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Bean Diseases

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BEAN DISEASES

ISSUED: 5-82

REVISED:

W.C. Nesmith and J. R. Hartman

BEAN YELLOW MOSAIC VIRUS

Viruses can cause serious damage to Kentucky bean plantings. More than one virus is often involved but bean yellow mosaic virus (BYMV) seems to be most frequently observed.

Symptoms

Although symptoms of this disease may vary depending on time of infection, bean variety and virus strain, symptoms generally include crinkling, downward cupping, yellow mottling, and dead areas along the veins of infected leaves. Death of vine tips and new leaves may occur on pole and half-runner bean types. Vines may die back several feet, thereby destroying the bean plants. Plants affected with root and stem rot, manganese toxicity and bacterial blight may show some symptoms similar to those of the virus so laboratory diagnosis is often advisable. Observations of any adverse root and soil conditions should be made.

Control

BYMV is carried to beans by aphids. These insects pick up the virus mainly from red or white clover or other legume weed hosts growing near the garden including earlier plantings of beans. The following suggestions may reduce the damage caused by BYMV in the garden:

1. Avoid planting beans near clover or other legumes.
2. Destroy legume weeds in fencerows or other areas in the garden.
3. Plant a barrier of sweet corn or other tall-growing crop upwind of the beans.
4. Plant bush-type beans if possible. It appears that Kentucky Wonder Pole beans and White Half-Runner beans are more susceptible to the virus.
5. Plant successive plantings of beans. Infection levels may be high one week, then lower a few weeks later allowing some of the plantings to escape infection. So keep on planting!
6. For commercial plantings, avoid planting successive plantings near each other.

Stem and Root Rots

The fungi which decay the lower stems and roots of green beans are present in almost all soils used for growing beans but these fungi build to higher levels with continuous cropping of beans in the same site. They can survive for long periods of time in the soil and may spread from place to place via moving soil. Most root rots are favored by cold or wet soils. Usually, these fungi are less of concern under ideal growing conditions for bean crops. The fungi may do little harm if plants are strong and vigorously growing. Virus-infected garden beans may be damaged more than beans without virus by root rot fungi. Rhizoctonia Root Rot (*Rhizoctonia solani*)--The *Rhizoctonia* fungus attacks plants at almost any age, causing seed rot, damping-off of seedlings, or stunting, yellowing and killing of older plants. Elongate, sunken, red-brown lesions develop on roots and stems at or below the soil line. Lesions may enlarge to girdle the stem, killing the roots and weakening the top of the plant. Infected plants may be stunted and the leaves may turn yellow and die.

Fusarium Root Rot (*Fusarium solani f. phaseoli*) --*Fusarium* grows best in warm soils so this fungus attacks beans later in the season. Plants are stunted or yellowed but not usually killed. The taproot and lower stem show reddish lesions which later turn brown to black. The red colored taproot tip and lateral roots may decay, shrivel and die. Rootlets may develop above the lesion, enabling the plant to survive.

Pythium Root Rot (*Pythium spp.*)--Pre-emergence damping-off and seedling wilt of beans is often caused by the *Pythium* fungus. Water-soaked lesions may appear on the stem and branches where the affected

tissue becomes soft and slimy. When the stem is girdled, the plant wilts suddenly and dies. Older plants may develop dark brown lesions instead of soft rot and may be stunted or die prematurely.

Control

1. A rotation of 4 to 5 years between bean crops is helpful--the longer the better.
2. Planting after the soil has warmed should produce rapid, vigorous growth. Cool soils can increase the incidence of root rots.
3. Shallow planting may be helpful.
4. Planting fungicide-treated seed can reduce seedling rots.
5. Treat soils with appropriate fungicides is available for commercial crops. (see ID-36)
6. Most bean varieties are susceptible to root rots under certain conditions but some more so than others. Kentucky Wonder Pole Beans and White Half Runner beans are among the most susceptible.
7. Be sure to allow time for cover crops to rot before planting by plowing soil 4 to 6 weeks prior to planting.

Anthracnose

The fungus *Colletotrichum lindemuthianum* which causes anthracnose can reduce bean quality as well as yield. Losses can be severe during cool, rainy weather.

Symptoms

The disease appears on all above ground parts of the plant but rarely on the roots. Lesions generally are dark brown and may contain pink spore masses during moist weather. Elongate, angular spots appear on the lower leaf veins spreading slightly into surrounding tissue and eventually appearing on the opposite side. Affected seeds are discolored. Plants grown from infected seed will develop cankers on the cotyledons.

The most striking phase of the disease occurs on the pod. Small brown spots appear and rapidly enlarge into dark sunken cankers. Often the margin will be a dark brown while the center portion of the canker is light in color.

