Zootaxa 4030 (1): 001–089
www.mapress.com/zootaxa/

Monograph

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.4030.1.1
http://zoobank.org/urn:lsid:zoobank.org:pub:BBB57FB4-F7E7-48B0-A17B-BE929EAD25E5

ZOOTAXA

4030

THE MELOIDAE (COLEOPTERA) OF WISCONSIN

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Magnolia Press
Auckland, New Zealand

Accepted by F. Shockley: 1 Sept. 2015; published: 13 Oct. 2015

DANIEL A. MARSCHALEK & DANIEL K. YOUNG
THE MELOIDAE (COLEOPTERA) OF WISCONSIN
(*Zootaxa* 4030)

89 pp.; 30 cm.

13 Oct. 2015

ISBN 978-1-77557-813-0 (paperback)

ISBN 978-1-77557-814-7 (Online edition)

FIRST PUBLISHED IN 2015 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

http://www.mapress.com/zootaxa/

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

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Abstract

There are recent faunistic surveys of selected insect taxa (e.g. Mutillidae, Scarabaeoidea, and Tenebrionidae) in Wisconsin but a formal investigation of the Meloidae (blister beetles) is lacking. The blister beetle fauna of several states has been published, but this study represents the first in the Midwestern United States. We provide a comprehensive list of all meloid species documented from Wisconsin. Also included are taxonomic keys as well as summaries for each species (species pages) which includes taxonomy, description, and natural history. Specimens were obtained from public and private collections, and field sampling. This survey advances our knowledge of meloids in Wisconsin as well as provides a contribution beyond this geographic area. During this survey, 28 meloid species in seven genera were documented in Wisconsin from 2605 specimens. Of these taxa, 10 species are considered new state records. While *Epicauta pensylvanica* represented nearly half of the specimens reviewed, and likely inhabits all counties within the state, other species were rarely encountered. This includes 10 species which were represented by seven specimens or fewer in this study. It is unclear if the rarity of these specimens is correlated with the rarity of the species or if it is due to other factors. Regardless, these rarely collected meloids in Wisconsin warrant further attention.

Key words: blister beetle, Meloidae, Wisconsin, distribution, natural history, taxonomy, checklist

Introduction

Meloids are commonly referred to as "blister beetles" due to the toxin, cantharidin, typically found within their bodies that can cause blistering of human skin (Howell & Ford 1985; Karras *et al.* 1996). Several meloid species have long histories of adversely impacting agriculture resulting from large aggregations foraging on crops and negatively impacting livestock health (Baerg 1925; Horsfall 1943; Ray *et al.* 1979, 1980; Blodgett *et al.* 1991). Blister beetles also have a complex and interesting development. Surprisingly, even with these important and interesting aspects, little is known about these beetles in their natural habitats.

Meloids are medium-sized beetles, ranging in size from 3–70 mm (Pinto & Bologna 2002), with a cylindrical shape and loose build. The prothorax is narrower than the abdomen and head, with the head abruptly constricted behind the eyes, forming a cranial "neck." The abdomen usually extends beyond the elytra, and the elytra are generally not rigid giving the body a softer feel than most other beetles. Most meloids have generalized, chewing mouthparts; however, some Nemognathinae have the maxillary galeae modified to form a sucking tube to imbibe nectar. Legs are long and slender with heteromerous tarsi. The pretarsal claws each typically possesses a ventral blade, which is sometimes reduced to a tooth.

Meloids exhibit an interesting dichotomy of larval development and hosts/prey. Most genera utilize the provisions and larvae of native ground nesting bees (Apiformes) (Enns 1956; Erickson & Werner 1974a, 1974b; Erickson *et al.* 1976); however, *Epicauta*, *Linsleya*, *Mylabris* (and relatives), and *Psalydolytta* utilize grasshopper eggs (Acridoidea) for larval food (Baerg 1925; Horsfall 1943; Pinto 1991). Selander (1981, 1982) suggested meloid eggs as a third larval food source. *Epicauta atrata* has been reared on eggs of other *Epicauta* species, while trials involving grasshopper eggs and pollen were unsuccessful. All meloids progress through a complicated hypermetamorphic development, except for the most primitive subfamily Eleticinae which occurs in South American, subsaharan Africa, and the Oriental Region (Pinto *et al*. 1996).

A generalized life cycle begins with a female ovipositing either in a shallow burrow in the ground about 2.5 cm deep (Horsfall 1943; Selander 1960) or on vegetation (Enns 1956; Erickson *et al.* 1976). The triungulin first larval instar is mobile and searches for an appropriate food. The quantity of larval food explains the extensive size variation among adults (Erickson & Werner 1974a), as adult weight can vary by a factor of 16 (Snead & Alcock 1985) or length by two-to-three fold (Pinto & Mayor 1986).

Once larvae locate food, development is similar for most species. Larvae immediately begin feeding and molt into a less mobile, scarabaeiform stage. This second instar is the first of four feeding instars, often grouped and referred to as the "first grub" (Selander & Mathieu 1964). After the fifth instar, the larva molts into a diapausing "coarctate" larva that is immobile, heavily sclerotized, and characterized by a reduction in appendages and fusion of body segments. The coarctate larva can serve as an overwintering stage in temperate regions or an aestivating stage during the dry season in tropical and arid regions (Pinto 1991). This stage can persist for more than a year (Horsfall 1943). Overwintering may occur in any of the other stages as well (Horsfall 1943). After completion of the coarctate stage, the larva enters a non-feeding, scarabaeiform seventh instar, or "second grub," resembling the first grub (second to fifth instars). This instar is short-lived and is followed by the pupal stage.

Environmental conditions are important in synchronizing larval stages and may cause development to deviate from this general plan. The fifth instar larva may molt directly to a pupa, allowing an additional generation in a year. It has also been shown that the seventh instar can retrogressively molt to the coarctate to avoid unfavorable conditions (Horsfall 1943).