

# Biology of *Pseudopostega* species in Europe (Lepidoptera: Opostegidae)

Erik J. van Nieuwerkerken

Published online July 2024

In: John van der Linden, 2024. Some endophagous insects from the Upper Midwest, USA. Self-published Web reference. <https://insect-pages.github.io/index.html>

The life history of most Opostegidae remains still a mystery, as it is only completely known for 11 of the ca. 200 known species (Davis 1989; van Nieuwerkerken 1990; Davis and Stonis 2007; Regier et al. 2015; van Nieuwerkerken et al. 2016).

For the six European species the hostplants were assumed by association with adults, and only *Opostega salaciella* had been reared accidentally from *Rumex* species, but without noticing immature stages (Nieuwerkerken 1990; Nieuwerkerken et al. 2004). Following up on the observation by Hinneberg in Sorhagen (1886) that *Pseudopostega auritella* (Hübner, 1813) had been taken in numbers around *Lycopus europaeus* (whereas Sorhagen at the same time cited the earlier suggestion that the species was reared from *Caltha*), I set out in 1988 to a locality in the Netherlands where the moth had been taken in numbers, and was indeed able to find stem mines in the very large plants of *Lycopus* that were abundant at that site. Although I was unable to find live larvae to rear the adult, I did find headcapsules of dead larvae that closely resembled opostegid head capsules as described by Heinrich (1918). This confirmed for me that *Lycopus* is indeed the hostplant of *P. auritella*. In 2005 I collected and photographed more stem mines in the coastal area of the Netherlands, and was also able to find young live larvae, but unable to rear any. In 2013 I could also find similar mines on *Mentha aquatica*, this time without larvae, but the similarity with the mines of *P. auritella* was so striking that it is extremely likely that these were the mines of *P. crepusculella* (Zeller, 1939). Although it cannot completely be ruled out that *P. auritella* could also feed on *Mentha*, it makes more sense to ascribe these mines to *P. crepusculella*.

These findings have been reported briefly in different papers (van Nieuwerkerken 1990; Huisman et al. 2007; Regier et al. 2015; van Nieuwerkerken et al. 2016), but a detailed description hasn't been published so far. I take the opportunity given by John van der Linden's website with life histories of North American *Pseudopostega* species, to publish my observations and photographs online as an impetus for other lepidopterists to search for the caterpillars and try to complete the life histories for the European species.

The general observation of the two Dutch species is that the stem mines and young larvae can be found in the autumn, September and October, in the largest plants, which are often growing in the shade. The mines were usually observed in the lower part of the stems. We still have no idea how the larva will proceed later, it is possible that the larva hibernates in the rootstock and resumes feeding in spring, as some of the Nearctic species do.

The biology of the third European species, *P. chalcopepla* (Walsingham, 1908) is still largely unknown, although it is associated with another Lamiaceae, *Rosmarinus officinalis*, its possible host.

I'd like to thank Sjaak Koster and Camiel Doorenweerd for accompanying me on my search for these species, and I am grateful to John van der Linden for providing me the opportunity to publish these observations online and to Charley Eiseman for his support and suggestions.

## References

- Davis DR (1989) Generic revision of the Opostegidae, with a synoptic catalogue of the world's species (Lepidoptera: Nepticuloidea). *Smithsonian Contributions to Zoology* 478: 1-97. doi: 10.5479/si.00810282.478. <https://repository.si.edu/handle/10088/6297>
- Davis DR, Stonis JR (2007) A revision of the New World plant-mining moths of the family Opostegidae (Lepidoptera: Nepticuloidea). *Smithsonian Contributions to Zoology* 625: i-v, 1-212. doi: 10.5479/si.00810282.625. <https://repository.si.edu/handle/10088/7184>
- Heinrich C (1918) On the lepidopterous genus *Opostega* and its larval affinities. *Proceedings of the Entomological Society of Washington* 20: 27-38. <http://biodiversitylibrary.org/page/2591893>
- Huisman KJ, Koster JC, Nieuwerkerken EJ van, Ellis WN (2007) Microlepidoptera in Nederland in 2005. *Entomologische Berichten, Amsterdam* 67: 34-47. <https://natuurtijdschriften.nl/pub/1011778>
- Nieuwerkerken EJ van (1990) Opostegidae. In: Johansson R, Nielsen ES, Nieuwerkerken EJv, Gustafsson B (Eds) *The Nepticulidae and Opostegidae (Lepidoptera) of NW Europe*. 357-372. [https://nepticuloidea.myspecies.info/sites/nepticuloidea.info/files/061Johansson\\_et al1990FaunaEntScandVol1-edited2022-HR.pdf](https://nepticuloidea.myspecies.info/sites/nepticuloidea.info/files/061Johansson_et al1990FaunaEntScandVol1-edited2022-HR.pdf)
- Nieuwerkerken EJ van, Laštůvka A, Laštůvka Z (2004) Annotated catalogue of the Nepticulidae and Opostegidae (Lepidoptera: Nepticuloidea) of the Iberian Peninsula. *SHILAP Revista de Lepidopterologia* 32: 211-260. <https://www.redalyc.org/pdf/455/45512710.pdf>
- Nieuwerkerken EJ van, Doorenweerd C, Hoare RJB, Davis DR (2016) Revised classification and catalogue of global Nepticulidae and Opostegidae (Lepidoptera: Nepticuloidea). *ZooKeys* 628: 65-246. <https://doi.org/10.3897/zookeys.628.9799>
- Regier JC, Mitter C, Kristensen NP, Davis DR, Nieuwerkerken EJ van, Rota J, Simonsen TJ, Mitter KT, Kawahara AY, Yen S-H, Cummings MP, Zwick A (2015) A molecular phylogeny for the oldest (nonditrysian) lineages of extant Lepidoptera, with implications for classification, comparative morphology and life-history evolution. *Systematic Entomology* 40: 671–704. <https://doi.org/10.1111/syen.12129>
- Sorhagen L (1886) *Die Kleinschmetterlinge der Mark Brandenburg und einiger angrenzenden Landschaften. Mit besonderer Berücksichtigung der Berliner Arten*. R. Friedländer & Sohn, Berlin: x + 367 pp. <https://books.google.nl/books?id=gzJDAAAAYAAJ&hl=nl&pg=PR1#v=onepage&q&f=false>

*Copyright Erik J. van Nieuwerkerken. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.*



*Pseudopostega auritella*

stem mines on *Lycopus europaeus* (red lines)

Netherlands, prov. Limburg, Brunssum NE: Bouwberg,  
N50.9543, E5.99009, 7.x.1988, EvN no 88169, EJ van  
Nieukerken.

