

**PROJECT TITLE**

Rewiring photorespiration using natural and synthetic pathways to sustainably increase crop yield

**CONSORTIUM**

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## SUMMARY OF THE REPORT

The study aimed to evaluate transgenic sunflower lines in the Screen-House at Forschungszentrum Jülich. The material was developed to introduce a photorespiratory bypass, a novel pathway that has been created and tested in various organisms, including Arabidopsis. In total, six plants from six transgenic lines, originating from two different accessions (HA337 and HA466), were compared with their respective azygous controls. Every week, several agronomic and physiological traits were measured, including chlorophyll content, the number of leaves, the length and width of the newest fully developed leaf, and the plant's height. Concerning the phenotype, only one line, HA337-591, whether transgenic or not, exhibited significantly different growth behaviour. Since the phenotype could not be linked to the transgene, it is likely a result of chromosomal rearrangements during the development of the plant material. For all measured traits, no statistical difference was detected between transgenic and non-transgenic azygous plant material. Therefore, no second experiment was started. In summary, the introduction of the constructs for the photorespiratory bypass did not show a beneficial effect under the tested conditions. Alternative constructs with specific sunflower promoters may lead to different results.