SEEDCANE PRODUCTION

SOUTH AFRICAN SUGARCANE
RESEARCH INSTITUTE

Contents

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Introduction

This manual outlines the procedures for the production of good quality seedcane. Seedcane is defined as any sugarcane plant material which is intended for use in the propagation of sugarcane. Planting good quality seedcane is crucial for profitable sugarcane production. The potential yield of a crop will not be attained if seedcane of poor quality is planted. In spite of this, seedcane production is an aspect of sugarcane management that is often neglected.

The benefits of quality seedcane

Reduced pest and disease risk

Planting good quality seedcane significantly reduces the risk of serious pest or disease outbreaks in commercial fields. This includes ratoon stunt (RSD), smut, mosaic and eldana.

Improved germination

Another advantage of good quality seedcane is good germination and the improved likelihood of high yields. Well-grown seedcane not yet mature is most likely to germinate quickly and evenly. Good germination leads to rapid growth of a uniform stand, and allows the variety to realise its full potential. Problems of gap filling after planting are therefore minimised and weed control is aided by a full leaf canopy.

Having the plant crop start off on such a strong footing and subsequent good management will lead to prolonged ratooning before replanting, thereby significantly reducing production costs.

Varietal purity

A further benefit of good quality seedcane produced in a well-managed nursery is varietal purity. Seedcane taken from commercial fields is often contaminated with off-type varieties, including unwanted varieties infected with disease. The production of seedcane under nursery conditions allows for regular inspections and effective eradication (roguing) of unwanted stools.

Where the grower has his own seedcane nursery, he is guaranteed seedcane of the **right variety** at the **right time** and of the **right quantity** for the replant programme.

A well-managed certified nursery expedites the introduction of new varieties by ensuring purity and providing a controlled environment for rapid bulking.

Description of the required standards for the two classes of

Class of seedcane	Source to establish nurseries	Fallow period
Certified seedcane and **Certified seedcane nurseries**	HWT certified whole-stick seedcane OR HWT transplants cut and grown from certified seedcane OR NovaCane® plantlets	Overall the period to be not less than 12 months with a minimum of 6 months totally free of sugarcane
Approved seedcane and **Approved seedcane nurseries**	Certified seedcane	Overall the period to be not less than 9 months with a minimum of 6 months totally free of sugarcane

Certified and approved nurseries

The Local Pest, Disease and Variety Control Committee (LPD&VCC) has legal powers, created through the provisions of the Sugar Act and the Sugar Industry Agreement. LPD&VCC regulations require that all commercial sugarcane fields be planted with either LPD&VCC **certified** or **approved** seedcane. The terms *certified* and *approved* refer to the two different classes of nursery (or seedcane) registration described in the regulations, with certified nurseries having to conform to a slightly higher set of standards than approved nurseries, as detailed in the table below. In addition to the requirements specified in the table, all seedcane must be well-grown, in good condition and not water or nutrient stressed. All movement, use or sale of seedcane has to be sanctioned by the LPD&VCC.

Good quality seedcane.

nursery (or seedcane) registration.

Disease, off-type and pest limits			Maximum age at harvest	Harvests permissible
Smut, Mosaic, Off-types	**RSD**	**Eldana/100**		
Less than local area hazard levels (not exceeding 0.1%) when inspected on the last of THREE consecutive LINE BY LINE inspections	NIL when tested (with cane being at least nine months old)	Less than local area hazard levels when inspected within two months of harvest date	Irrigated North and KZN Coastal <500 m above sea level: 9-12 months Midlands > 500 m above sea level: 12 –18 months	Plant and 1st ratoon only
Less than local area hazard levels (not exceeding 0.1%) when inspected on the last of TWO consecutive RANDOM inspections	NIL when tested (with cane being at least nine months old)	Less than local area hazard levels when inspected within two months of harvest date	Irrigated North and KZN Coastal <500 m above sea level: 9-12 months Midlands > 500 m above sea level: 12 –18 mnths	Plant crop only

Planning for seedcane

Each grower should ideally establish his or her own seedcane nursery to produce either certified or approved seedcane. All nurseries must be registered with the relevant LPD&VCC, who will inspect the seedcane produced in the nursery and approve its use either on the grower's farm or for sale to other growers.

Growers may opt not to have nurseries on their farms but must then purchase their seedcane for commercial planting from LPD&VCC certified or approved nurseries. If certified or approved seedcane is sourced from a grower outside of the LPD&VCC area, then permission must be obtained from both the sending and receiving LPD&VCCs.

