

Performance comparison of local and non-local genotypes of *Ammophila arenaria* in the Flemish coast and evaluation of the effects on a specialist herbivore

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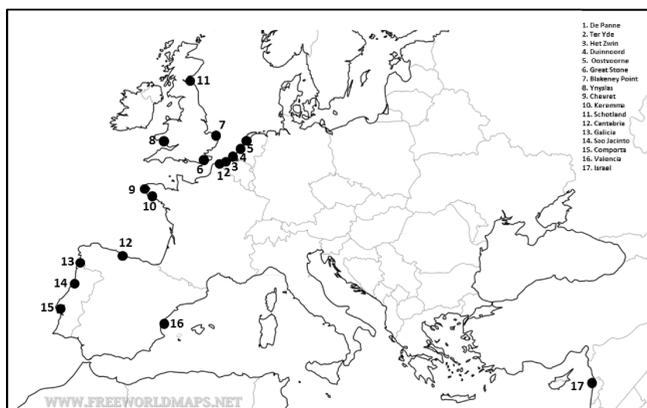
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Introduction

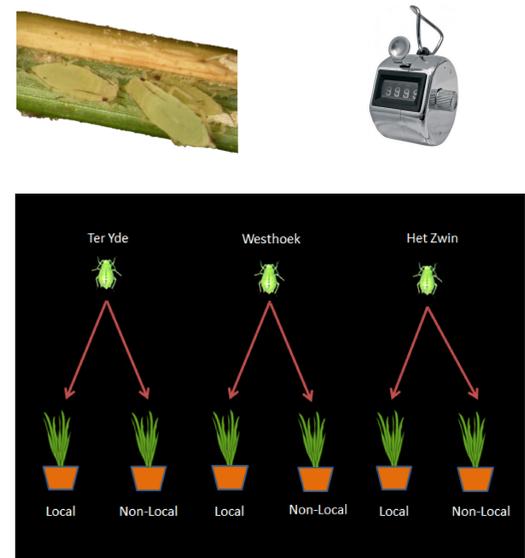
Ammophila arenaria or marram grass, is a sand-fixing plant species that occurs naturally in Mediterranean and Atlantic Europe coastal dunes. For this reason, it is commonly used for the stabilization and restoration of dune areas (in Europe and elsewhere). Current and traditional management practices often rely on the introduction of allopatric marram stands for sand fixation. However, the introduction of such exogenous plant material can have important effects at local level. To optimize the current management and conservation strategies of these natural systems it is necessary to assess: (I) what type of plant material is optimal (in terms of growth and survival) for re-vegetation purposes and (II) what are the effects are on the associated community.

Materials and methods

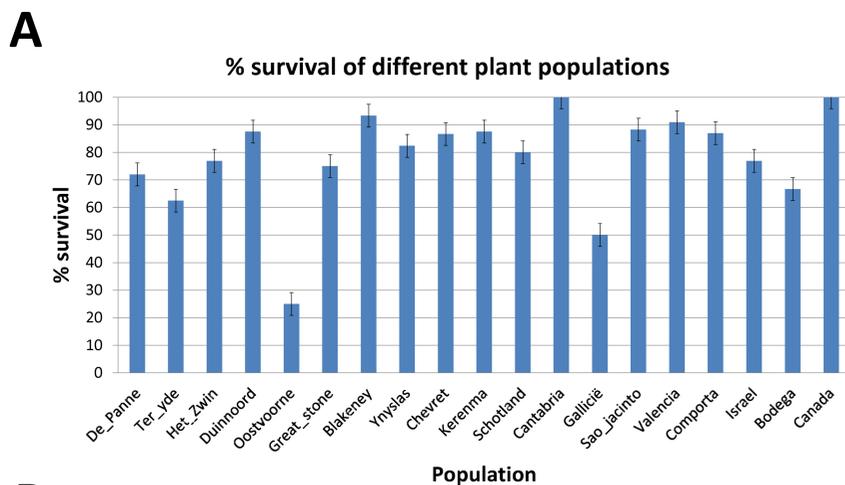
1 Field experiment: In three Flemish nature reserves, we conducted (3) common garden experiments; where, we compared the growth and survival of 17 different European populations of *A. arenaria* (see map) and 2 populations from North-America (location not shown).



