# SUGARCANE STREAK MOSAIC VIRUS

Sugar Research Australia

## INTRODUCTION

**Sugarcane streak mosaic virus (SCSMV) is an exotic sugarcane disease found throughout South Asia and South East Asia, including; India, Pakistan, China, Thailand, Vietnam, Myanmar and Indonesia. The disease has similar symptoms to Sugarcane mosaic virus (SCMV) and Sorghum mosaic virus (SrMV); a diagnostic test is required to determine which virus is present.**

## CAUSAL AGENT

This disease is caused by a virus: SCSMV, which is in the same family as Sugarcane mosaic virus (SCMV) and Sorghum mosaic virus (SrMV, the Potyviridae). SCSMV is more closely related to Wheat streak mosaic virus than the other sugarcane-infecting Potyviruses. There is some diversity in the genome of the virus, but the significance of this is unknown.

## SYMPTOMS

The main symptoms of SCSMV are a mottled streaky pattern of light and dark green on the leaves, similar in appearance to (SCMV); symptom variation with different varieties is common. Asymptomatic infection is also possible, where a plant is infected but shows no symptoms.

Leaf symptoms are most easily seen on young leaves; plants grown from infected billets may show symptoms within the first 1-2 weeks of growth. Crop inspections at around 4 months is optimal to determine the presence of the virus. The whole stool may appear pale in field inspections, especially in comparison to healthy plants. As the plants age, reduced growth becomes more obvious in diseased stools, however it is often difficult to identify because in many cases the entire block can be affected leaving no basis for comparison. SCSMV does not kill the plant. Growth effects may be more severe when both SCSMV and SCMV infect the same plants

## VECTOR AND SPREAD

No vectors have been found for SCSMV, however insect vectors are likely. Rapid spread of the virus has been reported in several countries but the vector has yet to be identified. In Indonesia, spread is mainly via infected seedcane with little evidence of significant spread by an insect vector. Infected seedcane may show few leaf symptoms so the virus can be inadvertently spread widely through seed movement. SCSMV is not spread in commercial crops via mechanical means - such as cane knives.

## YIELD LOSS

Yield losses from SCSMV are estimated to be as high as 30% in highly susceptible varieties, but average losses are closer to 15%.

*(Top) Leaf symptoms of sugarcane streak mosaic virus showing mottled streaks of pale green.*

*(Bottom) Whole-plant infection of Sugarcane streak mosaic virus. Symptoms are clearer on the young emerging leaves, and stool looks pale.*

***(Above)*** *Pale leaves with mosaic pattern typical in field infection of Sugarcane streak mosaic virus.*

## DIAGNOSIS

Diagnosis via symptoms alone can be difficult due to asymptomatic infection, poor symptom expression or the presence of other forms of mosaic. Specific assays have been developed including molecular (RT-PCR) and antibody-based (ELISA) technologies. These are used in surveillance and in clean seed programs. A specific RT-PCR is used in import quarantine in Australia to ensure plants entering the country are free from the disease.

## CONTROL

Planting of disease-free planting material is very important for limiting the spread of SCSMV. Hot water treatment is not effective for virus elimination, and meristematic tissue culture also has a low efficacy in virus elimination.

There does not appear to be a high level of resistance in commercial cane. More research into vectors and resistance are needed to provide for a more effective management strategy. It is important that the Australian industry remains free of the disease.

## HAVE YOU SPOTTED MOSAIC?

SCMV is found in the Childers and Rocky Point districts and Sugarcane striate mosaic virus is found in the Burdekin.

If mosaic symptoms are seen in other regions, please report the observations to SRA and the **Exotic Plant Pest Hotline (1800 084 881)**. SRA will be able to determine whether SCSMV is the cause of the symptoms you have seen.

## REFERENCES


Putra, LK, Kristini, A, Achadian, EM, Damayanti, TA (2014) *Sugarcane streak mosaic virus in Indonesia: Distribution, Characterisation, Yield Losses and Management Approaches.* Sugar Tech 16, 392-399.

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