

PROJECT TITLE

Testing root hypergravitropism as a trait affecting drought tolerance in barley

CONSORTIUM

P 1	Silvio Salvi		
P 2	Raffaella Balzano		

SUMMARY OF THE REPORT

The aim of the project "HYPERROOTS" was to analyze the ability of three hypergravitropic barley (*Hordeum vulgare* L.) mutant lines to better cope with drought stress when compared to wild type (Morex cv.) by using the GrowScreen- Rhizo platform located at the institute IBG-2: Plant Sciences, Forschungszentrum Jülich in Germany.

The aim of this experiment was to test if barley lines showing enhanced root gravitropic growth provide any advantage in terms of tolerance to reduced soil water availability .

The three mutant lines (egt1a, egt1 b and egt2) have been identified within the chemically (NaN₃) mutagenized barley population TILLMore, in the Morex cv. genetic background (Talamè et al. 2008; Bovina et al. 2011).

In the GrowScreen- Rhizo platform, plants were grown for 3 weeks under three different conditions:

-control level: rhizotrons filled with "well-watered soil" (70% water content);

-drought condition: rhizotron will be filled with "dry soil" (54% water content);

- semi-drought condition: two layers of soil with "well-watered soil" at the rhizotron bottom, and "dry soil" at the top. The semi-drought two layer setting was meant to mimic common field drought conditions with available deep-soil water.

Roots and shoot traits were collected every second day. At the end of the experiment, destructive measurements were conducted to analyze root and shoot dry weight and shoot relative water content. Root images were analyzed following protocols available in GrowScreen Rhizo 1 platform including PaintRHIZO and WinRhizo softwares (Nagel et al. 2012).

All quantitative measurements and comparisons were evaluated following a statistical approach. On the basis of the results obtained, these mutants show considerable differences regarding the total visible length of the roots, as well as for the root angle.

Strategies of the mutants to cope with the drought conditions are not yet clear.