SOUTH ZONE
MULBERRY SERICULTURE
TECHNOLOGY DESCRIPTOR

Central Sericultural Research & Training Institute (CSRTI)
ISO 9001: 2015 Certified
Central Silk Board, Ministry of Textiles : Govt. of India
Manandavadi Road, Srirampura, Mysuru-570008, India
Foreword

Technologies successfully adopted today in the field of mulberry sericulture are synonymous with Central Sericultural Research & Training Institute (CSRTI), Mysuru. The Institute has provided much needed impetus for the development and progress of sericulture in the south Indian states and contributed enormously to the silk production in the country. The quantum leap in productivity could be achieved due to the timely interventions over a period of time through the development and refinement of technologies. The seri-farmers benefited by adopting new silkworm hybrids, mulberry varieties, machines and products/technologies for crop production, crop protection including pest & disease management. The potential of newly developed mulberry varieties and silkworm hybrids were realized completely through recommended package of practices and resulted in higher productivity and sustainability in mulberry sericulture.

CSRTI-Mysuru being the premier R&D institute takes pride for the enhanced productivity in south Indian states specifically and in the country as a whole in mulberry sericulture. This Technology Descriptor: South Zone Mulberry Sericulture presents salient features of technologies widely accepted by the seri-farmers in the southern states. The valued contributions of scientists and technical personnel of CSRTI-Mysuru are highly appreciated. The consistent support of Shri K.M. Hanumantharayappa, Honb’le Chairman, Central Silk Board and Dr. H. Nagesh Prabhu, IFS, Member Secretary, Central Silk Board is greatly acknowledged in bringing about the publication. I hope that Technology Descriptor: South Zone Mulberry Sericulture would be of immense help to the sericulture farmers, extension personnel and other stakeholders.

Dr. V. Sivaprasad
Director
CSRTI-Mysuru

www.csrtimys.res.in
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V1

- Year of recommendation: 1997
- Parentage: S30 × C776

**Salient features**
- Quick sprouting after pruning/leaf harvest
- High rooting ability (94%)
- Leaf: Large, entire, ovate, glossy & dark green
- Medium Inter-nodal distance: 5.20 cm
- Tolerant to –
  - leaf spot
  - powdery mildew
  - leaf rust
- Moderately tolerant to leaf blight
- Leaf yield potential: 50-60 MT/ha/year

**Nutritive value**
- Moisture 78%
- Protein 27%
- Carbohydrate 26%

**Recommended for**
Irrigated tracts of all southern states

**Tips for best results**
Adopt recommended package of mulberry cultivation
- Year of recommendation: 2003
- Parentage: *Morus multicaulis* × S13

**Salient features**
- Quick sprouting after pruning/leaf harvest
- High rooting ability (92%)
- Leaf: Large, entire, cordate, smooth, glossy, dark green and wavy surface
- Short Inter-nodal distance: 3.90 cm
- Tolerant to –
  - leaf spot
  - resistant to leaf rust
- Leaf yield potential: 65 MT/ha/year

**Nutritive value**
- Moisture 75%
- Protein 26%
- Carbohydrate 25%

**Recommended for**
- Irrigated tracts of southern states

**Tips for best results**
- Adopt recommended package of mulberry cultivation
S13

- Year of recommendation: 1990
- Parentage: Open pollinated hybrid of Kanva-2

**Salient features**
- Quick sprouting after pruning/leaf harvest
- High rooting ability (80%)
- Leaf shape: Small, entire & ovate
- Short inter-nodal distance: 3.20 cm
- Tolerant to –
  - leaf spot
  - powdery mildew
  - leaf rust
  - Moderately tolerant to tukra infestation
- Leaf yield potential: 13-16 MT/ha/year

**Nutritive value**
- Moisture 78%
- Protein 23%
- Carbohydrate 27%

**Recommended for**
Semi-arid tracts of all southern states with red soils

**Tips for best results**
Adopt recommended package of mulberry cultivation
Year of recommendation: **1990**

Parentage: S30 × C776

**Salient features**

- Quick sprouting after pruning/leaf harvest
- High rooting ability (75%)
- Leaf shape: Small, entire & cordate
- Short inter-nodal distance: 3.40 cm
- Tolerant to –
  - leaf spot
  - powdery mildew
  - leaf rust
- Leaf yield potential: 13-16 MT/ha/year

**Recommended for**

Semi-arid tracts of all southern states with black soils

**Tips for best results**

Adopt recommended package of mulberry cultivation
MSG2

- Year of recommendation: 2015
- Parentage: BR4 × S13

**Salient features**
- Quick sprouting after pruning/leaf harvest
- High rooting ability (89%)
- Leaf: Large, entire, cordate, smooth and dark green
- Medium inter-nodal distance: 4.50 cm
- Moderately tolerant to –
  - leaf spot
  - leaf rust
- Leaf yield potential: 22-23 MT/ha/year

**Nutritive value**
- Moisture 77%
- Protein 25%
- Carbohydrate 28%

**Recommended for**
Semi-arid tracts of southern states. Also suitable for growing as small trees under protective irrigation

**Tips for best results**
Adopt recommended package of mulberry cultivation
Year of recommendation: 1986
Parentage: Mutant of Berhampore local

Salient features
- Quick sprouting after pruning/leaf harvest
- Low rooting ability (48%)
- Leaf: Large, entire, cordate, glossy & green
- Short inter-nodal distance: 3.53 cm
- Tolerant to –
  - leaf spot
  - powdery mildew
  - leaf rust
- Moderately tolerant to leaf blight
- Leaf yield potential: 28 MT/ha/year

Nutritive value
- Moisture 78%
- Protein 25%
- Carbohydrate 25%

Recommended for
Chawki mulberry gardens in red lateritic soils of Andhra Pradesh, Karnataka and Tamil Nadu

Tips for best results
Adopt recommended package of mulberry cultivation
Year of recommendation: 2004

Parentage: *Morus multicaulis* × S34

**Salient features**

- Quick sprouting after pruning/leaf harvest
- High rooting ability (94%)
- Leaf: Large, entire, cordate, smooth, glossy, dark green and slightly wavy surface
- Medium Inter-nodal distance: 4.50 cm
- Moderately Tolerant to –
  - leaf spot
  - leaf rust
- Leaf yield potential: 36-38 MT/ha/year with 8 crops/year schedule (alternate leaf picking and shoot harvest)

**Nutritive value**

- Moisture 80%
- Protein 27%
- Carbohydrate 25%

**Recommended for**

For exclusive chawki gardens in red laterite soils of southern states

**Tips for best results**

Adopt recommended package of chawki garden maintenance
- Year of recommendation: 2003
- Parentage: Punjab local × Kosen

**Salient features**
- Quick sprouting after pruning/leaf harvest
- High rooting ability (85%)
- Leaf: Large, entire, cordate, smooth & dark green
- Medium inter-nodal distance: 4.30 cm
- Tolerant to –
  - leaf spot
  - moderately resistant to leaf rust
- Leaf yield potential: 23-25 MT/ha/year

**Nutritive value**
- Moisture 73%
- Protein 23%
- Carbohydrate 18%

**Recommended for**
Resource constraint conditions (50% reduction in fertilizer and irrigation)

**Tips for best results**
Adopt recommended package of mulberry cultivation
RC2

- Year of recommendation: 2004
- Parentage: Punjab local × Kosen

**Salient features**

- Quick sprouting after pruning/leaf harvest
- High rooting ability (89%)  
- Leaf: Medium, entire, cordate, smooth & green  
- Medium inter-nodal distance: 4.40 cm
- Tolerant to –
  - leaf spot
  - moderately resistant to leaf rust
- Leaf yield potential: 21-23 MT/ha/year

**Nutritive value**

- Moisture 73%
- Protein 23%
- Carbohydrate 16%

**Recommended for**

Resource constraint conditions (50% reduction in fertilizer and irrigation)

**Tips for best results**

Adopt recommended package of mulberry cultivation
Year of recommendation: **2004**

Parentage: S41 (4x) × C776 (2x)

**Salient features**

- Quick sprouting after pruning/leaf harvest
- High rooting ability (90%)
- Leaf: Large, entire, cordate, smooth & dark green
- Short inter-nodal distance: 3.75 cm
- Tolerant to –
  - leaf spot
  - moderately resistant to leaf rust
- Leaf yield potential: 16-17 MT/ha/year in alkaline soils; 22-24 MT/ha/year in reclamated alkaline soils

**Nutritive value**

- Moisture 74%
- Protein 23%
- Carbohydrate 21%

**Recommended for**

Alkaline soils of southern states with pH upto 9.50

**Tips for best results**

Adopt recommended package of mulberry cultivation
Sahana

- Year of recommendation: 2004
- Parentage: K2 × Kosen

**Salient features**
- Quick sprouting after pruning/leaf harvest
- High rooting ability (80%)
- Leaf: Large, entire, cordate, glossy & dark green
- Medium inter-nodal distance: 4.81 cm
- Tolerant to –
  - leaf spot
  - moderately resistant to leaf rust
  - Moderately tolerant to tukra infestation
- Leaf yield potential: 25-30 MT/ha/year as inter-crop in coconut plantations

**Nutritive value**
- Moisture 73%
- Protein 27%
- Carbohydrate 22%

**Recommended for**
As inter-crop in coconut plantation

**Tips for best results**
Adopt recommended package of mulberry cultivation
Mulberry: Production & Protection

Salient features

- Year of recommendation: 2004
- Parentage: K2 × Kosen
- Quick sprouting after pruning/leaf harvest
- High rooting ability (80%)
- Leaf: Large, entire, cordate, glossy & dark green
- Medium inter-nodal distance: 4.81 cm
- Tolerant to:
  - leaf spot
  - moderately resistant to leaf rust
  - Moderately tolerant to tukra infestation
- Leaf yield potential: 25-30 MT/ha/year as inter-crop in coconut plantations

Nutritive value

- Moisture: 73%
- Protein: 27%
- Carbohydrate: 22%

Adopt recommended package of mulberry cultivation

Recommended for:

- As inter-crop in coconut plantation

Tips for best results

- Mulberry: Production & Protection
Nursery for raising mulberry saplings

- Year of recommendation: 1992

**Salient features**

- Well drained land with loamy soil is ideal for nursery
- The land to be ploughed or dug 30-40 cm deep
- Allow for weathering in sun for 2-3 weeks
- Prepare beds of size of 300 cm x 120 cm
- Provide irrigation channels of 25-30 cm width & 20 cm depth
- Treat the cuttings with 0.2% Bavistin solution for 10-15 min
- Plant cuttings at 8 cm distance in rows 20 cm apart
- Irrigate immediately after planting and then once in 4-5 days
- Apply chemical fertilizer after 55-60 days
- Use 3-4 months old saplings to establish plantation

*Usage*

In nurseries saplings get established quickly and grow vigorously and ensures uniform growth.

**Do's**

- For clayey or black cotton soil, add sand to beds
- Select healthy, 6-8 months old 10-15 mm thick cuttings

**Dont's**

- Don’t use stout lower and tender-green portion of shoots
- Tukra or scale infested cuttings should not be used
Mulberry cultivation for late age silkworm rearing

- Year of recommendation: **2001**

**Salient features**

- Cultivate mulberry in spacing of 90 cm x 90 cm or in paired rows \([(150+90)\times60 \text{ cm}]/\ (5’+3’\times2’]\)
- Apply 20 MT of farm yard manure/ha/year in two splits and NPK @ 350:140:140 kg/ha/year in five splits in the form of straight fertilizers
- V1 and G4 are suitable for late age silkworm rearing

**Usage**

- Provides quality leaves for rearing of late age silkworms

- Expenditure: ₹ 20000/- per acre
- Cost benefit ratio: 1:3

<table>
<thead>
<tr>
<th><strong>Do's</strong></th>
<th><strong>Dont's</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvest leaves as per schedule for maximum utilization of quality leaf</td>
<td>Do not allow the leaves to over mature</td>
</tr>
</tbody>
</table>

Don’t use stout lower and tender-green portion of shoots

Tukra or scale infested cuttings should not be used
Paired row system of plantation

- Year of recommendation: 1995

**Salient features**

- In this system of plantation plants are raised in paired rows.
- The distance between two rows in a pair is 90 cm (3’). The space between two pairs is 150 cm (5’) and distance between plants in a row is 60 cm (2’).
- With this spacing, a total of 13,888 plants can be planted in a hectare.

**Usage**

Facilitates movement of power tillers and tractors for intercultural operations

- Expenditure: ₹ 21000/- per acre
- Cost benefit ratio: 1:2

**Do’s**

Select high yielding mulberry varieties

**Dont’s**

Do not plant closer than recommended
Pruning and Training of Mulberry

- Year of recommendation: 1997

**Salient features**
- Pruning at uniform height facilitates development of proper stump to maintain ideal shape
- Facilitates uniform growth of entire plantation and allows mechanized inter-cultivation activities
- Uniform growth results in reduction in diseases and improved productivity

**Establishment of plantation and stump development**
- Plant healthy saplings and prune at a height of 15 cm from the ground
- Allow plant to grow for six months without leaf harvest, and take up first rearing by leaf picking
- Later select 3 strong & healthy shoots in each plant and prune at a height of 25 cm from the ground
- After every rearing, cut all shoots at a height of 30 cm from the ground and remove the weak and dry branches.
- Maintain only 10-15 healthy shoots/plant

**Usage**

- Plantation with proper stump development facilitates healthy growth and quality leaves

**Do’s**
- Maintain 10-15 healthy shoots/plant by removing weak shoots
- Use sharp secateurs for pruning
- Thin out all weak shoots between 30-40 days of pruning
- Stump development is useful for mechanized pruning using bush cutters

**Dont’s**
- Do not prune plants at ground level, while pruning with machines
- Do not allow more than 15 shoots/plant
Salient features

- Mulberry growth depends on soil fertility and availability of nutrients
- Soil fertility needs to be analyzed periodically to assess the soil nutrient status
- Fertilizer recommendations based on soil fertility need to be adopted for judicious use of fertilizers

Soil test based fertilizer application

- Year of recommendation: 2004

Salient features

- Mulberry growth depends on soil fertility and availability of nutrients
- Soil fertility needs to be analyzed periodically to assess the soil nutrient status
- Fertilizer recommendations based on soil fertility need to be adopted for judicious use of fertilizers

Soil test based recommendation of manures and fertilizers

<table>
<thead>
<tr>
<th>Organic Carbon (%)</th>
<th>FYM *</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.3</td>
<td>15</td>
</tr>
<tr>
<td>0.3 - 0.65</td>
<td>12</td>
</tr>
<tr>
<td>0.65 - &gt; 1.0</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pH</th>
<th>Urea #</th>
<th>AS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 6.0</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>&lt; 6.0</td>
<td>140</td>
<td></td>
</tr>
</tbody>
</table>

Available P (kg/ha) | SSP # | Available K (kg/ha) | MoP #
--- | --- | --- | ---
< 10 | 80 | 0 - 45 | 20
10 - 15 | 75 | 46 - 90 | 18
16 - 25 | 70 | 91 - 134 | 16
26 - 40 | 65 | 135 - 179 | 14

*MT/acre/yr; # kg/acre/crop; AS Ammonium sulphate; SSP Single super phosphate; MoP Muriate of potash

Do's

- Collect soil samples after pruning of mulberry plantation but before fertilizer application
- Collect separate samples for soils differing in texture, colour, yield pattern
- Reclaim problematic soils adopting proper remedial measures

Dont's

- Do not collect soil samples immediately after rain, irrigation and from bunds, near compost pits, marshy and water logged areas
- Do not dry the soil samples under direct sun or in hot temperature

The application of specified doses of fertilizers and manures recommended based on soil test results leads to effective maintenance of soil fertility status
Integrated Nutrient Management (INM) in mulberry cultivation

- Year of recommendation: **2003**

**Salient features**

- Integrated approach of nutrient management consists of chemical and biological means of soil health management, which are eco-friendly and cost effective

**INM package**

- **Organic fertilizers**: Apply farmyard manure (FYM) @ 8 MT/acre in two split dosages. FYM may be curtailed to 4MT/acre in the subsequent years as green manuring contributes to 50% of organic manure
- **Grow two green manure inter-crops at the onset of monsoon and mix in the soil or compost it**
- **Apply neem cake @ 200kg/acre once during monsoon or in 5 split doses**
- **Bio-fertilizers**: Apply 8kg Seri-azo and 2kg Seri-phos/acre/year in 5 equal doses
- **Spray Poshan, a multi-nutrient foliar spray @ 7ml/litre after 25 days of pruning**
- **Chemical fertilizers**: Apply chemical fertilizers as recommended & once the organic content improves (>0.65%), curtail 50% of fertilizers

**Usage**

Adoption of Integrated approach of Nutrient Management improves soil health and productivity

**Do's**

- Prefer crops like sunhemp, dhaincha etc., for green manures
- Mix biofertilizers, Seri-azo and Seri-phos in FYM and apply 15 days before or after application of chemical fertilizers
- Compost seri-waste by adopting seri-composting technology to improve organic carbon content

**Dont's**

- Do not mix bio- and chemical fertilizers while applying to soil
- Do not allow green manure crops to grow up to flowering/seed setting
- Do not burn mulberry shoots removed from the bed, instead use for composting
Drip Irrigation

- Year of recommendation: **1995**

**Salient features**

- An efficient water management system for mulberry
- One lateral is placed in between two mulberry rows and one microtube in amidst 4 plants
- The peak demand for water per plant/day in dry season is –
  - 1.2 litres for 60 × 60 cm plantation
  - 2.0 litres for 90 × 90 cm and paired row system
- Less water usage as compared to other irrigation systems
- Saves water up to 40% without affecting leaf yield

**Usage**

Technology for rainfed and semi irrigated conditions

Expenditure: ₹ 45,000/- per acre

**Do's**

- Use filters to avoid blockage of microtubules
- While ploughing, remove the laterals and microtubes

**Dont's**

- Do not use hard water for drip irrigation as it clogs the microtubes
- Do not use drip, where percolation is not proper
Mulberry cultivation package for young age silk worms

- Year of recommendation: 2001

**Salient features**

- Cultivate mulberry in spacing of 90 cm x 90 cm or paired rows [(150+90)x60 cm/ (5’+3’)x2’]
- Apply 40 MT of farm yard manure/ha/year and NPK @ 260:140:140 kg/ha/year in eight splits in the form of straight fertilizers
- Adopting top clipping method of training (alternate harvesting of leaves and shoots) 30 MT/ha/year of quality leaves for rearing young age silk worms can be produced
- S36, V1 and G2 are suitable for young age silkworm rearing

**Usage**

- Provides quality leaves for rearing young age silk worms
  - Expenditure: ₹ 20,000/- per acre
  - Cost benefit ratio: 1:3

**Do's**

- Harvest leaf as per schedule for maximum utilization of quality chawki leaf

**Dont's**

- Do not allow the leaves to over mature
Package for tree mulberry cultivation

- Year of recommendation: 2000

**Salient features**

- Choose S-13 mulberry variety and plant with a spacing of 2.4 m x 2.4 m. Maintain crown height of plants at 150 – 180 cm, and provide fertilizer @ 50:25:25 kg/ha/year of NPK under rainfed conditions.
- Grow green manure crops during rainy season for improving the soil fertility.
- The trees yield mulberry leaves @ 6–7 MT/ha/year.
- Mulberry leaves can be harvested 4 times in a year.
- Full productivity would be reached after three years.

**Usage**

- Suitable for water deficit or low soil moisture conditions
- Expenditure: ₹20,000/- per acre
- Cost benefit ratio: 1:1.6

**Do's**

- Use water efficient mulberry varieties

**Don't's**

- Do not plant with closer spacing
Affordable Micro Irrigation Technology (AMIT)

- Year of recommendation: 2013

**Salient features**

- Irrigation through a network of plastic pipes with laterals and emitters connected to a drum/water tank placed at a height of one meter
- Cost effective and eco-friendly technique to revive rainfed sericulture for poverty alleviation & employment generation
- For situations where ground water sources are fast depleting
- Effective utilization of available water resources
- Can overcome unpredictable power supply
- A farmer having 1000 liters of water output per day can easily maintain 680 mulberry plants as trees by supplying 2-2.5 liters water per plant on alternate days

**Advantages**

- Saves water, labour & energy
- Reduction in cost of cultivation
- Water use efficiency rate is more than 95%

**Usage**

- More appropriate for tree plantation
- Can be practiced where there is deficit & erratic rainfall
- Can overcome water, energy and labour constraints

**Do's**

- Pump and store water depending on availability of power
- Use appropriate tubes and emitters

**Don't's**

- Do not use inferior quality drip pipes and end emitters
Foliar application of POSHAN

Year of recommendation: 2012

**Salient features**

- Open trenches (1.5' width and 1' depth) along alternate rows
- Fill the trenches with mulberry leaves, shoots and silkworm litter and if available foliage of neem, Pongamia and Glyricidia and cover with dug-out soil
- Green manure crops can be grown during the onset of monsoon (June and Oct-Nov) and they can be mulched before flowering

**Usage**

The trench serves as rainwater harvesting canal/sink facilitating quick decomposition of mulberry shoots in to nutrient-rich compost.

- **Advantages over alternative technology:** Fertility building by sub-soil bio-massing/manuring and soil moisture conservation by organic mulching
- Expenditure: ₹15,000/- per acre
- Cost benefit ratio: 1:1.54

**Do's**

- Mulch fresh foliage and shoots
- Cover trenches with dug-out soil

**Dont’s**

- Do not leave trenches open
Foliar application of POSHAN

- Year of recommendation: 2011

**Salient features**

- Poshan is a multi-nutrient formulation
- Foliar spray of Poshan results in 20% increase in leaf yield, besides improving leaf quality
- Feeding Poshan sprayed leaves helps in uniform growth of silkworms, production of cocoons with improved shell weight and shell percentage

**Preparation and application**

- 1 litre of *Poshan* should be diluted in 140 liters of water and sprayed on one acre of mulberry (@7ml/l)
- Spray once per crop
- Spraying is to be done on the foliage, 25 - 30 days after pruning or leaf picking, between 8 & 11 am till the leaves are drenched

**Usage**

For mulberry leaf nutrient management and higher leaf yield

- Expenditure: ₹ 250/- per crop/acre
- Cost benefit ratio: 1:7
- Safe period for feeding silkworms: 48 h of spray

**Do's**

- Spray during cooler hours of the day
- If it rains within 6 h of spray, repeat
- Recommended for irrigated gardens only

**Dont's**

- Don’t spray against direction of wind
Composting & Vermi-composting from Seri-residue

- Year of recommendation: 1995

**Salient features**

- 12-15 MT biodegradable farm residue is generated from one ha of mulberry garden, which can be turned into compost
- Make a compost pit of 15’L x 5’B x 3’D in an elevated area
- Spread the farm residue layer by layer in the pit
- Apply fresh cowdung or spent slurry after each layer
- Fill the pit to a height of 30-40 cm above ground level, close it by plastering with mud and cow dung slurry
- Using earthworms, the organic residue can be rapidly decomposed
  - *Eudrilus eugineae*, *Eisenia foetida* and *Perionyx excavatus* can be used for this purpose

**Advantages over alternative technology:** The mulberry shoots normally take 9-12 months for decomposition, but by this method the compost is ready in 4-5 months

**Usage**
- **Do's**
  - Maintain moisture by sprinkling water periodically
  - Protect the pit with a thatched roof
- **Dont's**
  - Do not water once vermicast is detected

By composting/vermi-composting process, seri-farm residue is recycled as high nutrient manure
Navinya - a plant based formulation for management of root rot disease of mulberry

- Year of recommendation: 2011

**Salient features**
- Target specific eco-friendly plant based formulation
- Does not affect beneficial microflora in the soil
- Easy to apply
- Shelf life of two years

**Preparation and Application**
- Prune dried or wilted plant showing root rot symptoms at 1ft from ground level
- Remove soil around the collar region of the plant to form a basin and avoid over-flowing of the applied formulation
- Prepare solution by thoroughly mixing 10g of Navinya in 1 l water (1kg Navinya/100 l sufficient for 100 plants)
- Pour 1 liter of solution over the pruned stump so as to drench completely
- Cover the collar region with soil
- Treat the surrounding plants also to prevent spread of disease

**Usage**

- Expenditure: ₹300/- for 500 g (for treating 50 plants)
- Cost benefit ratio: 1:4.5

**Do's**
- Remove completely dried and dead plants, and burn. Then replant with new saplings dipped in 0.4 % Navinya solution for 15 min
- Treat as soon as root rot symptoms appear

**Dont's**
- Don’t irrigate the treated plants for 3-4 days after treatment
- Don’t store the product in damp places
- Don’t keep the product within the reach of children
**Nemahari** - a plant based formulation for management of root knot disease of mulberry

- **Year of recommendation:** 2012

**Salient features**
- A target specific, eco-friendly plant based formulation
- Does not harm beneficial microflora in soil
- Easily absorbed by the roots
- Inhibits multiplication of nematodes
- Easy to apply
- Shelf life is two years

**Preparation and application**
- Mix 16 kg Nemahari with 160 kg FYM (for 1 acre)
- Make 15 cm deep trenches along root zone of plants in rows
- Apply the mixture in the trench and cover with soil
- Repeat 70-80 days after first application
- A third application is recommended 140-150 days after second application if infection is severe (> 50 galls/plant)

**Usage**

- **Expenditure:** ₹ 100/- per kg
- **Cost benefit ratio:** 1:2.2

**Do’s**
- Irrigate moderately immediately after treatment
- Treat as soon as initial symptoms of root knot appear
- Apply compost to improve organic carbon in the soil
- Thoroughly wash farm implements used in the infected garden

**Dont’s**
- Don’t store the product in damp places
- Don’t keep the product within the reach of children
- Avoid overflow of water from the treated mulberry gardens

**Management of root knot disease of mulberry**
- Expenditure: ₹ 100/- per kg
- Cost benefit ratio: 1:2.2
IPM of pink mealybug, *Maconellicoccus hirsutus*

- **Year of Development:** 1990

**Salient features**
- Mealybug is a major sucking pest of mulberry with a wide host range
- Occurs throughout the year, but predominant during summer
- Causes leaf yield loss of about 1800 kg/acre/year
- Lays 350-500 eggs; incubation 6-9 days; nymphal period 23-27 days, thus completes life cycle in 30-36 days

**Management approaches**

**Mechanical Method**
- Remove and destroy infested portions by burning or dipping in 0.5% soap solution

**Chemical Method**
- Spray 0.2% DDVP (76% EC) (@2.63 ml/l) 15 - 20 days after pruning.
- Safe period for feeding silkworms: 15-17 days after spray

**Biological Method**
- Release lady bird beetles, *Scymnus coccivora* @500 beetles or *Cryptolaemus montrouzieri* @250 beetles/ac/year in two splits at an interval of 6 months

**Usage**

- Effective in the management of mealybug in mulberry
- **Expenditure:** ₹ 800/acre/year
- **Cost benefit Ratio:** 1: 4

**Do's**
- Top clip mulberry plants when silkworms settle for 4<sup>th</sup> moult
- Spray insecticides during cool hours.
- Release beetles only after 8-10 days of chemical spray

**Dont's**
- Don’t spray insecticide against direction of wind
- Do not spray insecticide after releasing beetles
Classical Biological Control of papaya mealybug, *Paracoccus marginatus*

- **Year of Development:** 2010

**Salient features**
- It is an exotic pest native to Mexico
- First reported in Tamil Nadu (2009) and subsequently spread to neighbouring states and caused heavy loss to sericulture industry
- Lays 400-600 eggs; incubation 8-10 days; nymphal period 22-25 days, thus completes life cycle in 30-35 days

**Management approaches**

**Mechanical Method**
- Remove the infested portions with secature and pile up at one corner of the garden

**Biological Method**
- Inoculative release of exotic nymphal parasitoid, *Acerophagus papayae* @ 1 vial (about 100 adults)/acre in pest infested gardens and other alternate host plants such as Papaya, Parthenium, Jatropha, Hibiscus, etc.

**Usage**

Effective in management of papaya mealybugs

**Availability of Parasitoids**
- Parasitoids are supplied free of cost by the National Bureau of Agricultural Insect Resources (NBAIR), ICAR, Bengaluru (Contact: 080-2351 1982)

**Do's**
- Take measures to encourage build up of population of natural enemies in the mulberry gardens

**Dont's**
- Don’t spray insecticide against papaya mealybug, as it may worsen the situation
- Don’t remove or destroy alternate host plants such as Parthenium, Jatropha etc., containing mummified mealybugs.
Classical Biological Control of papaya mealybug, *Paracoccus marginatus*

**Year of Development:** 2010

**Salient features**
- Leaf roller is a seasonal pest of mulberry
- Occurs from June to February with peak incidence during September to November
- Lays 80-150 eggs with an incubation period of 2-3 days
- Larval & pupal periods last for 8-12 and 7-9 days, respectively
- Completes life cycle in 17-24 days

**Management approaches**

**Mechanical Method**
- Remove and destroy infested portions along with the caterpillar by burning or dipping in 0.5% soap solution

**Chemical Method**
- Spray 0.15% DDVP (76% EC) (@2 ml/l) 12-15 days after pruning
- Safe period for feeding silkworms: 12 days after spray

**Biological Method**
- Release *Trichogramma chilonis*, an egg parasitoid @ 4 trichocards/acre/crop (from July to February)

**Usage**

- Effective in management of leaf roller in mulberry
  - Expenditure: ₹ 800/acre/year
  - Cost benefit Ratio: 1: 4

**Do’s**
- Plough deeply to expose the leaf roller pupae to birds
- Release egg parasitoids after 10 days of chemical spray
- Spray insecticides during cool hours

**Dont’s**
- Do not spray insecticide after releasing egg parasitoids
- Don’t spray insecticide against direction of wind
IPM of Bihar hairy caterpillar, *Spilarctia obliqua*

- **Year of Development:** 1995-96

**Salient features**
- Sporadic pest, which defoliates mulberry
- Occurrence coincides with onset of monsoon and continues up to February
- Lays 1000-1200 eggs with an incubation period of 5-7 days
- Larval & pupal periods last for 28-30 & 12-14 days, respectively
- Completes life cycle in 45-51 days

**Management approaches**

**Mechanical Method**
- Collect and destroy egg masses and gregarious young caterpillars by burning
- Deep ploughing exposes the pupae to the birds & scorching sun
- Flood irrigation kills the pupae

**Chemical Method**
- Spray 0.15% DDVP (76% EC) (@2 ml/l) 12-15 days after pruning
- Safe period for feeding silkworms: 12 days after spray

**Biological Method**
- Release *Trichogramma chilonis*, an egg parasitoid @ 4 trichocards/acre/crop

**Usage**

- Expenditure: ₹ 1000/acre/year
- Cost benefit Ratio: 1:3

**Do’s**
- Plough deeply to expose the pupae to birds
- Release egg parasitoids only after 10 days of chemical spray
- Spray insecticides during cooler hours

**Dont’s**
- Do not spray insecticide after releasing egg parasitoids
- Don’t spray insecticide against direction of wind

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**Chrysopid (Green Lacewing) for Thrips Management**

- **Year of Development:**
- Chrysopids (green lacewing) are broad spectrum predators in many agricultural crop systems
- The important Chrysopids include sp. & sp.
- Adults are green coloured insects with net-like wings which feed on nectar, pollen and other sugar sources
- Lay about 600-800 stalked eggs in small groups on leaves and other plant parts or nearby pest colony, which hatch in 3-4 days
- The larvae feed voraciously on thrips and other soft bodied insects and hatched larvae of Lepidopteran pests as well as Mites for 8-10 days
- They form silky cocoons from which adults emerge in 5-7 days
- Life cycle completes in 16-21 days, males live for 30-35 days and females up to 60 days
- 1000 eggs/acre two times at an interval of one week
- Eggs available in the form of egg cards, which may be stapled/tied to terminal leaves

**Recommendation**

- Effective in the management of thrips and other soft bodied pests including Mites in mulberry

**Usage**

- Do not spray any pesticides after the release of Chrysopids
- If infestation is severe, spray Rogor (3ml/l) 12-15 days after pruning and release Chrysopids after 8-10 days (safety period for feeding mulberry leaf to silkworms is 20 days)
Chrysopid (Green Lacewing) for Thrips Management

- Year of Development: 2016

**Salient features**

- Chrysopids (green lacewing) are broad spectrum predators in many agricultural crop system
- The important Chrysopids include *Chrysoperla* sp. & *Mallada* sp.
- Adults are green coloured insects with net-like wings which feed on nectar, pollen and other sugar sources
- Lay about 600-800 stalked eggs in small groups on leaves and other plant parts or nearby pest colony, which hatch in 3-4 days
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**Recommendation**

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**Dont’s**

- Do not spray any pesticides after the release of Chrysopids
Silkworm Hybrids

Year of recommendation:

Productive bivoltine hybrid

Plain larvae with bluish white body colour

Larval period: 23-24 days

Bright white hybrid shaped cocoons with medium grains

Cocoon yield: 65-70 kg /100 dfls

Pupation rate: >90%

Raw silk: 17-18%

Reelability: 86-90%

Filament length: 1000 m

Fibre quality: 2A-3A

Renditta: 5.5-6.0

Better crop stability with commercial farmers

Adopt recommended rearing package

Irrigated areas of Karnataka, Andhra Pradesh, Telangana, Tamil Nadu, Uttar Pradesh, Madhya Pradesh and Maharashtra

Recommended for

Tips for best results
*Year of recommendation: 1997*

**Salient features**
- Productive bivoltine hybrid
- Plain larvae with bluish white body colour
- Larval period: 23-24 days
- Bright white hybrid shaped cocoons with medium grains
- Cocoon yield: 65-70 kg /100 dfls
- Pupation rate: >90 %
- Raw silk: 17-18 %
- Reelability: 86-90 %
- Filament length: 1000 m
- Fibre quality: 2A-3A
- Renditta: 5.5-6.0
- Better crop stability with commercial farmers

**Recommended for**
Irrigated areas of Karnataka, Andhra Pradesh, Telangana, Tamil Nadu, Uttar Pradesh, Madhya Pradesh and Maharashtra

**Tips for best results**
Adopt recommended rearing package
CSR16 × CSR17

- Year of recommendation: 1997

**Salient features**

- Productive bivoltine hybrid
- Marked larvae with bluish white body colour
- Larval period: 23-24 days
- Bright white hybrid shaped cocoons with medium grains
- Cocoon yield: 65-70 kg /100 dfls
- Pupation rate: >90 %
- Raw silk: 18-19 %
- Reelability: 86-90 %
- Filament length: 1050 m
- Fibre quality: 2A-3A
- Renditta: 5.5-6.0
- Alternative to CSR2 × CSR4

**Recommended for**

Irrigated areas of Karnataka, Andhra Pradesh, Telangana, Tamil Nadu, Uttar Pradesh, Madhya Pradesh and Maharashtra

**Tips for best results**

Adopt recommended rearing package
**FC1 × FC2**  
**(CSR6 × CSR26) × (CSR2 × CSR27)**

- **Year of recommendation:** 2000

**Salient features**

- Productive bivoltine double hybrid
- Marked larvae with bluish white body colour
- Larval period: 23-24 days
- Bright white hybrid shaped cocoons with medium grains
- Cocoon yield: 70 -75 kg /100 dfls
- Pupation rate: >90 %
- Raw silk: 18-19 %
- Reelability: 86-90 %
- Filament length: 1100 m
- Fibre quality: 2A-3A
- Renditta: 5.3-6.0
- Better crop stability with commercial farmers
- Better seed crop performance and higher seed recovery

**Recommended for**

Irrigated areas of all parts of India

**Tips for best results**

Adopt recommended rearing package
Chamaraja  
(CSR50 × CSR51)

- Year of recommendation: 2012

**Salient features**

- Robust bivoltine hybrid
- Marked larvae with bluish white body colour
- Larval period: 23-24 days
- Bright white hybrid shaped cocoons with medium grains
- Cocoon yield: 70-75 kg /100 dfls
- Pupation rate: >90 %
- Raw silk: 19-20 %
- Reelability: 86-90 %
- Filament length: 1150 m
- Fibre quality: 2A-3A
- Renditta: 5.0-5.5

**Recommended for**

Irrigated areas of all parts of India and suitable for adverse conditions

**Tips for best results**

Adopt recommended rearing package
Jayachamaraja
(CSR50 × CSR52) × (CSR51 × CSR53)

- **Year of recommendation:** 2012

**Salient features**
- Productive bivoltine double hybrid
- Marked larvae with bluish white body colour
- Larval period: 23-24 days
- Bright white hybrid shaped cocoons with medium grains
- Cocoon yield: 70-75 kg /100 dfls
- Pupation rate: >90 %
- Raw silk: 19-20 %
- Reelability: 86-90 %
- Filament length: 1100 m
- Fibre quality: 2A-3A
- Renditta: 5.0-5.5
- Better crop stability with commercial farmers

**Recommended for**
Irrigated areas all over the country and suitable for adverse conditions

**Tips for best results**
Adopt recommended rearing package
G11 × G19

- Year of recommendation: 2014

**Salient features**

- Double hybrid for sub-optimal conditions
- Plain larvae with bluish white body colour
- Larval period: 23-24 days
- Bright white hybrid shaped cocoons with medium grains
- Cocoon yield: 65-70 kg /100 dfls
- Pupation rate: >90 %
- Raw silk: 17-18 %
- Reelability: 86 %
- Filament length: 950 m
- Fibre quality: 2A-3A
- