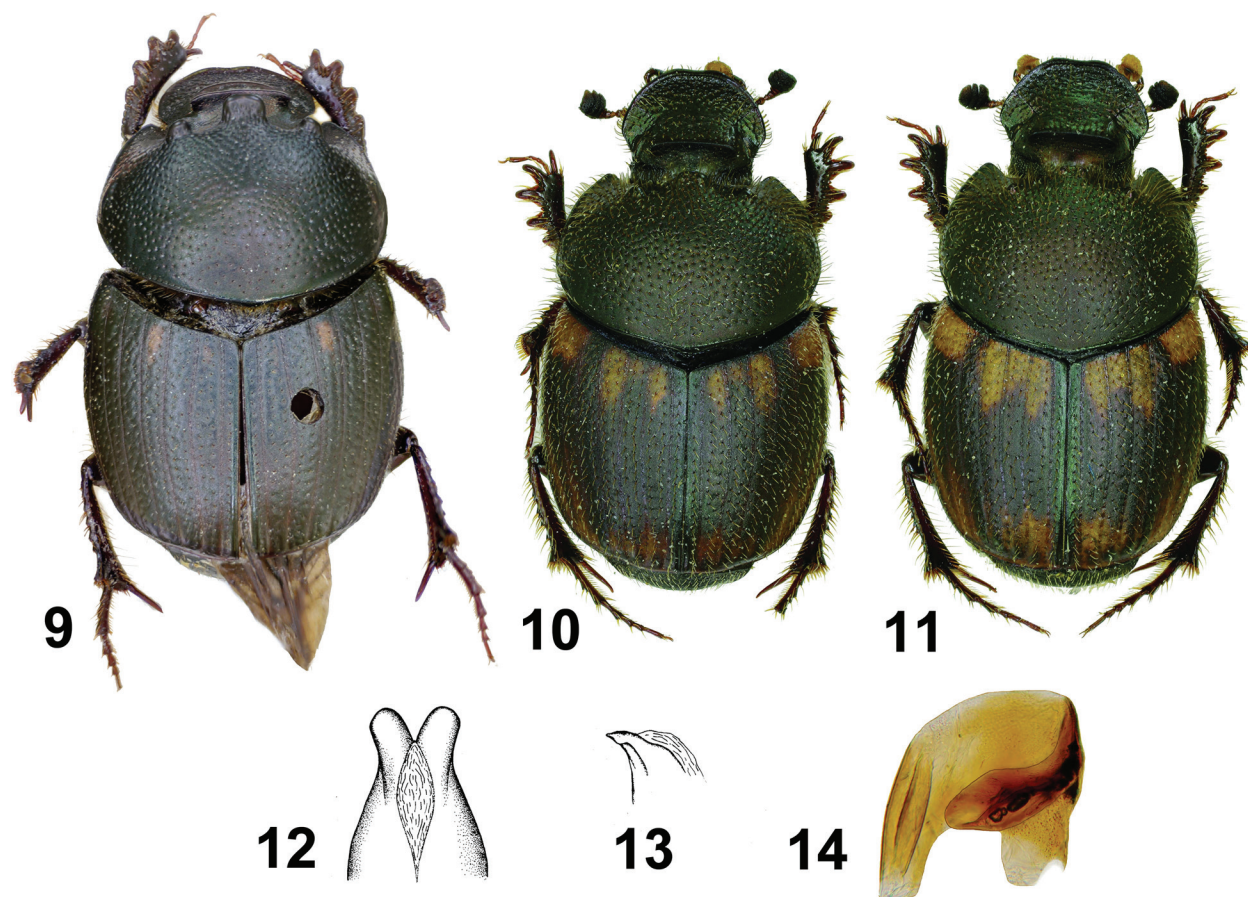
Onthophagus unxovi Bogachev, 1930: 87 [type locality: “Vezuri, prope Lesora, Ossetia meridionalis (distr. Rača)” [Racha, Georgia]; type material: lectotype male (designated by Tarasov 2005) and 7 paralectotypes, not examined, in the Zoological collection of MGU, Moscow, according to Tarasov 2005]; Balthasar 1963: 572 (as *O. unxovi*, incorrect subsequent spelling); Tarasov 2005: 257 (as junior synonym of *O. fortigibber*)

Type locality. For *O. fortigibber* “Aus dem zentralen Kaukasus: Umgebung von Wladikawkas” [Vladikavkaz, North Ossetia-Alania, southern Russia].

