

Ramu stunt

Introduction

Ramu stunt is a severe disease of sugarcane that can cause extensive yield losses. Ramu stunt was unknown until 1985-86 when poor yields, stool death and severe stunting became evident in commercial crops at Ramu Sugar (now Ramu Agri-Industries Ltd) in Papua New Guinea. A severe epidemic in the widely grown, but susceptible, variety Ragnar almost bankrupted the company. Investigations revealed unusual leaf mottling and striping symptoms associated with the poor growth but these were not always diagnostic because of symptom variation. The causal agent was unknown until recently.

Symptoms

The classic leaf symptom is an irregular streak (Image 1). Symptoms start as short irregular streaks or flecks, and may resemble a mosaic. As symptoms develop, the streaks become yellowish-green in colour, continuous or interrupted and interspersed by apparently healthy green tissue. Streaks can vary from several millimetres in length to run the full length of the leaf blade and range in width from 2-5 mm or more. Leaf symptoms differ considerably depending on the variety.

Diseased canes are thinner than healthy canes. Stools are severely stunted (Image 2) and there is progressive death of stalks. Diseased stools ratoon poorly. In the field, infection in a susceptible variety can lead to total ratoon failure.



Image 1: Leaf symptoms in the variety Ragnar seen as yellowish-green irregular streaks interspersed by green tissue.



Image 2: Severe stunting in the variety PN97-54.

Causal agent

Research at SRA has shown a novel virus in the Genus *Tenuivirus* is associated with Ramu stunt. Specific protein and RNA assays have been developed that consistently give positive results with Ramu stunt infected plant material. Previous reports of a phytoplasma associated with Ramu stunt are incorrect.

The viral genome, although not fully characterised yet, is similar to known tenuiviruses, Rice stripe virus, Maize stripe virus and Maize yellow stripe virus. A diagnostic test is now available for the virus using reverse transcriptase-polymerase chain reaction (RT-PCR). This test can be used to screen plants and the insect vector of the disease, *Eumetopina*.

Hosts

Ramu stunt has been confirmed in commercial sugarcane (*Saccharum* interspecific hybrids) and noble canes, also known as garden or chewing canes (*Saccharum officinarum*). Ramu stunt-like symptoms have been observed in wild canes such as *Saccharum robustum*.

Distribution

Ramu stunt is known only from mainland Papua New Guinea. It has been confirmed in commercial canes on the Ramu estate and in village gardens in the Ramu Valley. However Ramu stunt-like symptoms have been widely observed across PNG, ranging from the Madang Province to the Capital Province. Ramu stunt is a major disease threat to the neighbouring sugar industries in Australia and Indonesia.

Transmission

Ramu stunt is transmitted by the island sugarcane planthopper *Eumetopina flavipes* (Hemiptera: Delphacidae; Image 3) and by the planting of infected stalk material. The spread of the disease is more rapid during the wet season when planthopper populations are also high. Both nymphs and adults can transmit the disease. Nymphs and adults are found in the spindle roll of the sugarcane plant and these can be seen by unrolling the leaf whorl (Image 4).



Image 3 (above left): Adult *Eumetopina flavipes*.



Image 4 (above right): *Eumetopina* adults and nymphs inside the leaf whorl.

E. flavipes is widespread in Papua New Guinea and Indonesia where it uses sugarcane and other *Saccharum* species as hosts. It is a minor pest of sugarcane as long as it does not carry Ramu Stunt. *E. flavipes* is not present in commercial sugarcane growing regions in Australia but is present on many of the Torres Strait islands, and a small population survives on the Australian main land at Bamaga and New Mapoon. Both the vector and the virus would need to be transported concurrently for the disease to become established and spread within Australia.

Yield loss

In 1986, Ramu stunt almost destroyed the sugarcane industry in PNG, where a 60% reduction in productivity was recorded in the highly susceptible cultivar Ragnar, which occupied 90% of the plantation. Initial crop estimates of 360 000 tonnes cane had to be revised and the final harvest in 1986 was only 120 000 tonnes cane.

Control

The main commercial control used in PNG crops is the planting of resistant varieties and the destruction of infested crops. The selection of disease-free planting material is an important control measure. Excellent control of Ramu stunt has been achieved by cultivation of resistant varieties. Screening trials conducted at Ramu Agri-Industries, reveal that only 25% of Australian commercial varieties exhibit Ramu stunt symptoms. Research is underway to obtain resistance ratings for current Australian varieties which will be very important for an emergency response in the event of a disease incursion. There has been no attempt to control the disease by managing the insect vector.

Selected References

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Kuniata LS, Magarey RC, Rauka GR, Suma S and Bull JI (2010). Screening for Ramu stunt resistance at Ramu Agri-Industries, Gusap, PNG 1986-2008. Proc Aust Soc Sugar Cane Technol 32: 266-272.

Kuniata LS, Young GR, Pais E, Jones P and Nagaraja H (1994). Preliminary observations on *Eumetopina* sp (Hemiptera: Delphacidae) as a vector of Ramu stunt disease of sugarcane in Papua New Guinea. J Aust Ent Soc 33: 185-186.

Waller JM, Egan BT and Eastwood D (1987). Ramu stunt, an important new sugarcane disease in Papua New Guinea. Trop Pest Management 33: 347-349.

If you suspect you may have seen any of these this disease please contact the exotic pest hotline on 1800 084 881, SRA, or your local Productivity Service