Mobilizing Diversity for improving biologigal N Fixation in peanut

OBJECTIFS

In the Div-N-Fix project, we aim to explore other possibilities that could lead to the improvement of BNF in peanut. The project contains two work packages (=GRAFIX and DIASPORA) that will explore two different and complementary sources of diversity regarding BNF. DIASPORA will focus mainly on wild species and the evaluation of their potential to recruit efficient rhizobia and exclude cheater strains, while the second WP, GRAFIX will use a collection of African cultivars and landraces to explore variation in BNF in the cultivated compartment of peanut. Peanut was introduced in Africa in the XVIth century and its adaption to African environments is partly due to the selection operated for centuries by African farmers in low-input farming systems. By screening this collection, we expect to find alleles that are particularly suitable to improve the BNF trait in African fields.
In a third part, WP3, we want to cross and share the results of the two work packages in order to build a larger project on BNF in peanut.
To summarize, the three objectives of the Div-N-Fix project are:
• Exploiting cultivated peanut genetic diversity to generate knowledge on the molecular basis controlling peanut biological nitrogen fixation in Senegalese fields (WP1).
o Grow a collection 300 peanut varieties representative of African peanut diversity in a Senegalese field and collect phenotypic data related to biological nitrogen fixation.
o Combine genotyping data available for these 300 varieties and the collected phenotypic data to perform genome-wide association study in order to identify quantitative trait loci (QTLs) controlling the traits related to biological nitrogen fixation.
o Characterize the symbiotic phenotype of one QTL that shows the highest potential to increase nitrogen fixation. Accessions carrying favourable alleles at this QTL will be studied using a combination of molecular, histological and physiological approaches. The effect of this QTL on the recruitment of efficient symbionts will also be analysed.
• confirming that the plant genotype has an influence on the recruitment of specific bacterial communities and to decipher how it further influences BNF in cultivated peanut (WP2).
o Investigate the influence of the plant genotype on the recruitment of specific bacterial communities and evaluate the associated BNF efficiency by comparing modern commercial peanut accessions, landraces and a selected wild Arachis species grown in natural or agricultural soils.
o Decipher the influence of peanut domestication and selection on the recruitment of bacterial communities in its endemic area (Argentina) compared to West African introduction area (Senegal).
• crossing and share the results of the two work packages in order to build a larger project on BNF in peanut.

Responsable :

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