

# Large Scale Production of Mulberry Saplings

(Kissan Nursery)

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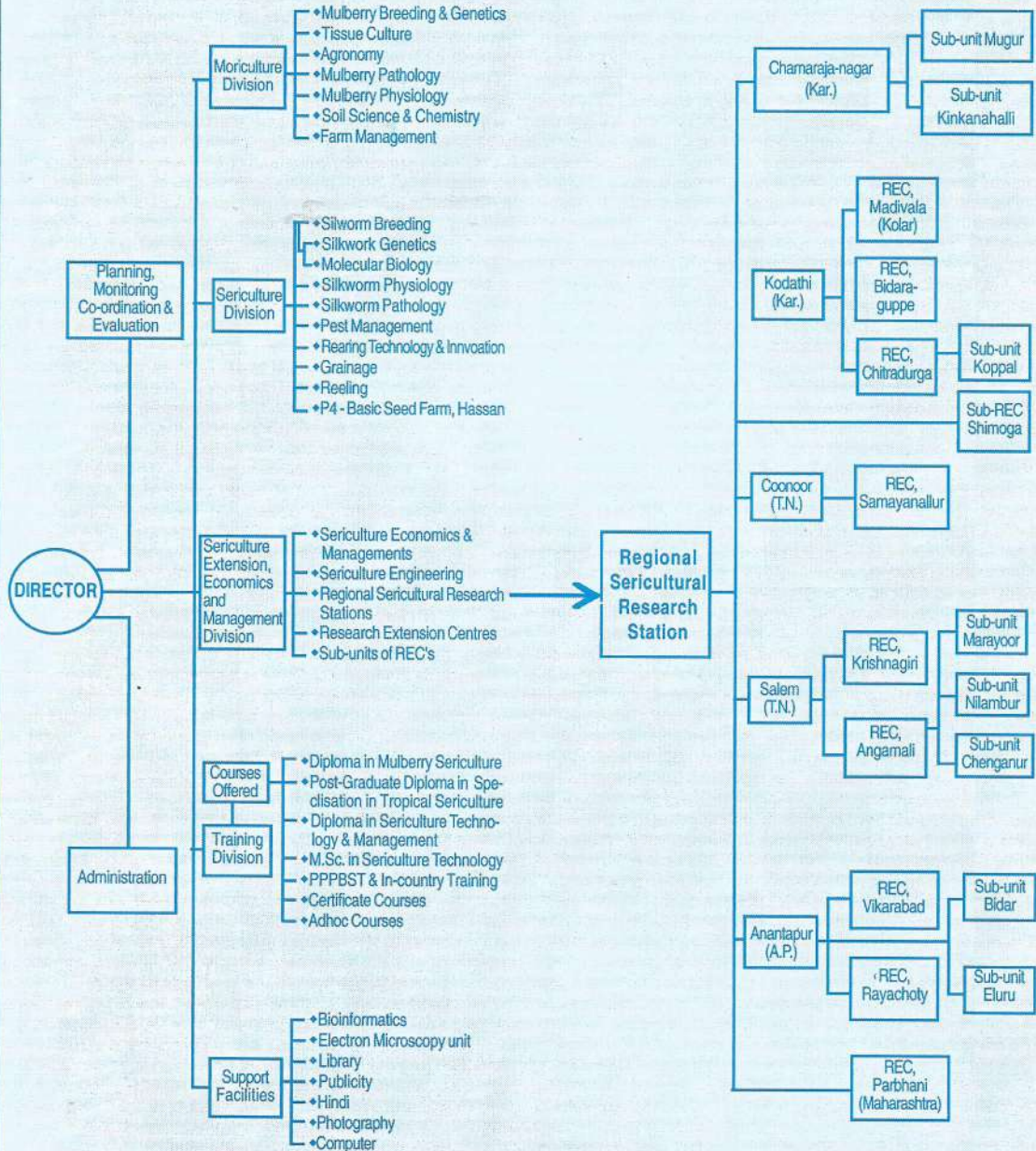
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## PREFACE

Development of appropriate technology and their transfer to the field have been playing an important role in the growth and development of the sericulture industry besides the increased income to the farmers. In this line, establishment of mulberry garden using sapling has got many advantages over traditional practice of planting cuttings directly in the field as the crop stands for more than 12-15 years. Hence initial establishment of garden is very vital in sericulture.

