Fabrizio Fabbriciani, Vinicio Salami, Marco Uliana

DESCRIPTION OF THE FEMALE OF *MELOLONTHA SARDINIENSIS* DRUMONT, MURET, HAYER & PENNER, 1999 (COLEOPTERA, SCARABAEIDAE, MELOLONTHINI)

Riassunto. *Descrizione della femmina di* Melolontha sardiniensis *Drumont, Muret, Hayer & Penner, 1999 (Coleoptera: Scarabaeidae: Melolonthini).*
Viene descritta e illustrata la femmina di *Melolontha sardiniensis*, finora ignota, e vengono brevemente commentate le attuali conoscenze sul comportamento di questo endemita sardo poco conosciuto, mettendole in relazione con quanto noto per una specie affine della fauna iberica.

Summary. The female of *Melolontha sardiniensis* is described and illustrated for the first time. The scanty available information on the behavior of this little known sardinian endemic are briefly commented and tentatively associated with the behavior of a related Iberian species.

Keywords: first record, female, Sardinia, *Melolontha*.

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INTRODUCTION

The genus *Melolontha* Fabricius, 1775, is widespread in the Palaearctic and in the Oriental regions, and currently counts over 60 species and subspecies (BEZDĚK 2016; SCHOOLMESTER 2022). Four species are present in Italy, and three of them have a wide distribution range (*M. melolontha* (Linnaeus, 1758), *M. hippocastani* Fabricius, 1801 and *M. pectoralis* Megerle von Mühlfeld, 1812), while one, *M. sardiniensis* Drumont, Muret, Hayer & Penner, 1999, is only recorded from a narrow hilly area in the Talana municipality (NU), in central-oriental Sardinia, between the Gennargentu massif and the Orosei Gulf.

Melolontha sardiniensis, which is the only *Melolontha* recorded for the island (BALLERIO et al., 2014; CARPANETO et al., 2021) is elusive and still poorly known. Apparently, it was sampled for the first time in 1994, and, to date, while males have been repeatedly collected, females had never been recorded.

One of the authors (VS), while surveying the collection of Enrico Castioni, noted a female *Melolontha* collected in Sardinia, about 10 km SE from the type locality of *M. sardiniensis*. No males were collected together, but because of its vicinity to the type locality and of the lack of other *Melolonta* recorded for Sardinia, the mentioned female is confidently identified as belonging to *M. sardiniensis*. This specimen is here described and illustrated.

MATERIALS AND METHODS

The characters considered in the description are those relevant according to other authors that recently addressed the taxonomy of the genus (BARAUD, 1992; KEITH, 2003; HILLERT et al., 2019), and in particular the shape and sculpture of clypeus, pronotum, elytra and pygidium.

Unfortunately, the condition of the setation could be assessed only partially, as it looks exensively worn, especially on the discal area of the pronotum and the distal area of elytra. This condition is common among aged individuals of Melolonthinae, and especially in females, that are more longeval than males and in which setae tend to easily worn due to the digging activity connected with oviposition.

Measurements

Measurements were taken with a 8x lens bearing a ruler divided in 30 parts and, for smaller anatomical parts, with a 10x micrometric ocular mounted on a trinocular XTL3A (magnification range 7-45x).

The ratio width/length of anatomical parts is abbreviated with W/L.

RESULTS

Melolontha sardiniensis Drumont, Muret, Hayer & Penner, 1999

Examined material. A single female was examined, labelled as follows: “Italia, Sardegna, (NU), dint. Lotzorai, 06/05/2009, Leg. E. Castioni”; it is preserved in coll. Enrico Castioni (Milano, Italy).

According to the collector, the specimen was collected by visual inspection of fronds, between 10.00 and 12.00 a.m. The collecting area is a semi-anthropized woodland in the vicinity of Lotzorai town.

Description.

Habitus as in fig. 1.

Size. Body length, from the margin of clypeus to the apex of pygidium: 27.5 mm. Maximum body width, measured in the distal half of elytra: 15.5 mm.

