B.Sc. Third Year, Semester - V

Botany Paper No. XVI (C)

Plant Pathology Unit-2

5) Cash crops

a) Grassy shoot of sugarcane

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a) Grassy shoot of sugarcane

Causal Organism: Phytoplasma (MLO)

Host: *Saccharum officinarum* (sugarcane)

Distribution

The disease was first noticed in India in 1919 in Maharashtra. It is one of the serious disease found in A. P., TamilNadu, Orissa, Bihar, U. P., Punjab and Rajasthan. It is also reported from Burma, Shrilanka and Sudan also. Numbers of varieties are affected in India. Losses from grassy shoot are in the form of reduced germination in setts from diseased canes, stunted growth and poor juice quality.

Symptoms:

Symptoms:

The disease has been variously described as ‘new chlorotic disease’, ‘albino disease’, ‘yellowing disease’, ‘bunchy disease’ or ‘leaf tuft’. The most pronounced symptom is the grassy appearance of the affected shoot. Shoots growing from diseased setts remain dwarfed or stunted. The leaves are narrow and small like grass leaves; the canes are thin with short internodes, giving a bunchy or grassy appearance to the culm. The leaves appear yellowish and in some cases may entirely devoid of any pigment. If many of the tillers are affected in this manner the entire shoot dries. Leaves exhibit straight, long, white or light green or yellowish streaks. The lower nodes produce large number of grassy shoots. In systemically infected canes the disease appears May-June. In sprouts raised from top buds the symptoms appear late as compared to sprouts raised from lower buds.

Causal organism and disease cycle:

The disease was first considered a viral disease. However, since 1971, it has been suggested that it is caused by a **mycoplasma like organisms** (MLO). **Corbett et al (1971)** first suggested that the disease was associated with mycoplasma like bodies and **Rishi et al (1973)** demonstrated with the help of electron microscopy, the presence of mycoplasma like bodies in the phloem of diseased canes.

The organism is present in the sieve tubes of phloem as ovoid, spherical or irregularly shaped bodies. The size of ovoid or spherical bodies is 300-400nm in diameter and that of protruding filament 30-50nm in diameter. These cells lack cell wall and are bounded by a single triple layered membrane. They contain ribosomal granules and DNA strand. Mostly the cells are concentrated towards the periphery of the cell, near the cell walls but often the cells are fully loaded with these bodies and then the cells dies followed by death of the MLOs due to starvation. In some cases, MLOs are seen lying close to sieve pores and turn filamentous while passing through the sieve pores. Concentration of MLO is high in canes growing at high temperature (around 30^0C) and such canes show severe symptoms.

Causal organism and disease cycle:

At lower temperature the symptoms are less severe and the number of MLO in the cells is also lower. The grassy shoot MLO perpetuates through diseased canes used for seed and spread through diseased setts and cane cutting knives (sap transmission). Ratooning of the diseased crops is an important source of perrennation. Introduction of the pathogen in new fields is mainly through diseased seed setts. Many aphids and a leaf hopper have been reported to spread the MLO from plant to plant in the field but only to a limited extent. The vectors are *Rophalosiphum maidis, Aphis sacchari* and *Aphis indosacchari*. Transmission by *Cuscuta campenstris* has also been reported from Bihar (Jha et al., 1973). The disease has been transmitted from sugarcane to sorghum and from sorghum to sugarcane by using *Aphis sacchari*.

Control measures:

1. Healthy seed setts should be taken from a field where grassy shoot is not present even in traces.
2. During the early stage of crop growth insect vectors can be controlled by weekly spraying of 0.16 percent malathion.
3. Diseased clumps should be dug out and destroyed.
4. Heat therapy has also been recommended. The setts should be kept in hot water at 50^0C for two hours or in hot air at 54^0C for eight hours.
5. Tetracycline antibiotics (250ppm) applied to seed setts under negative pressure has been found to eliminate symptoms. Single bud setts can be treated with such antibiotics.

Thank you