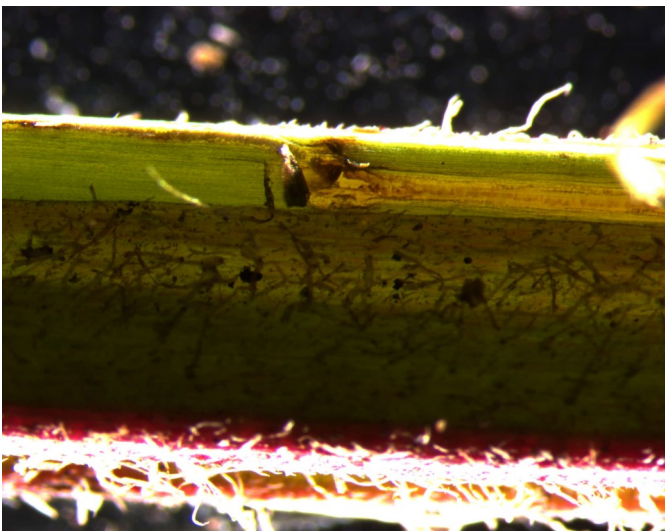
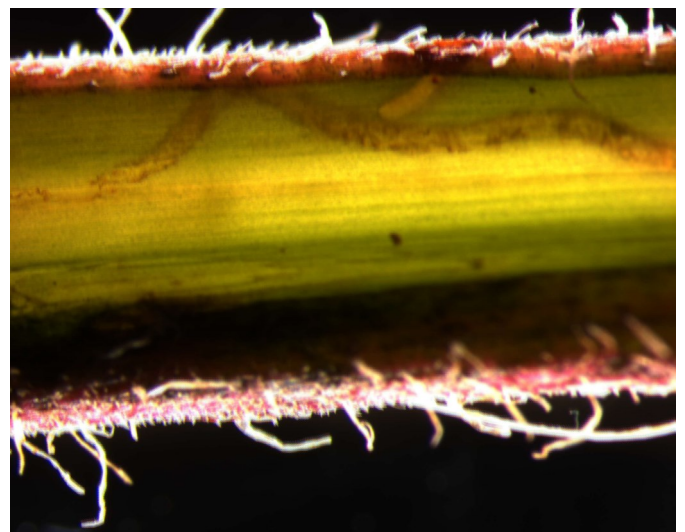
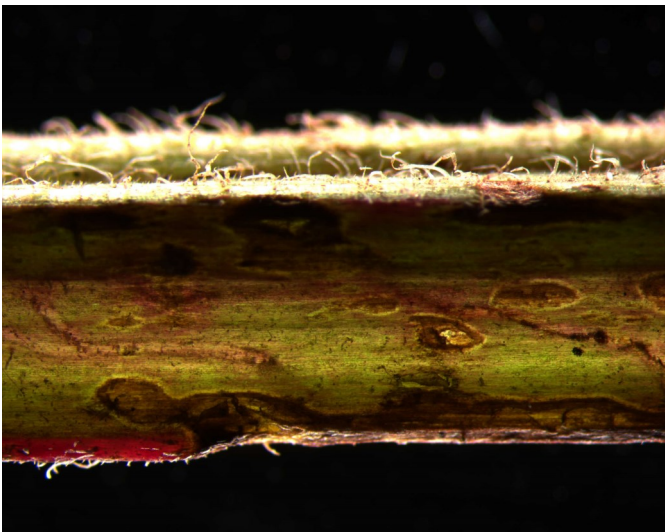
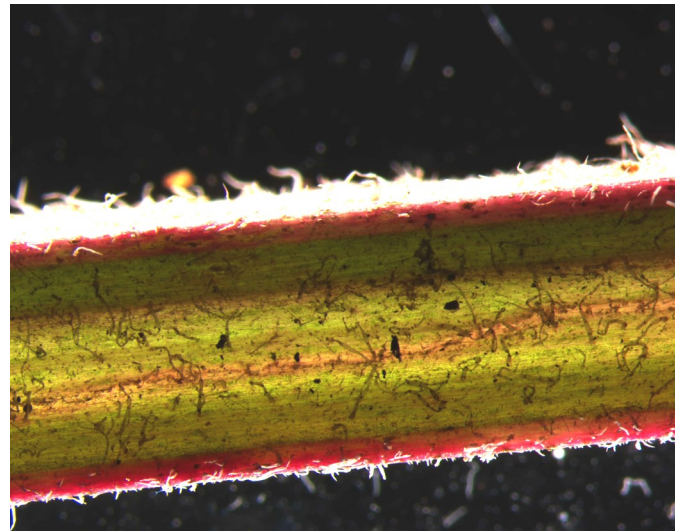
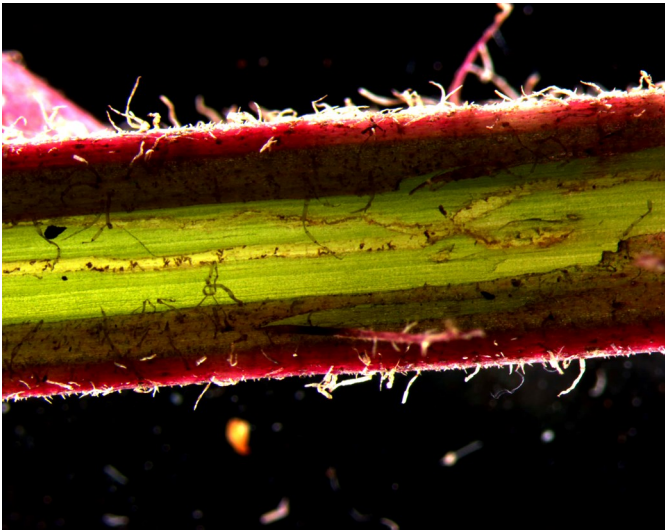
A locality where the moth previously had been taken in  
numbers, *Lycopus* is very common and with huge plants.  
Mines were found in thick stems only.



