Competitive pressure affects the inter- and intra-specific trait variability of *Carex* species

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Introduction:

- Both inter- (Díaz et al., 2007) and intra-specific (He et al., 2021) trait variability is very important factor influencing species community composition and within community trait distribution.
- Water regime (Li et al., 2020) and competitive pressure (Burns and Strauss, 2012) are two important factors affecting the species plasticity and thus their functional traits.

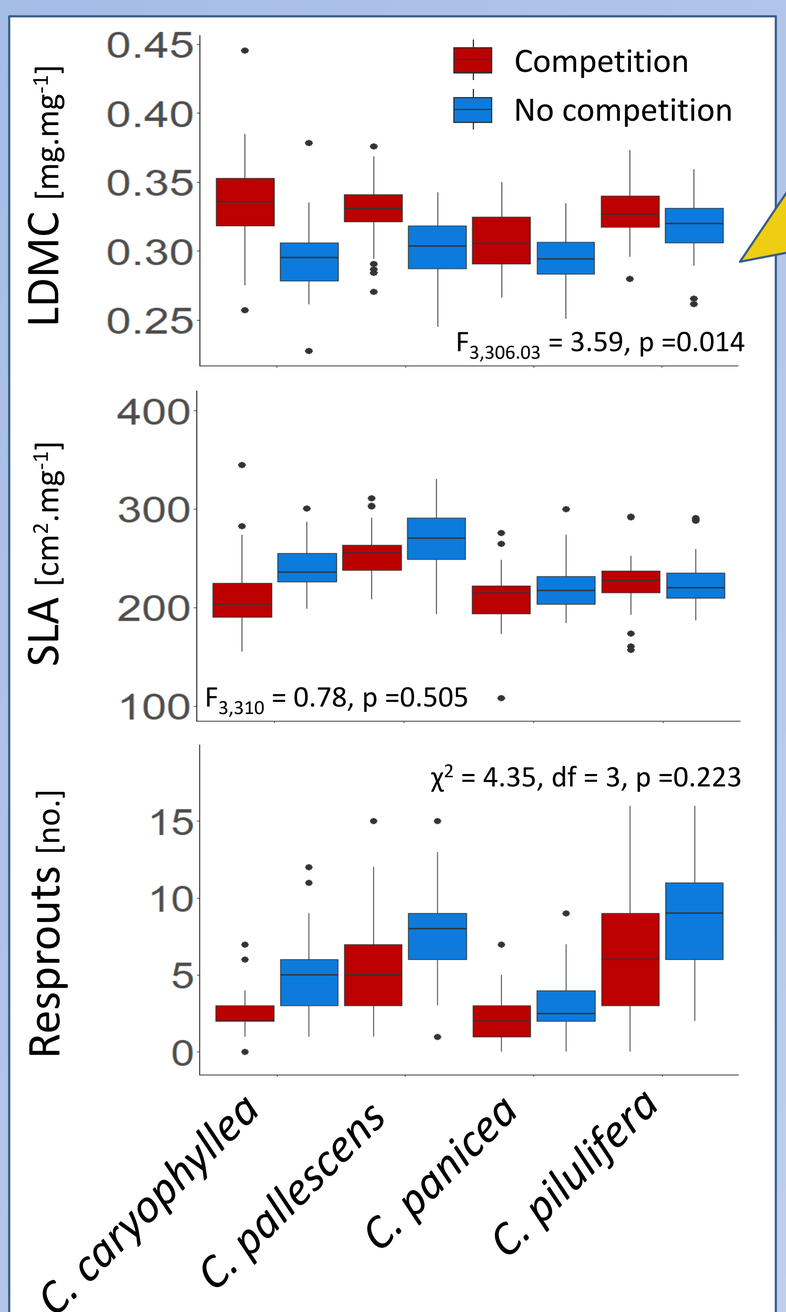


Fig. 2: Species * Competition interaction.

Is there some intra-specific trait variability between populations?

- Intraspecific variability (i.e., between populations) was found for at least some functional traits but it differed for individual species.