The present booklet on "**Large Scale Production of Mulberry Saplings**" describes the detailed technical know-how of producing the healthy saplings more efficiently and also the cost-benefit ratio of producing the saplings on a large scale thereby attracting many farmers to take up the activity and overcome the shortage of quality saplings of improved mulberry variety requirement at right time.

**Dr. S.B. Dandin**

Director, CSR&TI

MYSORE

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# Large Scale Production of Mulberry Saplings (Kissan Nursery)

## Introduction:

Mulberry is a vegetatively propagated perennial crop and in India propagation through cutting is the most common method. Though mulberry plantation can be established by planting cuttings directly in the field, using saplings has got many distinct advantages over direct plantation of cuttings like:

- " High survival rate due to existing root system, hence lesser fail pits.
- " Higher area coverage due to better use of plant material
- " Scope for removal of undesirable variety at nursery stage.
- " Quick and better establishment of garden.
- " Plants can be trained suitably.
- " Uniform development of garden.
- " Saplings can be raised in time to take up timely plantation during monsoon.

Realizing the importance of initial establishment of garden by using saplings more and more farmers are preferring saplings for the establishment of the garden. To facilitate large scale production, technical details of raising of saplings in large scale has been prepared as guide lines.

Improved mulberry varieties recommended for irrigated and rainfed conditions and suitable for raising saplings are Victory-1, S-36, S-13, S-1635 and S34. However, among the above, popular varieties namely V1, S36 and S13 are described here.

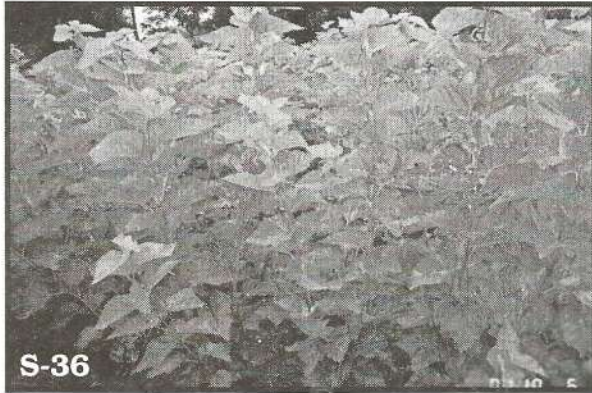
## Victory-1:

It is also popularly known as V-1. It is a selection from cross-pollinated hybrids of S30 and Ber. C-776. The variety is characterized by high, erect branches with grayish stem colour. Leaves are thick, succulent, large, entire, and ovate with truncate base. Leaves are smooth and glossy. It possesses good agronomical characters like high rooting ability, fast growth and high yield. Under irrigated condition with recommended package of practices, it yields more than 60 MT/ha/yr with excellent leaf quality.

## S-36:

Variety S-36 was evolved from Berhampore local by chemical mutagenesis. It is characterized by short internodes, semi-erect and medium branching with





grayish pink stem colour. Leaves are unloaded, cordate, glossy, pale green with smooth surface. It is recommended for assured irrigated condition and especially for rearing chawki worm. With recommended package of practices, it yields 40-45 MT/ha/yr. Because of high succulence and nutritive quality, it is more suitable for young age silkworm rearing.

### **S-13 :**

It is selection from open pollinated hybrids of Kanva-2. The variety is characterized by short internodes and high branching. Leaves are thick and dark green, unlobed with smooth surface. This variety is recommended for rainfed areas with red loamy soils and also for water scarce area of Andhra Pradesh having high temperature. With recommended package of practices it yields about 12 MT/ha/yr under rainfed conditions and 35-40 MT/ha/yr in semi irrigated conditions.



