

# Summary of Transnational Access to SCREEN Root LP

## 1. General Information

Project Acronym (ID):	Nitro-diversity
Project Title	Morpho-physiological evaluation of a collection of tetraploid wheats under different nitrogen levels.
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## 2. Duration of access

Begin of the project	End of the project
24 <sup>th</sup> September 2012	21 <sup>st</sup> December 2012

## 3. Project summary (max. 250 words)

The aim of the proposed project was to evaluate a collection of wheat genotypes under different nitrogen conditions considering both shoot and root traits. The collection was composed by 12 *T. durum*, 12 *T. dicoccum* and 12 *T. dicoccoides* genotypes. The basic question was to assess if and how domestication and breeding processes have modified shoot and root traits, in particular in relation to nitrogen availability.

## 4. Description of work (max. 250 words)

A collection of 36 genotypes including 12 *T. durum*, 12 *T. dicoccum* and 12 *T. dicoccoides* was used. For each genotype a subset of healthy seeds with uniform size were selected, surface sterilized and sowed in Petri dishes at 20-22°C for two days in darkness. After germination seedlings were transplanted into rhizotrons (90x70x5 cm, four plants per rhizotron) filled with peat soil (up to a volume of ~18 L). Plants were grown for four weeks under semi-controlled conditions in the Phytoc Greenhouse. The experimental design was a randomized block design with replication (two replications × two N treatments × three species × 12 genotypes per specie × two plants per genotype). Two separate experimental runs were set up. Root and shoot traits were quantified using the automated phenotyping system, SCREEN Root LP and the image-based software tool GROWSCREEN-Root (Nagel et al. 2012, *Functional Plant Biology*, 39, 891-904). In addition morpho-physiological measurements such as SPAD and Mini-PAM, were performed and biomass was quantified at the end of observation period.

## 5. Main achievements (max. 250 words)

We were able to obtain a complete set of phenotypic data related to plant growth, including both shoot and root traits, associated to nitrogen availability. Moreover, we were able to sample root and leaves tissues that will be used for further metabolomics and transcriptomics analysis. This will offer 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.