

Molecular Characterization and Diagnostics for Effective Management of Phytoplasma and Viral Diseases in Sugarcane

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ABSTRACT

Sugarcane is the third largest crop in terms of value next to rice and wheat in India. Vegetative propagation favours carryover of different pathogens through seed canes leads to spread of the diseases in the main field. Increasing virus and phytoplasma titre in the canes severely affects cane growth and varietal degeneration in elite varieties. This severely affect sugarcane cultivation in Andhra Pradesh and in the country. Hence, healthy seed combined with molecular diagnostics become the starting point for disease management in sugarcane. The advancements in molecular diagnosis and detection techniques have paved a way for efficiently discriminating of the virus infected seedlings benefit the sugar industry and agricultural research stations in supplying virus-free planting materials through tissue culture techniques. Now it is very well established that tissue culture derived planting materials are free from the viruses and exhibit varietal vigour. In this context, molecular characterization of viruses causing diseases like mosaic by *Sugarcane mosaic virus* (SCMV), *Sugarcane streak mosaic virus* (SCSMV) and *Maize yellow mosaic virus* (MaYMV), leaf fleck by *Sugarcane bacilliform virus* (SCBV), yellow leaf by *Sugarcane yellow leaf virus* (SCYLV) and grassy shoot by *Phytoplasma* was done based on partial genome analyses. Characterization of the viruses into new genus, species, strains and genotypes aided in developing molecular tools especially PCR, RT-PCR assays, and recombinant antisera for the viruses. Andhra Pradesh context, for the first time, all the viruses were characterized based on partial genomes.

Key Words: *Diagnosis, Molecular Characterization, Phytoplasma, Sugarcane and Viruses*