2 Laboratory experiment: we compared the growth of three aphid isolates of the specialist species *Schizaphis rufula* on 9 populations of *Ammophila arenaria* (local and non-local genotypes).



Results

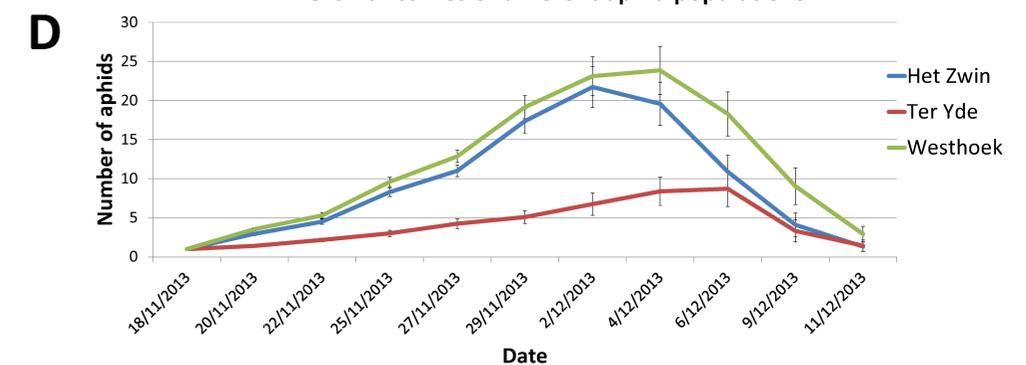
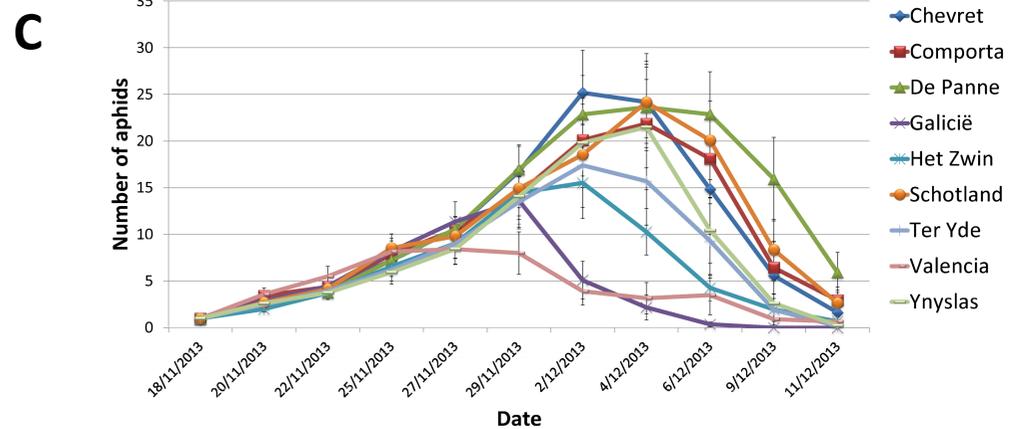


B

Results of field experiment

Type III tests of fixed effects				
Effect	Num DF	Den DF	F Value	Pr>F
Distance	1	796	6,06	0,0141

Type III tests of fixed effects				
Effect	Num DF	Den DF	F Value	Pr>F
Condition	1	210	2,91	0,0893



Discussion

- The results of the field experiment show that the percentage of plant survival differed between the *A. arenaria* populations compared (A). This means that depending on what type of population we introduce in the dunes, the chance of survival will vary. According to our analysis, the more distant the population is, the less likely is the chance of survival. Moreover, the field experiment also shows that plant growth (so called *condition*) of the surviving plants depended on the geographical distance (B). Our results indicate that we should be cautious when selecting plant material for re-vegetation purposes and preferably consider plant populations closely related to those of the target site.
- The laboratory experiment shows that plant origin had a strong influence on the population growth of the aphids (C). Also, the performance of the different aphid populations compared was clearly different (D). As in the field experiment, the geographical distance of *A. arenaria* (to the aphid population) was related to the aphid growth. In general, aphids performed better in local *A. arenaria* populations, or closely related ones, than in populations at greater distance. This observation supports the conclusion of the previous experiment, and indicates that local populations (or closely related ones) should be considered in the restoration of coastal dunes.