In Planta - Complementation of Clavibacter Michiganensis Subsp. sepedonicus Strains Deficient in Cellulase Production or HR Induction Restores Virulence

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Abstract

Clavibacter michiganensis subsp. sepedonicus, a Gram positive bacterium that causes bacterial ring rot of potato, was studied in eggplant, an alternate host, using strains that differed in phenotype. Two factors affecting virulence, the ability to induce a hypersensitive response (HR) and cellulase production, were studied. A plasmid-free isolate of *C.* michiganensis *subsp.*sepedonicus that causes HR on tobacco but is unable to produce cellulase multiplied efficiently*in planta*, but caused only weak symptoms. In contrast, a strain that is unable to induce HR on tobacco but produces cellulase was impaired in the ability to multiply in the host and caused no symptoms. When the two non-virulent strains were coinoculated into eggplants, typical disease symptoms developed. This enhancement was not due to formation of a new phenotype or significant increases in population density of either of the strains. Our results suggest that both cellulase production and the ability to induce HR are required for a successful infection process and disease induction by *C.* michiganensis subsp. sepedonicus. Our results additionally suggest that the ability to induce HR on non-host plants is required for multiplication in the host plant, whereas cellulase expression is necessary for induction of disease symptoms.