



Bean anthracnose

Colletotrichum lindemutheanum

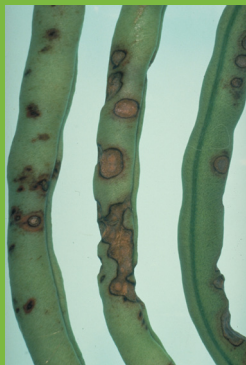


Photo: Denis Persley, Department of Agriculture and Fisheries

Brown sunken spots with dark margins caused by bean anthracnose on the pods of French bean.



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Red to black spots occur on the leaves on the underside.

SUMMARY: Bean anthracnose is a fungal disease primarily of the common bean, *Phaseolus vulgaris*. It occurs worldwide, including many countries of Africa. Signs of infection occur on leaves, mostly limited to veins on the underside. Spots, oval to circular, tan with dark borders, develop on stems and pods, and also on seedling stems and leaves. Spores formed in the spots are spread in rain-splash or by wind and rain. Infected seeds are sources of the fungus and responsible for long-distance spread. The disease is managed by using certified or approved seed. Seeds can also be treated with the fungicides captan or thiophanate-methyl. Intercropping with maize and use of 2-3 year rotations with non-legume crops are other preventive options reported to be effective.

KEY SIGNS

Bean anthracnose, caused by a fungus, is a major disease of common bean (snap or French bean), *Phaseolus vulgaris*, in both temperate and tropical countries worldwide. Anthracnose means 'coal disease'; it describes diseases caused by fungi that produce dark spots on leaves, petioles, stems and fruit.

Anthracnose fungi are invariably associated with wet-weather. Moderate rainfall and wind, and temperatures of 20-24°C, favour the diseases they cause. In the case of bean anthracnose it is seed-borne.

Seedlings from infected seeds show dark brown to black sunken spots on the stems and the first leaves, the cotyledons. Severely infected seedlings are stunted. If the spots surround the stems, the seedlings die.

The spots produce pink spore masses that spread to the other leaves. Dark streaks, red-purple at first, turning brown to black, appear on the lower surfaces, especially on the veins, but they are less obvious from above. Lower leaves are infected first, then those higher up the plant.

Infection of stems and petioles produces 1-2 cm diameter oval or circular spots with red-brown margins. If spots surround the stems, they collapse.

Spots are also evident on the pods. They are dark brown irregular specks or dark brown circular sunken spots, 1-10 mm diameter, bordered by distinct brown to black margins. During wet weather these spots, too, produce pink spore masses. In severe cases the pods shrivel and the seeds become infected.

MANAGEMENT

Prevention – what to do before signs are seen

Cultural approaches: The use of seed certified free from infection, and planting varieties with resistance to the disease should be used in combination with cultural techniques. However, there are different races of this fungus. If the local

racers are not known it would be best for smallholders to test varieties said to be tolerant or resistant before planting all their land with any one selection.

Intercropping with maize is reported to reduce the incidence of disease.

Planting in widely spaced rows that run parallel to the prevailing wind enables the leaves and pods to dry as quickly as possible, reducing risk of infection.

During the growth of the crop, apply a mulch to prevent soil from splashing onto the plants during heavy rains. Do not carry out field operations when the plants are wet, to minimise the spread of the disease by water splash.

After harvest, collect and burn debris, or plough the remains into the soil.

Chemical approaches: If certified or approved seed is not available, and there is no information on resistant varieties, then treat the seed with fungicide; use captan or thiophanate-methyl. Note that benomyl and thiram, widely used in the past as seed dressings, are banned or restricted in some countries. Consult your agriculture authorities for the eligibility of any fungicide before giving recommendations to growers.

Control – what to do after signs are seen

Cultural approaches: Use a 2-3-year rotation between crops of beans on the same land if anthracnose is established in the field – for example, rotate with maize or solanaceous crops (tomato, potato and eggplant).

Chemical control: It is very unlikely that fungicides would be economical for the control of this disease, or that they would be effective; however, if a fungicide was required on, for instance, plants grown for seed, use mancozeb, copper compounds or chlorothalonil. The appropriate times to apply fungicides are: (i) at flower set; (ii) late flowering; and (iii) pod fill.

CAUSE

Bean anthracnose is caused by a fungus, *Colletotrichum lindemuthianum*. It exists as a number of races.

C. lindemuthianum is the asexual state, producing small cylindrical spores on leaves, stems and pods, that are pale pink when massed together in cup-shaped structures in the spots.

Survival of the fungus between crops is in seed and in crop debris. Spread is in seed and by the movement of spores in wind-driven rain. There is some evidence that animals, insects and people walking through the crop when it is wet can spread the spores. Moisture is essential for spore development, spread and germination, as well as for infection.

IMPACT

The disease is important on the common bean, *P. vulgaris*, and other food legumes. It affects bean quality and hence its marketability. It was once widespread and serious in temperate and sub-tropical countries, leading to losses of economic significance. Problems have been reported in North, Central and South America, with up to 95% losses in Colombia, and also in Europe, Africa, Australia and Asia. However, thanks to the introduction of certified and approved bean seed schemes, its impact in many countries has declined. In Australia, for instance, the disease has been practically eradicated from commercial production using this method of control. Nevertheless, epidemics are still reported as new races of the fungus keep appearing. Bean anthracnose remains a problem in Kenya, Malawi (90% losses reported) Tanzania and Uganda, and often occurs in Burundi, Rwanda, and DR Congo.

DISTRIBUTION

The disease is found worldwide, and is reported wherever *P. vulgaris* is grown. It occurs throughout Africa.

FURTHER READING

Anthracnose of bean (*Colletotrichum lindemuthianum*). Plantwise Knowledge Bank. (<http://www.plantwise.org/KnowledgeBank/Datasheet.aspx?dsid=14918>).

Colletotrichum lindemuthianum. CABI Crop Protection Compendium. (<http://www.cabi.org/cpc/datasheet/14918>)

Persley D, Cooke T, House S (2010) Diseases of vegetable crops in Australia. CSIRO Publishing, Collingwood, Victoria 3066, Australia.

Vegetable crops: Bean anthracnose. Cornell Vegetable MD online. (http://vegetablemdonline.ppath.cornell.edu/factsheets/Beans_Anthracnose.htm).