Invasive Species Issues

May 2020

Ralstonia solanacearum race 3 biovar 2 (brown rot, bacterial wilt)

Ralstonia solanacearum is a bacterium that causes bacterial wilt in more than 200 different plant species. There are multiple races of *R. solanacearum*. Races differ in how virulent they are and the hosts they infect. There are also multiple biovars that differ based on nutrient requirements. Race 1 biovar 1 is native to the southern United States; other races and biovars are not native in the U.S. *Ralstonia solanacearum* race 3 biovar 2 (r3bv2) is of particular concern to the United States and causes brown rot in potato, Southern wilt in geranium, and bacterial wilt in tomato and eggplant. Unlike tropical races of *R. solanacearum*, race 3 biovar 2 is capable of causing disease at cooler temperatures. In 2020, r3bv2 was detected in the United States; eradication efforts were initiated.

Hosts and Damage

Ralstonia solanacearum has a very wide host range including common ornamental and crop species. Race 3 biovar 2 infects potato, tomato, geranium (*Pelargonium*), *Portulaca*, climbing nightshade, and chickweed. Not all hosts will display symptoms. In potato, dark brown streaks may appear in the vascular tissue of the stem which may be visible from the outside or after cutting the stem in cross-section. Leaves may exhibit upward curling, wilting, or yellowing. Potato tubers may have grayish-brown eyes, sticky ooze at the bud or stolon end, and may show grayish-brown discoloration within the tuber when cut open. In geranium, symptoms include yellowing and wilting of the lower leaves, upward curling of the leaves, and necrosis along leaf margins that have yellowed. Geranium stems may collapse resulting in whole plant mortality. Often, geraniums are symptomless.

Ralstonia solanacearum symptoms on potato. A) Brown discoloration inside the tuber, Ministry of Agriculture, Bugwood.org; B) Above ground wilt, National Plant Protection Organization, the Netherlands, Bugwood.org

Ralstonia solanacearum, wilt, chlorosis, and necrosis, geranium. Note the upturned margins., USDA APHIS PPQ, Bugwood.org

Symptoms of r3bv2 in potato may be mistaken for bacterial ring rot, blackleg disease, other wilt causing pathogens, drought, root damage, or nutrient deficiencies. In geranium, r3bv2 may be confused with bacterial blight. Plant samples should be submitted to a diagnostic lab for identification.

Clavibacter michiganensis subsp. *sepedonicus*, bacterial ring rot, tuber cracking in potato, Todd Steinlage, Alaska Div. Ag., PMC

Fusarium sp. wilt in potato causes yellow or necrotic lesions between veins, Howard F. Schwartz, Colorado State University, Bugwood.org

Xanthomonas sp. causing blight in geranium, symptoms include tan or brown round leaf spots, Nancy Gregory, University of Delaware, Bugwood.org

Vectors and Spread

Infected nursery stock and propagative material contribute to large scale spread of *Ralstonia solanacearum*. Asymptomatic plants can still shed large numbers of bacteria, resulting in spread of the pathogen. Localized spread of *R. solanacearum* occurs in soil and water where the pathogen can survive for up to two years after hosts have been removed. Contaminated equipment can also play a role in spreading the bacterium.

Pest Significance in Alaska

Detection or establishment of *R. solanacearum* in Alaska would be devastating to Alaska's potato industry due to regulatory costs and actions that would be incurred. If the pathogen were to become established, it would further damage the potato industry with production losses and costs of control. Establishment in nurseries and greenhouses would result in regulatory actions, including increased costs for control and losses of planting material.

Because *Ralstonia solanacearum* race 3 biovar 2 is a federally regulated plant disease, it is important to report suspected infections and not attempt to treat on one's own.

Additional Information

The State of Alaska Division of Agriculture can assist with plant pathogen identification and control questions. Please contact the Alaska Plant Materials Center - Plant Pathology Laboratory:
(907)745-8138 or todd.steinlage@alaska.gov

Pictures of plant diseases can be submitted for identification through our online pest portal at: https://pestreporter.alaska.edu/

For more information on this pathogen and others, visit our online course on Exotic Plant Pathogens available at: https://exoticplantdiseases.open.uaf.edu/

Header image citations L-R: 1)Biologische Bundesanstalt für Land- und Forstwirtschaft, Bugwood.org; 2)Ministry of Agriculture and Rural Affairs, Bugwood.org; 3)Biologische Bundesanstalt für Land- und Forstwirtschaft, Bugwood.org; 4) Central Science Laboratory, Harpenden, British Crown, Bugwood.org; 5) Joseph OBrien, USDA Forest Service, Bugwood.org

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