Reg. No.: COOP/2023/KOTA/201080/26/181

AGRICULTURE FORUM FOR TECHNICAL EDUCATION OF FARMING SOCIETY

Kota, Rajasthan

Viral Diseases of Banana and Their Management

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INTRODUCTION

Banana (Musa spp.) is a vital global food source and trade commodity, but its production is severely threatened by destructive viral diseases like Banana Bunchy Top Virus (BBTV), Banana Streak Virus (BSV), and Banana Bract Mosaic Virus (BBrMV). Because these systemic infections are incurable and easily spread through vegetative propagation and insect vectors (aphids and mealybugs), they cause devastating yield losses. Controlling these viruses requires an integrated approach focusing on early diagnosis, vector control, clean planting materials, and strict farm sanitation. The impact, transmission, symptoms, and management of these major banana viruses are mentioned below

1. Banana Bunchy Top Virus (BBTV)

Importance and Distribution:

Banana Bunchy Top Virus (BBTV) is one of the most severe viral diseases affecting banana and plantain crops worldwide. It occurs extensively in Southeast Asia, the Philippines, Taiwan, the South Pacific islands, parts of India, and Africa.

Transmission:

The disease is mainly transmitted by the banana aphid, Pentalonia nigronervosa, and can also spread through infected suckers and other contaminated planting materials.

Symptoms:

Dark green streaks develop along the veins and midrib of leaves. Leaves show marginal yellowing and curling. Newly formed leaves become smaller and grow in an upright manner.

Leaves become brittle and cluster closely at the plant top, producing the characteristic “bunchy top” appearance. Distinctive J-shaped streaks may appear near the midrib. Infected plants exhibit severe stunting. Fruit production is greatly reduced, and any fruits formed may be small or malformed.

Management:

Remove and destroy infected plants immediately through regular rouging. Eradicate infected mats and newly emerging suckers, where recommended, using herbicide injection. Plant certified virus-free materials such as indexed suckers or tissue-culture plants. Inspect plantations regularly to detect infected plants at an early stage. Keep fields clean and free from weeds. Manage aphid populations using recommended insecticides or suitable biopesticides.

2. Banana Streak Virus (BSV)

Importance:

Banana Streak Virus is an economically important disease of banana and plantain, particularly in Africa, India, and other tropical regions. It is caused by a virus belonging to the genus Badnavirus.

Transmission:

BSV is mainly transmitted by mealybugs in a semi-persistent manner. It may also spread through infected planting materials, including tissue-cultured plantlets.

Symptoms:

Yellow to chlorotic streaks appear on leaves and may later become necrotic. Older leaves develop prominent black streaks. Leaves become narrow, thickened, and may tear easily. Overall plant growth is reduced, resulting in stunting. Bunch emergence may be restricted or "choked." Abnormal leaf arrangement or changes in phyllotaxis may occur. Leaf sheaths of the pseudostem may split.

Management:

Identify and remove infected plants at an early stage. Use certified BSV-free planting materials. Confirm infection through appropriate serological indexing of symptomatic leaf tissue. Control mealybugs and their associated ants to reduce disease spread. Keep infected fields fallow for more than six months when recommended. Replant affected areas with certified virus-free planting material.

3.Cucumber Mosaic Virus (CMV)

Cucumber Mosaic Virus (CMV) can infect banana plants at various stages of growth. Although it usually causes a moderate reduction in yield, infected plants can act as a source of the virus and contribute to its spread if not properly managed**.**

Symptoms

The symptoms of Cucumber Mosaic Virus (CMV) in banana include the development of mosaic or streak-like chlorotic patterns on the leaves, along with rolling and twisting of the leaf margins. Infected plants may show bunching of leaves at the crown, and in severe cases, heart rot may develop. The leaves often become narrow and smaller than normal, while overall plant growth may be stunted. Severely affected plants may fail to produce bunches.

Management

Management of CMV involves the removal and destruction of infected plants to prevent further spread of the virus. Healthy and virus-free planting materials should be used for establishing new plantations. Weeds around the crop should be controlled because they can serve as reservoirs for the virus. Aphid vectors should also be managed through appropriate insecticide application. Maintaining balanced nutrition and following proper crop management practices can help plants remain healthy and reduce the impact of the disease.

4. Banana Bract Mosaic Virus (BBrMV)

Symptoms:

Pink to reddish, spindle-shaped streaks appear on the pseudostem, midrib, and peduncle. Mosaic-like streaks develop on the bracts and fruits. Newly emerging suckers may show reddish-brown streaks. Leaves become clustered, giving the plant a characteristic "traveller's palm" appearance. The peduncle may become elongated, and fruit hands may develop incompletely.

Management:

Remove and destroy infected plants as soon as symptoms are observed. Plant only certified virus-free planting materials. Conduct regular field inspections for early identification of diseased plants. Control aphid vectors with recommended insecticides to reduce virus transmission. Avoid intercropping banana with cucurbit crops and other potential alternate hosts.

CONCLUSION

Viral pathogens like BBTV, BSV, and BBrMV pose a constant threat to global banana production, causing severe stunting, leaf damage, and drastic yield losses that impact food security and local economies. Since viral infections cannot be cured chemically, control relies strictly on prevention through Integrated Disease Management (IDM) including early detection, prompt removal of infected plants, insect vector control, and using certified virus-free tissue culture stock. Long-term protection will depend on strict quarantine measures, farmer training, and breeding virus-resistant cultivars.