Proceedings of the SIGA-SEI-SIBV-SIPAV Web Workshop "Young Scientists for Plant Health"
16 December, 2020
ISBN **978-88-944843-1-1**

Poster Communication Abstract – PH.26

EXPLORING TOMATO RESISTANCE AGAINST THE PARASITIC WEED *PHELIPANCHE RAMOSA* THROUGH CRISPR/CAS9 TECHNOLOGY

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parasitic plants, P. ramosa, strigolactones, CRISPR/Cas9

Broomrapes are parasitic plants belonging to the genera *Orobanche* spp. and *Phelipanche* spp. They represents a serious biotic threat for various crops in Mediterranean basin, and in some regions of Europe and Asia. In Italy, tomato (*Solanum lycopersicum* L.) is one of the most important and traditional vegetable, and its extensive production can be severely affected by P. ramosa, which causes remarkable economical losses. Management practices result often inadequate to control this parasitic plant, mainly due to its underground mechanism of parasitism and hard-to-eradicate seed bank. It is well established that strigolactones (SLs), a class of phytohormones derived from carotenoids, induce the germination of P. ramosa seeds when exuded in the rhizosphere, therefore altering SLs release into the soil could represent a valid resistance strategy. Tomato knock-out mutants, for two of the key genes of the SLs biosynthetic pathway (SlCCD7 and SlCCD8), have been produced by CRISPR/Cas9 technology. The Slccd7 and Slccd8 mutant plants have been genotyped, phenotyped for some morphological characters (e.g. plant height, secondary branching) and advanced until generation T3. Phenotypic analysis, performed on generation T2, has shown the typical traits associated with the lack of SLs: reduced plant height and increased secondary branching. The Slccd7 and Slccd8 mutant resistance to P. ramosa is underway and it will employ a soilless pathogenicity assays previously established in our laboratory. SLs deficient mutants could find an application within the development of tomato rootstock by staking also other interesting traits (e.g. nematode resistance). Additionally, we are also investigating genes involved in the transport of SLs, in fact blocking their release into the soil by disrupting the transport mechanism while keeping biosynthesis active would likely produce mutants resistant to broomrapes but with no effects on phenotype.