Establishing a nursery and synchronising its outputs with the seedcane requirements of the farm can be a complex process. Seedcane production should therefore be regarded as a core component of all sugarcane production management planning.

Establishing a nursery

Seedcane can take one of three forms: whole-stick seedcane, transplants or NovaCane®. Growers will usually choose a particular option based on availability, source, ease of handling, labour requirements, quantities required and the intended purpose of the seedcane.

Types of seedcane

Whole-stick sugarcane

This is the most common form of seedcane used in the industry where the entire sugarcane stalk is planted as seedcane. The stalk may be cut up into billets, usually in the furrow, unless the seedcane was heat treated after harvesting.

Single-budded sett transplants

Transplants are an excellent alternative source of nucleus seedcane and are classified as certified seedcane in terms of industry seedcane rules. They have some distinct advantages, particularly for the rapid bulking up of healthy, true-to-type seed material in nurseries. Transplants can be easily and inexpensively transported over long distances, and each stool can be easily identified when roguing in the nursery.

They are not recommended for planting commercial fields. Being less hardy than whole-stick seedcane, transplants need to be handled with greater care to ensure a good stand, and watered if the nursery is not irrigated.

Transplants are usually obtained from transplant nurseries. If you wish to propagate your own transplants, follow the guidelines provided on page 18.

NovaCane® plants produced via tissue culture

NovaCane® plantlets are multiplied by means of tissue culture in a laboratory, thereby enabling a large number of plants to be propagated using a minimum quantity of starting material.

At the time of production and before being exposed to normal field conditions, NovaCane® plantlets are free of disease and are true-to-type.

The NovaCane® process is particularly useful in eliminating viruses such as sugarcane mosaic virus and sugarcane yellow leaf virus, both of which are not eliminated by conventional hot water treatment.

After production in the laboratory, the plants are hardened off and grown in seedling trays for a period of 3-5 months and the leaves are trimmed monthly. Plantlets can be easily and inexpensively transported over long distances, and each stool can be easily identified when roguing in the nursery.

NovaCane® plants satisfy the requirements to be classified as certified seedcane and can be harvested twice (plant and first ratoon crops) as certified seedcane provided the cane remains pest and disease free.

Forward planning

Planning seedcane production needs to start at least two years before the seedcane is actually required for planting into commercial fields.

The nucleus or mother seedcane to be planted in the nursery should be between 9 and 12 months old in the irrigated and coastal regions, and up to 18 months in the high altitude areas. Spring planting is the most suitable time for commercial fields in most areas, so the nursery should be planted in the previous spring. As the mother seed has to be ordered or planted at least a year before it is required for the nursery, producing seedcane for commercial planting takes at least two years.

As good seedcane can be cut from a nursery over a period of several months, some flexibility in planting dates is possible.

Nursery site

There are advantages to having a permanent site for a nursery, situated on good, well-drained soil, and in a low-risk area i.e. areas not prone to runaway fires, grazing cattle, frost or theft. The ability to irrigate a nursery will ensure that adequate amounts of fresh, well grown seedcane are available when needed. A permanent nursery site enables seedcane rotation to be practised without disrupting the management of commercial fields.

Commercial cane fields, preferably without a history of RSD, can be used as nurseries following a break of at least one year, 6 months of which must be free of regrowth from the previous crop. These nurseries can then revert to commercial cane production after the permissible number of harvests of seedcane have been taken.

Where a nursery is within a commercial field, its boundaries should be well-defined and clearly marked. The edges of the nursery must be wide enough to avoid contamination from neighbouring cane and to enable easy access. Where several different varieties are grown in the nursery, they must all be clearly labelled.

There are some obvious cost benefits from growers co-operating and producing their combined seedcane requirement in a single nursery, in conjunction with a shared heat treatment plant.

Nursery size

The size of nursery to produce the required amount of seedcane depends on the area of commercial cane to be replanted each year, the expected yield from the nursery, and the planting rate for commercial fields. All of these will vary from farm to farm but approximately 2 to 3 hectares of either LPD&VCC certified or approved nursery space is generally sufficient for every 100 ha of commercial cane with a replant of 10% per year. The size of the nursery can be calculated as shown in the following example:

Calculating the nursery area for a 100 hectare farm with an average replant percentage of 10%

10 ÷ 100 X 100 ha = 10 ha

There must be sufficient seedcane to replant 10 hectares of commercial fields every year.

If the seedcane planting rate is 10 tons per hectare:

10 t/ha X 10 ha = 100 tons

Required amount of seedcane is 100 tons.