*Pseudopostega auritella*

Habitat and stem mines on *Lycopus europaeus* stems

Netherlands, prov. Noord-Holland, Callantsoog, Zwanenwater N: De Vlake, N52.82364, E4.69302, 5.ix.2005, marshy grasland bordering *Betula* copse, EJ van Nieukerken & JC Koster

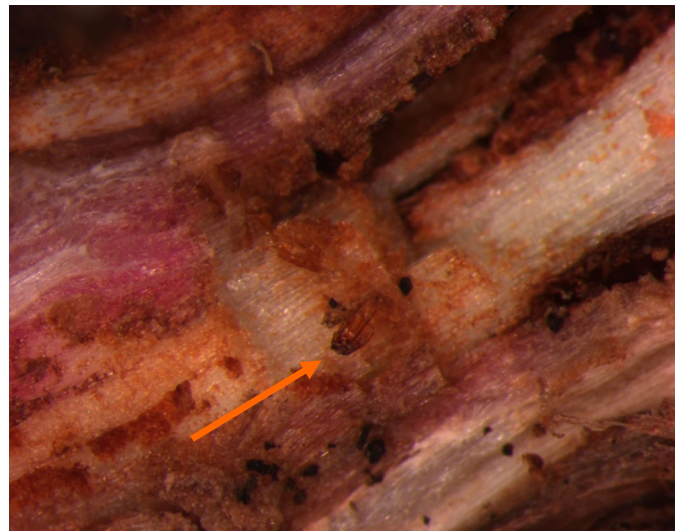
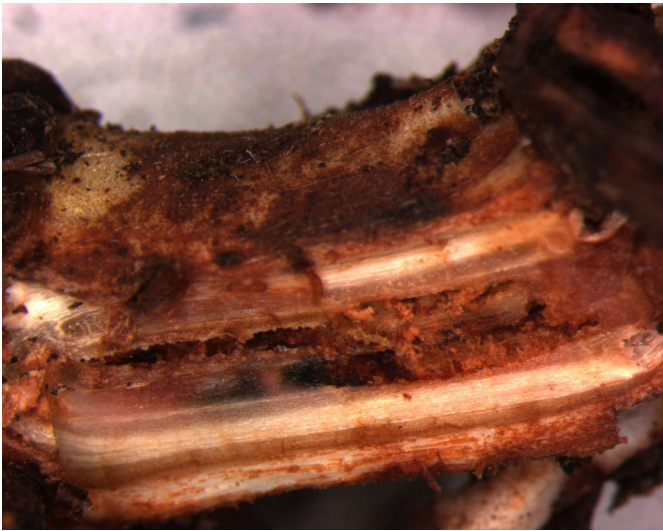


*Pseudopostega auritella*

Mines in *Lycopodium europaeus* stems

Netherlands, prov. Noord-Holland, Callantsoog,  
Zwanenwater N: De Vlakte, N52.82364,  
E4.69302, 5.ix.2005, marshy grassland border-  
ing *Betula* copse, EJ van Nieuwerkerken & JC  
Koster, EvN no 2005100

