KOPAČKI RIT Park prirode Nature Park

Photosynthetic pigments of broccoli sprouts under water stress

UNIVERSITY OF ZAGREB FACULTY OF SCIENCE Department of Biology

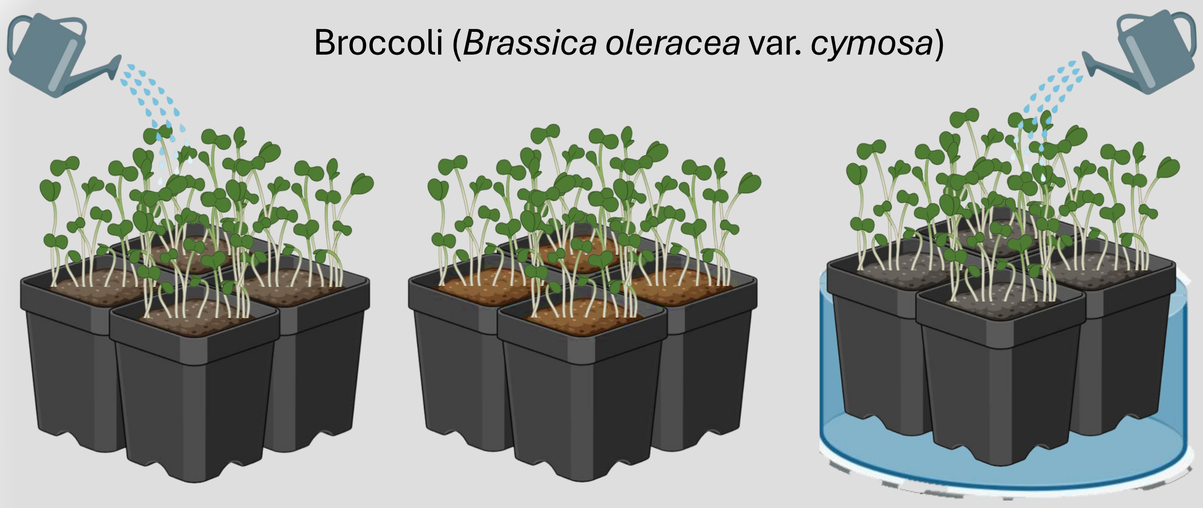
Fotosintetski pigmenti klijanaca brokule pod vodnim stresom

Daria Gmižić[1], Ivana Šola[1]
[1] University of Zagreb Faculty of Science, Department of Biology, Zagreb, Croatia

INTRODUCTION: Water stress, caused by lack or excess of water, may negatively impact photosynthesis leading to limited plant growth and development. Alterations in photosynthetic functioning are reflected in changes of photosynthetic pigments concentrations. Broccoli (*Brassica oleracea* var. *cymosa*) is considered a functional food because of a high content of bioactive compounds with a positive effect on human health. As the concentration of bioactive compounds depends on a process of photosynthesis, the aim of this study was to evaluate how does drought and flooding affect the photosynthetic pigments ratios in broccoli sprouts.

MATERIAL

Broccoli (*Brassica oleracea* var. *cymosa*)



Control
Every day

Drought
Every 3rd day

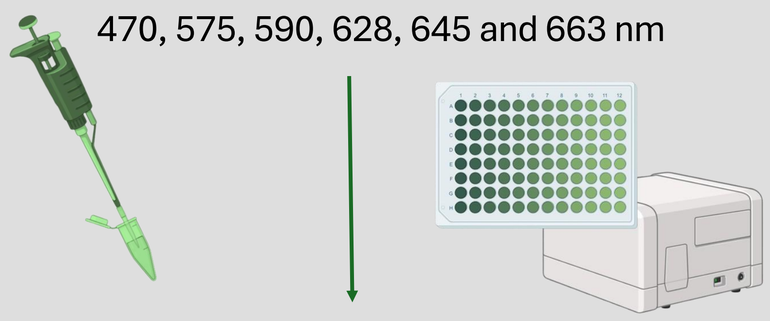
Flood
Constantly submerged

METHODS

extracts in 80% acetone

measuring absorbance at:

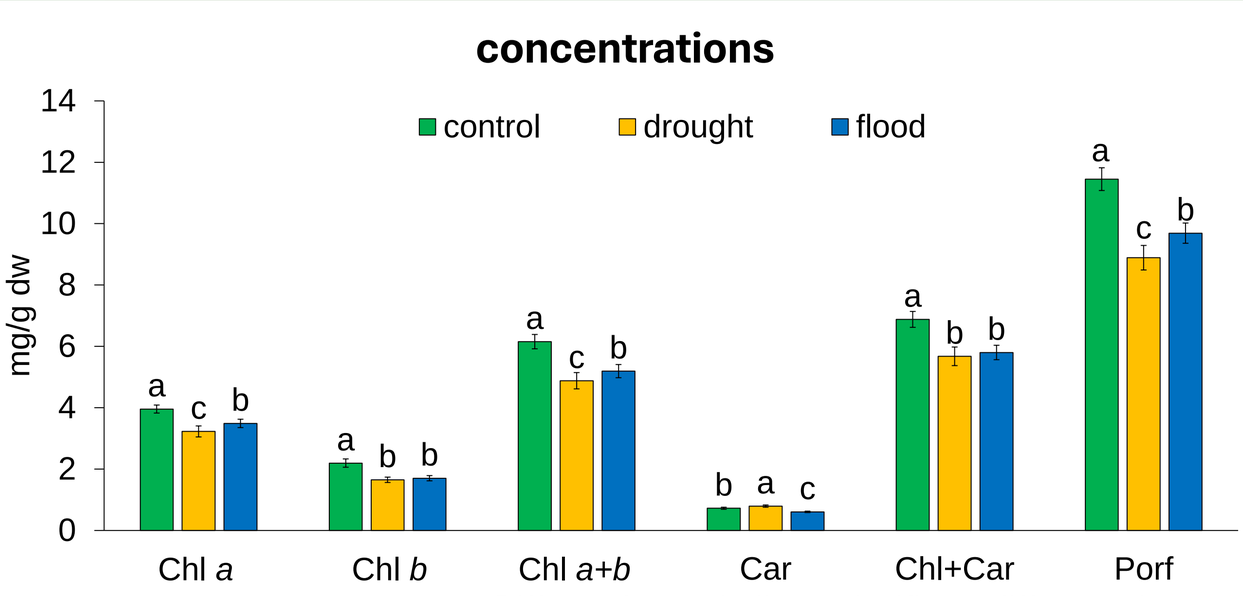
470, 575, 590, 628, 645 and 663 nm

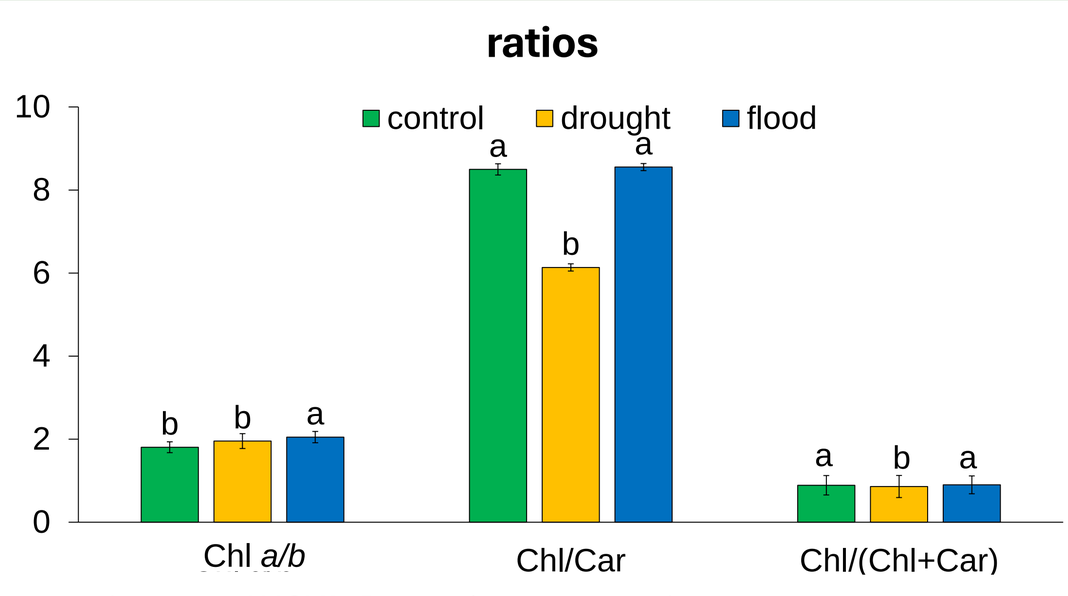


calculating the concentrations of:

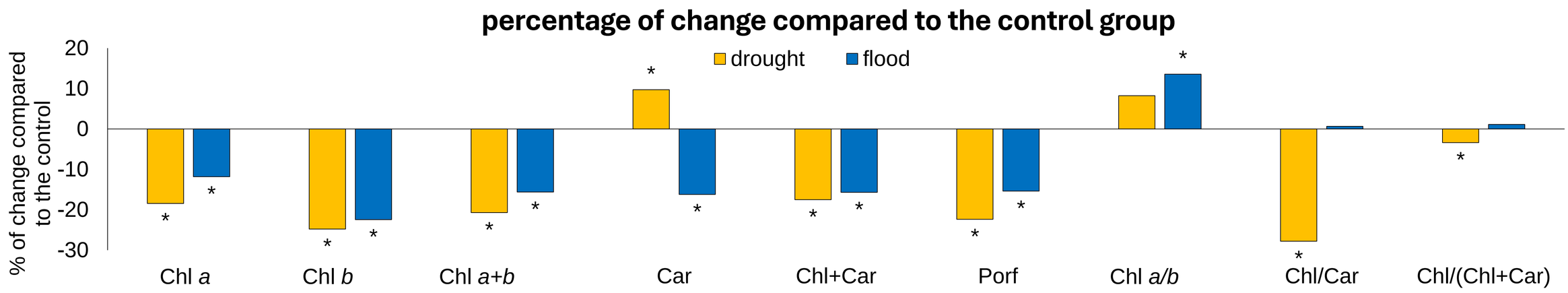
chlorophyll *a* (Chl *a*), Chl *b*, carotenoids (Car), porphyrins (Porf) and their ratios

RESULTS





Different letters indicate significant difference between treatments (one-way ANOVA, Duncan's test $p \leq 0.05$)



An asterisk (*) indicates significant difference between test groups and the control group (one-way ANOVA, Duncan's test $p \leq 0.05$)

CONCLUSION: The results show that both drought and flooding significantly impact the photosynthetic pigment concentrations and ratios of broccoli sprouts, differing in intensity and direction between pigments. In general, drought had a more pronounced negative impact on chlorophyll and porphyrins, while carotenoids showed differing response between two types of water stress, with increase under drought and decrease under flooding. These results indicate different adaptation mechanisms of photosynthetic apparatus under lack or excess of water in broccoli sprouts.

REFERENCE: Šola, I.; Gmižić, D.; Miškec, K.; Ludwig-Müller, J. Impact of Water Stress on Metabolic Intermediates and Regulators in Broccoli Sprouts, and Cellular Defense Potential of Their Extracts. *Int J Mol Sci* **2025**, 26, 632.

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HrZZ Croatian Science Foundation

TEMPHYS