

# Banana

## Diseases

### **Panama Wilt** (*Fusarium oxysporum* f. sp. *cubense*):

This is a soil-borne fungal disease and gets entry in the plant body through roots. It is most serious in poorly drained soil. Initial symptoms are yellowing of lower leaves, including leaf blades and petioles. The leaves hang around the pseudostem and wither. In the pseudostem of the diseased plant, yellowish to reddish streaks are noted with intensification of colour towards the rhizome. Wilt is severe in poor soil with continuous cropping of banana. Warm soil temperature, poor drainage, light soils and high soil moisture are congenial for the spread of the disease.

**Control:** Severely affected plants should be uprooted and burnt. Highly infected soil should not be replanted with banana at least for 3-4 years. Use of disease-free planting material and resistant cultivar are recommended. Growing of paddy followed by banana for 3-5 years once or twice, use of quick lime near the base of the plant and soaking with water and avoiding sunflower or sugarcane in crop rotation helps to reduce the disease incidence. Dipping of suckers in Carbendazim (10g/10 litres of water) followed by bimonthly drenching starting from 6 months after planting is also recommended. Application of bioagents, such as, *Trichoderma viride* or *Pseudomonas fluorescence* in the soil is effective.

### **Leaf Spot, Leaf Streak or Sigatoka Disease** (yellow sigatoka-*Mycosphaerella musicola*; black sigatoka or black leaf streak-*Mycosphaerella fijiensis*):

Yellow sigatoka is one of the serious diseases affecting the banana crop. Initial symptoms appear in the form of light yellowish spots on the leaves. A small number of these enlarge, become oval; the colour also changes to dark brown. Still later, the centre of the spot dies, turning light grey surrounded by a brown ring. In severe cases, numerous spots coalesce, killing large parts of the leaf.

Rainfall, dew and temperature determine the spread of the disease. Conditions favouring mass infection are most common during the rainy season with temperature above 21°C.

**Control:** Cultural practices such as improved drainage, control of weeds, removal of diseased suckers and adopting correct spacing is recommended.

Dithane M-45 WP (in oil-water emulsion) and Dithane M-45 (in water only) controlled *Mycosphaerella fijiensis* var. *difformis* in banana. Foliar spray of Copper Oxychloride (3 g/litre of water) or Thiophanate Methyl 1 g/ litres of water) controls the disease effectively.

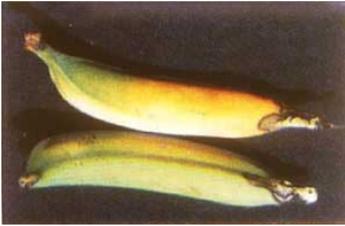
### **Anthracnose** (*Gloeosporium musae*):

The disease attacks banana plants at all stages of growth. Disease attacks the flowers, skin and distal ends of banana heads. The symptoms appear as large brown patches covered with a crimson growth of the fungus. The disease fruit turns black and the fruit is shrivelled.



**Control:** Spraying of Chlorothalonil (0.2%) and Bavistin (1 %) four times at 15 days interval is recommended. Minimising bruising; proper sanitation of handling and prompt cooling to 14°C are essential in minimising the disease in cold storage.

**Cigar End Tip Rot** (*Verticillium theobromae*, *Trachysphaera fructigena* and *Gloeosporium musarum*):



A black necrosis spread from the perianth into the tip of immature fingers. The rotted portion of the banana finger is dry and tends to adhere to fruits (appears similar to the ash of a cigar).

**Control** : Removal of pistil and perianth by hand 8-10 days after bunch formation and spraying the bunch with Dithane M -45 (0.1%) or Topsin M (0.1%) controls the disease effectively. Minimising bruising; prompt cooling to 14°C; proper sanitation of handling facilities reduce the incidence in the cold storage.

**Crown Rot** (*Colletotrichum musae*, *Fusarium sp.*, *Verticillium theobromae*, *Botryodiplodia theobromae* and *Nigrospora sphaerica*) :

The characteristic symptoms are blackening of the crown tissues, which spreads to the pulp through the pedicel resulting rotting of the infected portion and separation of fingers from the hand.

**Control** : Dipping the bunches or hands in Thiobendazole or Benomyl and/or using fungicide impregnated cellulose pad for packing is recommended.

**Stem-end Rot** (*Thielaviopsis paradoxa*) :

The fungus enters through the cut stem or hand. The invaded flesh becomes soft and water-soaked.

