

***Digitivalva arnicella* (Lepidoptera: Glyphipterigidae), rediscovered after 63 years of absence**

Steve Wullaert

Abstract. During an extended weekend excursion in the High Fens region in September 2018, in "Vallée de l'Emmels" in Amel, several young mines and one vacated old mine of *Digitivalva arnicella* (Heyden, 1863) were found in a nature reserve that is managed by Natagora. It is the first report of this species since 1955. Information about its distribution and biology is given.

Samenvatting. Tijdens een verlengde weekendexcursie in de regio van de Hoge Venen in de maand september 2018 werden in "Vallée de l'Emmels" te Amel verschillende jonge mijnen en één verlaten oude mijn van *Digitivalva arnicella* (Heyden, 1863) aangetroffen in een natuurgebied van Natagora. Het is de eerste melding van deze soort sinds 1955. Gegevens omtrent de verspreiding en biologie worden meegedeeld.

Résumé. Lors d'un long inventaire dans la région des Hautes Fagnes au mois de septembre 2018, dans la "Vallée de l'Emmels" à Amel, plusieurs jeunes mines et une ancienne mine abandonnée ont été découvertes de *Digitivalva arnicella* (Heyden, 1863) dans une réserve naturelle gérée par Natagora. Il s'agit du premier signalement de cette espèce depuis 1955. Des informations sur la répartition et la biologie sont également discutées.

Key words: *Digitivalva arnicella* – Faunistics – Rediscovery – Belgium.

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Introduction

In September 2018, the Workgroup Leafminers of the Flemish Entomological Society (F.E.S.) organised an excursion in the High Fens region in Rocherath (LG) from 6 till 9 September 2018. The intention was to observe as many Lepidoptera species as possible during this four-day excursion. On five previous excursions to Rocherath, the Workgroup Leafminers found a total of 566 different species and 7500 specimens of Lepidoptera. The High Fens area has proved to be very interesting and there is still much to discover. The Workgroup Leafminers discovered three new species for the Belgian fauna in 2017, all in one single terrain in Rocherath. These were *Pharmacis fusconebulosa* (De Geer, 1778), *Hellinsia osteodactylus* (Zeller, 1841) and *Ectoedemia minimella* (Zetterstedt, 1839) (Wullaert 2018).

On 9 September 2018, the workgroup found 68 mines made by young larvae (figs. 2–4) and one vacated mine (fig. 5) of *Digitivalva arnicella* (Heyden, 1863) in "Vallée de l'Emmels" in Amel (LG), leg. BMW. This nature reserve was chosen carefully for research because of the presence of

huge quantities of *Arnica montana* (pers. comm. Alexander Rauw), the host plant of this species (fig. 1).

Vallée de l'Emmels is a vast refuge (60 ha) in the south of the Province of Liège (Natagora 2019), with a very typical fauna and flora (fig. 1). The *Arnica* plants are slightly covered by grass and other plants and grow in the depressions of a slightly undulating area, protected from harsh weather conditions. On another site with *Arnica*, 1 km from Vallée de l'Emmels, the plants were found on exposed, flat ground without any weather protection. No mines of *D. arnicella* were found there.

Abbreviations

The used abbreviations are LG = Liège; BMW= Werkgroep Bladmineerders (Workgroup Leafminers).

