

## Publication

Distribution of bulbil- and seed-producing plants of *Poa alpina* (Poaceae) and their growth and reproduction in common gardens suggest adaptation to different elevations

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**Premise of the study:** The European Alps harbor a spatially heterogeneous environment. Plants can be adapted genetically to this heterogeneity but may also respond to it by phenotypic plasticity. We expected the important fodder grass *Poa alpina* to be adapted to elevation either genetically or plastically.

**Methods:** We investigated in three elevational common gardens whether growth and reproductive allocation of plants reproducing either by seeds or bulbils suggest adaptation to their elevation of origin and to what extent they can respond plastically to different elevations. Additionally, we analyzed genetic diversity using microsatellites and tested whether seeds are of sexual origin.

**Key results:** In the field, bulbil-producing plants occurred more often at higher elevations, whereas seed-producing plants occurred more often at lower elevations, but bulbil-producing plants were generally less vigorous in the common gardens. The response of plants to elevational transplantation was highly plastic, and vigor was always best at the highest location. The small genetic differences were not clinally related to elevation of origin, underlining the importance of phenotypic plasticity. Reproductive allocation was, however, independent of elevational treatments. Seed-producing plants had higher genetic diversity than the bulbil-producing plants even though we found that seed-producing plants were facultative apomicts mostly reproducing asexually.

**Conclusions:** Bulbil-producing *P. alpina*, showing a fitness cost at lower elevations compared with seed-producing plants, seem better adapted to higher elevations. By means of its two reproductive modes and the capacity to adjust plastically, *P. alpina* is able to occupy a broad ecological niche across a large elevational range.

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