

Aphids on *Ammophila arenaria* in Belgium: first reports, phenology and host range expansion

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KEY WORDS: *Ammophila arenaria*, Aphidoidea, first occurrence, coastal dunes, host range

This paper reports the discovery of three species of aphids (Hemiptera: Aphidoidea) previously unknown to occur in Belgium (7), namely the species *Schizaphis rufula* (Walker 1849), *Laingia psammae* (Theobald 1922) and *Metopolophium sabiniae* (Prior 1976). All species were collected on the dune grass *Ammophila arenaria* (L.) Link, a dominant grass species in sand dunes along all European coasts south of latitude 63°N (6). This plant grows most vigorously in the open habitat of mobile dunes where it regularly gets buried by windblown sand (1). It also tolerates the extreme exposure and wide fluctuations of soil temperature typical of this habitat (6). Based on morphology and distribution, two subspecies can be distinguished. *Ammophila arenaria arenaria* is present along the European North Atlantic coast, whereas *A. arenaria arundinacea* occurs at southern Atlantic latitudes and along the Mediterranean (9).

S. rufula has been described across Europe, including Britain, Corsica, Denmark, Finland, Germany, Ireland, Poland, Sicily, Sweden, the Netherlands and Ukraine (8). This species is known to live on leaves of *A. arenaria* and *Elymus arenarius* in sand dune areas, where leaves of these plants can turn yellow as a result of the infestation (3). During a large field survey in 2007 at six spatially-separated locations within the Flemish nature reserve Westhoek, this species was caught in large numbers. We sampled plants by sweep-netting, which yielded up to 485 individuals on a single plant. A field survey was conducted in the same nature reserve in the summer of 2008 with 60 *A. arenaria* plants belonging to the two subspecies. Again, *S. rufula* was the most numerous aphid species encountered. In both years this species of aphid was present from June onwards during the whole summer, in 2007 even remaining present up to October (Figs 1 & 3).

L. psammae is known from Britain, Bulgaria, Czech Republic, Denmark, Finland, Germany, Hungary, Poland, Romania, Russia, Sicily, Slovakia, Spain, Sweden, the

Netherlands and Ukraine (8). The aphids are known to live between the flowers or fruits, in the inflorescences of *A. arenaria* and *Calamagrostis epigeios*. In Sweden, the species is also collected on plants of the genus *Elymus*, *Calamagrostis arundinacea* and *Deschampsia caespitosa* (2). Interestingly, we encountered this species quite often on plants with no inflorescences, living on the leaves. This species was a lot less abundant than *S. rufula* during the 2007 sampling (Fig. 2), but in the field survey of 2008 the species was better represented (Fig. 3). It seems to be reaching peak densities earlier in the season than *S. rufula*.

M. sabiniae has up till now only been found in Britain and France (8). The observation of *M. sabiniae* feeding and reproducing on *A. arenaria* is the first (5). This aphid species is known from *Festuca rubra* and *Vulpia membranacea* in dune areas (4). Although of this species only 10 individuals in total were discovered in the 2008 survey (Fig. 3), it was recorded at 14/07, 30/07 and 24/09, suggesting persisting populations rather than spillover from other plant species. Moreover, we were able to breed this species on *A. arenaria* for several generations in the laboratory.

Another noteworthy observation during the same field survey was the development of large populations of the aphid species *Rhopalosiphum padi* (Linnaeus 1758) on *A. arenaria* (Fig. 3). This is to our knowledge the first report of *R. padi* successfully reproducing on *A. arenaria* (5). The primary host of this species is *Prunus padus* and occasionally some other *Prunus* species. The aphids hatch from eggs on these hosts in early spring. In late spring, alate viviparous females colonise secondary hosts. These are various grasses, including cereals such as barley (*Hordeum*), wheat (*Triticum vulgare*) and oats (*Avena sativa*). It occasionally occurs on other monocotyledons and on *Capsella bursa-pastoris*. In early autumn, the species migrates back to the primary host. This aphid species is a cosmopolitan pest that can do much harm to cereals and is a potential vector of plant viruses (3). Therefore this finding might be of some economical relevance, since *A. arenaria* is traditionally planted to stabilise sand and to control erosion, for example to prevent flooding (10).

