BSES
Sugarcane for the future

information sheet
ISO6052

Sugarcane Smut

Introduction

Sugarcane smut is one of the most serious diseases of sugarcane. Affected cane is severely stunted and production losses of 30-100% are common in susceptible varieties. The loss of susceptible varieties causes major disruption to plant improvement programs. The disease has had a history of spread around the world, particularly in the 1970s and early 1980s. Sugarcane smut occurs in all sugar industries except those in New Guinea (including Irian Jaya) and Fiji (and other South Pacific islands). The disease was found for the first time in Australia in the Ord River Irrigation Area of Western Australia in July 1998, and was recorded for the first time on the east coast of Australia in the Bundaberg-Childers area in June 2006. In November 2006, it was found in the Mackay area.

Causal organism

The disease is caused by a fungus, *Ustilago scitaminea*. The fungus infects plants through buds on standing stalks or germinating buds in the soil. The fungus grows in the plant in close association with the growing points or meristems.

Symptoms

Sugarcane smut is easily identified by the black whip-like structure that forms from the growing point of the sugarcane plant. This whip replaces the spindle leaf. Whips are formed in shoots developing from infected cane cuttings, cane that is infected from spores attached to the bud, shoots developing in contaminated soil and from side-shoots developing on mature stalks. The whip has a thin membrane that breaks to release the mass of black spores. When all spores are blown or fall from the whip, the straw colored core of the whip remains. Abnormal whips that contain some flower parts can sometimes be formed. Before the whip forms there is some shortening and crinkling of the youngest leaves.

Infected plants are usually stunted and individual stalks are thin with a grass-like appearance.

Typical smut whip and thin grassy shoot

Yield loss

Sugarcane smut can cause total crop loss in susceptible varieties. Losses have been estimated for a range of varieties at 0.6% loss for every 1% increase in the number of infected plants. In

susceptible varieties, plants will die, making ratoon crops unprofitable, and necessitating early plough out and replanting.

Smut can cause severe stunting and stool death

Spread

Sugarcane smut is primarily spread by wind dispersal of the spores or by planting infected or contaminated cane cuttings. Most of the spores usually spread only a short distance, 100 m. However, spores can travel many kilometers in winds. Movement of spores on machinery, clothing and shoes is also possible.

The spores can only survive for 2-3 months in moist soil but for longer periods in dry soil or other dry environments. The fungus can survive within infected cane plants as long as the plant remains alive. It requires a living plant to produce spores.

Control

Resistant varieties are widely used for control in countries where the disease is present. Resistance ratings for commercial varieties in Australia are available from BSES. BSES rates varieties for resistance to smut in Indonesia and Western Australia. The level of resistance required may vary between regions. Smut is favored by dry warm climates. In the Ord River Irrigation Area, which has an ideal climate for smut, only highly resistant varieties can be grown. It is likely that the Burdekin will require highly resistant varieties but the wet tropical areas and wetter southern districts may only require varieties with intermediate resistance.

Hot-water treatment of cane can be used to eliminate smut from infected planting material. Treatment at 52ºC for 45 minutes can give 99.5% control, and the long-hot-water treatment of 50ºC for 3 hours is also effective. Softening of the buds during hot-water treatment can make the buds more susceptible to re-infection from spores in the soil. The fungicide triadimefon (400 mL of product per 100 L of water) added to the hot-water treatment can prevent this problem and actually protects the cane from re-infection for many months. Alternatively, propiconazole (100 mL of product per 100 L of water) or triadimefon (400 mL of product per 100 L of water) is effective as a cold-water dip after hot-water treatment.

Quarantine

For more information contact the Sugarcane Smut Hotline 1800 303310

Sugarcane smut is a notifiable disease under Queensland *Plant Protection Regulations*. This means that if anyone finds a plant they suspect is infected with sugarcane smut they must report it to a Plant Protection Act inspector. Sugarcane and other infested plants from the Ord River Irrigation Area and Pest Quarantine Areas 4 and 5 (Bowen-Collinsville to Rockhampton and Rockhampton to Howard) in Queensland (see map below)), soil from sugarcane farms and appliances (harvesters and other machinery) that have worked on sugarcane farms can only be moved to other Pest Quarantine

Areas in Queensland or NSW with an inspector's approval. To move machinery:

- After its last use, clean the appliance (vehicle or machine) thoroughly;
- Phone BSES (07 3331 3333) or WA Agriculture in Kununurra (08 9166 4000) and request a clearance certificate. An inspector will visit, make the inspection and issue a certificate if the appliance has been cleaned to the standard required;
- Inform the Chief Executive Officer of BSES (fax 07 3871 0383) when the vehicle or machine will enter Queensland from Western Australia or when it is intended that the machine will arrive in another Pest Quarantine Area and its destination;
- Before using the vehicle or machine on sugarcane land, or selling it, phone BSES (07 3331 3333), to get the item inspected and obtain written approval.

