

سورة التوبة

Diseases of Banana

Black Sigatoka Disease

- Black Sigatoka is also known as black leaf streak.
- It causes losses of up to 50% or more.
- It is responsible for premature ripening in exported fruit.
- It has wide host range and is considered as more damaging than yellow Sigatoka disease.
- Black Sigatoka can significantly reduce fruit production on a single plant in several banana exporting countries of the world.

Black Sigatoka:

C.O. *Mycosphaerella fijiensis* Morelet

[anamorph: *Paracercospora fijiensis*
(Morelet) Deighton]

Yellow Sigatoka:

C.O. *Mycosphaerella musicola*
(Mulder)

Symptoms

- The first symptoms of black Sigatoka disease appear as tiny, chlorotic spots on the bottom surface of the 3rd or 4th open leaf.
- The spots turn into thin brown streaks later restricted by leaf veins.
- The color of the streaks becomes darker and is visible on the top surface.
- The lesions become large and dark giving characteristic black streaking of the leaves.
- Under humid conditions, adjacent tissue often show a water-soaked appearance.

Symptoms





Courtesy: Google Images

Black Sigatoka infected Banana



Factors Favouring

- The spores are formed under high moisture conditions.
- Dissemination of spores occurs by wind and rain.
- Both types of spores i.e. conidia or ascospores can germinate within two or three hours under humid conditions.
- Infection requires a minimum of two or three days under optimum conditions.

Disease cycle

- The pathogen produces conidia and ascospores, both of which are infective.
- Infected planting materials and leaves are responsible for the long-distance spread of the disease.
- The outbreak of black Sigatoka sometimes occurs from the import of infected germplasm.

Disease Cycle...

- The ascospores are dispersed by wind over longer distances while conidia are splash-dispersed within the crop.
- Both types of spores cause similar symptoms. They enter the leaf through the stomata.
- Following infection, emergence of hyphae from the stomata occurs.
- They develop into conidiophores forming new conidia.

Management

- Use resistant cultivars.
- Remove infected leaves to avoid the discharge of spores from the lower leaves in the stack.
- Use drip irrigation if possible to reduce splash dispersal.
- Ensure proper ventilation in the crop.
- Cultural practices including improved drainage, control of weeds, removal of diseases suckers and recommended spacing should be adopted.
- Foliar spray of Copper Oxychloride @ 3 g/liter of water or Thiophanate Methyl @ 1 g/ liter of water should be done for effective control of the disease.

Banana Bunchy Top

Banana bunchy top virus (BBTV) is a plant pathogenic virus of the family Nanoviridae known for infecting banana plants and other crops.

- **Common Name**

- Banana bunchy top

- **Scientific Name**

- *Banana bunchy top nanovirus*. The abbreviation is BBTV.

- **Distribution**

- It has been reported from Asia, Africa, North (Hawaii), South (Brazil) and Central America, Oceania. It is also recorded in American Samoa, Australia (restricted), Fiji, Guam, New Caledonia, Samoa, Tonga, Tuvalu, Wallis and Futuna.

- **Hosts**

- Banana and others in the genus *Musa*.

Symptoms

- The name "bunchy top" has been given because plants with banana bunchy top (BBT) symptoms have narrow and shorter leaves with little distance between them.
- Leaf edges often roll upwards with yellow margins.
- The most characteristic symptoms are short, dark-green dots and dashes along the minor leaf veins which form hooks curving downwards near the edge of the midrib.
- Plants infected at young stage rarely produce a fruit bunch.
- When diseased suckers are planted they become severely stunted and they do not produce fruit.
- Plants infected at a later growth stage may produce a distorted bunch.

Spread

- BBTV is spread through infected planting material, including suckers, or by the banana aphid (*Pentalonia nigronervosa*), when it feeds on diseased plants and moves to healthy ones.
- It takes more than 4 hours of feeding on a diseased plant before aphids become infected with the virus. But once infected, the aphids continue spreading the virus until they die.
- Aphids live for 15-20 days. The virus is not transmitted on tools or through the soil.
- Banana aphids can retain the virus for several weeks and may cover large distances especially when blown by the wind.

Symptoms of BBTV



Underside of a banana leaf showing veins that have dark and light areas.



Colony of Banana Aphid (*Pentalonia nigronervosa*)



Mottling of Inflorescence infected with BBTV



Diseased



Normal

Management

- Bunchy top cannot be cured and affected plants must be destroyed.
- Control depends on prompt detection and destruction of infected stools.
- Strict quarantine measures should be adopted to prevent movement of contaminated planting material.
- Control also depends on the use of healthy planting material and intensive eradication schemes.

Banana Anthracnose

Symptoms:

- 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 or blemishes and sunken spots on fruits that may bear masses of acervuli. The diseased fruit turns black and shows shrivelling.
- Spores produced on dead banana material spread to young fruit in water droplets.
- The pathogen may also produce symptoms on green fruit and enters the crowns after fruits are detached from stalks.
- The fungus remains dormant in the tissue until the onset of ripening.

Crown rot

- Brown to black color develops where the hand is detached from the bunch.
- A layer of whitish mold becomes evident on the cut surface of the crown.
- The mold can penetrate deeply into the crown and necks of fingers and causes a dry, black rot.
- Fingers may detach prematurely from severely infected crowns.
- Disease may increase rapidly during banana fruit ripening.

Causal Organism

- *Gloeosporium musae*
- *Colletotrichum musae*
- Fungus *Colletotrichum musae* can cause both crown rot and anthracnose.

Symptoms of Anthracnose





C.O. Colletotrichum musae
Fusarium semitectum

Factors Favouring

- These pathogens exist in banana fields on dead banana leaf or inflorescence tissues. They are dispersed by wind and water and also by some insects, birds, and rats.
- Disease symptoms increase due to poor management in banana fields.
- High rainfall and high relative humidity favour the disease.
- Poor fruit packinghouse practices including lack of proper washing and drying and dirty de-handing knives.

Management

- Spraying of Chlorothalonil (0.2%) or Bavistin (0.1 %) at 15 days interval is recommended.
- Minimizing bruising and development of blemishes.
- Proper sanitation, handling and prompt cooling to 14°C are essential to reduce the disease in cold storage.

- Prune diseased parts to prevent inoculum and increase air circulation minimizing competition among shoots for water and nutrients.
- Weeds need to be removed from banana field.
- Ensure good field drainage.

Banana Mosaic Virus

Symptoms:

- The disease is characterized by typical mosaic symptoms on the leaves.
- The earliest symptoms appear on young leaves as light green or yellowish streaks and bands giving a mottled appearance.
- Affected plants show dwarf growth and distortion of leaves.
- The aphid vector *Aphis gossypii* transmits the disease.

Management

- Avoid selection of suckers from infected clumps.
- Weeds in the nearby area should be removed as the virus survives in them during off season.
- Use of suitable insecticide to control aphids.

*Sources

- 1. Recommended books.
 - 2. Latest research articles downloaded from Google.
 - 3. Google images.
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- *Solely for academic purpose and guidance of students.