

GENERAL INFORMATION

author(s)	Baeten L, Vanhellemont M, De Frenne P, Hermy M, Verheyen K
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MATERIALS & METHODS

study area	3b
time period	July 2009–March 2010
goal	Determine the effect of former land use, and P supply in particular, on the number of seeds and their germinability for two forest herbs.
set-up	seed collection: Muizen forest and pot experiment Aelmoeseneie germination tests: seed mass, seed number of germinated seeds after species-specific stratification regimes in a growth chamber
data collection	for each adult individual: seed mass of 30-50 seeds, total seed mass -> number of seeds weekly: number of germinated seeds of <i>G. urbanum</i> (during 6 weeks) 2-weekly: number of germinated seeds of <i>P. elatior</i> (during 14 weeks)
remarks	

ABSTRACT

Land-use history can have large effects on the different life stages and demography of forest plant species. Here we studied how the legacies of former land use in post-agricultural forests, and increased phosphorus (P) availability in particular, may alter the germinability and seed quantity in populations of the forest herbs *Primula elatior* and *Geum urbanum*. We collected seeds in experimental populations of *P. elatior* and *G. urbanum* established in post-agricultural and ancient forest stands 10 y ago and determined the number of seeds per fruit and germination percentage. The effect of P availability on the production of germinable seeds was tested in a pot experiment with 3 P levels. Former land use had an impact on the mean germination percentage: seed germinability tended to be higher in post-agricultural compared to ancient forest sites. For *G. urbanum*, the number of seeds per fruit was also higher in post-agricultural forest. Whereas P availability had no effect on *G. urbanum* seed quantity and germinability, the germination percentage of *P. elatior* seeds increased significantly with P supply. Whereas previous studies showed that former agricultural land use can have detrimental effects on particular life stages of forest herbs (e.g., reduced juvenile or adult survival), the production of germinable seeds might rather benefit from it. The environmental legacies of former land use thus affect the various life stages of a plant differently, which results in complex effects of land-use history on the demography of forest plants.

RESULTS

The germination percentage of *P. elatior* and *G. urbanum* seeds was positively related to the mean seed mass, but there were no significant differences between ancient and post-agricultural stands. The mean number of seeds per fruit of *G. urbanum* was significantly higher in post-agricultural compared to ancient forest stands. The overall mean number of seeds per fruit of *P. elatior* was not affected by land-use history. Mean seed mass did not significantly differ between ancient and post-agricultural forest for the two species.

The germination percentage of seeds in the pot experiment was positively related to the mean seed mass of the two forest herbs. The germinability of *G. urbanum* seeds was unaffected by the P treatment; the germination of *P. elatior* increased significantly with P availability. The mean number of seeds per fruit was unaffected by the P treatments. The P treatment did not significantly affect the mean seed mass of the two species.