

MORPHO-PHYSIOLOGICAL EVALUATION OF A COLLECTION OF TETRAPLOID WHEATS UNDER DIFFERENT NITROGEN LEVELS

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We have analyzed if and how domestication and breeding processes have modified shoot and root traits in relation to N availability. A set of 36 inbred lines representing three stages in tetraploid wheat evolution was used: 12 wild emmer lines (*T. dicoccoides*), 12 emmer primitive domestic lines (*T. dicoccum*), and 12 modern varieties (*T. durum*). For each inbred line uniform seeds were selected and after germination in Petri dishes transplanted into rhizotrons filled with peat soil (90x70x5 cm). Plants were grown for four weeks under semi-controlled conditions in the Phytoc Greenhouse (Forschungszentrum Jülich GmbH, Germany) and root and shoot traits were quantified using the automated rhizotron robot (GROWSCREEN-Rhizo, Nagel et al. 2012, Functional Plant Biology, 39, 891-904). Additional measurements were performed to quantify the chlorophyll content, photosynthetic performance and biomass. Leaf samples were also taken for a metabolomics analysis with the aim to look for significant differences in metabolites content related to domestication and breeding by a different nitrogen supply. The experiment was arranged in a randomized block design with replications (two replications x two N treatments x three species x 12 genotypes per specie x two plants per genotype).

The analysis of a range of traits indicates significant differences between subspecies, genotype, and between the two different N level for several traits. The experiment offered a unique opportunity to relate different type of information to get a deep insight on the process of domestication and in particular on the adaptation to contrasting levels of nitrogen availability among wild emmer, emmer and durum wheat.

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