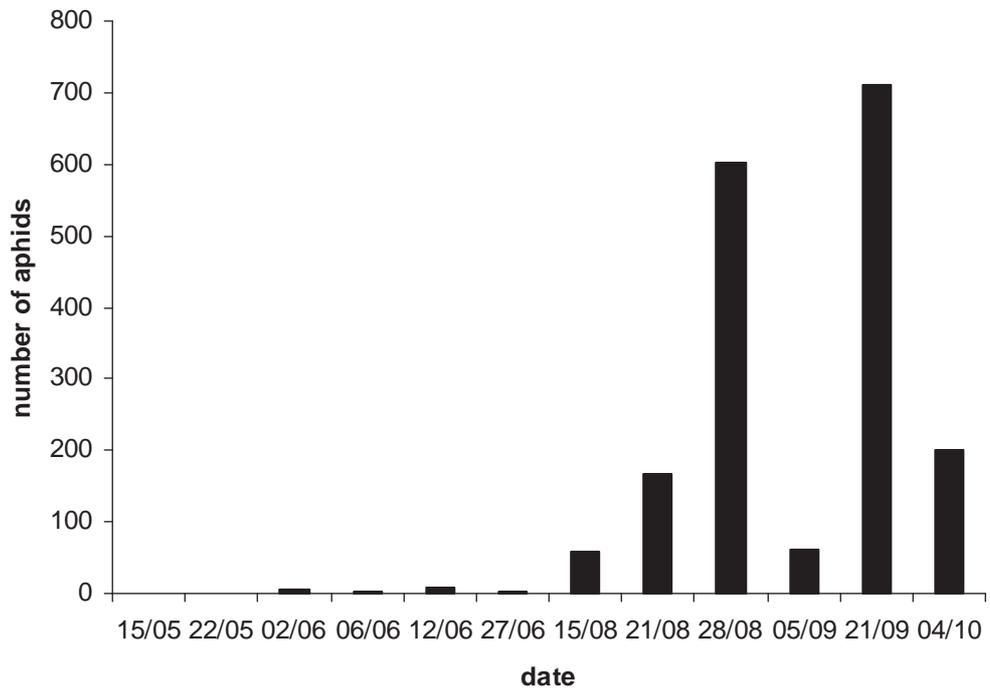


Fig. 1. – Phenology of *S. rufula* in the year 2007 based on sweep netting catches at different field sites.

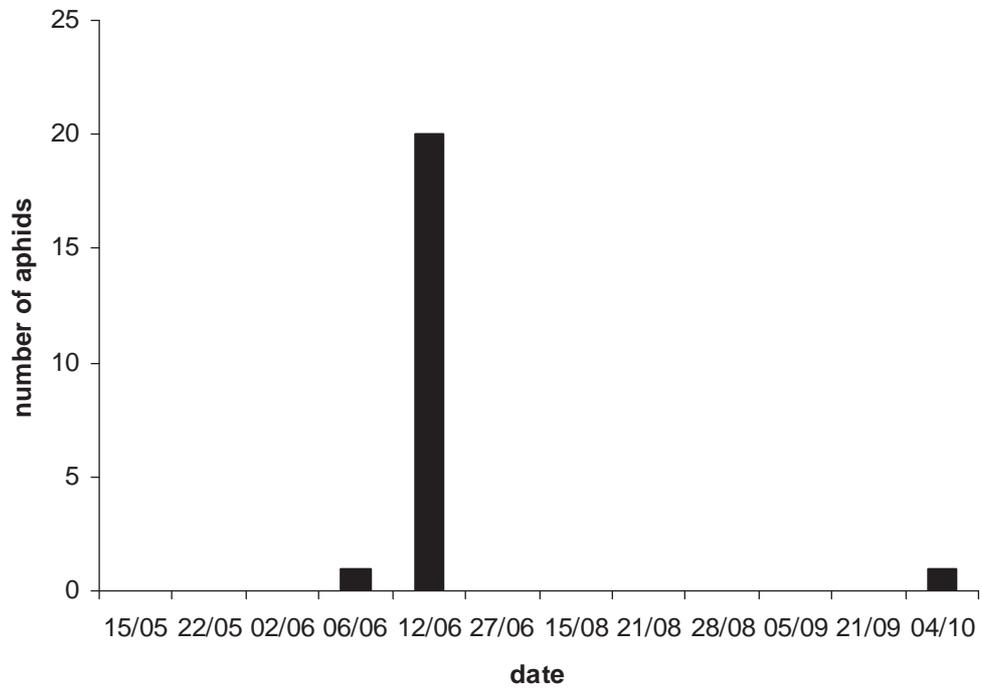


Fig. 2. – Phenology of *L. psammae* in the year 2007 based on sweep netting catches at different field sites.

