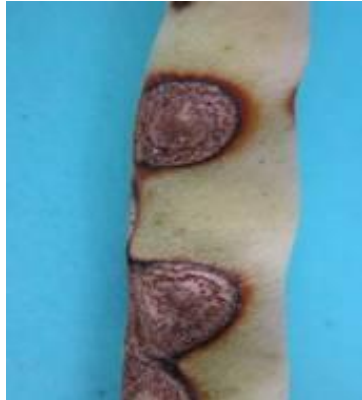


Lecture 15 - Diseases of Beans

Beans

Anthracnose: *Colletotrichum lindemuthianum*

Symptoms



Bean pods with black, sunken lesions or reddish-brown blotches most likely have [anthracnose](#), a fungal disease caused by *Colletotrichum lindemuthianum*. Black, sunken lesions about ½ inch in diameter develop on stems, pods and seedling leaves (cotyledons) but are most prominent on pods. A salmon colored ooze on lesions and the veins on lower leaf surfaces turns black. On lima beans, symptoms are sooty- appearing spots on leaves and pods. Anthracnose develops primarily during the spring and fall when the weather is cool and wet, and not during our hot, dry summers. Lima beans are particularly susceptible.

Pathogen

Mycelium is branched, septate, hyaline at first and dark colored with age. Acervuli develop beneath the cuticle. Conidia are borne on short conidiophores. Setae are few, brown and septate. Conidia are one celled, hyaline and cylindrical with rounded ends or with one end slightly pointed.

Mode of spread and survival

The fungus is seed borne and can survive from one season to another in debris from infected plant as well as in diseased seed. The fungus can remain alive in seeds even after the seeds are dead.

Disease Cycle

The fungus survives the winter primarily in bean seed. Survival in soil or in plant residue varies greatly, depending on environmental conditions. Moisture is required for development, spread, and germination of the spores as well as for infection of the plant. A prolonged wet period is necessary for the fungus to establish its infection. The time from infection to visible symptoms ranges from 4 to 9 days, depending on the temperature, bean variety, and age of the tissues. The fungal spores are easily carried to healthy plants in wind-blown rain and by people and machinery moving through contaminated fields when the plants are wet. Frequent rainy weather increases disease occurrence and severity.

Management

Prevent this disease by using certified disease-free seed for planting and removing all plant debris after harvest. Anthracnose can survive in the soil for two years on plant debris or be brought to the garden on infected seeds. Do not plant bean seeds in an area that had disease for two to three years. Avoid overhead watering and avoid splashing soil onto the plants when watering. Fungicide sprays of fixed copper are the only recommended chemical that can be used on lima beans for anthracnose control.

Bean Root Rots: *Rhizoctonia solani*, *Pythium*, *Fusarium solani*

Symptoms



Many fungi, including *Rhizoctonia solani*, *Pythium* species and *Fusarium solani*, form species *phaseoli*, live in the soil and will infect young seedlings or the seeds of bean plants. Seedlings fail to emerge after planting when the seeds rot in the soil or young seedlings may be stunted.

Plants are usually affected slightly above or below the soil line with a watery soft rot. Roots of the plant usually die and leaves turn yellow.

Management

Do not plant beans in low, poorly drained areas. Plant on raised beds. Plant after the soil has warmed to 69° F at a 4 inch depth. Reduce disease buildup in the soil by rotating locations in the garden where you plant bean or pea with other vegetables. Try to avoid injury to the root system, which often occurs during planting, through cultivation or due to a large population of nematodes in the soil. Remove crop debris immediately after harvest. Plant seeds previously treated with captan. Apply chemicals according to directions on the label.

Rust: *Uromyces appendiculaters*

Symptoms



[Bean rust](#) is mainly a disease of bean leaves that causes rust-colored spots to form on the lower leaf surfaces. Severely infected leaves turn yellow, wilt, and then drop off of the plant. Stems and pods may also be infected. This disease is caused by the fungus *Uromyces appendiculaters*. It affects most types of beans under humid conditions.

Pathogen

The fungus is autoecious, thus living its entire life on bean and long cycled rust. Uredia are brown and powdery. Uredospores are globose or ellipsoid. Spore wall is golden brown. Telia are formed on uredia and are dark brown or black. Teliospores are globose or broadly ellipsoid, pedicellate and one celled. Pycnia appear on the yellowish spots on the upper surface of the leaves.

Mode of spread and survival

The rust fungus is not seed borne, but can be disseminated locally by farm tools, insects, animals or other moving bodies. However wind is the principal agent for long distance spore dissemination.

Management

The fungus survives the winter in the soil, on plant debris and even on poles used the previous year. In gardens where rust has been severe, crop rotation is important. As plants begin to bloom, sulfur or chlorothalonil can be sprayed weekly on snap and green beans only. Do not apply chlorothalonil to lima (butter) beans. Wait seven days between spraying and harvest when using chlorothalonil on beans, and 14 days on Southern peas. Apply chemicals according to directions on the label.