If the yield of cane at the nursery site is conservatively estimated to be 80 tons per hectare per annum:

100 t ÷ 80 t/ha = 1.25 ha

Nursery space to obtain required seedcane needs to be sourced is 1.25 hectares.

If certified seedcane is purchased every year, the required area of LPD&VCC approved nursery is 1.25 ha.

Unless otherwise specified, only one harvest of this seedcane is permitted (plant crop only).

If certified seedcane is produced on the farm and a three-plot dedicated nursery system is used, then:

1.25 ha represents two of the three plots (to allow for a one-third fallow), so the whole nursery size needs to be:

(1.25 ÷ 2) X 3

= 1.9 ha (2 ha, to be practical).

Unless otherwise specified, only two harvests (plant and 1st ratoon crop) are permitted.

Important notes

- Seedcane requirements should always be overestimated and expected yields underestimated in order to allow for poor growing conditions, additional areas requiring replanting and other unforeseen circumstances.
- Seedcane must be planted so that it is available at the required time. Attention needs to be paid to the particular growth cycle of the area and the seedcane planting date adjusted accordingly (taking care not to exceed the LPD&VCC seedcane age limits for the area).
- Varieties will need to be planted in the nursery in proportion to the areas of commercial planting required.
- Varieties with low populations of thick stalks will require a higher planting rate.
- Different varieties need to be clearly marked in the nursery.

Nursery layout and rotations

A standard, permanent nursery is normally divided into three equal portions and cycled on a three-year rotation so that, in any given year, one-third will be fallow, one-third will carry a plant crop and one-third will carry a first ratoon crop. Getting the three blocks of a nursery into this rotational cycle can be done in one of two ways.

First option

This is the most rapid way to achieve the nursery cycle. It involves leaving two blocks (BLOCKS A and B) fallow for the first year. In year 2 the BLOCKS A and B are planted and BLOCK C is fallowed. At the beginning of year three, BLOCK A is harvested and ratooned while BLOCK B is harvested, ploughed out and fallowed; the third block, BLOCK C, which was fallow in the second year, is planted. This means that the nursery gets into its proper cycle in year three.

In the fourth year, the BLOCK A is harvested, ploughed out and fallowed, BLOCK B, which was fallow, is planted, and BLOCK C harvested and ratooned.

	Year 1	Year 2	Year 3	Year 4
BLOCK A	Fallow	Planted	Harvested and ratooned	Harvested, ploughed and fallowed
BLOCK B	Fallow	Planted	Harvested, ploughed and fallowed	Planted
BLOCK C		Fallow	Planted	Harvested and ratooned