Taxonomy

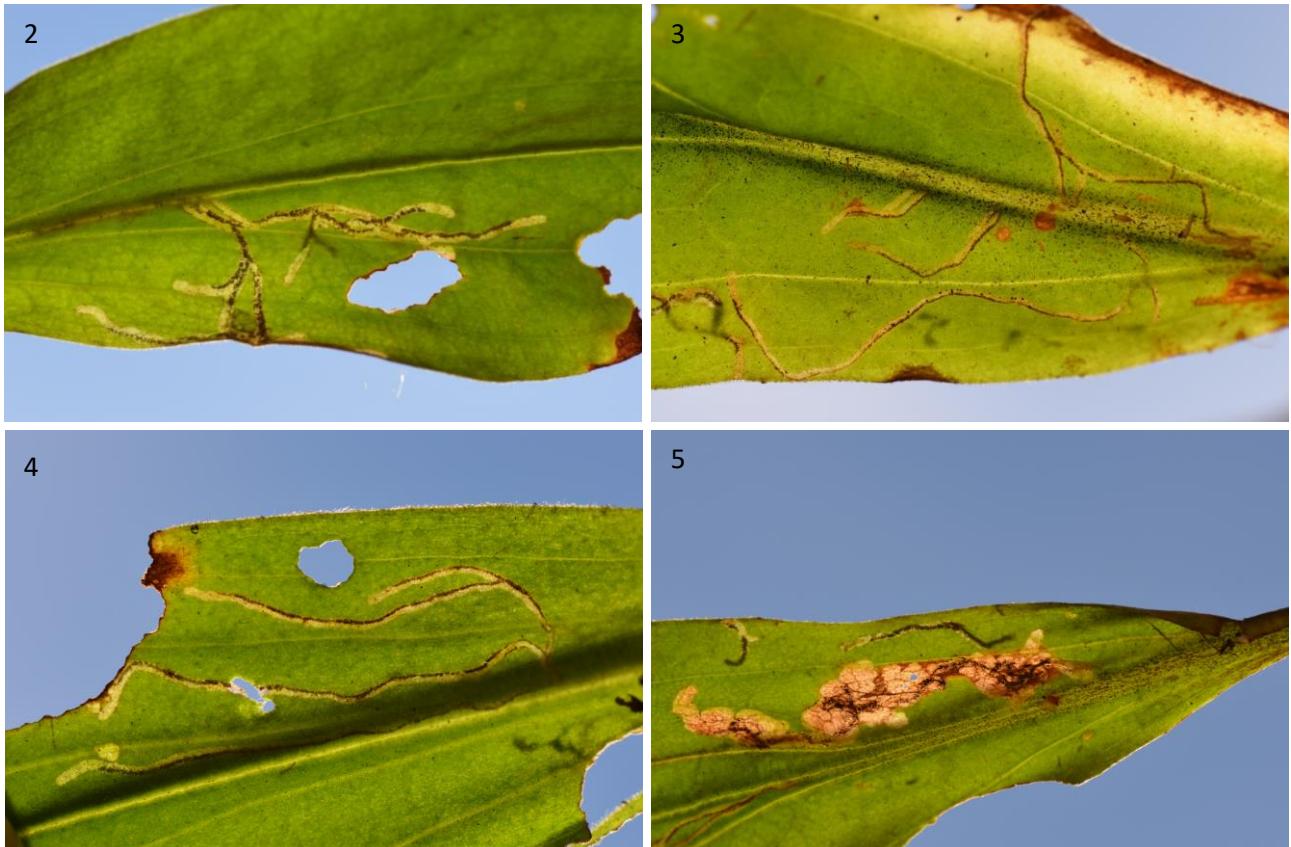
In an earlier taxonomic classification, *Digitivalva arnicella* was placed in the family *Acrolepiidae*. Nowadays the subfamily *Acrolepiinae*, in which the species is classified, is, together with *Orthoteliinae* and *Glyptapteridinae*, included in the family *Glyptapterigidae*. In this family 535 different species belonging to 28 different genera have been described (van Nieukerken *et al.* 2011). Sixteen species have been found in Belgium, including four species of *Digitivalva* (De Prins *et al.* 2019).

Life cycle and biology

Digitivalva arnicella was originally described as *Acrolepia arnicella* by von Heyden in 1863. The wingspan of the imago is 11.5–13.5 mm. The head and thorax are beige. The groundcolour of the forewing is whitish or pale beige with a brown fascia in the middle of the wing. A brown dorsal spot at one third from the wingbase some-



Fig. 1. Vallée de l'Emmels ~ Amel (LG) 09.ix.2018. © Steve Wullaert.



Figs. 2–5. Mines of *Digitivalva arnicella* on *Arnica montana* (arnica) – Vallée de l’Emmels ~ Amel (LG), 09.ix.2018. © Steve Wullaert.
Figs. 2–5. Mijnen van *Digitivalva arnicella* op *Arnica montana* (valkruid) – Vallée de l’Emmels ~ Amel (LG), 09.ix.2018. © Steve Wullaert.



Fig. 6. Young larva of *Digitivalva arnicella* on *Arnica montana* (arnica) – Vallée de l’Emmels ~ Amel (LG), 09.ix.2018. © Steve Wullaert.
Fig. 6. Jonge rups van *Digitivalva arnicella* op *Arnica montana* (valkruid) – Vallée de l’Emmels ~ Amel (LG), 09.ix.2018. © Steve Wullaert.

