



Information Sheet

9.1 Ratoon stunt (RSD)

Importance

Under the terms of the Sugar Industry Agreement (2000), Clause 77, RSD is a legislated disease. As such, the disease must be reported to the Local Pest, Disease and Variety Control Committee and must be managed according to the rules prescribed by the Committee (Clauses 78-80).

Ratoon stunt, formerly known as ratoon stunting disease (RSD) can cause substantial yield loss. This important disease, caused by the bacterium *Leifsonia xyli* subsp. *xyli*, occurs throughout the sugarcane industry although infection levels differ widely from region to region. The disease often goes unnoticed because it does not have obvious external symptoms and, as a result, can be inadvertently spread in infected seedcane and at harvest.

Spread

RSD is spread mainly by:

- Planting infected seedcane.
- Survival of RSD in volunteers and plant debris after infected crops are eradicated and fields replanted.
- Transmission from infected to healthy plants through wounds caused by farm implements, especially those used during planting and harvesting operations e.g. cane knives, mechanical planters and harvester, as well as rotary slashers.

Effect on yield

The effect of RSD on yield differs among varieties, but most can be severely affected. The disease slows down growth, resulting in a reduction in cane height (Figure 1) and diameter but usually has little effect on cane quality. Yield losses range from 0.1 to 0.5% for every 1% stool infected depending on variety and growing conditions. Average yield losses of approximately 17% can be expected in heavily infected fields under rainfed conditions, while losses of around 15% are likely under irrigated conditions. Losses are more severe when the crop suffers from moisture stress.



▲ Figure 1: Stunting caused by RSD.

Management strategies

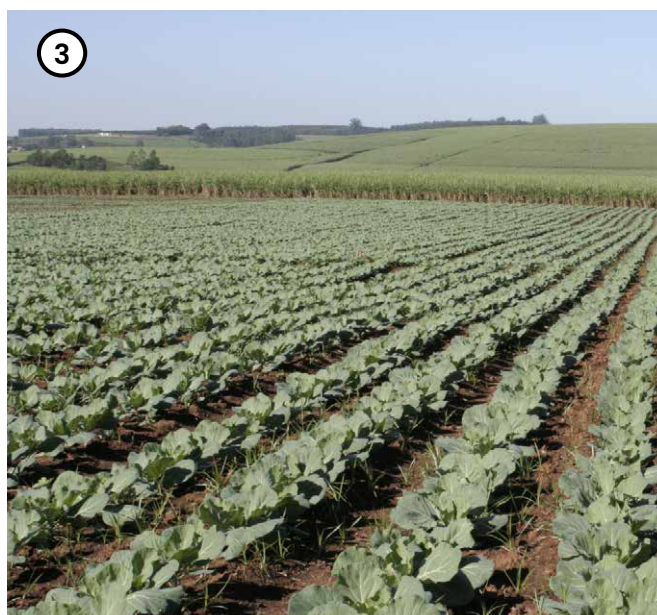
RSD is not airborne and has no known insect vectors e.g. aphids or leafhoppers. Sugarcane is also the only known host of the RSD bacterium in nature. By following some key steps, the risk of introducing RSD onto the farm can be minimised and, if already present, levels can be reduced over time.

The following steps are key to managing RSD effectively:

- 1. Healthy seedcane:** Plant only Certified or Approved Seedcane in commercial fields. Refer to SASRI's Seedcane Production Manual for information on the requirements for, and production of seedcane. Remember to source seedcane for gap-filling commercial fields only from a Certified or Approved nursery. Do not gap-fill seedcane nurseries.
- 2. Volunteer removal:** Ensure thorough eradication of the old crop before replanting. Replanting fields within a few weeks of eradication is not good practice as volunteer regrowth (Figure 2) and infected plant debris are common sources of infection in newly planted fields. Check the RSD status of fields that are due to be eradicated by sending samples to SASRI for testing.



▲ Figure 2: Volunteer regrowth.



▲ Figure 3: Low growing cover crop.

Give all fields, but especially those that were previously infected with diseases such as RSD, smut or mosaic, a break from cane before replanting so that volunteers can be identified and removed effectively. The break can include the winter months to minimise the short-term effects on production. Consider planting cover crops during the break. The chosen cover crop should preferably be a low growing, broadleaf crop so that volunteers can be easily identified and removed from the field (Figure 3). This is particularly important in seedcane nurseries. The benefits of cover crops are discussed in SASRI's Green Manuring Manual.

