

Project: Phylogeography and postglacial recolonisation of *Silene nutans* in Europe

Rationale

Silene nutans (*Caryophyllaceae*) is an herbaceous plant species showing genetically differentiated groups at the western and northern margins of its continental European distribution range. These results, based on allozyme and morphological variation, suggest a quite complex pattern of the geographic structuring of genetic variation of *S. nutans* in Europe, likely shaped by historical (postglacial migration, contact zones), but also by recent processes (adaptive radiation). It suggests for instance a speciation process between the calcicolous and silicicolous ecotypes found in Belgium. However, it is still not possible to disentangle the relative contributions of past history and recent processes. So it is indispensable to investigate the geographical patterns of genetic structure in *S. nutans* using a phylogeographic approach and cytoplasmic DNA markers.

Overall goal

To investigate the geographical patterns of genetic structure of *Silene nutans* using a phylogeographic approach, in relation to past climatic changes, but also to other processes such as adaptive radiation at species distribution margins. The study will be carried out on a detailed scale for the already potentially identified contact zones at western and northern margins, and will be extended to a larger scale in Europe, to have a comprehensive view of the determining evolutionary processes shaping genetic structure. It will also contribute to define a coherent taxonomic system for this species.

Objectives

The project will use cytoplasmic DNA markers (mtDNA and cpDNA) to achieve the following objectives:

- Identification for *S. nutans* of the refugial areas during the glacial periods, of the main postglacial (re)colonization routes and of the potential contact zones in Europe.
- Evaluation of the relative contributions of historical and recent processes (e.g. selection) to present-day genetic structure.
- Elucidating of past history of two edaphic ecotypes found at the western border of *S. nutans* range, and delimitation of their geographical distribution.
- For Belgium (and Luxembourg), it will contribute to define priorities for conservation of biodiversity, (1) by evaluating their importance as future migration route for herbaceous plants in response to climate change, (2) by determining their importance as key region for the conservation of *S. nutans* (presence of particular evolutionary significant units?), and (3) in case of the presence of particular evolutionary significant units, by evaluating their threat status and proposing appropriate conservation and management measures of the populations.