

PLANT DISEASE CONTROL NOTES

EXTENSION DIVISION • VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

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VEGETABLE DISEASES

ROOT AND STEM ROTS OF BEANS

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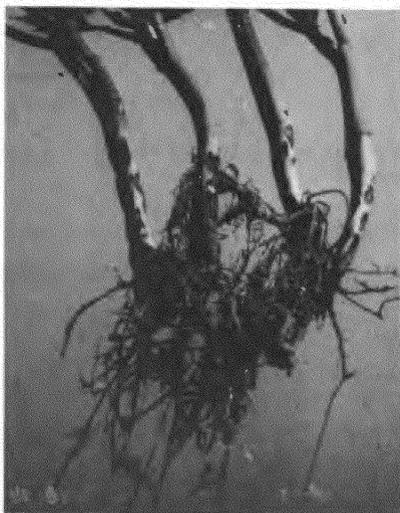
BLACKSBURG, VIRGINIA

Fungi that cause root and stem rots of beans exist wherever beans have been grown for several years and they are the most destructive diseases of the crop. Three different fungi are commonly responsible but others may be involved. They are soil-inhabiting fungi that attack bean plants at any stage of growth. Plants are commonly infected early in the growing season when the soil is cold and the moisture content high. The fungi causing root rots are capable of surviving in the soil for several years in the absence of beans or other cultivated crops. Root rot fungi are widespread, moving from plant to plant and from field to field by surface water, infected bean straw, and farm tools and equipment covered with infested soil. The most severe losses occur in areas where little or no rotation is practiced and root rot fungi become abundant in the soil.

SYMPTOMS OF DISEASE: The symptoms differ depending on the particular disease. Some of the more common diseases are described below.

1. Fusarium root rot caused by the fungus Fusarium solani f. phaseoli

This root rot usually appears as a slight discoloration of the taproot about a week or more after the seedlings emerge. The affected taproot gradually becomes brick-red as the disease spreads and eventually most of the taproot is infected. The red color on the taproot is replaced by a brown discoloration which is frequently accompanied by longitudinal cracks. Frequently the main root and the lower part of the stem becomes pithy. The small lateral roots and the end of the taproot are usually killed by the fungus. Frequently a cluster of fibrous roots may develop above the lesions just below the soil surface. Infected plants are usually stunted and grow more slowly than healthy ones. During dry weather, the leaves turn yellow and may even drop off. Pods on severely infected plants will be reduced and incompletely filled with undersized seed. Wilting of the plants rarely occurs, however in some instances, many plants may be killed.



2. Rhizoctonia root rot caused by the fungus

Rhizoctonia solani

This fungus is found in moist soils and it is capable of attacking a wide variety of vegetables. Loss of plants differs depending on the weather. Damping-off of seedlings is the most severe phase of disease. Infection may occur on the roots and stem above and below the surface of the soil.

Figure 1. Note stem cankers caused by Rhizoctonia solani. Infection may occur at any point on the roots and below ground portions of the stem.

Young seedlings wilt and collapse from the water-soaked rot produced on the stem near the soil line, or they may be twisted and stunted. Stem cankers are reddish-brown to brick-red, slightly sunken, and extend lengthwise on the stem (Figure 1). The fungus may cause seed rot decay. Small packages of seed are usually purchased already treated. Older plants that become infected may remain erect, but they usually remain stunted and their leaves turn yellow. Infection may take place at low temperatures; however, the disease is favored by warm weather.

3. Pythium root rot caused by the fungus *Pythium butleri*
Pythium root rot, also referred to as damping-off, hollow stem or wilt, causes a wet rot which is very destructive on young plants. Infection may occur above or below the soil line where a soft, colorless to dark-brown rot is produced. The outer tissue of infected plants slips easily from the central core. When half-grown plants become infected, they may survive for a short time, but they later wilt and finally die. When the weather is hot and humid, a rot of the stem and lateral branches may occur. A white cottony growth may be observed under very moist weather conditions. Several species of this common soil-borne fungus attack beans and other crop plants, especially in the seedling stage.

CULTURAL CONTROL

1. Use only certified, disease-free seed treated with a fungicide.
2. Plant seed as shallow as soil moisture will permit.
3. A rotation of at least 4 to 5 years is recommended. The cropping system should include grasses, cereals and green manure crops.
4. Plant in warm, well-prepared, well-drained soil capable of supporting good vine growth.
5. Make fertilizer application on basis of a soil test.
6. Avoid deep and close cultivation which injures the roots and provides easy entry for the causal fungi.
7. Diseased bean refuse left in the field should be turned under deeply by fall plowing.

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KEYS TO PROPER USE OF PESTICIDES

1. Read the label on each pesticide container before each use. Follow instructions to the letter; heed all cautions and warnings, and note precautions about residues.
2. Keep pesticides in the containers in which you bought them. Put them where children or animals cannot get to them, preferably under lock and away from food, feed, seed, or other material that may become harmful if contaminated.
3. Dispose of empty containers in the manner specified on the label.

SEE YOUR DOCTOR IF SYMPTOMS OF ILLNESS OCCUR DURING OR AFTER USE OF PESTICIDES.