Proceedings of the LXV SIGA Annual Congress
Piacenza, 6/9 September, 2022
ISBN: **978-88-944843-3-5**

Oral Communication Abstract – 7.07

EVALUATION OF GENETIC DIVERSITY OF SICILIAN AUTOCHTHONOUS TETRAPLOID WHEAT VARIETIES BY GLUTEN PROTEIN ANALYSIS

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conservation varieties, autochthonous wheat, genetic diversity, gluten proteins, traceability

In the latter years there has been an increasing interest in autochthonous wheats, including landraces and historical varieties, especially in Italy, as their products are perceived healthier and more "natural" by consumers. Since 2009 these genotypes can be officially registered as "conservation varieties" in which it is not mandatory to accomplish the DUS (distinctiveness, uniformity and stability) criteria.

Sicily is the Italian Region that mostly contributes to the National Register of conservation varieties because 23 out of the 27 varieties there reported are from this area. Moreover, the products obtained with Sicilian autochthonous varieties (such as pasta, bread and semolina….) can be found on the shelves of large retailers.

These ancient varieties attract not only consumers, but also breeders, despite their low productivity, because of their genetic diversity and wide adaptability to different environmental conditions. Given their increasing interest, it is important that such varieties are traceable and possibly certifiable, but their lack of uniformity makes these goals difficult and therefore they are vulnerable to fraud.

Gluten proteins, gliadins and glutenins, are the main wheat storage

proteins and their electrophoretic patterns are used both for variety description and technological quality evaluation. This latter can be predicted also by the determination of the percentage of Unextractable Polymeric Proteins (%UPP), directly related to gluten strength, by Size Exclusion High-performance liquid chromatography (SE-HPLC).

In this work we have analyzed gluten protein composition of 57 accessions belonging to 18 Sicilian tetraploid wheat conservation varieties, taking into account both individual spikes and a bulk, grown in different locations in two years, in comparison to 4 modern durum wheat cultivars. Electrophoretic pattern of gliadin and glutenin subunits revealed a wide intra-accession and intra-variety variability, but the gliadin electrophoretic pattern of bulks was uniform inside each ancient variety and this paves the way to use them for traceability.

SE-HPLC analyses revealed that in general, as expected, modern varieties have a %UPP higher than the ancient ones, but in 2019, when growing conditions were not ideal for modern varieties, the autochthonous varieties performed better than the modern ones, confirming their known better capacity to withstand adverse conditions.

Noteworthy was the observation that the landrace “Russello” showed a %UPP comparable to modern cultivars in both years, making it attractive as raw material for food processing.

This research has been funded by the project CA.VA.SI.F.D. (Characterization of Sicilian autochthonous varieties of durum wheat) of the Department of Agriculture of Sicilian Region.