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Isolation of novel *Arabidopsis* mutant plants altered in their pathogen defense response

Plant pathogens cause disease in many plants, which results in significant yield loss in crop plants world-wide. To defend against the invading pathogens, plants contain a specific pathogen defense system called gene-for-gene resistance. This system recognizes the presence of avirulence genes in pathogens. To understand how this process works, a genetic approach is being used with the model plant Arabidopsis. A variety of disease susceptible Arabidopsis, called RLD, were mutagenized and then screened by the researcher for mutants resistant to bacteria expressing the avirulence gene avrRPS4. These mutants were chosen for their phenotypic characteristics, and then screened for RLD background. The resulting mutants are called suppressors of RPS4-RLD, or srfr. Two independent srfr mutants (srfr1 and srfr3) specifically resistant to pathogens that express avrRPS4 have been identified from over two thousand specimens by the researcher. These suppressor mutants are the first to reverse disease susceptibility in an avirulence gene-specific manner, and provide a unique tool to identify additional important genes in the Arabidopsis disease resistance signaling pathway. Through genetic mapping of the srfr1 and srfr3 plants the researcher has determined that the primitive location for the mutation is on the bottom half of chromosome four. This was done by using known molecular markers and by examining recombination frequencies. With more refined mapping markers the exact location of the mutation will be identified. The knowledge gained from this project will ultimately be used to improve pathogen resistance in crop plants, thus increasing the yield of corn, soybeans and wheat.