# Comparative analysis of plant plasticity to light signals

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## Why?

**Plasticity** in response to environmental signals is key component of plant success but knowledge about its magnitude for a **large set of species** is still unknown. Moreover we need to distinguish reaction to signals carried by the source (e.g. change of **red/far-red ratio** for light) and the source itself (**photosynthetic active radiation** for light).

With this we can better predict species behavior in competition and find out how is plasticity correlated with other traits.

## What came out?

**Response types correlate with general traits:**

| Trait | R/FR and PAR | R/FR | R/FR partial | PAR | PAR partial | Overlap |
|---|---|---|---|---|---|---|
| Leaf area (log) | -0.213 | -0.017 | -0.034 | -0.223 | -0.24 | 0.012 |
| SLA | -0.133 | -0.041 | 0.001 | -0.159 | -0.127 | -0.053 |
| Height at maturity | 0.172 | 0.006 | -0.185 | 0.337* | 0.231 | 0.233 |
| Seed reproduction | 0.262 | 0.208 | 0.044 | 0.168 | 0.087 | 0.175 |
| Vegetative reproduction | 0.334* | 0.305x | 0.496** | 0.146 | 0.184 | 0.019 |
| Shoot lifespan (cyclicity) | -0.062 | -0.09 | -0.002 | -0.086 | 0.012 | -0.136 |
| Clonality | 0.054 | -0.068 | 0.25 | -0.032 | 0.118 | -0.2 |
| Distance of lateral spread | 0.158 | 0.107 | 0.447** | -0.139 | 0.11 | -0.389* |

- correlation of variance explained by treatment factors in individual species with traits of these species, values are correlation coefficients *(x<0.1, *<0.05, **<0.001)*

*Fragaria vesca* (**clonal**) – big response to **R/FR** change

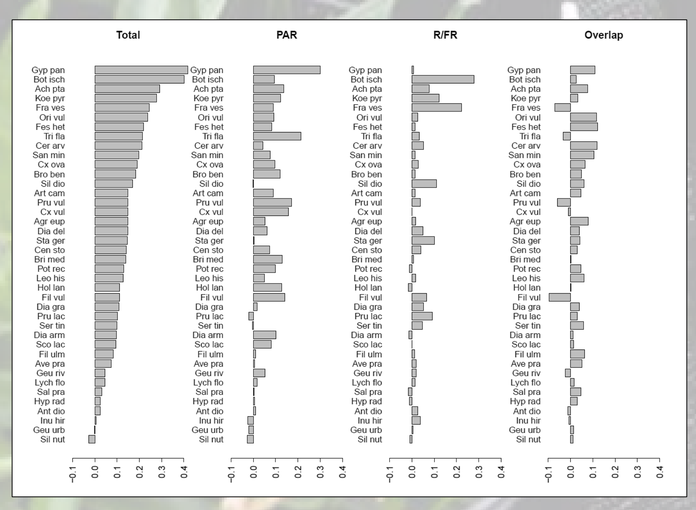


- real photographs of the plants after one month in the experiment

*Trisetum flavescens* (**high** species) – big response to **PAR** change


**Species differ a lot (e.g.):**

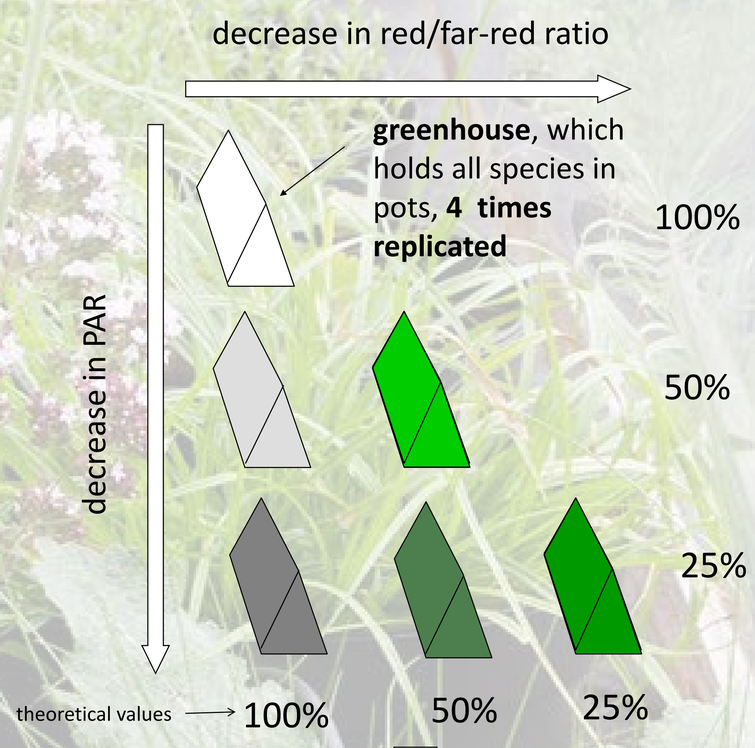



- the values are $R^2$ from the multivariate analysis

## How?

- **experiment with 40 mostly meadow species in the common garden**





**Reaction to R/FR and PAR was measured by:**

**TOP** parameters

- Median distance
- Distance range
- Distance skewness
- Asymmetry

**SIDE** parameters

- Median height
- Vertical range
- Vertical skewness
- Total area

**Summary reaction analyzed by multivariate techniques**

## Take home message

Clonal species respond more to R/FR changes (they win by mobility and adaptation)

High species respond more to PAR changes (they have to grow to win the big race)

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