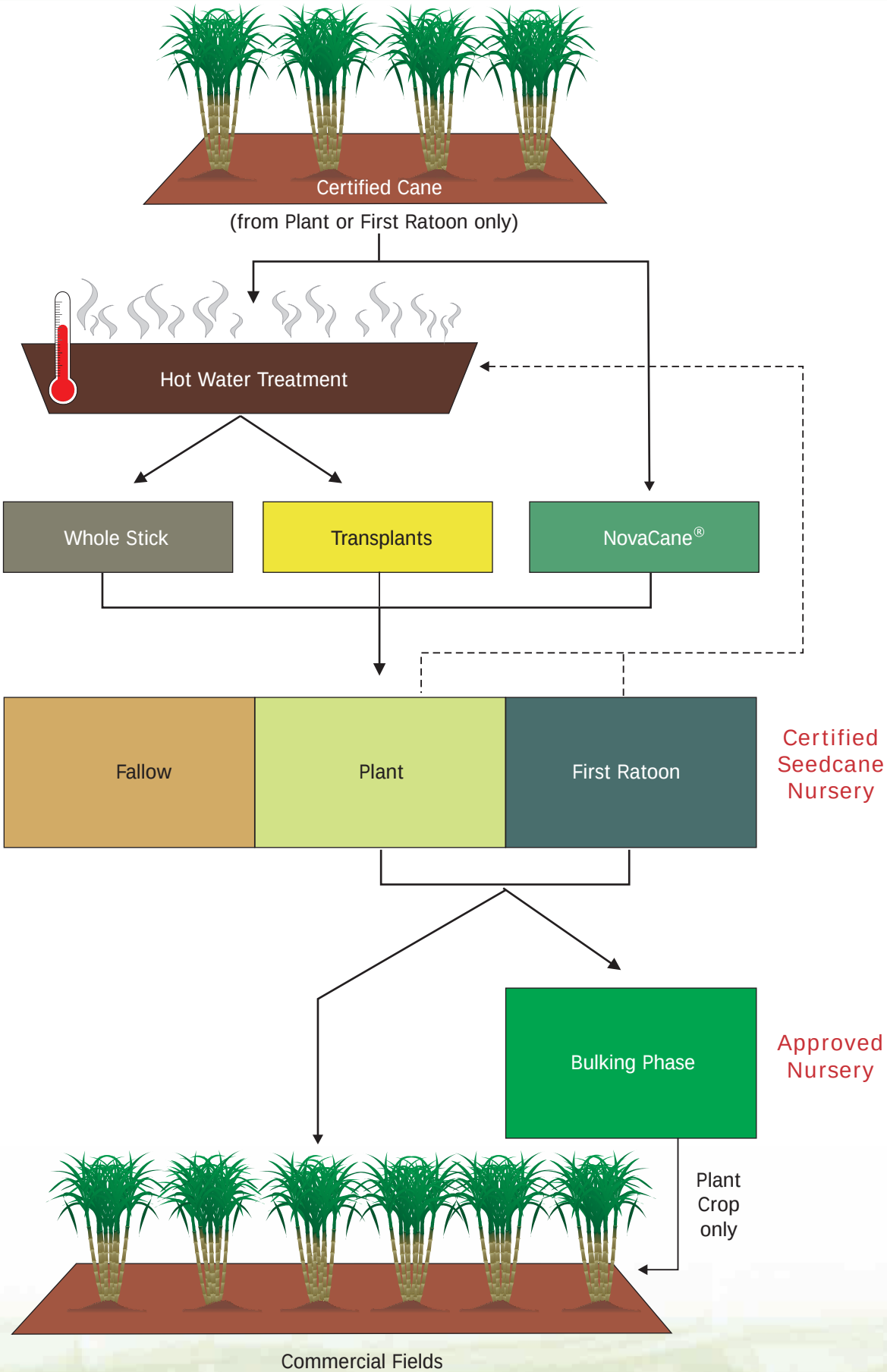
Second option

This is a more gradual process of implementing the full nursery cycle. In year one, only one block (BLOCK A) is fallowed. In year two, BLOCK A is planted and BLOCK B is fallowed. In year three, BLOCK A is harvested and ratooned, BLOCK B is planted and BLOCK C is fallowed. This system will achieve its full production in year four.

	Year 1	Year 2	Year 3	Year 4
BLOCK A	Fallow	Planted	Harvested and ratooned	Harvested, ploughed and fallowed
BLOCK B		Fallow	Planted	Harvested and ratooned
BLOCK C			Fallow	Planted

On an average sized farm, commercial fields can be planted with seedcane taken directly from the nursery. Because the risk of infection by diseases is increased with additional harvests, only the plant and first ratoon crops may be taken from a nursery.

On large farms and estates, a bulking phase will enable a larger amount of seedcane to be produced, but only the plant crop from the bulking phase may be used for as seedcane for commercial planting.



Flow diagram of seedcane showing a three-block nursery rotation and a bulking phase.

Using commercial fields

Sometimes, establishing a dedicated nursery site may not be practical. Growers may then opt to use commercial fields as temporary nurseries as they come up for replanting.

In order to be registered as either certified or approved nursery sites, these fields need to be subjected to the standard requirements for fallow and general suitability (soils, irrigation, low-risk etc.). Once the permitted number of harvests for seedcane is completed, the nursery reverts to a commercial field and the next nursery site is identified from within the normal area under fallow on the farm.

The advantages of this system are that the grower does not have to eradicate relatively high-quality seed material after only one ratoon, and the benefits of good seedcane are then maintained for the rest of the crop's life.

The disadvantages of this approach are that it might not be possible to choose the best site, and control could be compromised with having the nursery site or sites in different parts of the farm each year.

Commercial fields may be used as temporary nurseries where dedicated nursery sites are not practical.

Nursery operations

Nurseries should be managed to create the most favourable conditions for optimum growth. The costs of the additional management practices required to produce good quality seedcane are negligible in relation to the benefits obtained from using good seedcane to establish a healthy commercial crop.

Seedcane sources

Certified nurseries

For a LPD&VCC certified seedcane nursery, only certified seedcane from another certified nursery may be used as nucleus seedcane. This cane must be hot water treated at an approved facility before planting into the nursery. Once the nursery system is operational, nucleus seedcane can be obtained from the previous nursery crop each year and subjected to hot water treatment. Alternatively, hot-water treated single-budded sett transplants or NovaCane® plantlets may be used as nucleus material.

