



Dispersal of European broadleaf forest trees is not constrained by quality of seeds at the high elevation range limit

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The low temperature range limit of trees may be determined by their ability to produce and disperse viable seed. We tested this hypothesis in nine widely distributed broadleaf tree species in the Swiss Alps (genera *Fagus*, *Quercus*, *Fraxinus*, *Acer*, *Ilex*, *Laburnum*, *Tilia*, *Sorbus*). For each species we collected seeds from central (close to optimal) and marginal (highest elevation) sites, replicated in two regions.

Neither seed size or seed dry mass, nor seed nitrogen concentration differed between central and marginal populations, but 6 of the species (significant in 3 cases) showed higher concentrations of storage carbohydrates in seeds from high elevation. Viability tests with Tetrazolium and germination tests also revealed no differences. Neither time to emergence nor the fraction of germinating seeds differed. But overall germination success was poor in the two *Fagaceae* species, in one *Sorbus* species and in *Tilia*, irrespective of origin.

Our results contradict the hypothesis of diminished quality of seeds in trees at their high elevation range limits at current climatic conditions. With a continuation of climate warming the likelihood of upward spreading of these taxa seems to be matter of time only. Amount and quality of seeds does not pose constraints to range expansion as evidenced in this study.