### **2. Suitable season:**

Though mulberry saplings can be raised throughout the year in southern states, it is advisable to raise saplings 3 to 4 months prior to planting season i.e. February - April months so that the saplings will be ready by June/August to take up plantation taking advantage of monsoon rains. However in Tamil Nadu the planting season is in September/October and nursery has to be raised during June/July so as to obtain proper saplings for plantation.

### **3. Selection of nursery site and land preparation:**

The nursery site should be flat and elevated without much pebbles and stones. Low lying and submersible areas must be avoided. Sandy loam to clay loam with light textured, good drainage with pH range of 6.5 - 7.5 and soil depth of 3 feet is considered ideal for raising nursery. The nursery site also should be free from nematode and termite infestation. The site should have adequate irrigation facility, as irrigation is the most important component in the nursery activity.

After selecting the site, the land must be ploughed with tractor drawn mould board plough at least for two times. Depending upon the soil texture sand at the rate

of 10-20 MT/acre and well decomposed farm yard manure at the rate of 10Mt/acre should be spread followed by ploughing with country plough for thorough mixing of FYM in the soil and also to bring the soil to fine tilth. Later the land should be leveled for easy facilitation of irrigation.

After leveling the land, prepare raised beds of convenient size, preferably of 3m length x 1m breadth x 10 cm height with irrigation channel all-round the bed. It is better to irrigate the beds 15 days prior to planting of cuttings to allow all the weed seeds to germinate. These weed seedlings should be removed by light hoeing just before planting the cuttings. In one acre 1065 numbers of nursery beds can be prepared.

#### **4. Selection of material for seed cuttings:**

The source of seed cuttings is very important. The stock plants from which the cutting material is obtained should be true to type and free from diseases and pests. The seed material should have an ample supply of stored food to nourish the developing roots and shoots until new plants become self-sustaining. Hence, it is advisable to collect seed cuttings from exclusive seed gardens of 6-8 months growth after pruning. The shoots should be transported during cooler hours to avoid driage.

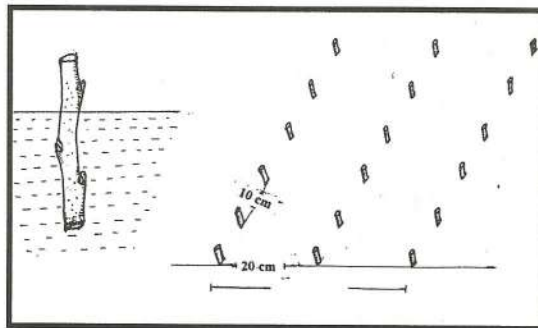
#### **5. Preparation of cuttings:**

Collect the shoots of desired variety from 6 - 8 months growth after cutting. Over matured basal portion and immature green portion of the shoots should be discarded. Prepare cuttings of 10 - 15 cm. length with 3-4 healthy buds using a secateur or sharp billhook. Cutting preparation machine developed by the Institute could also be used. Care must be taken to ensure clean cut on both the sides without splitting the stem or peeling the bark. To protect from fungal diseases soak the cuttings in 0.1 % Diathane M-45 solution for 30 minutes before plantation.

#### **6. Planting in the nursery bed:**

The cuttings should be planted in the nursery beds as quickly as possible to avoid dryage of cuttings. If the cuttings are to be preserved due to un-avoidable conditions, it should be preserved under the shade covered with wet gunny bags or green leaves.

Plant the cuttings in the nursery bed in a straight position exposing only one bud above the surface of the soil following row to row distance of 20 cm and cutting to cutting distance of 10 cm. A nursery bed with the size of 3m x 1m accommodates 150 no. of cuttings. After planting, the soil around the cuttings must be pressed firmly. Irrigation should be given immediately after planting the cuttings.



**Fig. Method of Planting Cuttings**

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## **7. Irrigation:**

Irrigation is one of the most important inputs in the nursery technique. Nursery beds are to be irrigated once in 4-6 days depending on the soil texture and weather conditions.

## **8. Maintenance of Nursery:**

Sprouting of cuttings starts after 10-12 days of planting. Though root initiation starts around 30 days after planting, root system develops well only after 70-80 days of planting. From each sapling allow only one shoot to develop by removing smaller shoots using secateur. During nursery period undertake weeding at least two times. The first weeding is to be carried out 35-40 days after planting and second weeding after 60 days of planting. To boost the growth of the sapling apply urea at the rate of 20g/sq. m. after 60 days of planting after second weeding.

## **9. Control of Disease and Pests:**

As a preventive measure after 30-40 days of planting spray 0.1% Bavistine to prevent foliar disease and 0.1% D.D.V.P to prevent pest infestation. However, appropriate measure must be taken to control any incidence of disease and pest, if observed.

## **10. Up rooting and Transportation:**

After 4 months of planting the saplings will attain about 90cm - 100cm height and ready for transplantation in the main field. Uproot the sapling carefully without damaging the bark of main roots. For easy uprooting of saplings, irrigate the nursery beds two days before uprooting.

For high rate of survival, the saplings should be planted as quickly as possible or it should be preserved fresh by covering it with wet gunny cloth. For transportation of saplings for longer distance it should preferably done during cooler hours.

Before taking up the plantation it is very much essential to check the saplings for root borne diseases like root knot and root rot and the infected saplings should be discarded by burning.

## **11. Economics:**

The details of material required, expenditure involved and economics of raising of saplings have been given in Table-1, 2 and 3. By following standard nursery technique from one acre of nursery about 1.28 lakhs good saplings can be raised with the cost of production of Rs.0.48 per saplings. A net profit of approximately Rs. 34,250.00 can be obtained by raising saplings in one acre in four months considering the selling rate of 75 paise per sapling.

By adapting suitable farm machinery for irrigation, cutting preparation, bed preparation etc., the cost of production of saplings can be brought down considerably.

Raising of saplings through kisan nursery programme can be taken up in small scale to large scale. The details of cost of production of sapling from 0.5 acre to 2.0 acres are given in Table-4.

## NURSERY DETAILS - RAISED BED

Area (Unit)	: 1 acre
Size of nursery bed	: 3 mt x 1 mt
No. of beds	: 1065
Spacing of cuttings in the bed	: 20 cm x 10 cm.
No. of cuttings per bed	: 150
Total number of cuttings required	: 1.60 lakhs

**TABLE-1 : EXPENDITURE TOWARDS PREPARATION OF NURSERY BEDS:  
(UNIT 1 ACRE)**

Sl. No.	Operation/materials	Hour/manday/ Materials Required	Rate (Rs.)	Total amount (Rs.)
1.	Tractor ploughing - Twice	4 hours	200/hr	800.00
2.	Sand (For black and clay soils only)	20 MT (Two lorry loads)	1500/load	3,000.00
3.	Farm Yard Manure	10 MT	400/MT	4,000.00
4.	Broad casting of sand	10 MD*	75/MD	750.00
5.	Broadcasting of FYM	10 MD	75/MD	750.00
6.	Bullock plough (twice)	4 pairs	100/pair	400.00
7.	Preparation of nursery bed (20 beds/MD)	53 MD	75/MD	3,975.00
<b>Total:</b>				<b>13,675.00</b>

**\*MD Mandays**

**TABLE- 2: EXPENDITURE TOWARDS PLANTING AND MAINTENANCE OF NURSERY (UNIT 1 ACRE)**

Sl. No.	Operation/materials	Hour/manday/ Materials Required	Rate (Rs.)	Total amount (Rs.)
1.	Planting material (Approximately 27000 cuttings/MT)	6 MT	1600/MT	9,600.00
2.	Transportation of planting material	1 loads	1000/load	1,000.00
3.	Preparation of cuttings (2500 cuttings/MD)	65 MD	75/MD	4,875.00
4.	Planting of cuttings (20 beds/MD)	106 MD	75/MD	7,950.00
5.	Irrigation (2 MD/irrigation) (25 irrigations)	50 MD	75/MD	3,750.00
6.	Weeding (twice) (20 beds/MD)	100 MD	75/MD	7,500.00
7.	Fertilizer (Urea) (@ 60 g/bed)	65 kg		400.00
8.	Application of fertilizer	10/MD	75/MD	750.00
9.	Uprooting of saplings (10 beds/manday)	110/MD	75/MD	8,250.00
10.	Miscellaneous (Insecticide, spray, etc.,)			1,000.00
			<b>Total :</b>	<b>45,075.00</b>

**TABLE-3: ECONOMICS OF SAPLING PRODUCTION (UNIT : 1 ACRE)**

<b>ITEM</b>	<b>QUANTITY AND RATE</b>	<b>AMOUNT (Rs)</b>
Seed Material Cost	6 MT @ Rs. 1600/MT	9,600.00
Transportation charges	Rs.1000	1,000.00
Farm Yard Manure	10 MT @ Rs. 400/MT	4,000.00
Sand	20 MT @ Rs. 150/MT	3,000.00
Tractor for plough	4hr @ Rs.200	800.00
Bullock plough	4 pair @ Rs.100/pair	400.00
Wages 514 MD	514 M.D @ Rs.75	38,550.00
Garden implement	Rs. 2000.00	2,000.00
Electricity and diesel	Rs.1000.00	1,000.00
Contingency	Rs.1400.00	1,400.00
<b>Total expenditure</b>		<b>61,750.00</b>
<b>No. of saplings expected (@ 80% survival)</b>	<b>1,28,000</b>	
<b>Total cost of production</b>	<b>Rs. 61,750.00</b>	
<b>Cost of production/sapling</b>	<b>Re. 0.48</b>	
<b>i) Total return @ Rs. 1.00/sapling</b>	<b>Rs. 1,28,000.00</b>	
<b>Net return @ Rs. 1.00/sapling</b>	<b>Rs. 66,250.00</b>	
<b>ii) Total return @ Re. 0.75/sapling</b>	<b>Rs. 96,000.00</b>	
<b>Net return @ Re. 0.75/sapling</b>	<b>Rs. 34,250.00</b>	

**TABLE-4: ECONOMICS OF KISSAN NURSERY**

Operation/ Material	Unit of Kissan nursery		
	0.5 acre	1.0 acre	2.0 acres
Planting material @ Rs. 1600/MT	4,800.00	9,600.00	19,200.00
Transportation of seed material	500.00	1,000.00	2,000.00
Tractor plough @ Rs. 200/ hour	400.00	800.00	1,600.00
Sand @ Rs. 150/MT	1,500.00	3,000.00	6,000.00
Farm Yard Manure @ RS. 400/MT	2,000.00	4,000.00	8,000.00
Bullock plough @ 100/one day	200.00	400.00	800.00
Wages @ Rs.75/ Man day	19,275.00	38,550.00	75,000.00
Garden implements	1,000.00	2,000.00	3,000.00
Electricity and diesel	750.00	1,000.00	2,000.00
Contingency	750.00	1,400.00	2,500.00
<b>TOTAL</b>	<b>31,175.00</b>	<b>61,750.00</b>	<b>1,20,100.00</b>
<b>No. of saplings expected (@ 80% survival)</b>	<b>64,000</b>	<b>1,28,000</b>	<b>2,56,000</b>
<b>Total cost of production (Rs.)</b>	<b>32,175.00</b>	<b>61,750.00</b>	<b>1,20,100.00</b>
<b>Cost of production/sapling</b>	<b>Re. 0.49</b>	<b>Re. 0.48</b>	<b>Re. 0.47</b>
<b>i) Total return @ Rs. 1.00/sapling Rs.</b>	<b>64,000.00</b>	<b>1,28,000.00</b>	<b>2,56,000.00</b>
<b>Net return @ Rs. 1.00/sapling Rs.</b>	<b>32,825.00</b>	<b>66,250.00</b>	<b>1,35,900.00</b>
<b>ii) Total return @ Re. 0.75/sapling Rs.</b>	<b>48,000.00</b>	<b>96,000.00</b>	<b>1,92,000.00</b>
<b>Net return @ Re. 0.75/sapling Rs.</b>	<b>16,825.00</b>	<b>34,250.00</b>	<b>71,900.00</b>

# Location Map of Central Sericultural Research & Training Institute, Mysore, India

