

# About *Grapholita compositella* (Lepidoptera: Tortricidae) feeding in the stems of Fabaceae

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**Abstract.** Larvae of *Grapholita compositella* (Fabricius, 1775) live on various species of Fabaceae; they feed between folded or spun leaves, flowers or seeds of the host plant. Stem-boring activity is often mentioned in the literature, but few illustrations about this behaviour are available. In this article, observations of stem boring larvae of *G. compositella* are described and illustrated.

**Samenvatting.** Rupsen van *Grapholita compositella* (Fabricius, 1775) leven op verschillende soorten Fabaceae. Ze voeden zich tussen omgevouwen of samengesponnen bladeren, bloemen of zaden van de voedselplant. Hoewel bronnen uit de literatuur vaak aangeven dat deze rupsen ook als stengelboorder leven, zijn hier weinig voorbeelden van terug te vinden. In dit artikel worden de vondsten van stengelborende rupsen van *G. compositella* beschreven en geïllustreerd.

**Résumé.** Les chenilles de *Grapholita compositella* (Fabricius, 1775) vivent sur différentes espèces de Fabaceae. Elles se nourrissent entre les feuilles repliées ou celles maintenues ensemble par de la soie, ou bien encore des fleurs et graines de la plante hôte. Bien que les renseignements provenant de la littérature indiquent souvent que ces chenilles vivent également comme foreurs dans les tiges, peu d'illustrations de ce comportement sont disponibles. Cet article décrit et illustre la façon dont les chenilles de *G. compositella* forent les tiges.

**Key words:** Belgium — Bionomics — Fabaceae — *Grapholita compositella* — Tortricidae.

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## Introduction

*Grapholita compositella* (Fabricius, 1775) (Fig. 1) is a small species of Tortricidae that can be found in most of Europe (Aarvik 2013). In southern regions it is bivoltine, in northern territories there is only one generation (Razowski 2003). Larvae are known to feed on different species of Fabaceae: *Trifolium pratense*, *T. repens*, *Medicago sativa*, *Lotus corniculatus*, *Melilotus* (Bradley *et al.* 1979, Ellis 2021) and *Astragalus cicer* (Lepiforum 2021). Feeding has been observed between spun leaves and flowers, as well as on the seeds (Bland 2004). Different sources in literature mention stem tunnelling behaviour by the first brood (Bradley *et al.* 1979, Razowski 2003, Sterling & Parsons 2012, Bland 2014). However, most records of larvae that have been entered on observation platforms concern specimens found on leaves and flowers of the host plant, possibly due to the lack of available reference material of stem boring specimens (Lepiforum 2021, Waarneming.nl 2021). Although *G. compositella* is common in many regions, observations of larvae are rarely recorded.

## Description and bionomics

The fully grown larva of *G. compositella* is approximately 7–8 mm long. Abdomen whitish or pale greenish, semi-translucent, turning orange to scarlet red when full grown (Swatschek 1958) (Fig. 9). Head yellowish brown. Prothoracic plate pale brown anteriorly, with dark brown markings posteriorly (not in the centre). Anal plate light brown. The larva leaves the host plant to pupate in a white silken cocoon amongst ground debris; in breeding conditions paper tissue is readily utilised. The larvae of the second generation and those of the univoltine populations hibernate within the cocoon and pupate in

spring. The pupa protrudes the cocoon shortly before emergence.



Fig. 1. *Grapholita compositella*, imago e.l. 17.vii.2021, bred from *Trifolium hybridum*, Lebbeke (OV) 19.vi.2021. © Ruben Meert.

Fig. 1. *Grapholita compositella*, imago e.l. 17.vii.2021, gekweekt van *Trifolium hybridum*, Lebbeke (OV) 19.vi.2021. © Ruben Meert.

## Observations

On 19 June 2021 twelve larvae of *G. compositella* were found in Lebbeke (OV) in stems of *Melilotus albus* (Fig. 2) and also of *Trifolium hybridum* (Fig. 3), which is not explicitly confirmed in literature but was assumed as a host plant. On both plant species wilting or distorted growth of one or more leaves of the shoot indicated the presence of a larva (Figs 4–5). On *M. albus*, the larval feeding caused a distinct bend in the top shoot (Figs 4, 6). In every case a hole had been made into the stem, out of which green, yellow or brown frass was often ejected (Fig. 6). Inside the stem mostly small amounts of green frass were found, sticking to the edges. As most stems of the mentioned host plants are already hollow, ‘tunnelling’ seems the perfect name for the larval activities, rather than ‘boring’ or ‘mining’.





- Fig. 2. *Grapholita compositella*, nearly full-grown larva in stem of *Melilotus albus*, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 2. *Grapholita compositella*, bijna volgroeide rups in stengel van *Melilotus albus*, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 3. *Grapholita compositella*, full-grown larva in stem of *Trifolium hybridum*, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 3. *Grapholita compositella*, volgroeide rups in stengel van *Trifolium hybridum*, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 4. *Grapholita compositella*, wilted leaf in top shoot of *Melilotus albus* caused by larval feeding, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 4. *Grapholita compositella*, verwelkt blad in scheut van *Melilotus albus*, veroorzaakt door de rups, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 5. *Grapholita compositella*, wilted leaf in shoot of *Trifolium hybridum* caused by larval feeding, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 5. *Grapholita compositella*, verwelkt blad in scheut van *Trifolium hybridum*, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 6. *Grapholita compositella*, distinct bend and perforation in stem of *Melilotus albus*, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 6. *Grapholita compositella*, gat met frass en misvorming van de stengel van *Melilotus albus*, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 7. *Grapholita compositella*, nearly full-grown larva in spun leaves of *Trifolium hybridum*, Lebbeke (OV), 19.vi.2021. © Ruben Meert.  
 Fig. 7. *Grapholita compositella*, bijna volgroeide rups in bladeren van *Trifolium hybridum*, Lebbeke (OV), 19.vi.2021. © Ruben Meert.



Fig. 8. *Grapholita compositella*, nearly full-grown larva in drooping shoot of *Lotus pedunculatus*, Lebbeke (OV), 22.ix.2021. © Ruben Meert.

Fig. 8. *Grapholita compositella*, bijna volgroeide rups in verwelkte scheut van *Lotus pedunculatus*, Lebbeke (OV), 22.ix.2021. © Ruben Meert.

Bradley *et al.* 1979 state that larvae tunnel upwards, beginning from the base. In the instances mentioned above all larvae kept feeding within the stem until they were fully-grown. The tunnelling direction could not be confirmed, but none of the larvae started feeding at the base of the plant: feeding signs could only be observed within the last few centimetres of the shoot before the top. In case of *Melilotus albus* the infected top shoots were situated approximately 150–170 cm above ground level, a distance that can hardly be tunnelled by such a small larva.

On 19 June 2021 another larva of *G. compositella* was found on *Trifolium hybridum* that did not tunnel at all, but just fed between a few spun leaves (Fig. 7). Assuming that larvae of the first brood in any case live in the stems of the

host plant, seems a bridge too far. All larvae that were collected on 19 June 2021 emerged between 6 and 17 July 2021 (Fig. 1).

By the end of September several drooping shoots on *Lotus pedunculatus* were examined (Fig. 8): again the distorted growth was caused by nearly full-grown larvae of *G. compositella* that were tunneling inside the stems, which means that also larvae of the second brood can feed in this particular way.



Fig. 9. *Grapholita compositella*, full-grown larva searching for a place to pupate, Lebbeke (OV), 21.vi.2021. © Ruben Meert.

Fig. 9. *Grapholita compositella*, volgroeide rups op zoek naar een plek om te verpoppen, Lebbeke (OV), 21.vi.2021. © Ruben Meert.

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