IMPACT OF WATER DEFICIT ON PRIMARY METABOLISM AT THE WHOLE PLANT LEVEL IN BREAD WHEAT GROWN UNDER ELEVATED CO_2 AND HIGH TEMPERATURE AT DIFFERENT DEVELOPMENTAL STAGES

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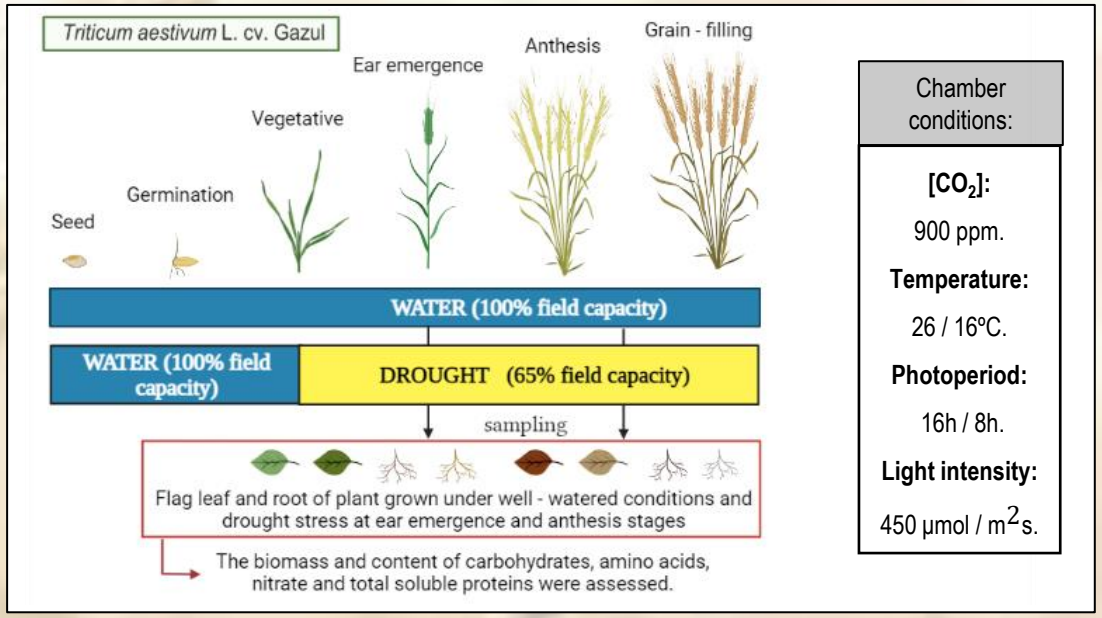
INTRODUCTION

- Predicted increases in the atmospheric CO_2 concentration and the earth's mean surface temperature will be accompanied by a higher incidence of drought events.
- These environmental changes are likely to adversely affect crop productivity and quality, including wheat, an essential food in the human diet.

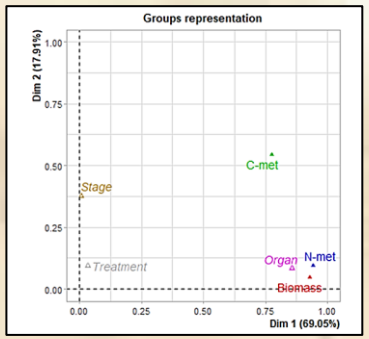
OBJECTIVE

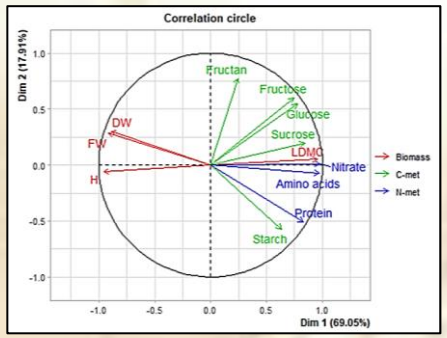
We investigated the **primary C-N metabolism** response to **drought stress** at the whole-plant level and its dependence on **plant development** in bread wheat grown under combined **elevated CO_2 and temperature.**

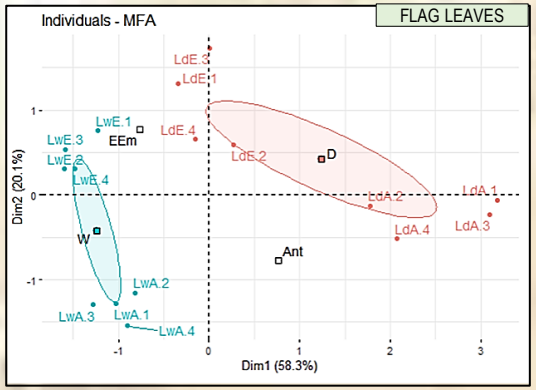
EXPERIMENTAL DESIGN

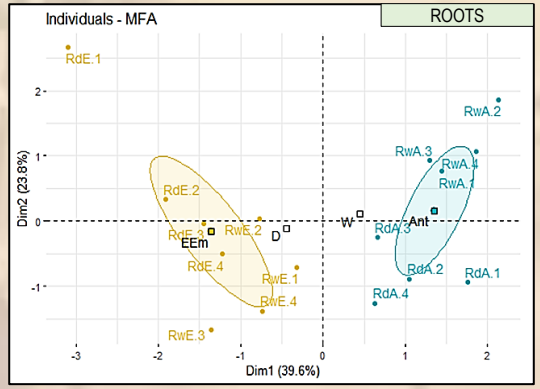


RESULTS



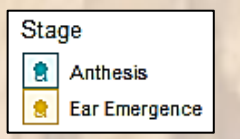






Multifactorial analysis revealed that the organ was the main factor explaining data variation. The physiological and biochemical traits in the flag leaves were more affected by drought than growth stage, leading to an accumulation of soluble carbohydrates, nitrate and amino acids.

By contrast, roots were affected by the developmental stages but not by the treatment. The root content of fructose, glucose, starch and amino acids was higher at ear emergence than anthesis, whereas the accumulation of sucrose, fructans, proteins and nitrate increased at the latest growth stage.



CONCLUSION

This study provides new insights into the **reprograming of primary metabolism at whole plant level** throughout the development in **response to the future climate scenario**, which could help to select traits ensuring sustainable food production systems that strengthen capacity for adaptation to climate change following the **Sustainable Development Goals of 2030 Agenda.**

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