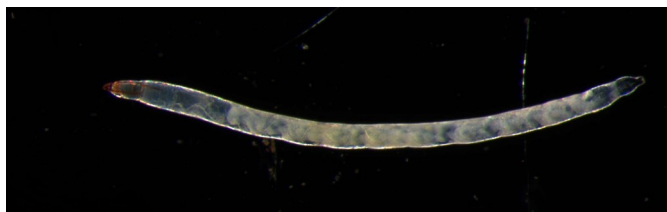
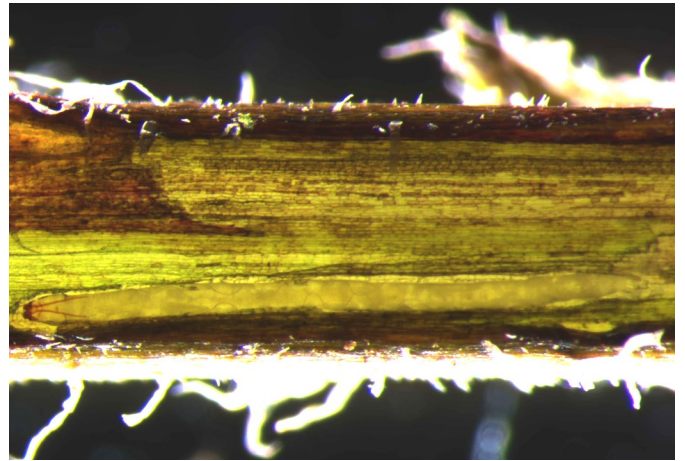
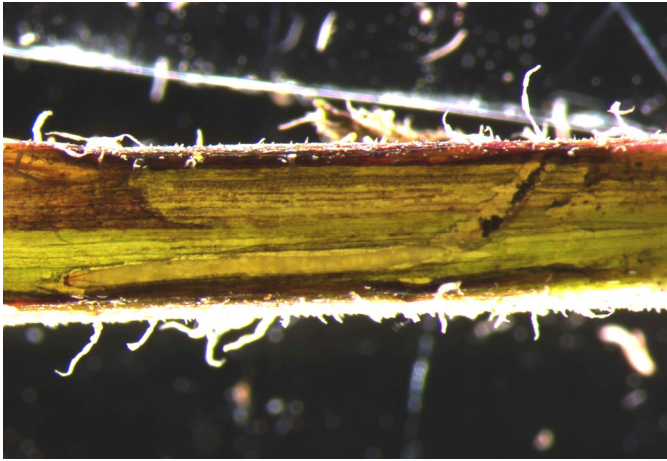
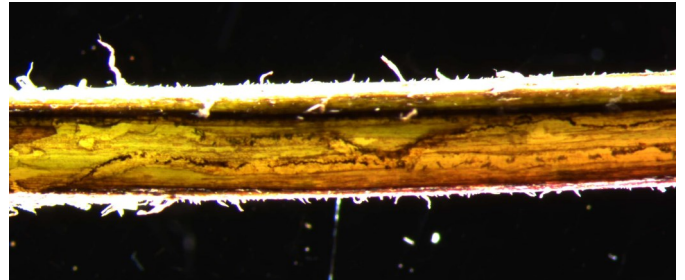
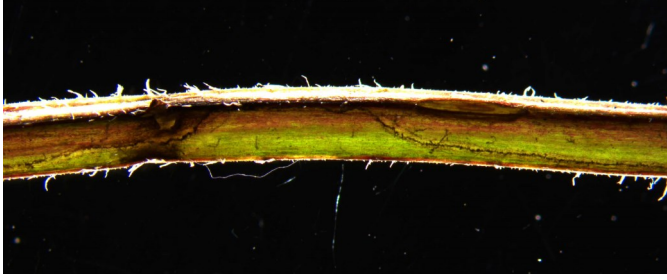
In some photos the epidermis has been re-  
moved to show the mine and frass



*Pseudopostega auritella*

Mines in *Lycopodium europaeus* stems, deeper layers in lowest part of stem, headcapsule above (arrow). Not sure that all deeper galleries are from *Pseudopostega*, there are also weevil larvae possible.

