



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

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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, Ericaceae, 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, *G. orbexilana* is assigned to Komai’s (1999) *G. jungiella* species group, which he defined based on Palearctic species. In North America this group includes *G. orbexilana* and *G. eclipsana* in the East, and *G. lunatana* (Walsingham), *G. conversana* (Walsingham), *G. vitrana* (Walsingham), *G. caeruleana* (Walsingham), and *G. imitativa* (Heinrich) in the West. A test of the hypothesis that *G. orbexilana* and the species named above form a monophyletic group within *Grapholita* awaits a comprehensive phylogenetic analysis of the genus.

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