Additional information about different stem-boring Lepidoptera (Glyphipterigidae, Tortricidae & Noctuidae) on *Luzula luzuloides* in Belgium

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Abstract. During the period 2018–2021, larvae of three different species of Lepidoptera were found boring in the stems of *Luzula luzuloides*: *Glyphipterix bergstraesserella* (Fabricius, 1781) (Glyphipterigidae), *Isotrias rectifasciana* (Haworth, 1811) (Tortricidae) and an undetermined species of Noctuidae. In this article, information is provided about their habitus and biology.

Samenvatting. In de periode 2018–2021 konden rupsen van drie verschillende soorten Lepidoptera borend worden aangetroffen in de stengels van *Luzula luzuloides* (witte veldbies): *Glyphipterix bergstraesserella* (Fabricius, 1781) (Glyphipterigidae) (breedvleugelparelmot), *Isotrias rectifasciana* (Haworth, 1811) (Tortricidae) (v-bandbladroller) en een ongedetermineerde soort uit de Noctuidae familie. In dit artikel wordt informatie gegeven over hun uiterlijk en levenswijze.

Résumé. Au cours de la période 2018–2021, des chenilles de trois espèces différentes de Lépidoptères ont été trouvées forant au sein des tiges de *Luzula luzuloides* (luzule blanchâtre) : *Glyphipterix bergstraesserella* (Fabricius, 1781) (Glyphipterigidae), *Isotrias rectifasciana* (Haworth, 1811) (Tortricidae) et une espèce non identifiée de la famille des Noctuidae. Cet article fournit des informations sur leurs apparences et leurs modes de vie.

Key words: *Glyphipterix bergstraesserella* — *Isotrias rectifasciana* — Noctuidae — *Luzula luzuloides* — Belgium.

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Introduction

A large population of *Luzula luzuloides* (Lam.) Dandy & Wilmott (Juncaceae) (white woodrush) occurs in the region of the Nature Reserve Ensebach-Our in Büllingen (LG) (Fig. 1). During several searches for larvae of *Glyphipterix bergstraesserella* (Fabricius, 1781) (Glyphipterigidae), which are assumed to feed in the stems of this plant (Lepiforum 2021, Schütze 1931), a larva of *Isotrias rectifasciana* (Haworth, 1811) (Tortricidae) and one of an undetermined Noctuidae species were found boring in similar conditions.

Fig. 1. *Luzula luzuloides,* Manderfeld (LG), 30.ix.2018. © Ruben Meert.

Glyphipterix bergstraesserella

Glyphipterix bergstraesserella (Glyphipterigidae) is a very rare species in Belgium, only occurring in the eastern parts of the Provinces Liège and Luxembourg (De Prins & Steeman 2021, Waarnemingen.be 2021). The larva is known to feed on *Luzula luzuloides* (Ellis 2021), but notifications in literature seem to go back to some very old observations (Lepiforum 2021).

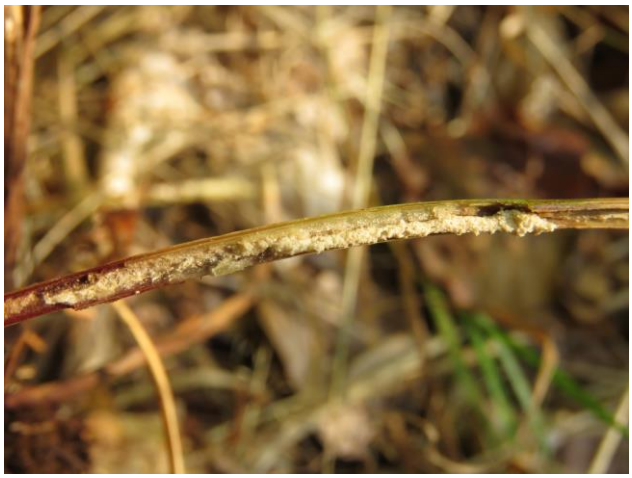

Fig. 2. *Glyphipterix bergstraesserella*, pale brown frass in flowering stem of *L. luzuloides*, Manderfeld (LG), 30.ix.2018. © Ruben Meert.

Fig. 2. *Glyphipterix bergstraesserella*, bleekbruine frass in bloeistengel van *L. luzuloides*, Manderfeld (LG), 30.ix.2018. © Ruben Meert.

