Proceedings of the LXVI SIGA Annual Congress
Bari, 5/8 September, 2023
ISBN: **978-88-944843-4-2**

Poster Communication Abstract – 3.21

EXPLORING THE POTENTIAL OF CELL SUSPENSION CULTURES IN WHEAT: INVESTIGATING THE IMPACT OF STARCH MUTANTS ON GROWTH AND METABOLISM

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cell suspension culture, bread wheat, starch mutants, plant metabolism

Plant suspension cultures have emerged as valuable tools in various applications, offering researchers the opportunity to overcome the structural complexity of whole plant organisms. Cell suspension cultures offer several advantages, including homogeneous cell populations, abundant material availability, rapid cell growth, and reproducible conditions, making them an ideal small-scale system for studying cell metabolism under diverse conditions. However, the utilization of cell suspension cultures in cereal crops, particularly in wheat, has been limited. Establishing cell cultures in staple crops like wheat holds great potential as a model system for advancements in New Breeding Technologies (NBTs).

In this study, our focus is on a set of bread wheat starch mutants previously generated through TILLING, targeting key genes involved in starch biosynthesis. The three mutant lines, namely Cad-GBSSI*, Cad-SSIIa*, and Cad-SBEIIa*, exhibit varying amylose content compared to the control, with Cad-GBSSI* having negligible amylose and Cad-SBEIIa* showing a significantly increased amylose content (70% vs. 30% of total starch). Alterations in starch composition are known to have substantial impacts on plant physiology, seed metabolism, and major traits. Our project aims to establish cell suspension cultures for the three starch mutants to investigate the influence of different starch compositions on wheat cell suspension growth and metabolism. Immature embryos from the green seeds of the starch mutants and the control were isolated and cultured at 24°C for

21 days on a callus induction medium in the dark. Promising callus samples exhibiting robust growth were subsequently transferred to sterile flasks and cultured in a liquid medium at 24°C.

This communication presents the establishment of cell suspension cultures for the three starch mutants and the control, accompanied by preliminary data on their morphological characterization. Furthermore, these cell cultures serve as a model system to explore the effects of altered starch composition on cell metabolism in wheat, offering insights into the intricate interplay between starch biosynthesis and plant physiology.