PROJECT TITLE

Characterising the improved drought tolerance of winter wheat following the application of a new and novel fungicide.

CONSORTIUM

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SUMMARY OF THE REPORT

A large-scale glasshouse trial was conducted in collaboration with the National Plant Phenotyping Infrastructure (NaPPI) group at the University of Helsinki (https://www.helsinki.fi/en/infrastructures/national-plant-phenotyping). The “Large Plant” system is an automated HTP plant phenotyping platform, utilizing conveyor belts to transport plants between watering stations, as well as imaging stations where RGB and chlorophyll fluorescence images are recorded. The automated watering system allows individual plants to have bespoke watering regimens, enabling the imitation of varying water levels across the experiment. In this experiment, Inatreq was observed in two forms, as a whole product (as it has been observed in previous chapters), and the product without the active ingredient fenpicoxamid. This was to identify if the observed phenotype following the application of the fungicide was a result of the active ingredient itself, or the adjuvants also included in the product. This work builds upon previous findings where the application of Inatreq resulted in the reduction of stomatal conductance and an increase in biomass accumalation. This phenotyping platform will help to characterize the physiological and morphological effects of Inatreq, and how these may subsequently affect plants grown in varying levels of water availability. This high-capacity study in an automated glasshouse allowed us to observe greater populations of plants than would be possible in a controlled growth room with traditional methods. Reduction of stomatal conductance, which has been previously observed following the application of Inatreq, has commonly been acknowledged as a drought mitigation strategy, increasing hydraulic resistance, and therefore reducing evapotranspiration. It is hypothesized that if Inatreq was to initiate this response before an enforced drought, treated plants may be better prepared and therefore be less affected by low water availability.

It was found that when wheat plants grown under low water avilability, the appplication of inatreq was associated with a significantly higher projected shoot area than control plants, which can be used as a proxy for biomass accumalation . As well as improved shoot area, it was observed that plants treated Inatreq also had significantly improved photosynthetic efficiency.