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Integrated Management of Sugarcane Diseases

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Introduction

Mostly sugarcane diseases are either seed borne or soil borne, therefore, once the disease has spread in the field, it is almost impossible to control it even with agro-chemicals. Over a hundred diseases affect sugarcane crops worldwide. Among them, about 10 are economically relevant over a certain period of time for a specific country or region, because of their direct impact. The disease incidence can be reduced or minimized by adopting different control measures. No single method is successful for the control of sugarcane diseases. Integrated disease management of sugarcane is the most suitable approach for manage all the diseases. It includes agronomical practices, cultural practices, and chemical and biological control measures.

Major diseases of sugarcane

1. Red Rot (*Collectotrichum falactum* Went.)
2. Ratoon stunting disease (*Clavibactor xyli*)
3. Wilt (*Fusarium sacchari)*
4. Pokkah boeng (*Fusarium moniliforme)*
5. Smut *(Ustilago scitaminea)*
6. Grassy shoot *phytoplasma*
7. Mosaic (Sugarcane mosaic virus, Sugarcane streak mosaic virus)

Different integrated approaches for control of sugarcane diseases

1. Use of Agronomical Methods

- Burning of trash
- Use of healthy seed
- Avoid rationing of diseased crop
- Crop rotation
- Drainage in fields
- Field sanitation

2. Legislation

To prevent introduction of diseases, quarantine practices for seed material and varieties between states is highly essential.

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3. Thermotherapy

Hot water treatment at 52°C for 18 minutes is highly useful for controlling all sugarcane internally seed borne diseases.

4. Chemical control

Seed treatment before sowing with the following fungicides is very useful for the control of sugarcane diseases.

- Dithan M-45 1:400 (0.25%)
- Vitavax 1:800 (0.125%)
- Benlate 1:1600 (0.062%)

5. Rouging of diseased clumps

Disease free seed nursery is desired to be established in each mills farm and farmer's field in which diseased clumps should be roughed out.

6. Use of long sets

Three or four budded setts are very suitable seed setts for the control of soil born inoculums of red rot, root rot and pineapple disease.

7. Good hygiene field conditions

Extreme dry and wet soils should be avoided for the control of red rot and root rot diseases.

8. Collateral hosts

Collateral hosts like sorghum should not be grown in the vicinity of sugarcane crop for the control of sugarcane mosaic virus where the grass hoppers feed and spread SCMV.

9. Disinfection of seed cutter

Dipping of seed cutters in the dettol solution or surf powder while cutting the seed setts is very useful for the control of sugarcane Mosaic Virus.

Integrated management of red rot

Vegetative propagation in sugarcane is most favours harbouring of the pathogen in the planting setts adequate care should be taken while selecting seed canes. Since it is difficult to detect incipient infections of *C. falcatum* in seed-pieces, it is recommended to take the planting material from a disease free crop. Sugarcane setts should be selected from red rot disease free area in order to eliminate primary source of infection. Red rot infected sugarcane

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fields should be rotated with paddy crop to destroy surviving debris borne inoculums in the field.

Integrated management of wilt

The disease is associated with fungus *Fusarium sp.* and *Cephalosporium sacchari* and the syndrome is predisposed by biotic and abiotic factors. Wilt causing fungus is a weak soil borne pathogen. Abiotic factors like drought, water logging and drought followed by water logging weaken the root system and predispose the plant for wilt infection. Elimination of biotic and abiotic factors will decline the wilt incidence. Wilt can be effectively managed by using disease free setts, crop rotation with paddy and by application of organic manure in order to increase the antagonistic flora which can inhibit wilt pathogen present in the soil.

Integrated management of Ratoon stunting

The bacterium can be eliminated through heat treatment from the infected canes. Conventional aerated steam therapy treatment of 50°C for 1–3 h or moist heat air treatment at 54 °C for 4 h of seed canes takes care of the pathogen inactivation. If such treated setts are used in nursery programmes, disease-free crop is ensured in commercial planting. Alternatively, use of tissue culture derived seedlings can prevent the pathogen from the infected seed canes.

Integrated Management of Sugarcane mosaic

Studies conducted very clearly established ubiquitous nature of SCSMV infection in sugarcane in different states in India and it has been found as a major causative virus of sugarcane mosaic. So far no aphid species is reported to transmit SCSMV in nature. SCSMV can also be controlled by resistance varieties. Elimination of SCSMV through meristem tip culture technique in India is being successfully used to many sugarcane varieties.

Grassy shoot stunt phytoplasma

The disease is widely present in all parts of India. It is mainly transmitted through infected sugar cane setts. *Proutista moesta*, a derbid bug has been reported to transmit this disease. The disease is caused by a Mycoplasma like organism (MLO). GSD can cause very heavy yield loss particularly when planting material is obtained from infected sources. GSD can be eliminated from infected setts by treating the setts in aerated steam (at 50°C) for one hour.

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Roguing and eradication of GSD clumps are very much helpful in the decrease of GSD. Plant crop with high level of GSD should not be ratooned.