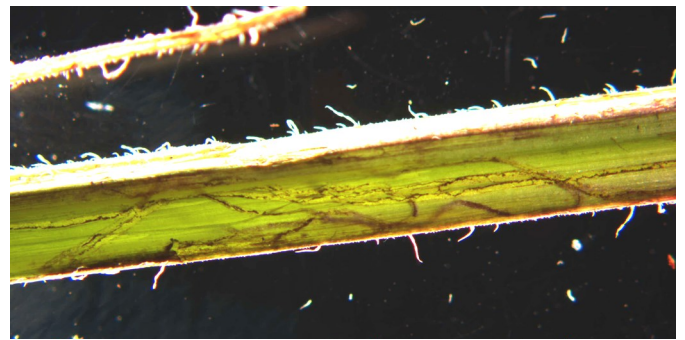
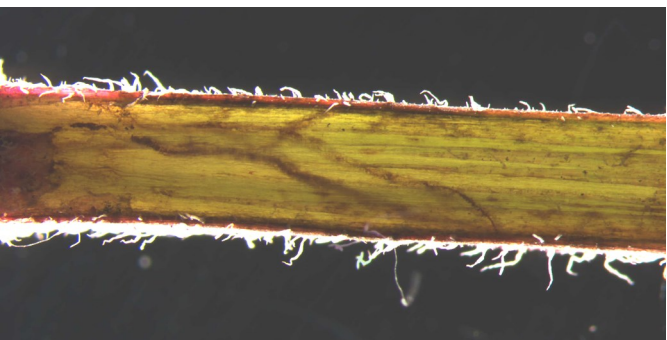
Netherlands, prov. Noord-Holland, Callantssoog, Zwanenwater N: De Vlakte, N52.82364, E4.69302, 5.ix.2005, marshy grassland bordering *Betula* copse, EJ van Nieukerken & JC Koster, EvN no 2005100



*Pseudopostega auritella*

Mines in *Lycopodium europaeus* stems, with live larva.

Netherlands, prov. Noord-Holland, Callantsoog, Zwanenwater N: N52.81934, E4.69749, 5.ix.2005, Alder copse, EJ van Nieukerken & JC Koster, EvN no 2005102





*Pseudopostega auritella*

Larva in mine in *Lycopus europaeus* stems

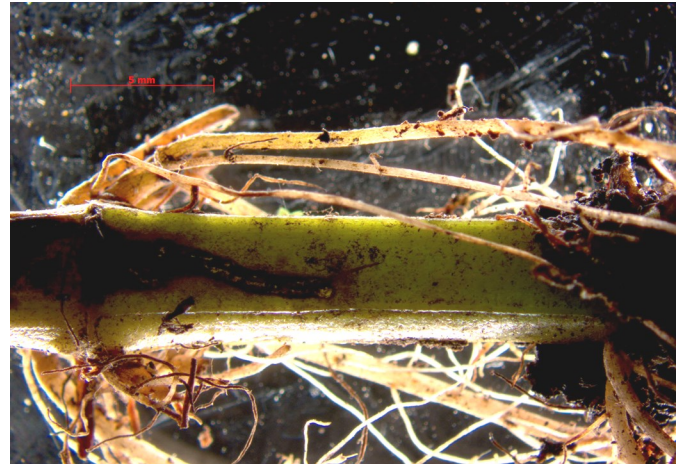
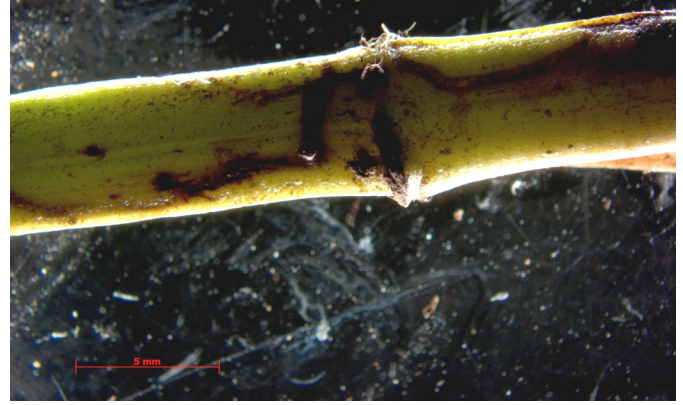
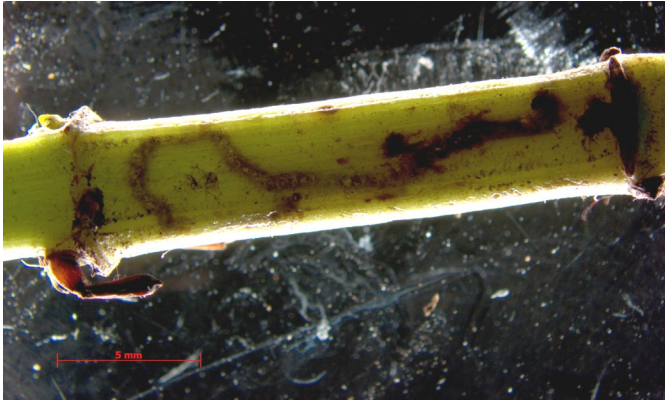
Netherlands, prov. Noord-Holland, Callantsoog, Zwanenwater, N 52.82375, E4.69292, 2.ix.2006, J.C. Koster & C. van den Berg, EvN no 2006903



