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Abstract – SY08

ANTHOCYANINS, PLANT FANCY INDUCERS OF RESILIENCE

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Anthocyanins are specialized plant metabolites which accumulate upon exposure to drought, salt stress, UV stress, high light, and high temperature. However, their role in plant response to environmental stresses is still controversial. To date, the major hypothesis is that anthocyanins mediate plant stress responses by their antioxidant and light-screening properties. In this work, we decided to study if anthocyanin accumulation could affect plant development and whether these changes could improve plant physiological response to stress. We induced anthocyanin over-accumulation in all the tissue of tobacco plants by means of transgenic overexpression of StAN1, a potato gene coding for an R2R3MYB anthocyanin activator. By comparing the transgenic and the wild type plants, we observed that the cyanic tobacco leaves showed several leaf traits typically reported to be part of the Shade Avoidance Response (SAR) in plants. In particular, low Leaf Mass per Area, cell enlargement, and low vasculature density have been evidenced. In addition, the cyanic leaves showed higher water content compared to the wild type ones. Even showing improved photochemical efficiency thanks to faster electron transport and lower dissipation index, gas exchanges were found to be lower in the cyanic plants compared to the wild type ones. In conclusion, this set of anatomical, morphological and physiological adaptations induced by anthocyanins at leaf level led to a more efficient photochemistry, an improved water status, and a reduced water consumption. These results provide evidence that anthocyanins accumulation could represent an inducer of beneficial morpho-anatomical adaptations for a more resilient phenotype under stress.