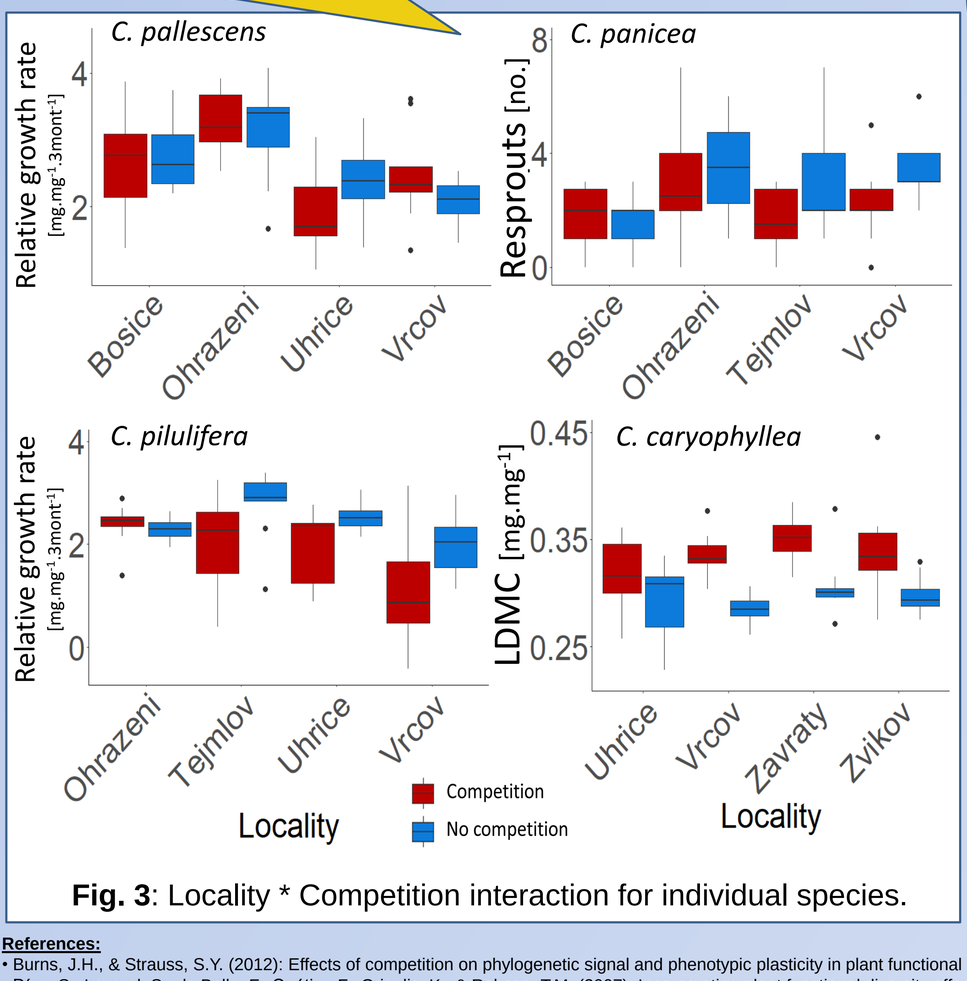


Fig. 3: Locality * Competition interaction for individual species.

Which traits are different between species? Are there other influencing factors?

- All traits differed between species.
- Although we used specie which are able to coexist quite well together, their traits were influenced not only by species identity but also by other factors (especially by competition, less important was locality of origin and water).

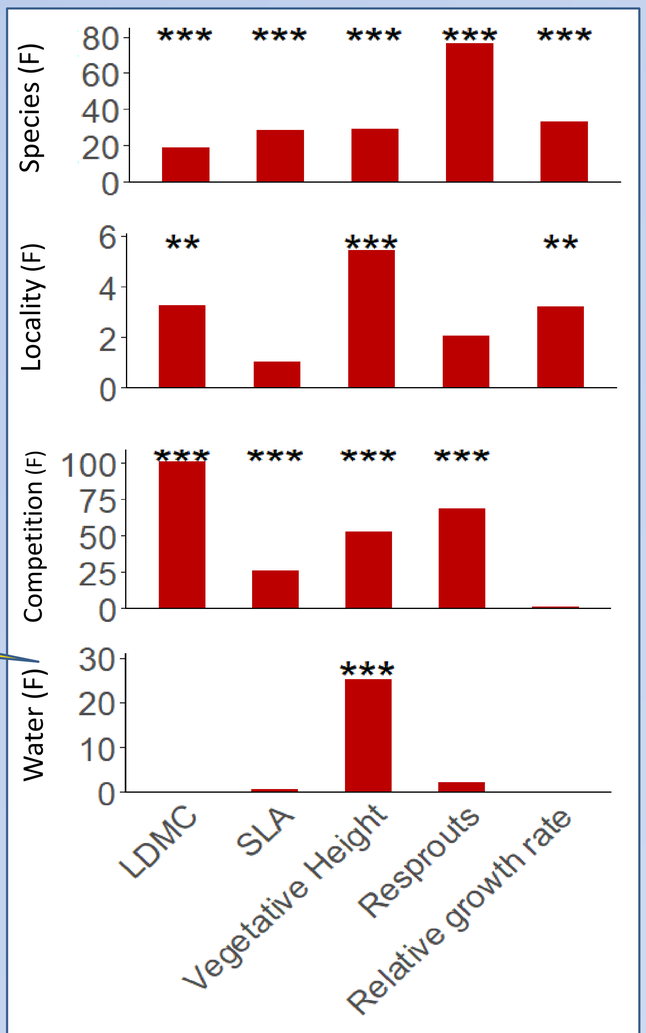


Fig. 1: Effect size of model terms.

Did the effect of competition differed between species?

- Competition influenced significantly many traits (Fig. 1, 2).
- For LDMC, the effect of competition differed even between species.

Methods:

Pot experiment

- Populations of four *Carex* species from four source localities from South Bohemia region. These species are able to co-occur although that they differ especially in the preferences on soil moisture gradient.
- 20 ramets of each population were grown in five randomly replicated blocks in factorial combinations of two moisture levels (water treatment), and with and without competition of *Holcus lanatus* (competition treatment).
- Three months of growing in pots in greenhouse (April – July 2020).
- Measurements of functional traits.