Approved nurseries

For a LPD&VCC approved nursery, only certified seedcane from a co-operator approved by the LPD&VC Committee may be used as nucleus seed. This seedcane does not require further heat treatment and, if kept disease free and approved by the LPD&VCC, it may be used to establish commercial fields the following year.

Important notes

- Seedcane should not have flowered, nor should it have swollen buds which are prone to damage and will lead to gaps in the nursery.
- All seedcane to be planted in a nursery should be treated with a fungicide to protect against pineapple sett rot and infection by smut (refer to *SASRI Information Sheets 2.7 Pineapple sett rot* and *2.11 Smut*).
- If high levels of eldana are present and no alternative seedcane can be sourced, or if the seedcane is to be moved to another farm, it should be hot water treated (50°C, 30 minutes) to ensure that any eldana present is killed.

Planting

Ideal planting times are September, October and March. Avoid planting mosaic susceptible varieties from end of September through to the end of February to reduce the risk of acquiring mosaic.

Planting into a nursery must take place only after the previous cane crop or nursery has been completely destroyed. This is best achieved using glyphosate or imazapyr-based herbicides that are registered for cane destruction, followed by a 12 month break. During this break, the soil can be left fallow, or a low-growing crop can be grown. This will enable the easy recognition and eradication of any sugarcane regrowth from the previous crop. Suitable fallow crops could be either a cash crop or a green manure crop.

The ideal time for planting sugarcane is September, October or March.

To obtain good germination and rapid establishment of the seedcane crop, plant using water (2 to 3 litres per metre of row) or apply a suitable composted organic material in the furrow if the nursery cannot be irrigated.

Seedcane nurseries should not be 'gapped up' to compensate for patchy germination, unless further nucleus seedcane of identical variety and quality is available.

Planting whole-stick seedcane

With good soil conditions, the setts or stalks of seedcane can be spaced slightly apart in the planting furrow, thus allowing the most economical use of the valuable seedcane and also to facilitate roguing operations in the nursery.

Heat treated cane has no apical dominance. Whole stalks should therefore not be cut into setts when being planted as this could re-introduce diseases.

Planting transplants and NovaCane® plantlets

In their final stages, NovaCane® plantlets are similar to transplants grown from single-budded setts (SBS). The following planting guidelines therefore apply to both SBS Transplants and NovaCane® plantlets.

- Order plants 12 months before planned planting date.
- The number of plants planted per hectare differs depending on the row spacing. Plants are planted either 40 or 50 cm apart.
- Vehicles should be covered and the plants should not be exposed to high temperatures. If there are delays in delivery, the consignment should be removed from the delivery vehicle if possible, and stored in a cool place and kept moist.
- Plant within 24 hours of delivery (especially if plants are received bulk-packed in plastic bags). Plants that are hardened in trays with plastic sleeves should be kept in the sleeves up to the time of planting if possible to further reduce stress.

- Always plant in the best soils with some form of irrigation available.
- The soil should be clod-free to avoid air-pockets forming around the roots, regardless of whether ploughing or minimum tillage has been used as a form of cultivation.
- Fertiliser (P and K) should be applied and incorporated into the soil prior to planting to avoid the possibility of root scorch. Nitrogen fertiliser should be top-dressed after the plants are established.
- A wooden peg and hammer are required to make the hole for each plant. There are also both hand and tractor-mounted implements designed specifically for planting trees and other seedlings and these can be used to speed up the planting process if necessary.
- If the soil is dry and friable (easily crumbled), a small amount of water will be required to allow the planting hole to remain open long enough while the plant is positioned and planted. It is also a good idea to water each plant after planting. There are also commercially available water-retaining gel products which can be applied in the planting hole that will enable water to be made available to the plant during the very early stages of growth.

- The depth of planting should be just below the lowest leaf of the plant to ensure that tillering occurs below soil level. This will give the roots a good start and reduce stress to the plant.
- Gentle foot pressure needs to be applied around the plants after planting.
- Apply a nematicide in sandy soils if necessary for nematode control. Bandit® (imidacloprid) should be applied to control thrips if planting in summer.
- The field should be irrigated after planting.

Nutrition

Nutritional requirements should be determined from the analysis of soil and leaf samples submitted to SASRI's Fertiliser Advisory Service.

Weed control

Fields can be either hand-weeded or sprayed with herbicides within a week of planting. Regular weed control is necessary in the nursery, until the crop has canopied.

Transplants and NovaCane® are very sensitive to herbicides. Herbicide damage is minimised when leaves are trimmed and the plants are planted deep. Early application of products such as metribuzin + diuron are safe for use if directed into the interrows so that the spray swath covers only the base of each plant.