Control

1. Because the fungus can be carried on the seed, be sure to plant only disease-free seed.
2. A crop rotation of at least 3 years is important to reduce carry-over at site.
3. Follow a good weed control program.
4. Plow under or remove plants after harvest to reduce overwintering of the fungus in the field/site.
5. Fungicide sprays can also be helpful. (see ID-36 for commercial plantings)

Bacterial Blights

Bean blights, caused by one or more species of bacteria, occur in most of the bean growing areas of the world. Under favorable weather conditions, these bacteria can spread rapidly through a field causing defoliation and pod damage.

Common Blight (*Xanthomonas phaseoli*) and Fuscous Blight (*X. phaseoli* var. *fuscans*)--Lesions on the leaves first appear as small, watersoaked, light green areas. The spots become dry and brown with a narrow yellow halo. As the disease develops, the spots may grow, eventually killing the leaves. Similar watersoaked spots form on pods and can develop into broad irregular blotches. In humid weather, a yellow bacterial crust covers the surface of the diseased area. The margin of the spot or the entire spot may be red-brown in color. In severe attacks, the pods may shrivel and seeds may not develop.

Wilt (*Corynebacterium flaccumfaciens*)--The symptoms of bean bacterial wilt are similar to those of common blight. In addition, the plants are stunted and the leaves droop and appear wilted.

Halo Blight (*Pseudomonas phaseolicola*)--This blight is similar to common blight except that there may be a large yellow halo (up to 1/2 inch in diameter) surrounding the leaf spot (Figure 6). Newly developing leaves may show yellowing due to systemic infection and plants can die rapidly. Leaf

symptoms without halos may develop if temperatures are relatively high. Symptoms on the pods are also similar to those of common blight. The bacterial crust on the surface of the spots may be white instead of yellow.

Brown Spot (*Pseudomonas syringae*)--This disease is more common on lima beans. Small, water soaked spots on the leaves become a red-brown color, the spot center dries out, turns grey and may fall away. Veins on the underside of the leaves may turn red-brown. Spots on the stems and pods are more elongated than those on the leaves.

Spread

The bacteria overwinter in seed, plant refuse or susceptible weeds. When infested seeds are planted, an early outbreak may occur on the new crop. The bacteria can spread to healthy plants via splashing rain, wind-blown soil particles, or on tools and implements moving through wet fields. The bacteria enter through natural openings such as stomates or through wounds such as those caused by chewing insects and blowing sand particles. The brown spot bacterium can overwinter in other plants such as lilac or members of the *Prunus* group. Once introduced, these bacteria can colonize the leaf without causing symptoms, then cause sudden crop damage, following heavy rains. Therefore, control will be centered around keeping the population of bacteria low and out of the field.

Control

1. Rotate beans with other crops leaving 2 to 3 years between bean crops.
2. Use commercially grown, disease-free seed. Using locally saved seed is very risky because the pathogen is saved with the seed.
3. Do not work fields when plants are wet.
4. Spray bean plants at the first sign of disease with a copper containing chemical bactericide. (see ID-36)

Bean Rust

Bean rust is caused by the fungus *Uromyces phaseoli typica*. The disease is most important on dry and pole snap beans, but it also affects bush snap and lima beans. In Kentucky, bean rust normally occurs in the late summer.

Symptoms

The rust pustules tend to be most numerous on the underside of the leaves, less abundant on the pods, and they occur sparingly on the stems. Infection is first evident as minute, almost white, slightly raised pustules which later become distinct, reddish-brown, tiny circular "cushions" that are typical of a true rust. Each pustule is made up of a powdery mass of rust-colored spores. When the leaf becomes heavily infected, it shrivels and falls from the plant.

Spread

The fungus exists between crops in the form of spores which initiate infections in the following crop. Cloudy, humid days with temperatures between 60° and 75° F are favorable for disease development. Under these conditions, an infection of bean rust can produce a new crop of spores in 10 to 15 days. Although *Uromyces* spores may blow long distances and infect plants where no beans have ever been grown, it has been shown that when one crop of beans follows another in the same field, the amount of rust inoculum is increased so that the following crops may be damaged severely. In Kentucky, rust is much more common in late summer and early fall than any other season.

Control

1. Crop rotation is the first suggestion for control.
2. Spraying with approved fungicides at regular intervals, starting when the disease first appears or when advisories are issued, will give effective control. (see ID-36)

3. Some bean varieties are resistant to some races of the rust fungus. These varieties are listed as rust resistance in seed catalogs. Consider them where space doesn't permit long rotations and where fungicides will not be used, especially in late summer plantings.

NOTE: Contact your County Extension Office for the currently recommended chemicals.