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STRESS TOLERANCE IN EGGPLANT: CAN DOWNY MILDEW RESISTANCE 6 (DMR6) PLAY A ROLE?

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Climate change has a strong impact on agricultural production, causing severe yield losses due to both direct effects, like rising temperatures and reduction of water availability, and indirect effects, such as modifications in plant development or in the interactions occurring between crops, pests, and pathogens. Thus, in the coming years the world food security will largely depend on the availability of biotic and abiotic stress-tolerant plants. To this end, a significant contribution might be provided by the New Plant Breeding Techniques (NPBT) such as genome editing, and in particular CRISPR/Cas9 technology, which offer new opportunities to crop improvement.

The *Downy Mildew Resistance 6* (*DMR6*) gene encodes an enzyme involved in salicylic acid (SA) degradation, and its inactivation in tomato was found to increase SA levels and to confer disease tolerance to distinct classes of pathogens: bacteria, oomycetes, and fungi. Since SA has been also recognized as an abiotic stress-tolerance enhancer, *DMR6* knockout might induce both biotic and abiotic stress tolerance in plants.

CRISPR/Cas9-mediated knockout of *DMR6-1* gene was obtained in *Solanum melongena*, cv. 'Black Beauty', by applying an *Agrobacterium tumefaciens* mediated co-culture protocol. A large T_0 generation was screened through Sanger sequencing to check for mutations in the target region and one plant resulted to be edited with an efficiency of about 70%. It showed small deletions in *DMR6-1* sequence, causing frameshift mutations and thus knockout of the gene functionality. The plant was self-crossed and the T_1 generation obtained, with the goal to fix the mutation. Molecular and phenotypic analyses are being performed on T_1 individuals in order to

assess their tolerance to water deprivation as well as to biotic stresses caused by *Phytophthora infestans* and *P. capsici*.