**Control** : Minimising bruising; prompt cooling to 14°C; proper sanitation of handling facilities and hot water treatment of hands (such as 5 minutes in 50°C water) helps in controlling the disease in cold storage.

**Pseudostem Heart Rot** (*Botrydiploia sp.*, *Gloeosporium sp.* and *Fusarium sp.*) :The first indication of heart rot is the presence of heart leaves with part of the lamina missing or decayed. In severe cases, the inner leaves of the crown first turn yellow, then brown and finally die. In more severe cases all the leaves and the plant die.

**Control** : Adopting field sanitation, good drainage and proper spacing reduce the incidence of the disease. To prevent spread of the disease, spraying of Captan or Dithane M-45 or Dithane Z- 78 is effective.

**Head Rot** (*Erwinia carotovora*) :

Newly planted suckers get affected, leading to rotting and emitting of foul odour. In older plants rotting at the collar region and leaf bases are seen. In advanced cases, trunk base becomes swollen and split.

**Control** : Good drainage and soil conditioning can control the disease to some extent. Use of rhizomes with dead central buds and active lateral buds prevents the appearance of the disease.

### **Bacterial Wilt or Moko Disease (*Pseudomonas solanacearum*) :**

The young plants are affected severely. In the initial stages the bacterial wilt is characterised by the yellowish discolouration of the inner leaf lamina close to the petiole. The leaf collapses near the junction of the lamina with the petiole. Within a week most of the leaves exhibit wilting symptoms. The presence of yellow fingers in an otherwise green stem often indicates the presence of moko disease. The most characteristic symptoms appear on the young suckers that have been cut once and begin regrowth. These are blackened and stunted. The tender leaves from the suckers turn yellow and necrotic.

**Control :** Early detection and destruction of the suspected plants may help in preventing the spread of the disease. All the tools used for pruning and cutting should be disinfected with formaldehyde. As the insects can carry the disease causing bacterium on the male flowers, removal of the male flowers as soon as the last female hand emerge help in minimising the spread of the disease.

### **Banana Bunchy Top Virus (BBTV) :**

The disease is transmitted to the plant by the aphid vector *Pentalonia nigronervosa* and dwarf bananas are very susceptible to this disease. Primary symptoms of the disease are seen when infected suckers are planted. Such infected suckers putforth narrow leaves, which are chlorotic and exhibit mosaic symptoms. The affected leaves are brittle with their margins rolled upwards.

Characteristic symptom of bunchy top virus is the presence of interrupted dark green streaks along the secondary veins of the lamina or the midrib of the petiole. The diseased plants remain stunted and do not produce bunch of any commercial value.



**Control :** Systematic eradication of the diseased plants, suckers and the clumps is very essential. Planting materials should not be collected from places affected by this disease. The aphid should be controlled to check spread of the disease by spraying with Metasystox (0.1-0.5%). Plants adjacent to the healthy plants should also be

sprayed. The affected plant should be killed with kerosene or herbicides such as 2, 4-D or 2, 4, 5-T. The rhizome should be dug out, cut into small sections and sprayed again so that no suckers can be produced which may harbour the virus.

### **Banana Streak Virus (BSV) :**

A prominent symptom exhibited by BSV is yellow streaking of the leaves, which becomes progressively necrotic producing a black streaked appearance in older leaves. . The virus is transmitted mostly through infected planting materials, though mealy bugs (*Planococcus citri*) and more probably *Saccharicoccus sacchari* are also believed to transmit it. Shoot tip culture does not eliminate it from vegetatively propagated materials.

**Control:** Control strategies include use of clean planting material and quarantine. Eradication of infected plants and control of vectors are effective in controlling the severity of the disease.

### **Mosaic Virus :**

The disease is characterised by typical mosaic symptoms on the leaves. Mosaic plants are easily recognised by their dwarf growth and mottled, distorted leaves. The earliest symptoms appear on young leaves as light green or yellowish streaks and bands giving a mottled appearance. The aphid vector *Aphis gossypii* transmits the disease.

**Control :** The plantation should be kept free from weeds. Suckers from infected clumps should not be used for planting. Weeds in the nearby area should be removed as the virus survives in them during off-season. Use of suitable insecticide to reduce spread of the disease is also suggested.

**Banana Bract Mosaic Virus (BBMV) :**

The symptoms appear as yellow green bands or mottling over an entire area of young leaves. The affected leaves show abnormal thickening of veins.

Bunch development is affected.

**Control :** Removal and destruction of affected plants along with rhizome. Growing cucurbits in and around banana field should be avoided.