

Plant Disease Notes

Fusarium Root Rot of Garden Beans

Fusarium root rot on garden beans is caused by the fungus *Fusarium solani* f. sp. *phaseoli*. The fungus can attack older seedlings. It can destroy a crop when environmental conditions such as drought or flooded soils have caused reduced root growth. Fortunately, this disease usually causes little damage to unstressed plants.

Symptoms. Unlike other root rotting diseases, Fusarium root rot does not cause seed rots or damping-off of seedlings. Symptoms do not appear until a week or more after the seedling emerges. The first symptoms are narrow, long, red to brown streaks on the hypocotyls and taproot. The taproot later turns dark brown and cracks often develop lengthwise. The taproot may shrivel and die. Clusters of fibrous roots may develop above the shriveled taproot. These fibrous roots may keep the plant alive, and, under ideal growing conditions, few aboveground symptoms will be noted. Plants may be stunted, have an unthrifty color, and grow more slowly than healthy plants. Poor root function deprives them of nutrients and water. This can result in uneven plant stands. Symptoms may resemble Rhizoctonia root rot in some situations. Laboratory examination may be necessary for diagnosis of Fusarium root rot.

Persistence and Transmission.

The pathogen usually survives as thick-walled chlamydo spores in the soil. The spores germinate when stimulated by nutrients exuded by germinating seeds and root tips. Then the fungus penetrates the plant tissue. Chlamydo spores of *Fusarium* can germinate and reproduce near seed and roots of many non-host plants as well as organic matter. This means the pathogen can survive in the field indefinitely. The pathogen is moved around the field by wind, rain, irrigation water, farm implements, and any other agent or process capable of moving soil. With each successive crop of beans, pathogen populations increase and the disease becomes more severe. Plant damage is usually increased under environmental conditions that stress plants. These conditions include deep planting, soil compaction, hardpan layers, cool temperatures, high or low pH, low fertility, pesticide or fertilizer injury, and flooding or extended drought.

Control. Fusarium root rot can be controlled by using the following strategies:

- The best control measure is to plant in a warm, well-prepared, well-drained, and well-fertilized seedbed capable of supporting

rapid bean growth. Conditions that promote plant health and growth will reduce losses associated with Fusarium root rot.

- Minimize soil compaction. Soil compaction and the formation of a hard pan severely limits root growth and can decrease oxygen as water is held in the soil above the compacted soil.

- Use resistant varieties. Resistance can be overcome if conditions favor disease development.
 - Soil solarization can be effective in sterilizing the soil when environmental conditions are favorable.
- Fungicides are generally not effective in controlling Fusarium root rot.



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