

PROJECT TITLE

Effect of carbon dioxide (CO₂) enrichment on plant development and yield of sugar beet and its effect on the development of Cercospora leaf spot (caused by the fungus Cercospora beticola)

CONSORTIUM

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SUMMARY OF THE REPORT

In a free air carbondioxide (CO₂) enrichment facility (FACE) at Campus Klein Altendorf, sugar beet were cultivated. The aim was to study the effect of atmospheric CO₂-elevation to 600 ppm on the physiological processes of sugar beet yield formation in interaction with the dynamic of infestation by the fungal disease Cercospora leaf spot. A control field (ambient CO₂-concentration) and the field with elevated CO₂-concentration were split into one fungicide treated healthy half and one half inoculated by *Cercospora beticola*. Two sugar beet varieties were sown (3rd of May 2023): One genotype which was susceptible to *C. beticola* and one which was described as being only very slightly susceptible. Multiple manual and sensor measurements were conducted throughout the entire season. The evaluation of data is still work in progress. One first result is the photosynthetic efficiency: The variety susceptible to *C. beticola* reacted clearly with increased efficiency to the CO₂-elevation. Later in the season, this effect was not measured any more. This drop occurred around the 8th of August when cercospora leaf spot symptoms appeared in the inoculated treatment. By harvest, the 4th of October, beet yield was clearly increased by elevated CO₂-concentration with a much stronger effect for the variety of very slight susceptibility to *C. beticola*. The effects we already found need a proper verification by another year coming along with different weather and micorclimate conditions. Moreover, for future experiments, we will put an even stronger focus on plant development by conducting destructive intermediate harvests throughout the season.