times extends to an angled fascia. A blackish spot is present near the tornus (Bengtsson & Johansson 2011). The slightly glossy yellowish white larva has segments that are strongly constricted. The head is bright yellow and heart shaped and the mouth is brownish (Heyden 1863). The species is univoltine: the flight period is stated to be July (Bengtsson & Johansson 2011), but according to Gaedike (1970) moths are on the wing from June to August. The larvae start mining the leaves of *Arnica*

montana in the middle of summer. Young mines can be found from the end of July onwards, but they are most easily found in September (van Nieuwerken & Koster 1999). From September onwards, the mines become very conspicuous, and the long corridors can be seen from a distance (fig. 6). At first they are thread-thin, sometimes branched and most of them start at the midrib (Hering 1957) (figs. 2–4). The long thin mines are yellowish (Heyden 1863). The frass is deposited in a partially broken

line, and most of it is pressed close against one side of the corridor (Hering 1957) (figs. 2–4). The larva hibernates and in early spring it makes large irregular blotches in the rosette leaves (van Nieukerken & Koster 1999). From then on the mines become much broader and shorter and the black frass lies in a central line (Hering 1957). Larvae often abandon their mine and make another one in the same or in a different leaf. To pupate, the larva makes a new short mine at the underside of the leaf, where it spins a thin cocoon and pupates (van Nieukerken & Koster 1999). The larva is monophagous on *Arnica montana* (arnica) (Gaedike 1970) (fig. 7).



Fig. 7. *Arnica montana* (arnica) – Vallée de la Holzwarche ~ Rocherath (LG), 23.vi.2012. © Dries De Vreeze.

Fig. 7. *Arnica montana* (valkruid) – Vallée de la Holzwarche ~ Rocherath (LG), 23.vi.2012. © Dries De Vreeze.

Distribution

Digitivalva arnicella has a fairly limited distribution in Europe. In Scandinavia, it occurs only in the southern parts of Norway and Sweden and in parts of Denmark (Bengtsson & Johansson 2011). It is found in the west of France, in southern Italy and in the east of Poland (Gaedike 1970). Further afield, the species occurs in Austria, the Czech Republic, Germany, Hungary, Lithuania, Romania, Slovakia and Switzerland. It appears to be absent from the Iberian Peninsula, all European islands and Eastern Europe (Agassiz & Gaedike 2019). In the Netherlands, it was first discovered in 1893 in the Province of Gelderland. In 1904 a second location was added by Ter Haar in the Province of Drenthe (Kuchlein 1993). Before

1950, the species was fairly common where the foodplant grew in in the eastern and northern parts of the Netherlands. From 1950 until 1990 there are no data available. From 1991 till 1998 *D. arnicella* was rediscovered and found in the Province of Drenthe in eight different localities (van Nieukerken & Koster 1999). Between the rediscovery and the writing of this article, two populations had disappeared. In 2018, protective measures were taken in the Netherlands on the two remaining sites of *D. arnicella* in Drenthe, where it still occurs (Muus 2019).

Conclusion

In the 20th century, *Arnica montana* declined seriously due to its medicinal use. Plants were collected massively in the wild. Now, however, the plant is protected by law. In Belgium the plant has disappeared completely in Flanders and in Wallonia, the sites, where the plant remains plentiful are very limited (Dijkstra 2019). Most sites are situated in the High Ardennes in the Province of Liège and Luxembourg (waarnemingen.be 2019). It has also declined seriously in several nature reserves in the High Fens area (pers. comm. Alexander Rauw) but, fortunately, there are some places left where the plant is still thriving (fig. 8). In the Netherlands *Arnica montana* has declined dramatically since 1950 and is now a threatened species (Dijkstra 2019) and, as a consequence *Digitivalva arnicella* is highly endangered.

It is very important to examine the remaining locations of the host plant in the coming years. The survival of *D. arnicella* depends largely on the proper management of these areas. The current mowing strategy in some places, in the month of August, is disastrous for the survival of the larvae as they are mining at that time. Also deep cutting/mowing has to be avoided if the rosettes are to be preserved, in which the larvae live from September to May.

Some of the largest populations of *Arnica montana* in the Netherlands have been found on places where burning techniques were applied on a small scale. According to van Nieukerken & Koster (1999), controlled burning of small spots adjacent to a population of *Digitivalva arnicella* could be very beneficial. It is impor-



Fig. 8. *Arnica montana* (arnica) ~ Elsenborn (LG), 23.vi.2012. © Billy Herman.

Fig. 8. *Arnica montana* (valkruid) ~ Elsenborn (LG), 23.vi.2012. © Billy Herman.

tant however, to realise that burning is detrimental to the survival of larvae, so it has to be done on a small scale and old plants have to be left alone. Apparently, the species prefers areas with sufficient variation and shelter in the terrain (van Nieukerken & Koster 1999). By preserving the host plant, suitable habitats for this species should be ensured.

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