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STUDY OF VARIABILITY OF β-GLUCAN IN WHEAT GENOTYPES

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Wheat is one of the most important cereal crops worldwide, used for the production of bread and pasta. To improve the quality of wheat-based foods, several breeding programs have been carried out, focusing on the content of proteins, pigments, antioxidants and, more recently, fiber.

In the last years the attention of cereal markets has started to focus on the beneficial properties of the non-digestible components of starch contained in different cereals. In fact, dietary fiber has a significant impact on the health of the human intestinal flora and has been recognized as a potential pharmaceutical preventative agent for chronic dietary diseases, if taken in appropriate doses.Among the fiber, β-glucans and arabinoxylans, whose structural properties affect the digestibility and fermentation of food, are the most represented in wheat.

The main objective of this research was to study the variability of β-glucans in wheat to identify genes involved in its controlling and accumulation.

A phenotypic characterization for β-glucan content of different genetic material including the CerealMed collection and tritordeum genotypes was accomplished. The CerealMed collection included 190 tetraploid wheat

genotypes selected within the Global Durum Wheat Panel (GDP).

The quantification of β-glucans was carried out using the Mixed-Linkage β-Glucan Assay Kit (Megazyme International Ireland Ltd, Wicklow, Ireland) based on the method approved by McCleary and Codd (1991) in two environments in order to find genetic loci involved in the trait.

B-glucan content showed low variability among the genotypes of the CerealMed collection. In particular, β-glucan amount ranged from 0.2% to 0.6%, with mean value of 0.37%, in line with what already observed in wheat genotypes. Large variability was observed among the set of tritordeum genotypes, and four lines were identified as best candidate for crossing with durum wheat genotypes. β-glucan content varied from 0.52% to 2.08% with four lines showed up to 2%. Therefore, screening of breeding lines, modern varieties, "ancient" varieties, tetraploid wild genotypes and Tritordeum for β-glucan content can be the key to identify useful genotypes to be adopted in interspecific transfer programs for grain quality improvement.