For NSW:
Contact the SUGARCANE SMUT HOTLINE on 1800 303 310 to confirm details.

Smut spores are microscopic, and where there is dust, there may be spores. Spores can be trapped in inaccessible parts of a machine and be freed to infect during transport, use or repairs in the field (spores can remain viable for up to a year). The legislation requires all plant material, sugarcane smut spores and soil to be removed. Therefore, cleaning will involve extensive dismantling, together with steam cleaning or washing with a water and detergent mixture under high pressure followed by application of a disinfectant. Cane Knife Steriliser and Steri-Max are registered for the disinfection of machinery, implements and tools. The complexity of cane harvesters means cleaning these machines will need rigorous attention to detail.

People traveling to cane farms in the Ord River, Pest Quarantine Areas 4, 5 and 6 in Queensland or overseas should wash all clothing in hot water and clean and disinfect boots, cameras and other items carried into cane fields.

For further information

If you want further information on sugarcane smut contact your nearest BSES Extension Officer or Barry Croft, BSES Program Leader Biosecurity, on 0417 613 089 or 07 5496 3357 or Rob Magarey, BSES Principal Research Officer on 07 4068 1488.

References

Comstock, J.C. (2000) Smut. In *A guide to sugarcane diseases* Ed. P. Rott, J.C. Comstock, B.J. Croft and A.S. Saumtally. CIRAD/ISSCT, Montpellier.

Croft, B, Magarey, R and Whittle, P. (2000) Disease management. In *Manual of cane growing*. Ed. D.M. Hogarth and P.G. Allsopp. BSES, Brisbane.

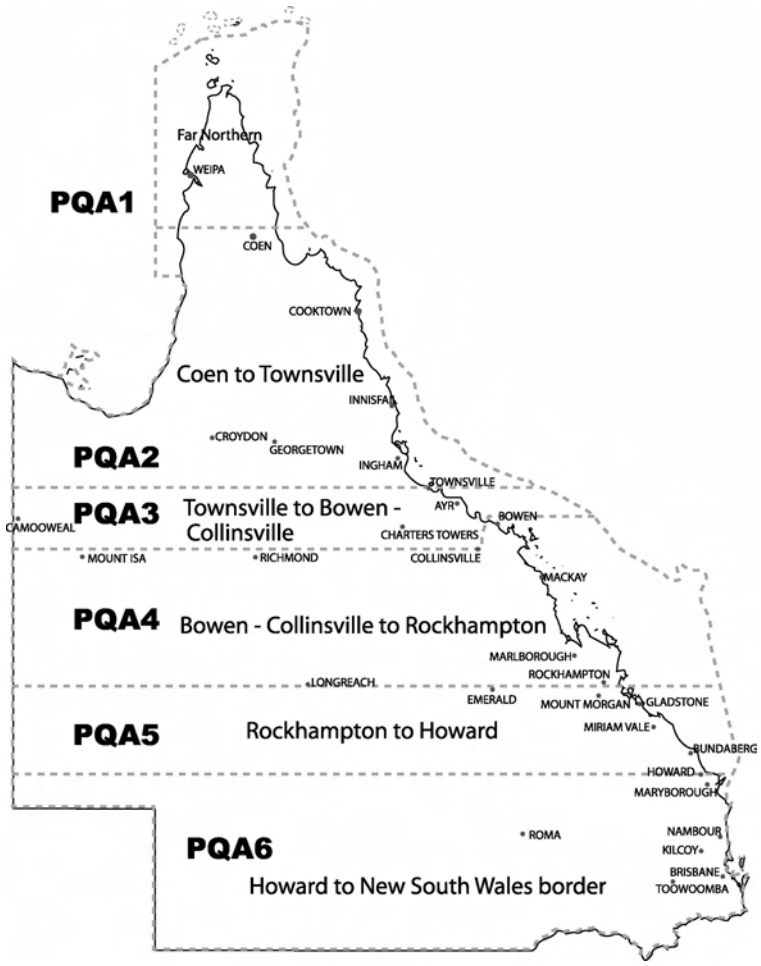
Large smut whip

FOR FURTHER INFORMATION

SUGARCANE SMUT HOTLINE

1800 303 310

PEST QUARANTINE AREAS IN QUEENSLAND



BSES Sugarcane for the future

Queensland Government Department of Primary Industries and Fisheries

An information pack is also available on the BSES Limited web site Biosecurity section (www.bses.org.au).