Color. Head and pronotum dark brown to black, with matt appearance. Elytra brown, with more shining appearance, epipleura narrowly darkened. Antenna brown, with slightly darker club. Femora and tarsi brown, tibia dark brown to black.

Morphology. Head. Clypeus strongly trasverse (W/L: 2.83), sides moderately converging towards canthi, margin strongly raised, almost straight in the medial part, broadly rounded at the angles. Fronto-clypeal suture slightly raised, straight in the medial part, rounded backwards towards eyes. Canthi well-developed, with raised, sharp apex. Punctation of clypeus dense, quite regularly spaced, with punctures smaller and better defined in the medial area; punctation of the frons comparatively coarser, much sparser and raspose. Labrum as in fig. 3.

Antenna with 10 antennomeres, antennomere 1 triangular and flattened in dorsal view; club with 6 antennomeres, subglobose, slightly longer than wide (W/L: 0.75), and long as antennomeres 2-4 measured together.

Pronotum transverse (W/L: 2.05), moderately convex, lateral margins crenulate, subparallel in the basal half and strongly rounded in the distal half, anterior margin moderately curved, indistinctly bordered, posterior margin narrowly bordered, except in the medial part, slightly concave at sides and convex in the middle. Anterior angles sharp, obtuse, barely protruding, posterior angles sharp, acute, almost flat. Punctation fine and overall very dense, giving a matt appearance, slightly denser at the sides, slightly sparser in the discal area, where punctures are moderatley larger. A scarcely punctured medial area is present, irregular shaped, broader and with sparser punctures near the base, and split in the distal part by a densely punctured inset (fig. 2).

Scutellum parabolic, slightly trasnverse (W/L: 1.10), apex barely marked, surface almost smooth, only bearing sparse micro-punctuation and with indistinctly raised margin.

Elytra moderately convex, covered by fine transversal wrinkles and fine, quite dense punctures, giving an overall rather shining appearance. Odd interstiae raised and sparsely punctured, with more shining appearance: 3 and 5 well marked and broader than others, 7 poorly marked and irregularly interrupted, 9 well marked but thin. Epipleura bordered until the apical round. Sides moderately diverging, then rounding and converging in the apical third. Basal margin raised and marked by a shallow medial impression, periscutellar area slighly concave. Humeral callus well marked. Lateral declive with a long and shallow post-humeral impression. Apical calli marked.

Propygidium covered by elytra; pygidium slightly broader than long (W/L: 1.30), almost flat, covered by dense, fine, raspose punctures, apex not produced.

Femora densely and finely punctured. Tibia with much larger and sparser punctures, leaving unpuctured shining areas. Protibia 3-toothed, distal and medial teeth more protruding, acute, inclined forward, subparallel to each other; proximal tooth less developed, obtuse. Protarsi inserted in front of the medial tooth. All claws with a strong basal tooth, all legs with external and internal claws alike.

Genitalia as in fig. 4.

Setation. The whole body bearing short adpressed light yellow to ivory setae. Setae erect on clypeus, on frons erect and almost two times longer next to the fronto-clypeal suture, adpressed near the eyes.

Antennomere 1 with a tuft of long setae along its posterior margin and sparse setae along the apical margin, antennomeres 2-4 almost glabrous, antennal club with sparse raised setae.

Pronotum with reclined to adpressed setae, finer than those of the head, directed outwards; remains of rare raised and thicker setae are visible. Lateral margins with long, thicker, raised, curved setae, few similar ones also along the anterior and the posterior margin. Inferior side of the posterior margin with hairs covering the basal portion of the scutellum.

Elytra with adpressed setae, slightly lighter in color, directed backwards (especially in the internal part) or outwards (especially in the declive part). Basal margin with denser and longer setae.

Femora rather densely covered by a mix of long, thin, reclined setae and longer, thicker, raised ones; tibiae lacking thin adpressed setae, only with sparser raised ones, very scarce on protibiae, moderately dense on meso- and metatibiae.