*Pseudopostega crepusculella*

Habitat and stemmines in *Mentha aquatica*, photos not well in focus

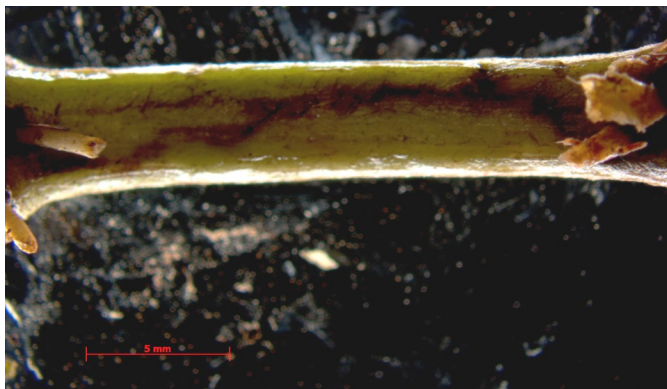
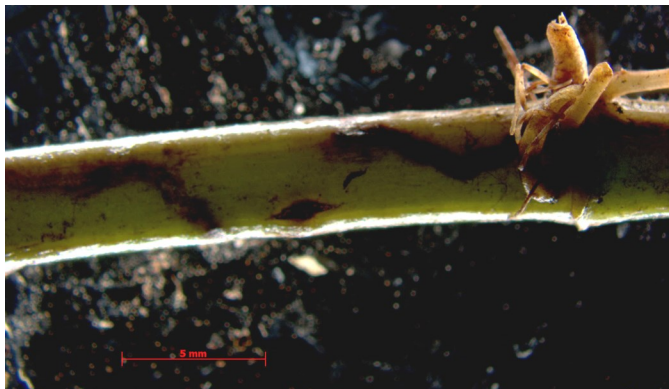
Netherlands, prov. Zuid-Holland, Rockanje, Voornes Duin, N51.89182, E4.04185, 10.ix.2013, E.J. van Nieukerken & C. Doorenweerd, EvN no 2013104



*Pseudopostega crepusculella*

Stemmines in *Mentha aquatica*

Netherlands, prov. Zuid-Holland,  
Rockanje, Voornes Duin, N51.89182,  
E4.04185, 10.ix.2013, E.J. van Nieukerken  
& C. Doorenweerd, EvN no 2013104



*Pseudopostega crepusculella*

Stemmines in *Mentha aquatica*; whether the frass in the photo above all belongs to *Pseudopostega* is uncertain.

Netherlands, prov. Zuid-Holland, Rockanje, Voornes Duin, N51.89182, E4.04185, 10.ix.2013, E.J. van Nieukerken & C. Doorenweerd, EvN no 2013104