Fields with a history of problems with creeping grasses should not be planted to NovaCane® or transplants.

Pest and disease inspections

LPD&VCC teams inspect nurseries regularly for pests, diseases and off-types. In addition, farm staff should also be trained to conduct their own inspections.

All nurseries should be registered with the LPD&VC Committee, whose teams will then inspect them regularly for pests, diseases and off-types.

Inspections are performed in young cane (when the canopy is knee to shoulder high – about 1.5 m) by walking between the cane lines and carefully examining the plants. Line by line inspections are conducted and diseased stools and off-types are marked for roguing. Certified nurseries require at least three line by line inspections by LPD&VCC while approved nurseries require two random surveys by LPD&VCC in order for the seedcane to be registered.

Growers are advised to supplement the required LPD&VCC inspections by conducting their own inspections. On request, the LPD &VCC or instructors from the Shukela Training Centre will train farm staff to recognise and eradicate diseased and off-type stools. It is important for every farm to have its own trained staff to manage nurseries and carry out the necessary field hygiene procedures.

For comprehensive information on the many pest and disease threats facing our industry, please consult SASRI publications such as the *Pest & Disease Guide* and the various SASRI Information Sheets on diseases. The LPD&VCC teams will routinely inspect for the more common and important pests and diseases such as smut, mosaic, MSV, RSD and eldana.

Roguing

It is the grower's responsibility to remove diseased stools (clumps of infected shoots) and off-types that have been identified by LPD&VCC. These stools can be dug out and left to dry in or beside the field (stool roguing). They may also be chemically rogued in the field by spraying with 10 ml of a 10% glyphosate solution sprayed over as much of the unwanted stool as possible. Care should be taken to avoid spraying the surrounding stools. Sprayed stools will die off after four to eight weeks.

If smut is observed, emerging whips must first be cut from the infected plants and placed in bags so that the spores are not spread while the whips are being collected and removed from the field. The bags of whips should be closed and taken as far from the field

as possible for burning. Whips should not be left in or beside the field. In the case of chemical roguing, it is important to remove both incipient and emerging whips by cutting about halfway up the stalk before spraying with glyphosate.

Harvesting

When harvesting any seedcane, new knives must be purchased and whilst in use they must be cleaned and scrubbed frequently in a disinfectant such as Jeyes Fluid (1 part to 9 parts water) to minimise the risk of spreading RSD. Each cutter should be issued with at least two knives.

Seedcane harvested from the nursery should be handled carefully to avoid damage to the buds and it should be planted without delay.

Cane knives used in the nursery should be disinfected frequently.

Loading and transport

Vehicles used for moving the seedcane from nurseries to the fields for planting should be thoroughly cleaned before use, in order to minimise the risk of varietal mixing or pest transmission and disease infection. This is particularly necessary if the transport is also used for haulage to the mill.

Loading of seedcane should preferably be done by hand and handling should be kept to a minimum. Mechanical grab-loaders may cause significant damage to buds. Once loaded, the trailer should move slowly over rough surfaces to avoid further damaging the buds.

Hot Water Treatment (HWT)

HWT is an essential feature of seedcane production, and ensures that seedcane stocks are free of RSD, as well as certain other diseases and pests. The process must be managed with extreme care to be effective.

Procedure

The time and temperature combination for HWT is a compromise between the need to eliminate RSD and to achieve good germination.

A short treatment (30 minutes at 50°C) will eliminate smut, *Fusarium*, chlorotic streak and most insect pests including sesamia and eldana. It is essential to treat seedcane for at least 30 minutes if it is being transported from high to low eldana risk areas.

Seedcane must be treated for two hours at 50°C for acceptable control of RSD. It should be noted that treatment for two hours at 50°C provides little control of leaf scald, and may increase the susceptibility of certain varieties to smut and mosaic.

Treatment for two hours at 50°C may not entirely eliminate RSD from severely infected cane. To ensure that all traces of RSD are removed, it is preferable that seedcane should first be tested, and only selected for treatment if found to be free from RSD. Recycling previously heat treated seedcane stocks through the nursery system is the best way to ensure that RSD is not re-introduced.

Seedcane being lowered into an Upfold hot water treatment tank.

Standard sizes of HWT tanks.

