



In case of commercial varieties soaking the cuttings in solution of Carbendazim 1000 ppm for overnight is suggested to get rid of Botrydiploidia like infections.

- iv. The bundles are then kept in shade with their basal ends facing upside for 15- 20 minutes to drain out excess water.
- v. A fresh slanting cut at the basal end of cutting is given. The individual cuttings are then dipped in IBA 2000 ppm solution for 30 seconds. Care should be taken to dip the cuttings up to the half of the last internodes only.
- vi. The treated cuttings are then planted in erect position in the beds. A cutting with at least two basal buds should be inserted into the potting mixture in the bag.
- vii. The cutting starts sprouting after 7 days depending on the prevailing climatic conditions.

III. Care and Maintenance of the nursery plants

- i. Light and frequent irrigation is necessary for sprouting and development of the nursery plants. The plants in poly bags should not be given stress.
- ii. Nursery should be kept weed free. Spraying of pre-emergence weedicides prior to planting can suppress the weed growth without any adverse effect to the nursery plants.



Leaves affected by Chafer and Flea beetle (left) and Rust infection (right)

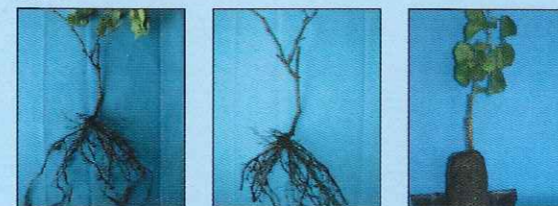
iii. During early phase growth, insects like flea beetle, chafer beetle and caterpillars may attack on the growing parts of the plants. Spray of Carbaryl 2g/l or Malathion 2ml/l or Neem-oil 2ml/l can control the infestation. Drenching of Chlopyriphos @ 2 ml/lit. water can control the termites during the period of high temperature.

iv. In case of commercial varieties planted in nursery thorough protection against all the major and minor

diseases is necessary. In case of rootstocks only rust is found a major problem at later stage. Alternate sprays of Chlorothalonil 1g/l, Tridemephon 1g/l and Carbendazim 1g/l can provide better protection against rust.

v. Foliar application of 19:19:19 @ 2 g/l have been found very useful as a supplement nutrient for proper development of the nursery plants.

vi. General observation is that the sprouting success and development of the rooted cuttings is better under direct sunlight than in the shade. If the plants are being raised during summer (February to May), use of shade net (50%) is required. However, the plants grown in shade require the hardening of at least for 15 days before transportation or transplantation in the main field.



Nursery Plants from beds and bags being prepared for planting

How to prepare IBA 2000 ppm solution?

Weigh 1g of IBA powder and dissolve it in 50ml of Methanol or Ethyl alcohol. Make the volume up to 500ml with water. Store the solution in colored bottle, as it is sensitive to light.

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APPROPRIATE NURSERY TECHNIQUES

(A key for successful vineyard establishment)



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'Reap as you sow' is a principle of successful vineyard management. The selection of planting material is the first and the most important factor to be considered while establishing a vineyard. The planting material should be genuine and disease free. Appropriate nursery techniques should be followed for multiplication of grape plants.

Defining Appropriate Nursery Techniques (ANT)

ANT can be defined as the practices, which assure the quality planting material. This can be the end product of judicious management at all the following steps:

- I. Establishment and Maintenance of Mother Block
- II. Multiplication of Plants in Nursery
- III. Care and Maintenance of the nursery plants