Type material. Holotype, for *O. fortigibber*, fixed by monotypy, a male according to the author (actually a female), in HHNM (examined).

Diagnostic features. Length 5.5 to 8.0 mm. Color blackish brown, poorly shiny due to distinct microreticulation; elytra blackish brown with basal reddish yellow spots on 2nd and 4th interstriae (holotype), some specimens with spots on base of 3rd and 6th/7th interstriae, some with an additional humeral spot–5th interstria always without basal spot, 1st interstria always blackish brown along entire length, in all the examined specimens, some with apical spots, more or less joined and forming a single larger one extended over 2nd interstria to the side; some with nearly the entire elytral surface, except disc, dark yellow (Fig. 9–11); pubescence pale yellow.

Head with clypeus broadly round on either side of shallow median emargination, barely sinuate near obviously produced genae. Clypeofrontal carina weak or absent in males, moderately elevate but



Figures 9-14. *Onthophagus (Palaeonthophagus) fortigibber* Reitter, 1909. **9)** Holotype female. **10-11)** Males (TR-Gümüşhane, Zigana geçidi, 2100 m). **12)** Parameres, dorsal view (drawing by Ivo Gudenzi). **13)** Parameres, lateral view (drawing by Ivo Gudenzi). **14)** Lamella copulatrix.

distinct, bent backward in females; occipital carina distinct in both sexes, extended in an erect straight lamina, only slightly bent backward in males. Clypeal and frontal surface with large setigerous punctures, more widely spaced on frons than on clypeus in males; females only with frontal surface simply punctate, clypeal surface with very coarse, transversely rugose or sub-rugose punctures. Setae long and erect.

Pronotum convex, declivous anteriorly, with distinct anterolateral tubercle on either side and with an anteromedian round prominence, clearly projecting further forward than the anterolateral tubercles. Anterior angles distinctly produced, sides not or very indistinctly sinuate behind them. Dorsal surface setigerously punctate, punctures broad, sub-regular in distribution, separated by 1–3 diameters on disc, gradually becoming sparser toward base; each puncture bears a small granule at its anterior margin, and a long pale yellow seta.

Elytral striae shiny, barely impressed, with punctures slightly larger than strial width and barely crenating interstrial sides. Interstriae flat to barely convex, all, except the sutural interstria, rather regularly biserially granulate; granules slightly smaller than strial punctures; posterior margin of each granule with a small, indistinct, setigerous puncture; setae pale yellow, thin, shorter than pronotal ones.

Pygidium with widely spaced, setigerous punctures; setae yellow, long, thin.

Inner angle of protibial apex with a small denticle strongly curved downward in males, lacking denticle in females.

Parameres (Fig. 12–13) short, barely sinuate along sides, latero-apical spatulae bent ventrally, not or very slightly diverging apically, without latero-proximal denticle, latero-apical angle round. Lamella

copulatrix (Fig. 14) horseshoe shaped and clearly emarginate at one side, right lobe with a strongly sclerotized plica ventrally bent.

Distribution. Georgia, Azerbaijan, South Russia, Ukraine. Turkey (Löbl et al. 2006).

Material examined. RUSSIA: “Sakka Tschmi”, “Umg. Wladikaw / kas”, 16.vii.1907, 1 female (holotype, HNHM); “Cauc. centr. / Ossetia / Lars”, 31.v.1913, 2 females (MNHN). TURKEY: Gümüşhane prov., Bayburt, 2000 m, 3.vii.1992, S. and R. Ziani leg. 1 male (SZCM); Gümüşhane prov., Zigana geçidi, 2100 m, 19.vi.1992, A. Ballerio leg. 2 males and 1 female (SZCM).

Remarks. Most probably the record of *O. fortigibber* from Ukraine derives from an incorrect placement of its type locality. “Wladikawkas”, presently Vladicavkaz, is a town in the Republic of North Ossetia-Alania, southern Russia, not, as stated by Zunino (1978), in the Ukraine.

Discussion

Onthophagus lemuroides and *O. fortigibber* are unquestionably two good species, due mainly to the different shape of the paramere apices, the different cephalic structure of major males, and the different coloration of the elytra. Nevertheless some chromatic varieties are similar and, considering pronotal development in males and females of both species are also similar, it may not be easy to distinguish the two taxa.

