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299-P1 - The inactivation of MdDIPM4 by CRISPR/Cas9 editing reduces the susceptibility of apple to fire blight disease

Monday, July 15, 2019 - 18:00 - 19:00

SEC - Hall 5

Abstract

Fire blight, caused by the bacterium *Erwinia amylovora* (*E.a.*), is one of the most economically important and invasive diseases affecting apple (*Malus x domestica*). The molecular mechanisms of *E.a.*-apple interaction are widely elucidated but the management of the disease remains still arduous. Apple protein MdDIPM4 interacts with the DspA/E effector, mandatory for the pathogenesis of *Erwinia amylovora*, but its biological function is still unknown. In this work, the knock-out of *MdDIPM4* has been produced in two *Malus x domestica* susceptible varieties, by using the CRISPR/Cas9 system delivered via *Agrobacterium tumefaciens*. Fifty-seven transgenic lines were analyzed using a Next Generation Sequencing to identify the CRISPR/Cas9-induced mutations. Some edited plants with a loss of function mutation were selected and inoculated with the pathogen. An increased resistance was observed, demonstrating that *MdDIPM4* is involved in plant susceptibility to fire blight. Moreover, with the aim of producing plants 'clean' from exogenous DNA, we used a heat shock-inducible FLP-FRT recombination system designed specifically to remove the entire T-DNA in those plants with an increased pathogen resistance. Our data demonstrated the possibility to produce apple varieties more resistant to fire blight by using the CRISPR/Cas9 technology, and containing a minimal trace of exogenous DNA. These plants may be used in further analysis to elucidate how *MdDIPM4* is involved in the onset of the disease.

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