Model	Water capacity (litres)	Number of baskets	Interval between baskets (min)	Output per 10 h shift (kg)*
3 ton	3 300	9	15	2 800
5 ton	4 800	13	10	4 700

(* Assuming 70 kg seedcane per basket and no downtime)

Hot water tanks

A continuous output HWT plant comprises a tank and a number of baskets, each of which holds 60-70 kg of seedcane. Baskets are added successively to the tank at appropriate intervals (10–15 min, depending on the tank size) and are slid on rails from the input to the output end of the tank as treatment progresses. When the longest immersed basket has been in the tank for two hours, it is removed and a new basket is added. By adding relatively small baskets at short intervals, the large temperature fluctuations which result from adding large loads of cold seedcane are avoided.

Heating is achieved by electric elements (usually 18 kW) and temperature is controlled by a thermostat assisted by good water circulation which avoids hot and cold areas within the tank.

A major advantage of this type of tank is that damage due to excessive handling of the seedcane is minimised. If enough baskets are available, they could be used to transport seedcane directly to the field after treatment, thereby further reducing handling and possible damage.

Sizes of Upfold HWT tanks

Two standard sized models of continuous output HWT plants are available commercially. For details of distributors visit SASRI's website at www.sugar.org.za/sasri.

Smaller tanks of 1 000 litre capacity, suitable for treating single-budded setts, can be made to order.

Important notes

- While large batch tanks are available for HWT, SASRI recommends the use of the continuous output HWT plant. With this system, the time to reach the required temperature is reduced and a fairly constant temperature is maintained during the process.
- Seedcane germination is eventually reduced after prolonged operation of the HWT plant, as the water becomes contaminated. It is therefore necessary to empty the tank and refill. The refilling interval depends on the rate at which fouling of the water occurs, but is normally necessary after 40 to 50 hours of operation. An Upfold tank should be drained and refilled with clean water after treating no more than four hundred 70 kg baskets.
- The two-hour treatment period should commence only when the water temperature has reached 50°C. The time should be strictly controlled and a constant temperature maintained.
- Loose dead leaf material should be removed before HWT, but it is not necessary to strip the seedcane completely. Leaving the leaf-sheath bases at the nodes gives some protection to the buds which become soft during hot water treatment.
- Seedcane should be handled carefully after HWT. Softened buds are easily damaged after removal from the tank, and this often results in poor germination.
- Where smut is common, HWT of smut-susceptible varieties may result in the rapid re-infection. To counter this effect, seedcane of susceptible varieties should be treated with a registered fungicide when these varieties are planted in areas where smut is prevalent. Bayleton is currently the only fungicide registered for use against smut in sugarcane. Refer to SASRI for updates.
- Some varieties are sensitive to HWT and may germinate slowly after treatment, particularly under cool conditions. It is important to treat these varieties with a fungicide before planting. Refer to SASRI Variety Information Sheets for details.
- Heat treated cane has no apical dominance. Seedcane treated as whole stalks should not be cut into setts when planted in the nursery as this could re-introduce diseases.

Propagating transplants

Growers can propagate their own transplants relatively cheaply in the hot months when no special germination facilities are required and off-season labour can be used.

Transplants established in seedling trays during January can be planted out in March. The trays can then be replanted immediately and those plants can be kept in the trays until spring.

Under favourable conditions, plants will be ready for transplanting into the field after 50 days in summer, and up to 100 days or more in winter. Good management and adequate nutrients will ensure the development of a firm root plug. This can be checked by examining the root plug periodically.

The nursery site must be in full sunlight but sheltered from the wind.

Preparing seedcane

A twin blade circular saw is used to cut 25 mm single-budded setts (SBS) from the cane stalks. The blades should be sterilised frequently with 10% Jeyes fluid.

Transplant producers should ensure that young, good quality seedcane for the production of transplants is available at all times to ensure good germination and vigorous plant growth.

SBSs that are damaged by borer or infected with stalk rot must be discarded. The remaining SBSs must then be treated with a registered fungicide.

Setts can be pre-germinated in humid conditions at a temperature of 28 - 30°C for a few days before planting those that have germinated into the trays. However, when temperatures are too high or the conditions too humid, fungal and yeast infections can infect whole batches, resulting in no germination.

Single budded setts are prepared using a twin blade circular saw.

To prevent this, SBSs should be planted into trays half-filled with growing medium. The SBS should not be covered with growing medium at this stage and trays must be stacked on top of each other in a warm (28 - 32°C) germination room. After two to three days and once most of the buds have germinated, any un-germinated SBSs are discarded and replaced with germinated ones. The SBSs must then be covered with medium before being left in the germination room for another day or two. The trays must be watered daily. When most buds have germinated, the trays are placed outdoors.