I. Establishment and Maintenance of Mother Block

- a. Mother block should be raised at an isolated location to avoid frequent disturbances during farm management practices in other blocks.
- b. It should have protection of fence to avoid easy access of trespassers and animals.
- c. The foundation material for planting should be procured from well-recognized source to assure its purity.
- d. Appropriate isolation distance should be maintained while planting different varieties in a block.
- e. As far as possible the mother block should be raised organically. Application of 10 MT farmyard manure (FYM) with 100kg Single super phosphate per acre twice a year i.e. in the month of March and September will maintain the fertility of the soil. For additional nutritional requirement application of Urea and Sulphate of potash each @ 100kg per acre in 4-5 split doses during grand growth period of vine i.e. from February to September is advisable. Micronutrients are applied as and when required.
- f. To keep the plants healthy, appropriate plant protection measures should be taken up.
- g. The plants of mother vines should be trained on training system based on the vigor of the plant. Generally, 'T' or 'Kniffin' trellises are preferred to train the mother stock plant in the nursery, which can provide proper utilization of sunlight for good food reserve with proper thickness. Each shoot should provide 3-4 cuttings having 4-5 buds. Thus an acre of area will provide about 0.2 million cuttings in one season. The pruning for cuttings can be done twice in a year.
- h. More vigor leads to increase in inter-nodal length. Spray CCC @ 750 - 1000 ppm to reduce the inter-nodal length and also advance the shoot maturity.

During the shortage of mature cuttings, semi mature cuttings can also be utilized for multiplication by 'Zero Energy Cool Chamber' technique. Research is going on to increase the rate of success in this method and to make it more applied.

Spraying of 6-BA @ 5- 10 ppm make the leaves more functional, increasing the food storage of the shoots.

- i. Irrigate at regular interval in the mother block to maintain field capacity and avoiding water stress during the active growth period.

II. Multiplication of Plants in Nursery

Multiplication of nursery plants can be done on raised beds or in nursery bags.



Nursery plants in beds and poly-bags

a. Preparation of raised beds for planting

- i. The land should be pulverized by ploughing and tillage practices. Mix FYM @ 10 MT per acre in the top layer of the soil thoroughly. The raised beds of size 1 - 1.25 m width X 3- 4 m length and of 10 cm height are prepared by maintaining irrigation channel.
- ii. The beds should be irrigated thoroughly before planting.
- iii. Pre-emergence weedicides should be sprayed before planting to control weeds.

In case of nursery in raised beds, only those nursery plants having 3-4 mature eye-buds should be removed for transplanting. Further, to avoid moisture loss from the plant, all the leaves along with green portion should be removed. The roots at the time of planting should be arranged properly. The tap roots after 6" may be pruned to avoid folding of roots in the pit.

b. Preparation of bags and potting mixture for planting

- i. The optimum size of polythene bags used for nursery multiplication is 5"x 7". However, this can be reduced to 4"x 6" if the plants have to be transported to a longer distance for accommodating more bags. The nursery plants should be at least four months old. The

polythene bags for nursery purpose should be of folding type, having 50 to 100-micron thickness. Six to eight holes of 5 mm dia to be made at the bottom of the bag to facilitate drainage of excess water.

- ii. Potting mixture to be used for bag filling should be as follows.

Type of soil to be used	Proportion in the mixture v/v		
	Soil	FYM	Sand
Black cotton soil	2	1	1
Loamy soil	3	1	0
Light/ Sandy soil	1	1	0

The ingredients taken for potting mixture should be sieved through 40-mesh and mixed thoroughly. Insecticide powder of Chlorpyrifos dust should be mixed @ 1 g per kg of potting mixture to avoid the risk of termites.

- iii. The bags filled with the potting mixture should be arranged in sunken beds in dry climate and on flat beds in rainy season. The size of beds should be maintained as in raised bed. The beds lined with polythene prevent the roots to penetrate in the soil.

c. Preparation of cuttings and planting

- i. Well-matured shoots of 6 to 10 mm thickness are selected from the healthy mother vines.
- ii. Four to five eye budded cuttings are prepared by cutting at middle of the inter nodes. About 40-50 cuttings are tied in bundles with their basal ends facing to one side at same level to maintain polarity.



Selection of Hardwood cuttings for planting and regular inspection of nursery

- iii. Soaking the cuttings in running water for 24 to 48 hrs is necessary for the rootstocks, which are difficult to root will help in leaching out rooting inhibitors.