Thus, couplet 648–721 in Balthasar’s (1963) key to the *Onthophagus* species, which only considers elytral coloration, will not work for many specimens: “Flügeldecken auf hellem Untergrund dunkel gefleckt oder gezeichnet, selten fast ganz dunkel oder hellbraun” for *O. lemuroides* and “Flügeldecken auf dunklem Untergrund hell gefleckt oder gezeichnet selten sind die Flügeldecken vollkommen gelb bis rotbraun, oder sie sind teilweise metallisch gefärbt” for *O. fortigibber* (as *O. tricuspis*). Also Kabakov’s (2006) key to the lemur group considered only their coloration differences, ascribing to *O. lemuroides* elytra ochreous-yellow, with symmetrical dark small spots rarely absent, and to *O. fortigibber* elytra black or dark brown, with yellow or dark red spots or without them. The variety of *O. lemuroides* with elytra completely black (Fig. 5), quite common in Turkey, is not included in Kabakov’s key.

Petrovitz (1968) pointed out two remarkable chromatic varieties in the species: a “f. *flavipennis*” of *O. fortigibber* (as *O. tricuspis*), with the elytra, including epipleurae, completely yellow, except for the juxtasutural stria and a black spot in the basal third of 7th interstria, and a “f. *nigra*” of *O. lemuroides*, with the elytra completely black.

I have never seen specimens of *O. fortigibber* with elytra totally yellow, as cited by Petrovitz (1968). All the specimens examined by me have elytra more or less yellow, but always with a black basal spot on the 5th elytral interstria (Fig. 10; 11). The variety with elytra almost without black spots (Fig. 4) is common among specimens of *O. lemuroides*.

A study of the lamellae copulatrices as a tool for discriminating, contrary to other *Onthophagus* species, is not at all useful to distinguish *O. lemuroides* and *O. fortigibber*, the pieces of the two species being very similar (Fig. 8; 14). On the contrary, apices of parameres (Fig. 6–7; 12–13) show constant differences between *O. lemuroides* and *O. fortigibber*, and can be decisive for recognizing the two taxa.

The following key provides an instrument for distinguishing *O. lemuroides* and *O. fortigibber* without using the presence or the absence of maculation on elytra. I believe it is useful to include two other similar species, i.e. *Onthophagus lemur* and *O. trigibber*. This is not meant to imply a phyletic relationship between these species. Such a phylogenetic hypothesis is beyond the aim of this work.

Key to the species morphologically similar to *Onthophagus lemur* (Fabricius, 1781)

1. Occipital carina of the head with a transverse erect lamina, sometimes ending in a pair of vertical horns in male. Pronotum declivous anteriorly in both sexes, with an anterolateral tubercle on each side and an anteromedian gibbosity; pronotal anterior angles clearly produced, sides not or indistinctly sinuate behind them; inner angle of protibial apex with a small denticle strongly curved downward in male; pubescence yellow; length from 4.0 to 8.0 mm. **2**
 — Not all the above characters present simultaneously.. **all other *Palaeonthophagus* Zunino**
- 2(1) Pronotum granulate on disc, granules sub-regular, separated from 0.5–1.0 times their diameter; major males occipital carina with a straight erect lamina, never ending in two horns; southern Europe, Middle East. ***O. lemur* (Fabricius)**
 — Pronotum punctate on disc, punctures sometimes bearing a small granule at their anterior margin, separated from 1–2 times their diameter; major males occipital carina either with an erect lamina slightly bent backward or with a lamina ending in two vertical horns. **3**
- 3(2) Occipital carina extending at base to inner edge of eyes; pronotal anterolateral tubercles turned inward; pronotal anteromedian gibbosity clearly sinuate at base; Morocco, Algeria, Tunisia. ***O. trigibber* Reitter**
 — Occipital carina clearly not extended at base from side to side of the head; pronotal anterolateral tubercles facing forward or turned slightly outward; pronotal anteromedian gibbosity slightly or not at all sinuate. **4**
- 4(3) Head with clypeus distinctly emarginate at middle; occipital carina in major males with an erect lamina ending in a pair of vertical horns; Turkey, Iraq, Iran. ***O. lemuroides* d'Orbigny**
 — Head with clypeus barely emarginate at middle; occipital carina in major males with an erect lamina never ending in a pair of vertical horns; Caucasus, northern Russia, Turkey. ***O. fortigibber* Reitter**

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