Recommended fallow periods

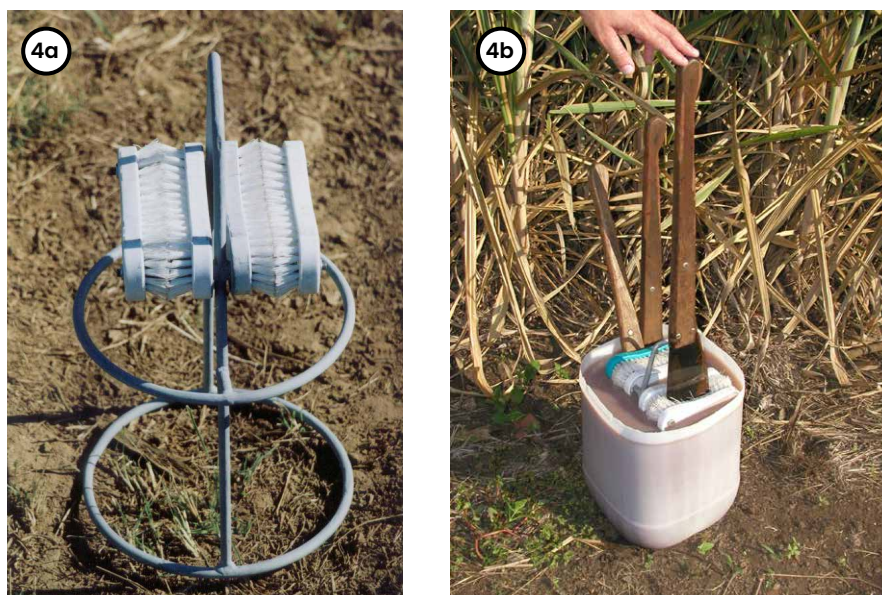
Note: Fallow = land that has been left unplanted to sugarcane. The fallow period starts from the time of physical removal of the previous crop or after the first application of glyphosate (or similar chemical).

- Certified nursery blocks – not less than 12 months with a minimum of 6 consecutive months totally free of sugarcane before planting.
- Approved nursery blocks – not less than 9 months with a minimum of 6 consecutive months totally free of sugarcane before planting.
- Commercial fields – a minimum of 3 months totally free of cane.

Fields must be inspected monthly, and volunteers must be removed during the fallow period.

3. Field hygiene: Ensure that farm implements are properly decontaminated.

- Clean cane knives with a disinfectant when harvesting cane to minimise the risk of RSD spread. A foaming quaternary ammonium compound containing benzalkonium chloride and didecyl dimethyl ammonium chloride (3% solution) can be used for this purpose. Jeyes Fluid (10% solution) or methylated spirits (75% solution) are also effective. A contact time of at least five minutes is required for QACs and Jeyes Fluid to be effective.



▲ Figure 4: Knife-cleaning device.

A knife-cleaning device (Figure 4) can be used to remove soil and plant debris from the knife blade to facilitate the decontamination process.

Note: Methylated spirits should be prepared in a knapsack sprayer to reduce the risk of evaporation and can be sprayed onto the knife blade after removing plant and soil debris. A few seconds is required for effective decontamination with methylated spirits.

In **commercial fields** where in-field decontamination is not always practical, knives should at least be decontaminated when moving from one field to another and at the end of each day.

In **seedcane nurseries**, more frequent decontamination (preferably after every metre of row cut) is necessary. Extra knives should be allocated to each cutter when harvesting seedcane to ensure that the knives are decontaminated properly. Knives used for cutting seedcane should be new or be kept separate from those used in commercial fields. The handles of the seedcane knives can be painted to allow easy identification.

- It is difficult and time-consuming to decontaminate **mechanical harvesters** effectively. All parts of the harvester that come into contact with cut cane surfaces, and those parts where cane juice can accumulate and drip onto the cane row, need to be decontaminated. This involves washing these parts with water under high pressure to remove plant and soil debris before applying the disinfectant at the recommended rate (see *Information Sheet 2.10 Decontaminating mechanical harvesters*).
- **Mechanical planters**, as well as **trailers** and **bins** that are used to transport seedcane must also be decontaminated in this manner. **Rotary slashers** are also an important means of RSD spread and need to be decontaminated when moving between fields.

4. Know the RSD status of your fields: RSD does not have obvious or consistent symptoms that can be easily recognised in the field. For accurate diagnosis, submit samples to SASRI for testing.

Diagnosis has four main purposes:

- 1) To check the health of seedcane,
- 2) To check the RSD status of old ratoons due for replanting,
- 3) To check the RSD status of fields where yields fall below expectations, and to monitor RSD incidence in the industry.

RSD bacteria live inside the xylem (water-conducting) vessels of the stalks. So, for accurate diagnosis, the xylem sap (not the cane juice) needs to be extracted. This extracted sap is then sent to SASRI for testing.

In most cases, the SASRI Biosecurity teams will collect samples from the fields to be tested but growers can take their own samples and deliver to the Biosecurity office provided arrangements have been made for the samples to be received. When taking samples, the following points should be noted:

- The samples must be taken from maturing cane that is at least nine months of age to ensure the populations of RSD bacteria in the stalks are high enough to be detected.
- Select stalks from poorly grown stools in all parts of the field to increase the likelihood of detecting RSD in what is a relatively small sample.
- The lower portion (50-100 cm) of each stalk is required – the RSD populations are highest in the lowest internodes.
- Bundle the stalks from the field or section of the field together securely and label with the farm, field and crop details.
- Deliver the stalk samples to the Biosecurity office as soon as they have been collected. The sap must be extracted on the day of collection. Delays can seriously reduce the accuracy of diagnosis. If the stalks are too dry, another sample will need to be collected from the field.

Standard RSD sample sizes:

- Commercial fields: 20 stalks per 5 ha field or section of field.
- Certified or Approved seedcane nurseries: 40 stalks per 1 ha seedcane block.

Separate 40-stalk samples must be taken:

- 1) from blocks that exceed 1 ha,
- 2) from blocks that are planted to different varieties,
- 3) where seedcane of one variety was obtained from a different source, or
- 4) where seedcane of one variety was prepared and planted on different dates.

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