Transnational Access Report

1. General Information

Project Acronym (ID):	CERGEN_ROOT
Project Title	Root diversity of cereal genetic resources – origin vs. ploidy.
Installation used	GROWSCREEN-Rhizo
Name of Group Leader	Gernot Bodner
Name of organization	University of Natural Resources and Life Sciences Vienna

2. Project summary (max. 250 words)

The project is aimed to determine the effect of genetic background (ploidy level and breeding) and hydrological regime at the site of origin in shaping the root system (deep vs sallow), developing the rooting strategies (exploitive vs explorative) and diversity in anatomical root characteristics (xylem vessels).

Diversity in root phenotypes (root architecture, morphology and anatomy) and their functional roll in water uptake of a set of 12 durum wheat landraces and wild species originated from a wide range of climates (Csa, BSk according to Köppen-Geiger) and annual rainfall (150 to 590 mm) were studied.

Plants were grown in rhizotrons under optimum moisture for four weeks in the PhyTec Experimental Greenhouse at Forschungszentrum Jülich (FZJ).

Plant growth and development were analyzed at both above and below-ground parts by measuring physiological traits (Gas exchange parameters, leaf area, biomass) and daily root imaging (the visible portion of root system facing rhizotrons' transparent plate) using automated GROWSCREEN-Rhizo phenotyping system on 6 replications of each genotype. This will allow identifying the functional relations between roots and shoot traits in terms of plant water uptake.

3. Main achievements (max. 250 words)

Analysis of the collected root data (root architecture, morphology and anatomy) and physiological traits (leaf area and stomatal conductance) should reveal the (1) functional relations between root and leaf traits and (2) contribution of genetic background and hydrological regime in shaping the root system and rooting strategies in terms of water uptake among investigated landraces and wild species. Thereby, a root based criteria of selection can be suggested for specific target environments.