Survival and Epiphytic Fitness of a Nonpathogenic Mutant of *Xanthomonas campestris* pv. Glycines

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Xanthomonas campestris pv. glycines is the causal agent of bacterial pustule disease of soybeans. The objective of this work was to construct a nonpathogenic mutant derived from the pathogenic wild-type strain YR32 and to evaluate its effectiveness in preventing growth of its parent on the soybean phyllosphere. A mini-Tn*5*-derived transposon was used to generate nonpathogenic mutants. Southern hybridization and pulsed-field gel electrophoresis confirmed the presence of a single transposon in each of the nonpathogenic mutants. One of the nonpathogenic mutants, M715, failed to induce a hypersensitive response in tomato leaves. An ice nucleation gene (*inaZ*) carried in pJL1703 was introduced into strain YR32 as a reporter gene to demonstrate that the presence of M715 could reduce colonization of the soybean phyllosphere by YR32. de Wit serial replacement analysis showed that M715 competed equally with its wild-type parental strain, YR32. Epiphytic fitness analysis of YR32 in the greenhouse indicated that the population dynamics of strains YR32, YR32(pJL1703), and M715 were similar, although the density of the mutant was slightly less than that of its parent. The M715 mutant was able to survive for 16 days after inoculation on soybean leaves and maintained population densities of approximately 10^4 to 10^5 cells g (fresh weight) of leaf^{-1}. Therefore, M715 shows promise as an effective biocontrol agent for bacterial pustule disease in soybeans.

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