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

Poster Communication Abstract – 7.34

A DOUBLE FACE OF A POTATO R2R3-MYB TRANSCRIPTION FACTOR: ANTHOCYANIN OR PROGRAMMED CELL DEATH CONTROL

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transcription factor, development, phenylpropanoids, paralogs, senescence

Plant R2R3-MYBs are transcription factors involved in different types of physiological events spanning from specialized metabolism to organ development control. We previously found that two paralog R2R3 MYB genes named as *ScAN1* and *ScAN2*, isolated from the wild potato *Solanum commersonii,* were able to induce either anthocyanins or senescence when ectopically overexpressed in *Nicotiana* benthamiana. The idea of an overlapping regulation between anthocyanin and senescence is enforced by different events of plant biology i.e. autumn red foliage, hypertensive response to pathogens and tolerance to abiotic stress. With this in mind, the objective of our study was to find out more about the activity of these paralogs. In transgenic tissues where one of these genes has been ectopically overexpressed, we observed the presence apoptotic-like bodies. Further localization of gene expression, tested by using GUS reporter, revealed transcriptional regulation of one paralog in potato root tissues known to be subjected to a developmental cell death during lateral root development. Transcriptomic evidence also revealed that ScAN2gene transcripts are triggered during interaction with the necrotrophic fungi Rhizoctonia solani,in combination with chlorophyll degradation and senescent symptoms. We believe that this double function of *ScAN2* depends upon the genomic

context where it works. In fact, *N.* tabacum plants stably overexpressing *ScAN2* do not show evident signs of senescence; by contrast, they possess high level of phenolamides, molecules involved in biotic stress signaling and several developmental processes. Basing on these results, we hypothesize that the potato anthocyanin R2R3 MYBs had maintained a double evolutive role connected to the induction of programmed cell death and phenylproanoid metabolism. With these results we provide novel data regarding the association between polyphenols and either plant senescence or plant cell death.