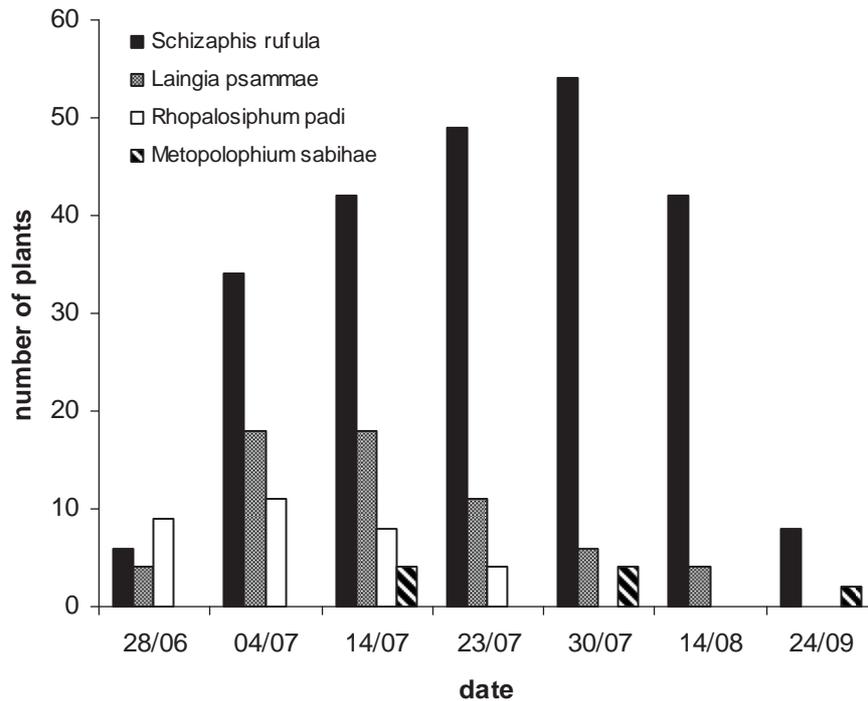


Fig. 3. – Phenology of *S. rufula*, *L. psammae*, *R. padi* and *M. sabiniae* in the year 2008 based on the number of plants out of 60 replicates, on which the aphid species was recorded during a field survey.

ACKNOWLEDGEMENTS

The first author is a PhD candidate and Eduardo de la Peña is a postdoctoral fellow of the Research Foundation – Flanders (FWO). The research is partially funded by FWO research project G.0057.09N. We would further like to thank Prof. Juan Manuel Nieto Nafría, Prof. Nicolás Pérez Hidalgo & colleagues of the University of León for confirmation of aphid identifications.

REFERENCES

- ELDRED RA & MAUN MA (1982). A multivariate approach to the problem of decline in vigor of *Ammophila*. Canadian Journal of Botany - Revue Canadienne De Botanique, 60:1371-1380.
- HEIE OE (1982). The Aphidoidea (Hemiptera) of Fennoscandia and Denmark. II. The family Drepanosiphidae. Fauna Entomologica Scandinavica, vol. 11. Scandinavian Science Press Ltd., Klampenborg.
- HEIE OE (1986). The Aphidoidea (Hemiptera) of Fennoscandia and Denmark. III. Family Aphididae: subfamily Pterocommatinae & tribe Aphidini of subfamily Aphidinae. Fauna Entomologica Scandinavica, vol. 17. E.J. Brill/Scandinavian Science Press Ltd., Leiden.
- HEIE OE (1994). The Aphidoidea (Hemiptera) of Fennoscandia and Denmark. V. Family Aphididae: Part 2 of tribe Macrosiphini of subfamily Aphidinae. Fauna Entomologica Scandinavica, vol. 28. E.J. Brill, Leiden.
- HOLMAN J (2008). Host plant catalog of aphids: Palaearctic region. Springer Netherlands, Houten.
- HUISKES AHL (1979). Biological flora of the British-Isles – *Ammophila arenaria* (L) Link (*Psamma arenaria* (L) Roem et Schult – *Calamagrostis arenaria* (L) Roth). Journal of Ecology, 67:363-382.
- NIETO NAFRÍA JM, LATTEUR G, MIER DURANTE MP, TAHON J, PÉREZ HILDAGO N & NICOLAS J (1999). Les pucerons de Belgique (Hemiptera: Aphididae). Parasitica, 55:5-38.
- NIETO NAFRÍA JM (2007). Fauna Europaea: Hemiptera, Aphidoidea. Fauna Europaea version 1.3 (Internet address: <http://www.faunaeur.org>).
- RODRIGUEZ-ECHEVERRIA S, FREITAS H & VAN DER PUTTEN WH (2008). Genetic diversity and differentiation of *Ammophila arenaria* (L.) Link as revealed by ISSR markers. Journal of Coastal Research, 24:122-126.
- VAN DER PUTTEN WH (1990). Establishment of *Ammophila arenaria* (Marram grass) from culms, seeds and rhizomes. Journal of Applied Ecology, 27:188-199.

Received: September 25, 2009

Accepted: Janvier 16, 2010

Branch editor: Hendrickx Frederik

