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GPDUR PROJECT : GENETIC AND PHENOTYPIC EVALUATION OF DURUM WHEAT FOR SIMULTANEOUS IMPROVEMENT OF GRAIN YIELD AND PROTEIN CONTENT

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In France, cultivated area of durum wheat has dramatically decreased in few years, since 2010. The government decided to launch a large recovery plan in order to stimulate all the sector (from breeding to transformation). One of the major issue is the negative correlation between yield and protein content. Results of last registration year show that yield is improved to the detriment of protein content. This last trait is major for market accessibility, genetic progress for yield is then accessory. However, weakness in yield improvement penalizes durum wheat competitiveness regarding others crops which are included in the rotation.

Negative relation yield-proteins is not a durum wheat specificity. In bread wheat, recent studies on GPD (Grain Protein deviation) have shown that it is possible to broke this relation. And the determinism linked to nitrogen post-flowering starts to be known.

Our project propose to evaluate, with genetic and phenotypic approaches, a panel of lines selected to represent a large genetic diversity : french lines, international elites lines (from P. Tuberosa), EPO population (Evolution Pre-Breeding Population). All the lines have been genotyped with SNPs from TaBW280K chip from the french Breedwheat project.

The panel has been tested for disease resistance and for quality and it will be phenotyped in a multi-local network for GPD and specifically on 2 high throughput phenotyping platforms at field level (Mauguio, Gréoux) in order to try to understand and validate hypothesis for GPD determinism established in bread wheat. Phenotypic and genetic data will be used for association mapping analysis in order to identify molecular markers linked to GPD and compare the genetic architecture of this trait to what is known in bread wheat. At the end of the project, breeders will have access to genetic information that can be implemented in their breeding programs to improve the selection of progenitors advantageous for GPD.

ABSTRACT