Bacterial Blight: *Xanthomonas campestris* pv *phaseoli*

Symptoms



There are two widespread [bacterial blights](#) that affect most types of beans, common blight (*Xanthomonas campestris* pv *phaseoli*) and halo blight (*Pseudomonas syringae* pathovar *phaseolicola*). The stems, leaves and fruits of bean plants can be infected by either disease. Rain and damp weather favor disease development. Halo blight occurs primarily when temperatures are cool. Light greenish-yellow circles that look like halos form around a brown spot or lesion on the plant. With age, the lesions may join together as the leaf turns yellow and slowly dies. Stem lesions appear as long, reddish spots. Leaves infected with common blight turn brown and drop quickly from the plant. Common blight infected pods do not have the greenish-yellow halo around the infected spot or lesion. Common blight occurs mostly during warm weather.

Pathogen

The bacteria is gram negative rod, non capsulated and motile with single polar flagellum.

Mode of spread and survival

The pathogen is seed borne and the disease spread through wind splashed rains from diseased to healthy plants. In new area disease spreads through infected seeds.

Management

Both of these diseases come from infected seeds. The diseases spread readily when moisture is present. Avoid overhead watering and do not touch plants when the foliage is wet. The bacteria can live in the soil for two years on plant debris. Do not plant beans in the same location more frequently than every third year. Buy new seeds each year. Fixed copper can be applied at ten day intervals. Wait one day between spraying and harvest.

Mosaic Viruses

Symptoms



[Mosaic viruses](#) in which the leaves show sharply defined patches of unusual coloration may occur in beans. The causal agents of these symptoms may be nutrient imbalance or herbicide injury or result from infection by one of several viruses.

Pathogen

Cucumber mosaic virus

Mode of spread and survival

The virus occurs worldwide in many agricultural crops, ornamentals and weeds. Many of these plants serve as reservoirs for season to season survival of the virus. The virus is transmitted mechanically with ease as well as in seed and by aphids, especially *Myzus persicae* and *Aphis gossypii*.

Management

There are no recommended chemical controls for these problems. Many of these viruses are transmitted by aphids and are also transmitted through seed. For this reason it is unwise to save seeds from year to year.

Powdery Mildew: *Erysiphe polygonii*

Symptoms

Leaves are covered with patches of a whitish to grayish powdery growth. This disease is caused by the fungus *Erysiphe polygonii*. New growth appears contorted, curled or dwarfed and may turn yellow and drop. Pods are dwarfed and distorted. This is mostly a problem on fall beans. Powdery mildew is spread by wind and rain.

Pathogen

The mildew pathogen develops mycelial threads between a few cells near the epidermis and grows root like structures, haustoria that slowly withdraw food from the living plant tissue. After the fungus covers the upper and sometimes the lower leaf surface with fungus threads, the threads can produce many short multicellular fungus stalks, each of which bears a few spores resembling beads in a chain.

Mode of spread and survival

The fungus is capable of attacking different leguminous hosts and survives in conidial or perithecial form. The conidia are easily carried by wind, rain and insects. The spores are short lived and usually die in about 2 days if they do not reach a suitable host. When humidity is high and the leaf surface is dry, the spores germinate readily in few hours and the germ tubes enter the plant. Some strains produce sexual perithecia with asci which can remain alive from one season to the next.

Management

Avoid crowding plants by allowing adequate space between rows. On Southern peas, sulfur can be used. When the disease is first noticed, sprays or dusts of sulfur are recommended for use on snap and green beans only. Do not use sulfur on young plants. Apply chemicals according to directions on the label.

Cercospora Leaf Spot: *Cercospora* sp.

Symptoms



This fungal disease, caused by *Cercospora* species, occurs primarily on the lower leaves of plants as irregular, tan [spots](#). Severe infection causes excessive leaf drop and stunting of the plant. Infection is worse during periods of extended rainfall, high humidity and temperatures between 75 to 85° F.

Management

Use disease-free seed for planting. Remove all debris in the garden after harvest. Do not plant beans in the same area for two to three years. There are no resistant varieties or recommended chemicals for this disease in the home garden.

Watery Soft Rot: *Sclerotinia sclerotiorum*

Symptoms

Small, soft, watery spots that are caused by the fungus *Sclerotinia sclerotiorum* occur on the stems, leaves and pods of beans. These spots enlarge rapidly under cool, moist conditions, and run together, girdling the stem. Infected pods turn into a soft, watery mass, before dying out and turning brown. Soon infected areas are covered by a white fungal growth.

Management

Improve air circulation between plants and rows. Too much fertilizer favors heavy vine growth, creating areas for the disease to develop. There are no recommended chemical controls for the home garden.