Metasternum and metaepisternum with long, raised and thin pubescence, abdominal ventrites with much shorter, adpressed, dense setae, sparser along the medial line.

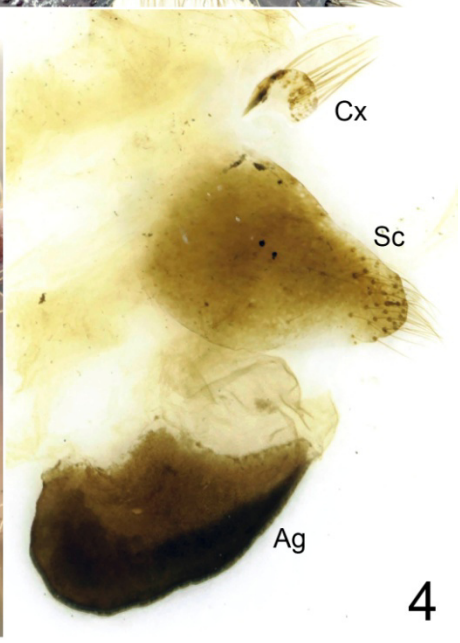
Pygidium with dense, short, reclined setae.

DISCUSSION

The activity of males of *M. sardiniensis* was documented by CILLO et al. (2018), who observed their flight between approximately 23.00 and 00.30 hours, and their feeding activity extended up to 03.30. Afterwards, they simply hang onto branches for the rest of the night, until they descend and start bury themselves into the ground at dawn.

So far, no observations about the behavior of females are available. Based on taxonomic relationships, we consider plausible that they behave similar to females of *M. llinaresi* Hillert, Rössner, Navarro & Urbano, 2019, a species endemic of the Seville province (Andalusia, Spain) and, as *M. sardiniensis*, belonging to the "*papposa*" group (HILLERT et al., 2019; RÖSSNER & HILLERT, 2020).

Fig. 1. Female of *Melolontha sardiniensis*, habitus. Body length 27.5 mm.



Figs. 2-4. Female of *Melolontha sardiniensis*. **2:** head and pronotum, inclined lateral view. **3:** head, frontal view. **4:** left genital sclerites. **Ag:** accessory gland. **Cx:** coxite IX. **Sc:** subcoxite IX.

According to observations provided by ALVARADO et al. 1996 (sub *M. papposa*) and DURÁN et al. 1996 (sub *M. papposa*), males of *M. llinaresi* start flying around olive trees between about 18.30 to 23.00, at a time variable depending on the locality of observation, while females stay almost motionless at the ground, not far from their emergence holes, waiting for males. After mating has occurred, females bury themselves again into the ground, often re-entering their exit hole, and lay eggs.

If such behavioral inclination (remaining on the ground, with scarce or null flight activity) is verified also on females of *M. sardiniensis*, it will potentially explain the difficulty in observing them. In fact, searching methods used to detect males (attraction by light sources and search on branches, either by visual inspection or with beating sheet) would not allow a successful detection of females.

The new collecting locality extends eastwards the known, almost punctiform distribution of this species. Moreover, its finding in a semi-anthropized environment suggests that *M. sardiniensis* may be more widely widespread in the area than so far ascertained.

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AUTHOR'S ADDRESS

Fabrizio Fabbriciani - Via Alfredo Chiti 9, 51100 Pistoia, Italy; f.fabbriciani@bardazzi.it; https://orcid.org/0000-0002-5024-4615

Vinicio Salami - Via Fausto Gamba 26, 25128 Brescia, Italy; vinicio.salami@gmail.com

Marco Uliana - Museo di Storia Naturale di Venezia Giancarlo Ligabue, S. Croce 1730, 30135 Venezia, Italy; marco.uliana.1@gmail.com; marco.uliana@fmcvenezia.it; https://orcid.org/0000-0001-7180-6659