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

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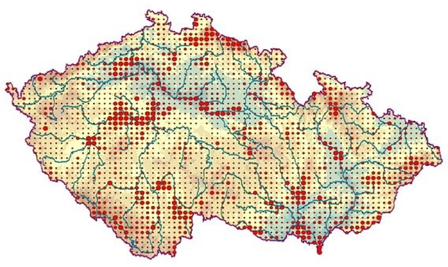
One of the ultimate goals of ecology is to explain the **patterns of species abundance.** While we know that abundance is affected mainly by frequencies of species habitats and also by some plant traits, there is little information whether species abundance is affected by the plant's **phenotypic plasticity** 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



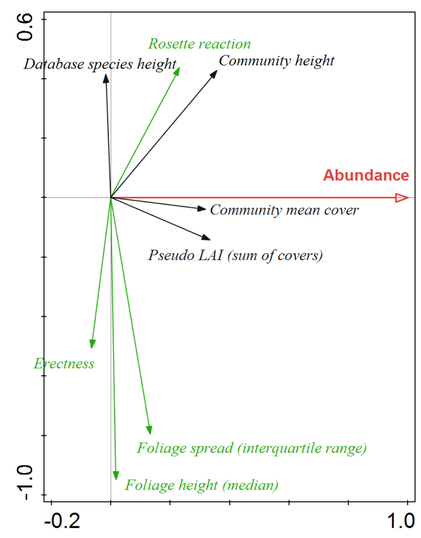
http://www.sci.muni.cz/botany/vegsci/

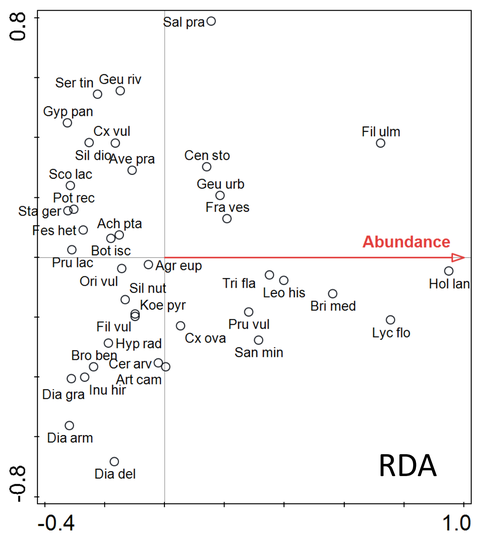
- regional abundance of each species from stratified *Czech national phytosociological database*
- local abundances (mean cover in relevés)
- local competition (pseudo LAI)

RESULTS

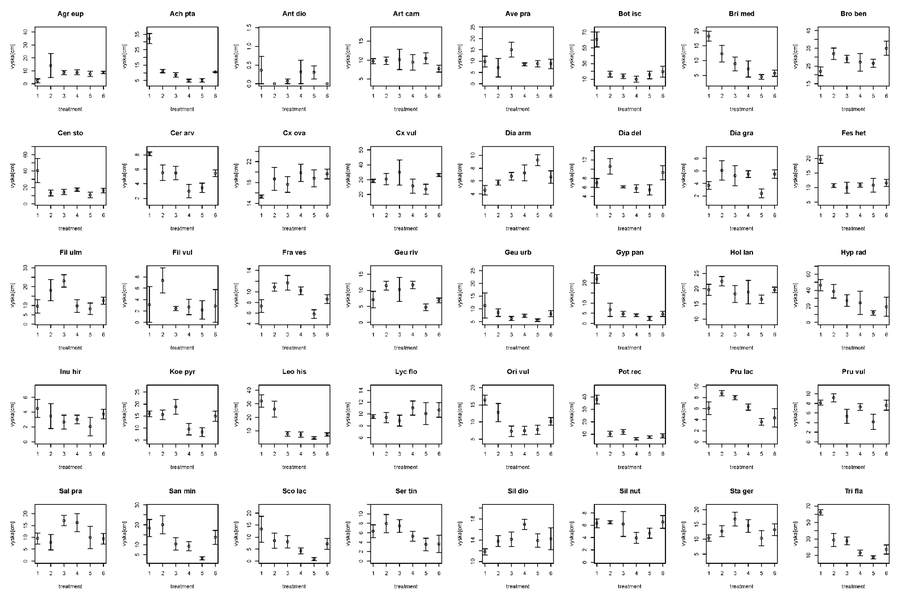
only data from September (July and August available)

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



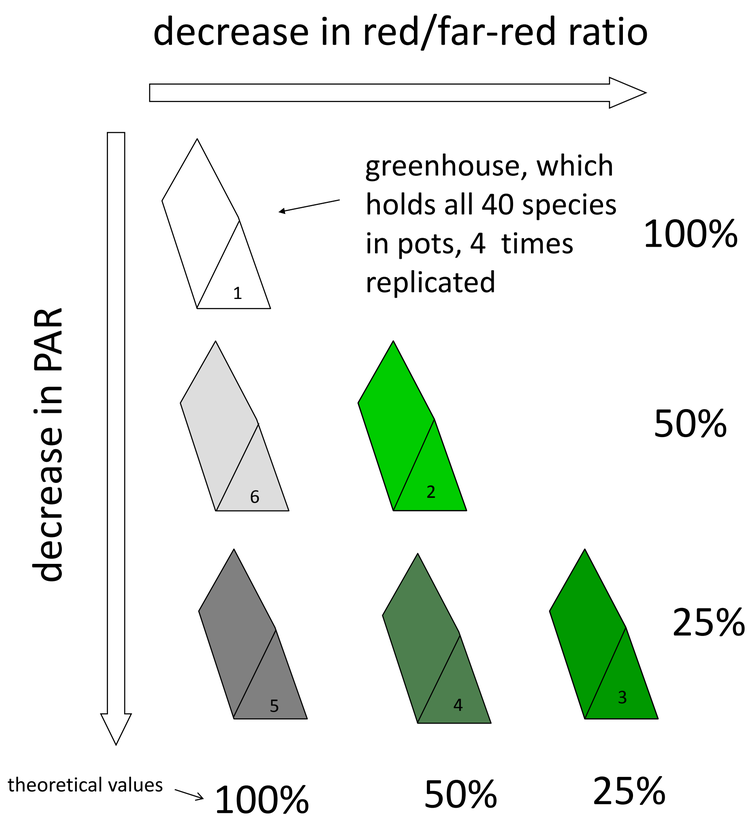


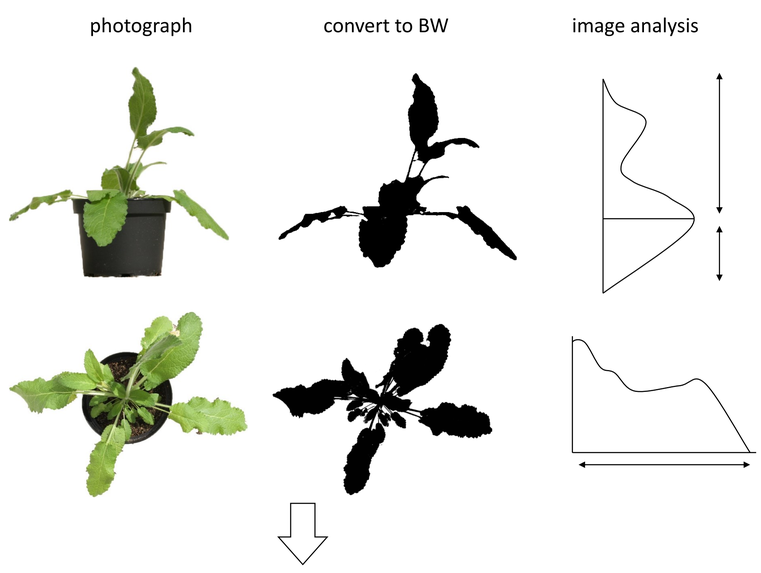
- reaction to R/FR is not very well correlated to abundance
- smaller species tend to react more to change in R/FR ratio
- \+ reaction to PAR is slightly more correlated with abundance



- 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





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

the species set

Achillea ptarmica	Asteraceae
Antennaria dioica	Asteraceae
Artemisia campestris	Asteraceae
Centaurea stoebe	Asteraceae
Hypochaeris radicata	Asteraceae
Inula hirta	Asteraceae
Leontodon hispidus	Asteraceae
Scorzonera laciniata	Asteraceae
Serratula tinctoria	Asteraceae
Cerastium arvense	Caryophyllaceae
Dianthus armeria	Caryophyllaceae
Dianthus deltoides	Caryophyllaceae
Dianthus gratianopolitanus	Caryophyllaceae
Gypsophila paniculata	Caryophyllaceae
Lychnis flos-cuculi	Caryophyllaceae
Silene dioica	Caryophyllaceae
Silene nutans	Caryophyllaceae
Carex ovalis	Cyperaceae
Carex vulpina	Cyperaceae
Origanum vulgare	Lamiaceae
Prunella laciniata	Lamiaceae
Prunella vulgaris	Lamiaceae
Salvia pratensis	Lamiaceae
Stachys germanica	Lamiaceae
Avenula pratensis	Poaceae
Bothriochloa ischaemum	Poaceae
Briza media	Poaceae
Bromus benekenii	Poaceae
Festuca heterophylla	Poaceae
Holcus lanatus	Poaceae
Koeleria pyramidata	Poaceae
Trisetum flavescens	Poaceae
Agrimonia eupatoria	Rosaceae
Filipendula ulmaria	Rosaceae
Filipendula vulgaris	Rosaceae
Fragaria vesca	Rosaceae
Geum rivale	Rosaceae
Geum urbanum	Rosaceae
Potentilla recta	Rosaceae
Sanguisorba minor	Rosaceae

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!!**