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## Systematics of the weevil genus *Mecinus* Germar, 1821 (Coleoptera: Curculionidae). II. Phylogenetic analysis based on adult morphological characters and host plant information

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### Abstract

A phylogenetic analysis of all species belonging to the weevil genus *Mecinus* Germar, 1821 (Coleoptera: Curculionidae: Curculioninae: Mecinini) was carried out. *Mecinus* are exclusively Palaearctic and feed on Plantaginaceae belonging to the tribes Plantagineae and Antirrhineae. Based on a cladistic analysis of six outgroup and 47 ingroup taxa, and 31 adult morphological and three ecological characters, the monophyly of *Mecinus* appears strongly supported. In this genus six species groups and one monobasic group were recognized. Many species are morphologically similar to one another and lack phylogenetically useable apomorphies; thus for practical convenience these species, which produce highly polytomic topologies, have been treated as the *M. pascuorum* and the *M. elongatus* complexes. However, a large assemblage of species, characterized by elongate body shape, appears well supported. This includes the *M. collaris*, *M. circulatus*, *M. heydenii* and *M. janthinus* groups together with the *M. simus* group where a reversal to the primitive oval body shape in some species is presumed. Other well supported groups are the *M. paratychoioides* and *M. marina* groups that appear more related to species of the *M. pascuorum* complex than to the main clade of elongate species. Optimizing host plant preferences onto the morphological phylogeny indicates that feeding on Plantagineae was the plesiomorphic condition for the genus *Mecinus*. All species feeding on Antirrhineae, which represent a minority, are included in two well supported groups, the *M. heydenii* and *M. janthinus* groups, which however do not share unequivocal morphological synapomorphies. In general there are no strict relationships between groups of weevils and their specific feeding habits, since larvae of closely related species adopt different strategies, such as seed predators, stem borers or gall inducers. Similarly no distinct biogeographic pattern of *Mecinus* has been observed in light of the phylogeny.

**Key words:** Curculionidae, Mecinini, *Mecinus*, morphology, phylogenetics, species groups, host plants

### Introduction

The taxonomic classification of weevil species belonging to the Palaearctic genus *Mecinus* Germar, 1821 (Curculionidae, Curculioninae, Mecinini) has proven difficult because the genus has few morphologically informative character systems. Indeed many species are rather difficult to separate from one another, since they are distinguishable only by a few subtle characters such as the shape of the rostrum or elytra, the pattern of the vestiture and the shape of the penis and spermatheca (Caldara & Fogato 2013).

A recent study on the phylogeny of Mecinini, based on morphological characters, suggests that *Mecinus* is monophyletic and basal within this tribe with *Gymnetron* Schoenherr, 1825 and *Rhinusa* Stephens, 1829 as sister groups (Caldara 2001).

Larvae of all *Mecinus* species with known biology live on angiosperms belonging to the family Plantaginaceae as recently circumscribed (Olmstead *et al.* 2001; Albach *et al.* 2005; Caldara & Fogato 2013), and several species have recently been subject of detailed ecological studies as potential biological control agents of some Palaearctic species of toadflax (*Linaria* spp.), which have become invasive in North America (see Toševski *et al.* 2011 for references).