Does higher plasticity in response to light quality help plants to be more abundant?

One of the ultimate goals of ecology is to explain the patterns of species abundance. While we know that abundance is affected mainly by frequencies of species habitats and also by some plant traits, there is little information whether species abundance is affected by the plant's phenotypic plasticity in response to major environmental factors. Still phenotypic plasticity is known to vary between species and to be one of the key factors underlying plant performance if environment is heterogeneous. In this study we aimed to test plasticity in response to changed light quality (generally changed red/far-red ratio) that is responsible for plants response to other plants presence, competition and thus fitness.

**ABUNDANCE DATA**

- regional abundance of each species from stratified Czech national phytosociological database
- local abundances (mean cover in relevés)
- local competition (pseudo LAI)

http://www.sci.muni.cz/botany/vegsci/

**RESULTS**

- side photos (R/FR regression coefficients) + database data

- reaction to R/FR is not very well correlated to abundance
- smaller species tend to react more to change in R/FR ratio
- + reaction to PAR is slightly more correlated with abundance

- heights and standard errors of all species – they vary from no height reaction to strong positive and negative reactions to PAR and R/FR change

**PLASTICITY TO LIGHT**

decrease in red/far-red ratio

greenhouse, which holds all 40 species in pots, 4 times replicated 100%

decrease in PAR

theoretical values

100% 50% 25%

photograph convert to BW image analysis

100% 50% 25%

coefficients of reaction to R/FR and PAR in values:

- vertically – height, median and interquartile range of foliage, rosette x, leaf erectness
- horizontally – spread, amount of foliage, eccentricity, decline of fol., convexity of fol.

+ biomass

**FINAL REMARKS**

- the first results don’t show strong effect of plasticity to light signals on abundance but:
  - we need to analyze the horizontal data, biomasses, data from earlier times and connect our data with data from long term growth data etc.
  - we plan to extend the species set to 80 species
  - we are open to questions and suggestions!!