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PRODUCTION OF SUGARCANE PLANTING MATERIAL THROUGH LATERAL SHOOT MULTIPLICATION

SUGARCANE RESEARCH INSTITUTE
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INTRODUCTION

Crop establishment is one of the main cost components in sugarcane production. Conventionally, sugarcane crop has been established by using cuttings produced by raising seedcane nurseries which require not only a substantial extent of land, but also considerable amount of labour and capital. Further, a large bulk of seedcane has to be transported to the field, which is also costly. Moreover, lack of healthy seedcane at appropriate times has been a serious constraint for sugarcane production. Sugarcane smallholders are not in a position to produce their own seedcane requirements by adopting the recommended practices because of non-availability of heat treatment facilities to them. The sugar companies which are presently supplying seedcane to farmers have also not been in a position to provide all seedcane requirements and nor has there been any arrangements to produce seedcane through capable farmers either. Thus, most of the times, farmers resort to obtain seedcane from commercial plantations, which is not a recommended practice. This has resulted in not only using large quantities of seedcane costing more, but also poor germination and disease problems which ultimately has led to low cane yields and incomes. The Lateral Shoot Multiplication (LSM) technique adopted in Japan to produce planting material helps to overcome these constraints and to increase farmer income by reducing cost of planting material and planting.

LATERAL SHOOT MULTIPLICATION (LSM)

LSM technique involves inducement of development of lateral buds successively by removing apical dominance by excising the tips of the mother cane stalks and of the lateral shoots.

PROCEDURE

DE-TOPPING OF MOTHER STALK

Mother cane plants are de-topped using a sharp knife when they are about 7-8 months old to induce the development of primary

lateral shoots. Cane stalks should be de-trashed before de-topping to facilitate emergence of lateral shoots. Plants should be de-topped at the point of 6th leaf position to remove the apical bud of the top most visible inter-node. A garden secateur is more appropriate for de-topping. The cut surface should be treated with a fungicide spray (1% Benomyl aquas solution) to prevent infections and be covered with a gummious substance (eg. Chemifix) to avoid evaporation.

DE-TOPPED MOTHER PLANTS

DE-TOPPING OF PRIMARY, SECONDARY AND TERTIARY LATERAL SHOOTS

The primary lateral shoots are de-topped when they are having about 7- 8 open leaves (Approximately 5-6 weeks after first cutting). The point of excision should be determined by leaving about 6-7 secondary buds in the primary lateral shoots.

DE-TOPPING OF LATERAL SHOOTS

The secondary lateral shoots are also then de-topped. This process is repeated in tertiary shoots also. Number of de-topping cycles depend on the cane variety and prevailing environmental conditions. The interval between two consecutive de-topping operations should be about 6-7 weeks.

SEPARATION, POTTING AND HARDENING OF LATERAL SHOOTS

When the lateral shoots developed from the tertiary shoots are about 5-6 weeks age, they are separated from the mother stalk, sorted out by size, and their leaves should be pruned. The pruned shoots are also treated with a fungicide to prevent infection. Sorted shoots are then transferred to 3-4" polythene pots filled with soil. These pots are kept under high humidity to prevent wilting. The potted plants should be shaded initially and watered regularly.

SEPARATION FROM MOTHER PLANT

POTTED PLANTS IN A HARDENING NURSERY

FIELD PLANTING

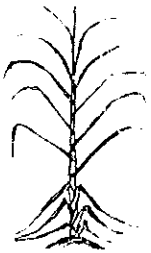
About one month after hardening, the potted plants are ready for field planting. The field planting can be done by manually or by using mechanical transplanter as practised in Japan. Before planting, to improve the function of planter and to reduce evaporation, the leaves should be trimmed. Plants should be planted at a depth of about 10cm with 1.5m between rows and 40cm between plants.

After planting, the field should be sufficiently irrigated and gaps, if any, should be filled using healthy plants.

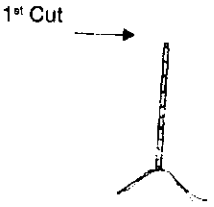
Other management practices should be followed as recommended.

IMPORTANT POINTS TO BE REMEMBERED

- Use a **sharp** knife or a secateur for de-topping
- Cut at the **correct** position
- Spray a **fungicide** on the cut surface to prevent infection

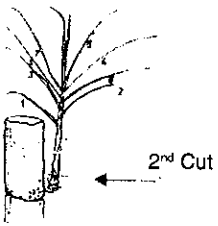


1. 7-8 months old Sugarcane plant

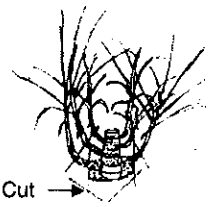


2. De-topped cane after De-trashing

3. Emergence of primary lateral shoots

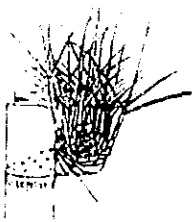


4. De-topping of a Primary lateral shoot



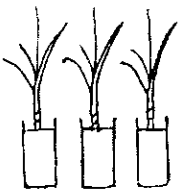
5. De-topping of secondary lateral shoots

6. A rosette of tertiary lateral shoots developed after de-topping of secondary lateral shoots



7. Removal of rosette from mother stalk

8. Sorting of lateral shoots according to the size



9. Potted lateral shoots

Steps in LSM technique

- Paste a **gummy substance** on the cut surface of the mother stalk to reduce evaporation
- Do the **recommended agronomic practices** such as fertilising, weeding, irrigation, etc.
- Establish the hardening nursery **close** to the field to reduce transportation cost and for easy handling
- Provide adequate **shade** for newly potted shoots for three weeks and water them frequently
- **Trim** the leaves of potted plants and **spray water** one day before field planting
- Prepare the field well and **fertilise** it before field planting
- **Irrigate** the field if it is dry before field planting
- Keep the field **weed-free** specially during the first 3 months

SECATEURS USED IN LSM TECHNIQUE

ADVANTAGES OF THE LSM METHOD

- Can produce farmers' own planting material requirements by themselves using family labour rather than depending on others and hence increases the farmer income
- Reduces the land requirement for the nursery

  There is about 98% saving on land requirement compared to the conventional method. One hectare of nursery can produce planting material sufficient for 200 ha in 15-16 months as against 43 ha in conventional method in two nursery cycles, which require 16-17 months
- High rate of propagation

  This method makes possible production of about 40-45 plants from a single stalk
- Reduces the cost of producing planting material and hence increases the farmer income

  Cost per plant is about 35 cents including hired labour and 9 cents, if family labour is used. Cost saving on planting material at 35 cents/plant is 31% (with hired labour) and 82% (assuming the use of family labour) over the conventional method of planting.
- About 40% saving on planting labour
- About 34% saving of total cost of crop establishment
- An ideal method to produce planting material for gap filling in ratoon crops as farmer can practise this method in small scale in his own field
- Possible to produce disease-free planting material if it is practised under the green house or poly-tunnel conditions
- As only a small area needs to be looked after, farmer can devote better care and attention to the lateral shoot multiplication unlike a large conventional nursery

Nevertheless, the LSM method has the following disadvantages

- Requirement of a high level of skill for de-topping
- Requirement of timely-executed de-topping operations
- Requirement of additional tools for de-topping
- Requirement of good soil moisture condition at the time of planting
- Difficulties in weed control at the early stages of the crop.

In spite of these disadvantages, adoption of this method benefits the farmers since it provides a solution to the problem of seedcane and for its other advantages.

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