



Bacterial Wilt Host Relations

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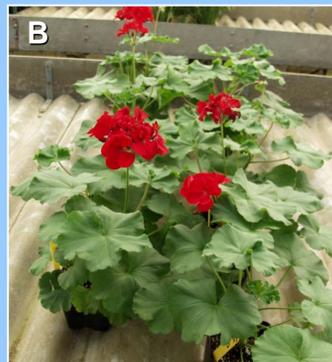
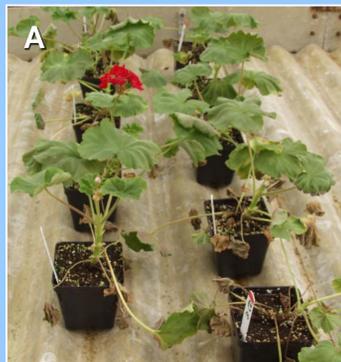


The Bacterial Wilt strain of *Ralstonia* known as Race 3, Biovar 2 (R3B2) had never been reported in the US until 1999 when it was introduced via geranium cuttings. Since R3B2 is considered a potential threat to the potato industry if the bacterium becomes established and spreads into major potato producing areas in the US. *Ralstonia solanacearum* R3B2 was listed as one of the 10 plant pathogens in USDA's Agricultural Bioterrorism Protection Act of 2002.

Research objectives : 1) methods for disease control by inhibiting *Ralstonia* cell division, 2) genetic profiling of bacterial wilt strains entering North America and host range determination 3) identification of host resistance within geranium cultivars, and 4) examining pathogenicity of *Ralstonia* populations under cool weather conditions found in temperate climates. These studies are important steps towards better understanding the pathogen and preventing the disease from becoming established in the United States. Our research provides a direct benefit to the \$300 million per year geranium industry, and helps safeguard the \$1.2 billion per year US potato industry.

Phosphorous Acid Infection Prevention

Reduced or prevented root system infection of geranium cuttings by use of phosphorous acid (H_3PO_3). Phosphorous acid inhibits *R. solanacearum* cell division. (Plant Disease 90:798-802)

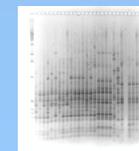


Plants inoculated with 6×10^7 cfu/g soil. Disease control "A", Plants treated with 15 g / 100 gal of phosphorous acid "B".

Genetic Fingerprinting

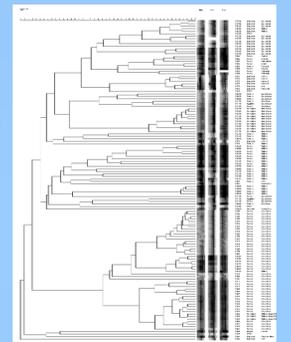
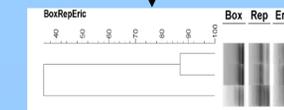
Developed rep-PCR protocols to clearly distinguish clonal populations of *R. solanacearum* that are entering the US. Determined that rep-PCR is one of the quickest and most effective way to identify the source of a *Ralstonia* outbreak when it occurs. (Phytopathology 99:1070-1077)

Individual rep-PCR gel



Fingerprints of many strains are compared to identify closely related strains.

Individual strain fingerprint developed from rep-PCR profiles from 3 primer sets



Pathogenicity at 18° and 30°

Evaluated strains of *R. solanacearum* from indigenous populations within the United States and from commercially imported ornamental propagative plant material. Certain Biovar 1 strains were found that were able to infect and produce wilt symptoms on potato and tomato at 18 °C and in some case at rates similar to strains belonging to R3B2 group. We found evidence that R3B2 strains are not unique in their ability to infect plants under cool weather conditions; other populations in other races of *R. solanacearum* also have the potential of infecting host plants under temperate conditions.



Potato wilt caused by an R3B2 strain at 18° C

Resistant Cultivars

Identified cultivars of scented and regal geraniums that are highly resistant to infection with R3B2. R3B2 does not colonize the roots of certain cultivars, and resistant cultivars may contribute to a breeding program to transfer this resistance to zonal geraniums. Zonal geraniums themselves were found to have varying degrees of resistance to *R. solanacearum*. (HortScience 44 (5): 1504-1508)



Sixty-one cultivars of geranium were screened for resistance to R3B2 and other *Ralstonia* strains commonly found infecting crops in North America. Zonal geraniums "A", Scented geranium "B".