**Anthracnose of bean (Colletotrichum lindemuthianum)**

**Host plants / species affected**

Cajanus cajan (pigeon pea)

Canavalia ensiformis (gotani bean)

Capsicum annuum (bell pepper)

Glycine max (soyabean)

Lablab purpureus (hyacinth bean)

Lens culinaris subsp. culinaris (lentil)

Phaseolus (beans)

Phaseolus acutifolius (tepary bean)

Phaseolus coccineus (runner bean)

Phaseolus lunatus (lima bean)

Phaseolus vulgaris (common bean)

Pisum sativum (pea)

Vicia faba (faba bean)

Vigna mungo (black gram)

Vigna radiata (mung bean)

Vigna sinensis ssp. sesquipedalis (asparagus bean)

Vigna unguiculata (cowpea)

**List of symptoms/signs**

Fruit  -  lesions: on pods

Fruit  -  lesions: scab or pitting

Leaves  -  Abnormal colours

Leaves  -  Necrotic areas

Seeds  -  Discolorations

Seeds  -  Lesions on seeds



**Symptoms**

Anthracnose disease attacks all plant parts at any growth stage. The symptoms are most visible on leaves and ripe fruits. At first, anthracnose generally appears on leaves as small and irregular yellow, brown, dark-brown, or black spots. The spots can expand and merge to cover the whole affected area. The color of the infected part darkens as it ages. The disease can also produce cankers on petioles and on stems that causes severe defoliation and rotting of fruits and roots. Infected fruit has small, watersoaked, sunken, circular spots that may increase in size up to 1.2 cm in diameter. As it ages, the center of an older spot becomes blackish and emits gelatinous pink spore masses.

Symptoms of anthracnose can appear on any plant part. Initial symptoms may appear on cotyledonary leaves as small, dark brown to black lesions. Conidia and hyphae are transported by rain or dew to the developing hypocotyl. The infected tissues manifest minute rust-coloured specks. The specks gradually enlarge longitudinally and form sunken lesions or eye-spots. These enlarge on the hypocotyl of the young seedling, causing it to rot. On older stems, the eye-shaped lesion is about 5-7 mm. Lesions may first develop on leaf petioles and the lower surface of leaves and leaf veins as small, angular, brick-red to purple spots which become dark brown to black. Later, the lesions may also appear on veinlets on the upper surface of leaves. Sporulation can occur in lesions on the petiole and larger leaf veins, thereby producing secondary inoculum (Zaumeyer and Thomas, 1957). Pod infections appear as flesh to rust-coloured lesions. The lesions develop into sunken cankers (1-10 mm) that are delimited by a slightly raised black ring and surrounded by a reddish-brown border.

The lesion centre is paler, and during periods of low temperature and high moisture, may contain a gelatinous mass of pale salmon pink conidia. With age, the conidia dry up, becoming grey-brown or black. If severely infected, young pods shrivel and dry up. The fungus can invade the pod, and the mycelia and conidia infect the cotyledons or seed coat of the developing seeds. Infected seeds are often discoloured and may contain dark brown to black cankers (Zaumeyer and Thomas, 1957).

**Prevention and control**

**Cultural Control**
Seed should be pathogen-free. Anthracnose-free bean seed has been produced and used in various regions of the world to control the disease (Costa, 1972; Copeland et al., 1975; Zaumeyer and Meiners, 1975; Crispin-Medina and Campos-Avila, 1976). Infected crop residues should be buried and rotation with non-susceptible crops is often recommended. Crop rotations of 2-3 years are often recommended because the pathogen can survive in infected crop debris for >2 years (Tu, 1983). It is also important to restrict the activity and movement of field workers and agricultural implements in fields when the foliage is wet from rain or dew (Vieira, 1967).

Since the fungus is disseminated in the presence of water, fields should not be entered for cultivation or pesticide applications when the plants are wet. Unnecessary movement in infested fields should be minimised to reduce the spread of the disease. The fungus does not survive well under field conditions, so infested bean debris should be incorporated in the soil after harvest to reduce winter survival. Dillard (1988) recommends  two-year crop rotation as insurance against winter survival, as it provides some control of root-rotting organisms.

**Chemical Control**
Due to the variable regulations around (de-)registration of pesticides, we are for the moment not including any specific chemical control recommendations. For further information, we recommend you visit the following resources:

* EU pesticides database ([**www.ec.europa.eu/sanco\_pesticides/public/index.cfm**](http://www.ec.europa.eu/sanco_pesticides/public/index.cfm))
* PAN pesticide database ([**www.pesticideinfo.org**](http://www.pesticideinfo.org/))
* Your national pesticide guide

**Impact**

Anthracnose is an important fungal pathogen of *P. vulgaris*, affecting yield, seed quality and marketability of the crop. The disease causes greater losses in temperate and subtropical zones than in the tropics. It has caused economic losses in North, Central and South America, Europe, Africa, Australia and Asia (Cruickshank, 1966; Chaves, 1980; Tu, 1981). Yield losses of 95% have been recorded in Columbia and over 92% in Malawi (Allen, 1983). At one time, it was considered the most important disease in the bean-producing areas of eastern USA; losses amounting to $1.5 million were reported in Michigan during 1914. The disease declined considerably in importance during 1955-1976, due to the widespread use of clean seed produced in areas where anthracnose does not occur (Zaumeyer and Thomas, 1957). However, during 1977-1978, a serious epidemic occurred in southwestern Ontario, Canada, due to the introduction of the gamma and delta races of the pathogen (Tu, 1988). Clean seed and resistant cultivars have also diminished the importance of bean anthracnose in western Europe (Fouilloux, 1979).