

Important Diseases of common bean and Their Management

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Introduction

Common bean (*Phaseolus vulgaris* L.) is a diploid ($2n = 2x = 22$) self-pollinating species that can also out-cross, albeit at very low rates (Ferreira *et al.*, 2000; Gepts, 2001). Common bean is an essential source of proteins and nutrients to over 500 million people in Africa, Latin America and the Caribbean (Singh, 2005). Low yields in bean crop are attributed to both abiotic and biotic factors, namely drought, pests and diseases (Mourice and Tryphone, 2012).

1. Common blight (*Xanthomonas axonopodis* pv. *phaseoli*)

This disease is a constraint to bean production in India. Percentage crop losses of between 10 and 75% have been reported. The common blight produces similar symptoms on leaves, pods, stems and seeds. Small water-soaked spots are the first symptoms observed on leaves and appear within 4 to 10 days of infection. As the spots develop, the centre becomes dry and brown. The lesion is surrounded by a narrow band of bright yellow tissue. However, yellowed tissue is occasionally absent.

Control

- Intercropping bean with maize was shown to reduce the severity of common bacterial blight.
- Use certified disease-free seed
- Plant resistant varieties (e.g. French bean variety 'Paulista')
- Practise a 2-3 year crop rotation without legumes
- Do not work in bean fields when the plants are wet
- If blight is observed on scattered plants, spot application of copper hydroxide could be considered

2. Fusarium root rot (*Fusarium solani* f. sp. *phaseoli*)

Seedlings infected with *Fusarium* root rot appear dwarfed. The primary leaves are often yellow, later turning necrotic and finally the seedlings wilt. *Fusarium* species infect bean roots when the soil is too wet, or too hot for good bean growth. The fungus survives in soil for long period. *Fusarium* wilt is a manifestation of *Fusarium* root rot.

Control

- Plough deeply bean debris after harvest
- Practise a 6 to 8 year crop rotation without legumes
- Do not feed livestock old bean straw if manure is to be used on bean fields
- Plant beans in hills or ridges in heavy soils
- Seed treatment with *Trichoderma viride* 4 g/kg seed

3. Bean rust (*Uromyces appendiculatus* var. *appendiculatus*)

Rust spots (pustules) appear on all parts above the ground. They are most numerous on leaves, particularly on the underside. They are less abundant on stems and occur sparingly on pods. Initial symptoms are minute, slightly raised yellow pustules, which later become distinct circles, reddish brown in colour and surrounded by a yellow halo. The disease is spread long distance by wind. Plant to plant spread of the disease is by farm tools, insects or water splash. Severely infected leaves drop off. The disease is spread long distance by wind. Plant to plant spread of the disease is by farm tools, insects or water splash.

Control

- Destroy crop residues after harvesting
- Avoid continuous cropping of beans or follow Intercrop with cereals
- Practise a 2 to 3 year crop rotation without legumes
- Plant resistant varieties where available (e.g. French bean variety 'Theresa')
- A number of pesticides are available in the market. There are reports claiming that baking soda, compost tea spray, EM (effective microorganisms) and papaya leaf extract control bean rust.

4. Bean common mosaic virus

Symptoms of bean common mosaic virus (BCMV) are cupping and twisting of leaves with a light and dark green mosaic pattern. The dark green tissue is often bubbled and/or in bands next to the veins. Affected plants produce smaller, curled pods with a greasy

appearance and yields are reduced. The virus is seed borne. It can be transmitted by several aphid species.

Control

- Use certified and disease-free seeds
- Plant resistant varieties (e.g. French bean variety 'Paulista')
- Control attacks of aphids
- Remove infected plants from the field.

5. Halo blight (*Pseudomonas syringae* pv. *phaseolicola*)

The most characteristic halo blight symptoms occur on bean foliage. Initially, small water-soaked spots resembling pin pricks appear on the lower leaf surface. These spots turn brown in a few days and the surrounding tissue gradually become yellow-green. This zone of yellowed tissue around the spot resembles a halo, hence the name of the disease. Pod lesions first appear as small water-soaked pin pricks on the pod surface. These lesions gradually enlarge to form dark sunken spots of various sizes. White bacterial ooze appears on the spots when wet. Halos do not develop around pod lesions.

Control

- Use certified disease-free seed and Practise a 2-3 year crop rotation without legumes
- Plant resistant varieties (e.g. French bean variety 'Paulista')
- Plough under bean debris after harvest
- Do not work in bean fields when the plants are wet
- If blight is observed on scattered plants, spot application of copper hydroxide could be considered.

References

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