Sugar Research Australia

Information Sheet
IS17007

CHLOROTIC STREAK

INTRODUCTION

Chlorotic streak is found in all sugarcane growing areas in eastern Australia and can cause serious yield losses, particularly in flood prone or waterlogged parts of the industry. The disease is one of the most widespread and common diseases within the Australian sugarcane industry (Figure 1).

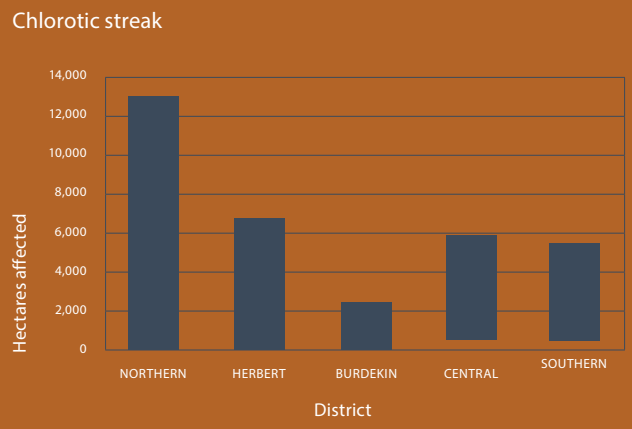

Figure 1: The influence of region on the incidence of Chlorotic streak disease in Queensland (average of 1980 to 2002 data).

SYMPTOMS

The main symptoms of chlorotic streak are irregular creamy white streaks with indistinct margins (Figure 2).

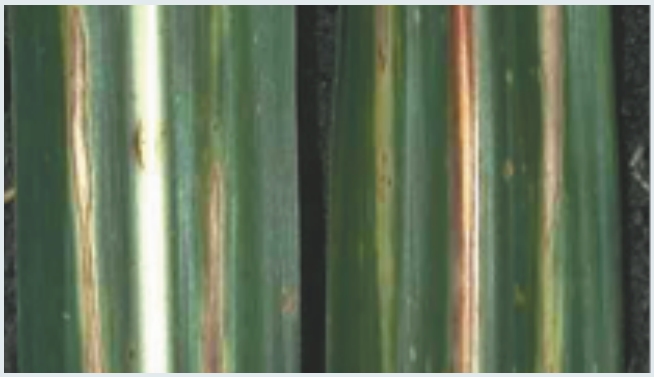

Figure 2: Symptoms of chlorotic streak are irregular creamy white streaks sometimes with patches of dead tissue within the streaks.

The streaks often fade and reappear as they extend along the leaf. As the disease progresses, many leaves develop dead section of leaf tissue along the streaks. There may be one or more streaks per leaf.

If stalks with chlorotic streak are sliced lengthwise, short red streaks will be seen running through the nodes - these streaks are longer than those seen with ratoon stunting disease (Figure 3).

Figure 3: Comparison of internal stalk reddening in chlorotic streak (left) and RSD (right).

YIELD LOSS

Cane infected with chlorotic streak will lack vigour leading to yield reductions of up to 40%. Poor ratooning is also a characteristic of this disease.

SPREAD

Chlorotic streak is spread by diseased planting material and by soil water. The disease is most common in areas prone to flooding and/or waterlogging. The combination of the disease and the deleterious effects of waterlogging can compound the yield losses suffered in infested fields.

The disease can survive for several months in the absence of the sugarcane plant once a field is infested. Recycled irrigation water that has passed through infested fields can spread the disease to the next field that is irrigated with the water.

The disease is not transmitted mechanically by harvesting or planting equipment or other devices such as cane knives. Chlorotic streak can infect a number of common grass weeds.

CAUSAL ORGANISM

Chlorotic streak was first recognised as a disease in 1929 but over 80 years passed before the causal agent was identified. SRA researchers used modern DNA technology and traditional pathology to identify the organism causing the disease.

Using new sequencing technologies, they compared the DNA between a healthy sample and infected sample. Their investigations eventually led them to a group of organisms called protozoans. - The organism is a unique Cercozoa, not closely related to any known organism. It has been named as Phytocercomonas venanatans. The organism is about one hundredth of one millimetre in size and is distinguished by two flagella (whip-like structures; Figure 4).

Figure 4: The organism causing chlorotic streak, a Cercozoa with two flagella.

MANAGEMENT

Chlorotic streak can be managed through the use of disease-free planting material, avoiding highly susceptible varieties and improved drainage of low-lying cane fields. Improved drainage will avoid waterlogging, which will reduce the risks of spreading chlorotic streak and improve cane growth.

In some low-lying and flood prone areas, it is impossible to completely avoid the spread of chlorotic streak.

Therefore, growers need to reduce the effects of the disease by ensuring they use disease-free seed cane and avoiding highly susceptible varieties.

Approved seed is hot water treated to ensure the seed cane is free of chlorotic streak and other diseases such as ratoon stunting disease (RSD) and leaf scald. Chlorotic streak can be eliminated by a short hot water treatment (50°C for 30 minutes). Seed cane should be planted on the least flood prone and best drained section of the farm to reduce infection.

Growers should inspect their seed cane or ask for their local Productivity Service to inspect their seed cane. If chlorotic streak is found in the seed cane, the section of the block with the disease should be avoided or a new seed source that is free of disease located. Approved seed should be purchased regularly to renew a grower's disease free source of seed cane.

DIAGNOSIS

A PCR-based diagnostic test is available for chlorotic streak. It works well on stalk material and expressed sap, meaning that it can be used to check if planting material is free of the disease.

The test is of great value in the identification of chlorotic streak due to chlorotic streak not always causing symptom expression. Current research is looking at ways of combining chlorotic streak and RSD testing.

RESISTANCE SCREENING

Until recently, rating varieties for resistance to chlorotic streak was difficult because replicated field trials with controlled levels of inoculum were challenging to achieve.

Research underway at Woodford and Tully is looking at ways of inoculating sugarcane with controlled amounts of the cultured pathogen. Implementing a rapid routine resistance test would allow highly susceptible varieties to be identified before they are released to industry. Resistance ratings are available through QCANESelect™.

FOR FURTHER INFORMATION

If you would like further information on chlorotic streak please contact your local adviser.

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