Phenological responses in a changing climate

DISTURBANCE ECOLOGY

UNIVERSITÄT BAYREUTH

SUSALPS
Sustainable use of alpine and pre-alpine grassland soils in a changing climate

Introduction & Background:

- Plant phenology is a sensitive indicator of climate, that capturing system dynamics
- Plant community dynamics can be influenced by advances in species specific flowering phenology (niche-overlap, plant-pollinator mutualism, invasion)
- Cascading effects throughout trophic levels

Method:

1. Simulation of climate change by downslope translocation of intact plant-soil monoliths
2. Weekly monitoring of marked individuals

phenological sensitivity

$$S_{phen} = \frac{\mathrm{Onset}_{warm} - \mathrm{Onset}_{cont}}{T_{warm} - T_{cont}}$$

performance sensitivity

$$S_{perf} = \frac{(\#\mathrm{Flowers}_{warm} - \#Flowers_{cont})/\#Flowerscon_t}{T_{warm} - T_{cont}}$$

Accelerated phenology under warmer conditions leads to higher flower performance

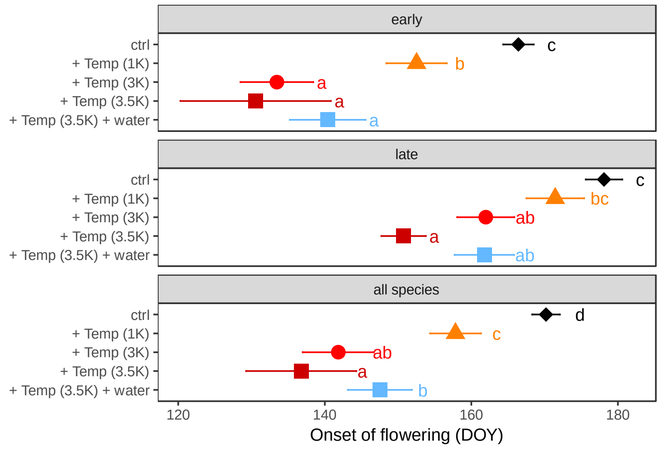
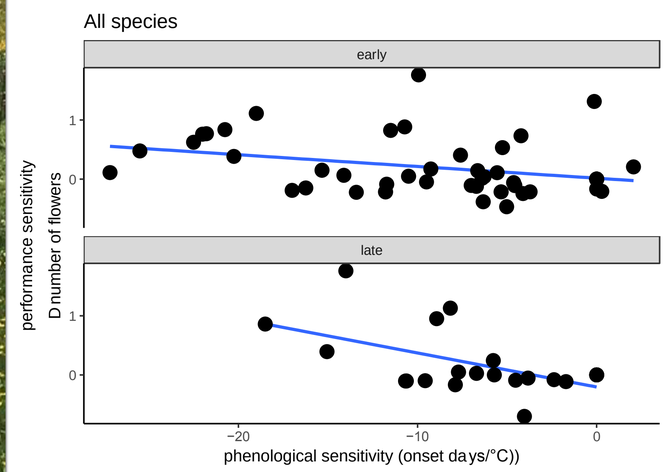


Fig. 1: Shifts in onset of flowering along an altitudinal gradient



Phenological sensitivity: $p < 0.001$
Early / Late: $p = 0.681$
Interaction: $p = 0.106$

Fig. 2: Phenological sensitivity as significant predictor of flowering performance

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Max A. Schuchardt, Bernd J. Berauer, Peter Wilfahrt, Andreas von Heßberg, Anke Jentsch
University of Bayreuth – Department of Disturbance Ecology, Germany;
max.schuchardt@uni-bayreuth.de