Growing media

Composted pine bark or composted bagasse can be used. Composted bagasse has good physical and chemical properties and is well suited to the propagation of transplants. Prepare the compost as follows: to one cubic metre of fresh bagasse, incorporate 3 kg of freshly ground dolomitic limestone and 2 kg of 2:3:4(24) fertiliser. Mix thoroughly and moisten the stack. Turn over every two weeks for the first six weeks. Enrich with further nutrients at a rate of 2 kg 2:3:4(24) per cubic metre of decomposing bagasse. Continue aerating the stack by turning at least once a month. After about four to five months the bagasse will have shrunk considerably, turned black and will be ready for use.

Planting into trays

Multi-cellular seedling trays are recommended for propagating transplants. All trays must be thoroughly washed after each use. If polystyrene, trays must be treated with a copper-based root-pruning solution before use and re-dipped if necessary.

The trays must be raised at least 300 mm off the ground to allow light to penetrate underneath, which prevents roots from growing through the drainage holes in the tray cells.

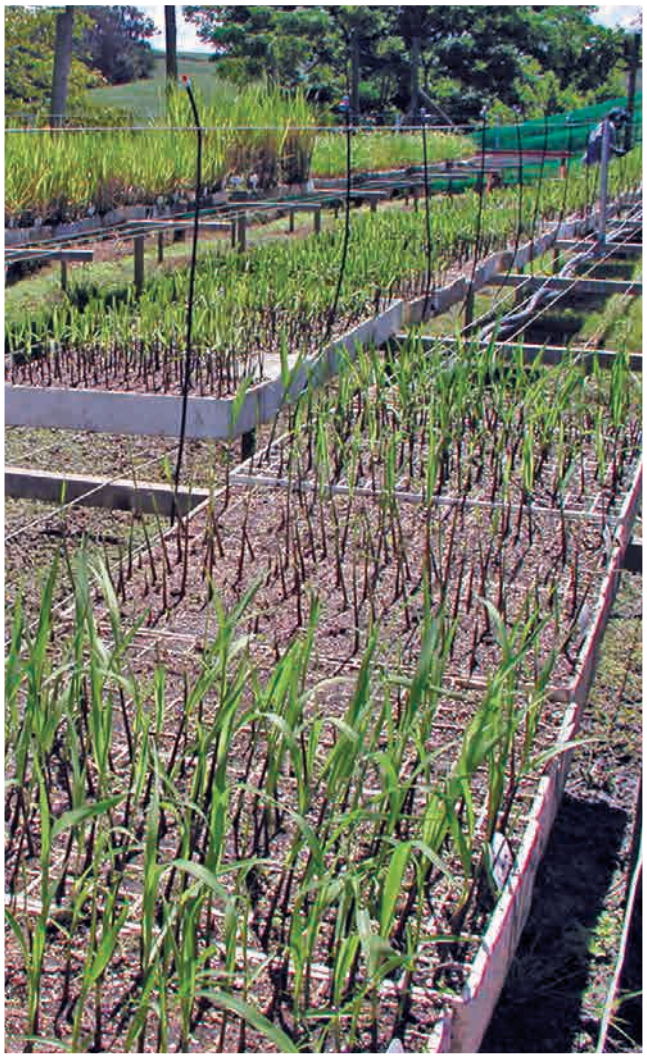
Fertigation

Trays must be irrigated 4 times daily for 3-7 minutes. Although the cane sett acts as a nutritional buffer during the early stages of growth, supplementary feeding will be necessary because of the high degree of leaching. The following nutrient concentrations are recommended when fertigating: N: 90 - 120 ppm; Ca: 30 - 50 ppm; P: 50 - 60 ppm; Mg: 20 - 30 ppm; K: 50 - 60 ppm; S: 20 - 30 ppm; pH 4.5 - 6.0; EC: <200 mS/m.

Various commercial liquid fertiliser formulations are available for use in fertigation. An inexpensive 5:1:3 NPK formulation may be prepared from commonly available fertiliser carriers. Fertigate at least twice weekly during summer and once a week during the winter months.

Trimming

Transplant leaves should be trimmed 4-6 weeks after planting. Trimming during the growing period can be beneficial by slowing down the stronger plants and allowing the weaker ones to catch up, making them more uniform. A light trimming a day or two before transplanting facilitates handling and reduces transplant stress. As cutting tools can spread RSD, it is important that the instruments are regularly dipped in Jeyes fluid (10 % solution) or methylated spirits 75%.



Multi-cellular seedling trays should be raised at least 300 mm off the ground to allow for light to penetrate underneath.

NOTES

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