A new species of Grapholita Treitschke (Lepidoptera: Tortricidae) from the midwestern USA

TERRY L. HARRISON¹,², LORAN D. GIBSON² & TODD M. GILLIGAN³
¹Department of Entomology, University of Illinois, 320 Morrill Hall, 505 South Goodwin Avenue, Urbana, IL 61801 USA. E-mail: tharriso@illinois.edu
²2727 Running Creek Drive, Florence, Kentucky 41042. E-mail: kymothman@fuse.net
³Colorado State University, Department of Bioagricultural Sciences and Pest Management, Fort Collins, Colorado 80523. E-mail: tgilliga@gmail.com
¹Corresponding author

Abstract

Grapholita orbexilana, new species, is described from Illinois, Kentucky, and Ohio, USA. The larvae feed exclusively on Orbexilum onobrychis (Fabaceae), a plant of conservation interest in the Midwest. The moth is univoltine; its complete annual life cycle is detailed. Adult morphology readily distinguishes G. orbexilana from all other midwestern species of Grapholita; diagnostic information is provided. Observations on morphology, larval host plant preference, and pheromone attraction are presented to support the assignment of G. orbexilana to the jungiella species group of the subgenus Grapholita.

Key words: Conservation, life history, microlepidoptera, Olethreutinae, Orbexilum onobrychis, pheromone attraction, restricted habitat, taxonomy

Introduction

The genus Grapholita Treitschke (Lepidoptera: Tortricidae) comprises about 130 described species worldwide (Brown 2005, Gilligan et al. 2012). The majority of described species occur in the Holarctic; however, this might reflect lack of collecting and taxonomic study in other regions (particularly the Neotropical and Afrotropical regions) rather than actual paucity of Grapholita species in those areas (Rota and Brown 2009). Twenty described species of Grapholita occur in the Nearctic (Brown 2005), of which 19 are native, and one, G. delineana Walker, has been introduced from the Old World (Miller 1982).

Adults of Grapholita are small to medium-sized moths (forewing length 3.5–8.0 mm). Many species are adorned with elaborate forewing markings that often include a well-defined ocellus (see Gilligan et al. (2008) for definition) and white or silvery costal and dorsal strigulae. The genus contains both nocturnal and diurnal species, the latter of which may visit flowers for nectar (Powell and Opler 2009).

The biology and immature stages of many Grapholita are well studied due to the damage they cause to fruit, and the genus contains several notorious pests such as the plum fruit moth, G. funebrana (Treitschke), and the oriental fruit moth, G. molesta (Busck). Larvae of most species feed on reproductive tissue of their hosts or are internal feeders in stems and roots (Heinrich 1926, Miller 1987, Gilligan et al. 2008, Komai 1999). Among the species of Grapholita for which larval hosts are recorded worldwide, the majority feed on plants in the families Fabaceae and Rosaceae, while other hosts are in the families Asteraceae, Cannabaceae, Cornaceae, Dipterocarpaceae, Ebenaceae, Eriaceae, Fagaceae, Myrtaceae, Polygonaceae, and Sapindaceae (Brown et al. 2008, Gilligan and Epstein 2012). Many species complete 2–3 annual generations, although some, such as G. molesta, may complete 3–7 generations per year (Rothschild and Vickers 1991), depending upon latitude. Typically, overwintering occurs as a last instar larva, and pupation occurs in the spring, either on the host plant or in adjacent leaf litter.

On the basis of forewing pattern and coloration, legume-feeding habit, and presence of a “sclerotized ring bearing minute thorns” in the basal area of the ductus bursae, \textit{G. orbexilana} is assigned to Komai’s (1999) \textit{G. jungiella} species group, which he defined based on Palearctic species. In North America this group includes \textit{G. orbexilana} and \textit{G. eclipsana} in the East, and \textit{G. lunatana} (Walsingham), \textit{G. conversana} (Walsingham), \textit{G. vitrana} (Walsingham), \textit{G. caeruleana} (Walsingham), and \textit{G. imitativa} (Heinrich) in the West. A test of the hypothesis that \textit{G. orbexilana} and the species named above form a monophyletic group within \textit{Grapholita} awaits a comprehensive phylogenetic analysis of the genus.

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References


