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THE CIRCE PROJECT: MOLECULAR TRACEABILITY AND TECHNOLOGICAL/NUTRITIONAL QUALITY CHARACTERIZATION FOR THE VALORISATION OF SICILIAN DURUM WHEAT LANDRACES

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Durum wheat is one of the most important crops in Italy and Sicily in particular, because it is the second Region regarding its production and it has a long history of durum wheat cultivation. Moreover, it is particularly rich in landraces. The spread of modern cultivars in the mid-20th century caused a decrease in their cultivation resulting in the risk of losing these genetic resources. However, in the latter years, the interest in these genotypes has risen again and the economic value of their product is high. Unfortunately, some claims, not supported by scientific evidence, are being made about their nutritional properties, creating confusion among consumers. Moreover, the risk of misidentification and fraud, together with the lack of traceability, causes concerns in all the actors of the entire food chain. The objective of the project CIRCE is to establish the genetic identity of the 5 most important Sicilian durum wheat landraces (Bidì, Russello, Perciasacchi, Timilia Reste Bianche, Timilia Reste Nere), in order to set up a traceability system based on Single Nucleotide Polymorphism (SNP) genotyping. Furthermore, these varieties have been cultivated for 2 years in 3 different localities along with 3 modern varieties (Iride, Orizzonte, Simeto) to evaluate any difference in nutritional and technological properties in relation to the environment.

For the genotyping, different landraces accessions from farmers, custodian farmers and research entities have been collected, along with the most cultivated modern varieties in Sicily. The 7K Wheat Array (TraitGenetics GmbH, Gatersleben, Germany), which includes 6707 polymorphic SNP, are used and the results will allow us to find a set of common intra-genotype SNP capable to discriminate the different accessions. Technological quality is evaluated calculating the percentage of Unextractable Polymeric Protein (%UPP) through Size-Exclusion Chromatography, a parameter correlated to alveographic measures. Regarding the nutritional characterization, different compounds are quantified: total and water-extractable arabinoxylan, fructans and amylase/trypsin-inhibitors (ATI); the latter two are putatively involved in non-coeliac wheat sensitivity, so these analyses will give some evidence about the difference in healthy properties between landraces and modern varieties, also in relation to the growing conditions. The project CIRCE aims to valorise typical Sicilian durum wheat production and to explore and exploit these genetic resources. *CIRCE project has been funded by PSR SICILIA MISURA 19.1/16.1 of GAL ISC MADONIE (CUP F72C21000270009) and belong to the EIP AGRI (Agricultural European Innovation Partnership), as a part of EU Common Agricultural Policy (CAP) and works to foster competitive and sustainable farming and forestry that "achieves more and better from less".*