

On the Leaves: The disease appears on the lower side of the leaves as black streaks on the mid-rib and veins. This condition sometimes results in a puckering of the surface. The leaves, particularly when the petioles are affected, turn yellow and fall prematurely, leaving small, weak plants incapable of producing a maximum crop.

On the Pods: The lesions are most noticeable on the pods, at first as minute, dark-red spots, which rapidly enlarge and become sunken or saucer-shaped, with a definite dark-red or black border. The sunken appearance disappears as the pods become mature and dry. In other cases, when infection has been extensive, the numerous small lesions coalesce, giving the pods a brownish, black-pitted appearance. The centre of the larger spots may be brown, black, pink or grey, depending on the age-condition of the fungus.

CAUSAL ORGANISM.

Bean anthracnose is caused by the fungus *Colletotrichum Lindemuthianum* Sacc. and Magn. The vegetative mycelium consists of hair-like tubes, at first colourless but later brown; invisible to the unaided eye except in clusters or tufts such as are sometimes seen in the centre of old lesions. A net-work of this mycelium develops beneath the epidermis of the infected spot causing the characteristic appearance of the disease, and later produces small erect branches or conidiophores bearing the elliptical or kidney-shaped spores, stuck together by their mucilaginous envelopes. In masses the spores are pink or cream-coloured. These spores are scattered by numerous means to other parts of the plant and even considerable distances to other plants. If there is a supply of moisture, they germinate immediately by sending out one or more germ tubes, which enter the healthy tissue, and in turn its mycelium develops, producing a fresh lesion and a new generation of spores.

LIFE HISTORY.

The fungus passes the winter in a dormant condition in the seed, in diseased bean refuse, or in the soil, but chiefly in the seed. The bean seed upon germination is pushed above the ground, both halves forming the cotyledons or rudimentary leaves, which serve as a primary source of food during germination and until the plant has become established. Consequently, infected seed invariably produces infected cotyledons. The moisture taken up by the seed during germination is sufficient to enable the fungus to commence growth and produce spores. These spores are brushed off on the soil as the cotyledons push toward the surface, and immediately come in contact with the young tender stem, ready to germinate and attack the new plant. The cotyledons remain on the stem for a considerable period after the true leaves have appeared and, if weather conditions are favourable such as plenty of moisture, and not too much sunlight, the spores are produced in large numbers from diseased cotyledons. These are washed down the stem by rain and spread by other means to all parts of the plant and adjacent plants. The cotyledons thus serve as the nest, in which is produced the new generation of spores and from which they can most easily be spread.

These spores now attack the leaves and stem, setting up disease and weakening the plants. By the time the pods are setting, more spores have been produced from these new lesions and the pods become infected. The fungus mycelium attacks and penetrates the pods causing serious injury and finally enters the new crop of seed in which it lives in a dormant condition until germination takes place the following spring.

The fungus is also capable of wintering over in diseased stems, old pods and leaves, and if these are applied to the soil the new crop infection will take place. Probably it is capable of living on organic matter in the soil for a few years and, if a reasonable rotation is not practised, infection from soil-carried organisms may be expected.