



Morphological description and identification of *Melolontha cuprescens*, *Melolontha furcicauda* and *Melolontha indica* (Coleoptera: Scarabaeidae): serious root feeding and defoliating pests in India

Abhishek Rana · Ravinder Singh Chandel ·
 Kuldeep Singh Verma

Received: 3 July 2021 / Accepted: 14 September 2021
 © The Author(s), under exclusive licence to Springer Nature B.V. 2021

Abstract *Melolontha* is an important genus of the subfamily Melolonthinae and the tribe Melolonthini. It is a major polyphagous pest of different agricultural crops and forest trees. The adults of this species are defoliators and grubs are root feeders. It is essential to acquire a better understanding of the correct identity of these species to implement the most suitable pest management options. In this study, three *Melolontha* species viz., *Melolontha cuprescens*, *Melolontha furcicauda* and *Melolontha indica* were investigated using light microscopy, in order to generate detailed information on morphological characters for the pest identification. A detailed comparative description of the larval characters (mouthparts, raster, spiracles and thoracic legs); pupal characters (antennae and caudal appendages); adult characters (antennae, pronotum, scutellum, meso-metasternal process, legs, pygidium and male genitalia) is given with the help of suitable microscopic pictures and line diagrams. The larvae of these species can easily be distinguished based on mandibles, epipharynx, raster pattern and shape of anal opening. The caudal extremity of pupae also allows differentiation among *Melolontha* species. In beetles, shape and size of antennae, pronotum and pygidium can be used to separate sexes and to differentiate *Melolontha* species. Male genitalia is the most

stable character for differentiation of species in the adult stage.

Keyword *Melolontha* spp. morphometrics. male genitalia. raster pattern. taxonomic characters

Introduction

Scarabaeidae is the largest family of Scarabaeoidea represented by 30,000 species of beetles worldwide (Erlér & Ates, 2015). It is divided into 13 subfamilies, of which Melolonthinae is the largest subfamily which is widely distributed throughout the world (Kumar et al., 2017a, 2017b). The majority of the phytophagous species of scarabs belong to this subfamily. The scarabaeids are polyphagous pests both in grub and adult stage and inflict heavy damage to different agricultural crops, fruits, vegetables, ornamental plants, plantation crops, pastures, meadow grasses, and forest trees in different parts of the world (Chandel & Kashyap, 1997; Potter et al., 1992).

The genus *Melolontha* Fabricius, 1775 is a phytophagous scarab group constituting the type genus of the subfamily Melolonthinae and tribe Melolonthini. The type genus, *Melolontha* is a representative genus, with regard to the Scarabaeidae family. There are about 60 species/sub species within the genus *Melolontha* which have been discussed worldwide (Keith & Li, 2005). The beetles belonging to genus *Melolontha* are cosmopolitan and some of the species

A. Rana (✉) · R. S. Chandel · K. S. Verma
 Department of Entomology, CSK Himachal Pradesh
 Agricultural University, Palampur, Himachal Pradesh,
 India

self attested