Functional trait measurement in the source localities

- Measurements of functional traits of 10 individuals from each population at the time of harvesting of pot experiment (July 2020).

Are trait differences consistent between and within species?

- Interspecific differences in some traits were quite stable, with their values closely correlated between greenhouse and field populations (e.g., SLA), while others were rather instable (e.g., LDMC).
- The trends within species only sometimes reflected the overall trend.

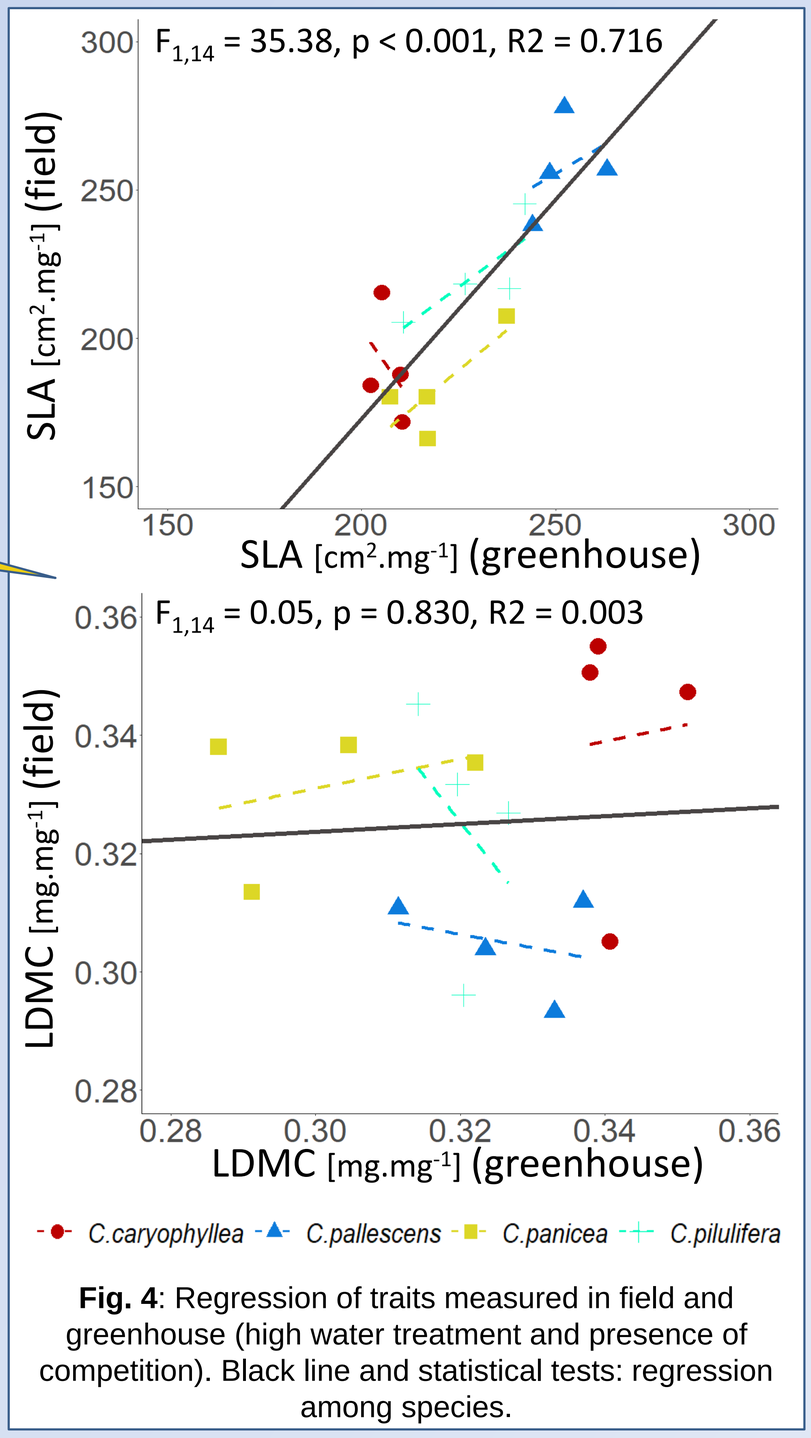
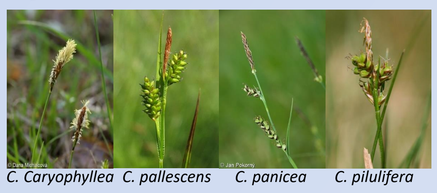


Fig. 4: Regression of traits measured in field and greenhouse (high water treatment and presence of competition). Black line and statistical tests: regression among species.

Conclusions:

- **The most important differences were between species.**
- **Competition influenced trait differences more than water or locality of origin.**
- **Intraspecific trait variability can be important for specific traits.**
- **Field-greenhouse comparison of traits showed the consistency or plasticity of traits between species.**



C. Caryophyllea C. pallescens C. panicea C. pilulifera

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