In the period 2018–2021, larvae of *G. bergstraesserella* were observed by the author between August and May, inside the stems of *L. luzuloides*. In summer and autumn, pale brown frass was found inside the flowering stems of infected plants, up to the last node below the inflorescence (Fig. 2). Microscopic observations of very tiny holes (±0.25 mm) closed with frass or with ejected frass at about 40–50 cm high on the stem (Fig. 3) suggest that young larvae enter the stem somewhere in the upper half and initially bore upwards, but this needs to be confirmed.

Fig. 3. *Glyphipterix bergstraesserella*, possible entrance hole closed with frass in flowering stem of *L. luzuloides*, Manderfeld (LG), 30.ix.2018. © Ruben Meert.

Fig. 3. *Glyphipterix bergstraesserella*, mogelijk inkruipgat gevuld met frass in *L. luzuloides*, Manderfeld (LG), 30.ix.2018. © Ruben Meert.

Fig. 4. *Glyphipterix bergstraesserella*, larva in *L. luzuloides* stem, Manderfeld (LG), 30.ix.2018. © Ruben Meert.

Fig. 4. *Glyphipterix bergstraesserella*, rups in stengel van *L. luzuloides*, Manderfeld (LG), 30.ix.2018. © Ruben Meert.

Larvae observed in August were about 2 mm long and lived within the upper half of the flowering stem. In autumn larvae were feeding at the very base of the stem near the root crown; all were found head down (Fig. 4). After overwintering, larvae were located in fresh shoots that showed wilting at the top and sometimes fine grained, dark brown frass between the leaves, especially when given a new shoot to feed on (Fig. 5).

Fig. 5. *Glyphipterix bergstraesserella*, fine-grained frass produced by larva whilst boring in fresh shoot of *L. luzuloides*, Manderfeld (LG), 11.v.2021. © Ruben Meert.

Fig. 5. *Glyphipterix bergstraesserella*, fijnkorrelige frass geproduceerd door larve bij het aanboren van een verse scheut van *L. luzuloides*, Manderfeld (LG), 11.v.2021. © Ruben Meert.

Description of the larva: body length by the end of September between 6.5 and 7 mm, reaching approximately 10 mm when fully grown in spring (May). Head light brown with mouthparts darker. Thoracic plate and thoracic legs translucent light brown. Pinacula dark brown. Abdominal spiracles small and edges nearly black, with adjacent pinacula at an angle over each spiraculum (resembling a 'double' spiraculum from a distance) (Fig. 6). Ground colour ivory dorsally, more whitish ventrally. Abdominal prolegs very pale. 2 dorsal rows of reddish patches between segments T3 and A8, tinged reddish between these rows on segments A5 till A8. Six dorsal setae on segment A8 with prominent pinacula at the base, those on the top joined together. Narrow plate on A9 and anal plate light brown. Anal prolegs partially light brown (Fig. 7).

After some bred specimens emerged, an empty, firm silken cocoon in which soil particles were incorporated (Fig. 8) was found in the soil in which a *L. luzuloides* plant was potted, suggesting that full-grown larvae leave their host plant to pupate amongst the roots. As no living pupae were observed in this breeding experiment, this suggestion cannot be confirmed at present. The flight period of adult moths (Fig. 9) in Belgium starts by the end of May; most individuals are seen in June (Waarnemingen.be 2021).

Fig. 6. *Glyphipterix bergstraesserella*, larva, detail of spiraculum and adjacent pinaculum, Manderfeld (LG), 25.iii.2021. © Ruben Meert.
Fig. 6. *Glyphipterix bergstraesserella*, rups, detail van spiraculum en aanliggend pinaculum, Manderfeld (LG)? 25.iii.2021. © Ruben Meert.

Fig. 7. *Glyphipterix bergstraesserella*, larva, Manderfeld (LG), 30.ix.2018. © Ruben Meert.
Fig. 7. *Glyphipterix bergstraesserella*, rups, Manderfeld (LG), 30.ix.2018. © Ruben Meert.

Fig. 8. *Glyphipterix bergstraesserella*, cocoon on 29.v.2021, bred from larva on *Luzula luzuloides*, Manderfeld (LG), 25.iii.2021.© Ruben Meert.
Fig. 8. *Glyphipterix bergstraesserella*, cocon op 29.v.2021, gekweekt van rups *op Luzula luzuloides,* Manderfeld (LG), 25.iii.2021. © Ruben Meert.

Fig. 9. *Glyphipterix bergstraesserella*, imago e.l. 26.v.2021, bred from larva on *Luzula luzuloides*, Manderfeld (LG), 25.iii.2021. © Ruben Meert.
Fig. 9. *Glyphipterix bergstraesserella*, imago e.l. 26.v.2021, gekweekt van rups op *Luzula luzuloides,* Manderfeld (LG), 25.iii.2021. © Ruben Meert.

Fig. 10. *Isotrias rectifasciana*, larva in web in fresh shoot of *L. luzuloides*, Manderfeld (LG), 25.iii.2021. © Ruben Meert.
Fig. 10. *Isotrias rectifasciana*, rups in spinsel in jonge scheut van *L. luzuloides*, Manderfeld (LG), 25.iii.2021. © Ruben Meert.

Fig. 11. *Isotrias rectifasciana*, larva in fresh shoot of *L. luzuloides*, Manderfeld (LG), 25.iii.2021. © Ruben Meert.
Fig. 11. *Isotrias rectifasciana*, rups in jonge scheut van *L. luzuloides*, Manderfeld (LG), 25.iii.2021. © Ruben Meert.

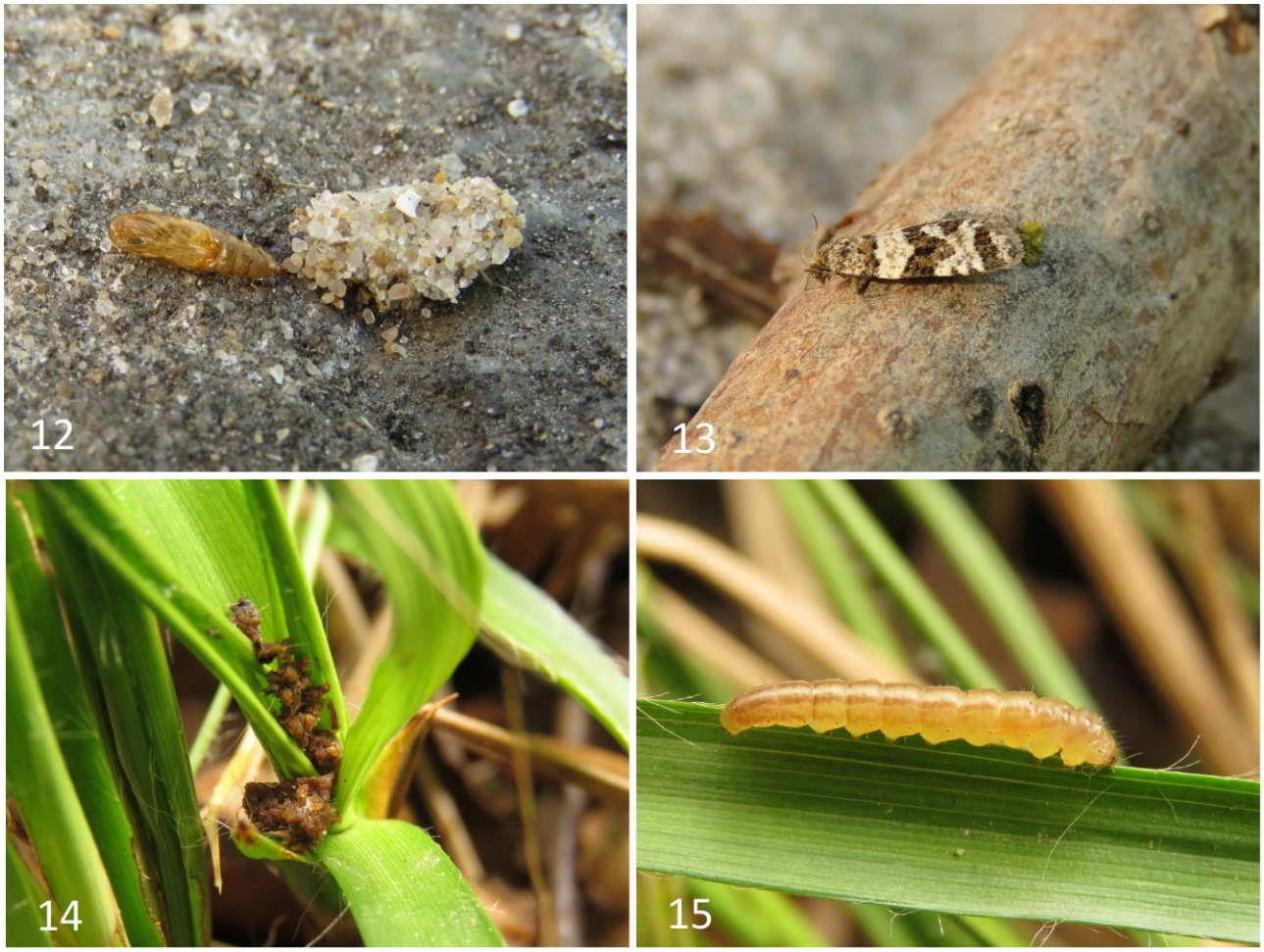

Fig. 12. *Isotrias rectifasciana*, exuvium and cocoon e.l. 12.v.2021, bred from a larva in *L. luzuloides* stem, Manderfeld (LG), 25.iii.2021. © Ruben Meert.
Fig. 12. *Isotrias rectifasciana*, exuvium en cocon e.l. 12.v.2021, gekweekt van rups van *L. luzuloides*, Manderfeld (LG), 25.iii.2021. © Ruben Meert.

Fig. 13. *Isotrias rectifasciana*, imago e.l. 12.v.2021, bred from a larva in *L. luzuloides* stem, Manderfeld (LG), 25.iii.2021. © Ruben Meert.
Fig. 13. *Isotrias rectifasciana*, imago e.l. 12.v.2021, gekweekt van rups in stengel van *L. luzuloides*, Manderfeld (LG), 25.iii.2021. © Ruben Meert.

Fig. 14. Noctuidae sp., ejected frass at top of *L. luzuloides* plant, Manderfeld (LG), 23.iii.2019. © Ruben Meert.
Fig. 14. Noctuidae sp., frass aan de top van *L. luzuloides* plant, Manderfeld (LG), 23.iii.2019. © Ruben Meert.

Fig. 15. Noctuidae sp., larva in *L. luzuloides* stem, Manderfeld (LG), 23.iii.2019. © Ruben Meert.
Fig. 15. Noctuidae sp., rups in stengel van *L. luzuloides*, Manderfeld (LG), 23.iii.2019. © Ruben Meert.

Isotrias rectifasciana

Isotrias rectifasciana (Haworth, 1811) (Tortricidae) is a rare species in Belgium, occurring in the eastern part of the country (De Prins & Steeman 2021). On Lepiforum 2021, Erwin Rennwald discusses the fact that there is a lot of doubt concerning the biology of the larva: different hypotheses are provided by various authors, suggesting that larvae feed on *Quercus*, *Acer*, *Crataegus*, polyphagous on herbaceous plants or even decaying vegetation.

On 25 March 2021, an unknown larva was found in a white, silken web (probably a hibernaculum) within a fresh shoot of *L. luzuloides* in Manderfeld (LG) (Fig. 10). The larva (Fig. 11) was placed in a jar, partially filled with moist sand. When given a potted *L. luzuloides* shoot to feed on, it immediately bored into the centre of the plant, in which it fed for a few more days. It left the plant afterwards to pupate on the surface of the soil, in a white cocoon in which sand grains were incorporated. On 12 May 2021, the pupa protruded from the cocoon (Fig. 12) and an imago of *I. rectifasciana* emerged (Fig. 13).

Breef description of a full-grown larva (based on pictures of only one specimen): ±10 mm body length. Head brown. Thoracic plate translucent light brown, darker laterally. Body greyish white, very translucent, internal organs clearly visible. Pinacula rather small, greyish. Anal plate light brown.

Noctuidae sp.

A collected *L. luzuloides* plant on 23 March 2019 showed dark brown frass (less fine compared to that of *G. bergstraesserella*) (Fig. 14) and wilting at the top. Opening the stem revealed a Noctuidae larva (Fig. 15), that could not be reared, possibly an *Oligia* or *Mesoligia* sp. (pers. comm. Jeroen Voogd). Most of these species overwinter as a small larva within the host plant. At first sight, the larva showed a few similarities in shape and colour to those of *G. bergstraesserella*. A larger size at that

time (+10 mm) and the missing pinacula nearby the abdominal spiracles are the most obvious differences to distinguish these Noctuidae larvae from those of *G. bergstraesserella*.

Conclusion

In Belgium, the larval stages of at least 3 different species of Lepidoptera (*Glyphipterix bergstraesserella*, *Isotras rectifasciana* and a Noctuid sp.) can be found feeding and hibernating within stems and shoots of *Luzula luzuloides*. The described differences between these larvae should make it possible to distinguish them from each other.

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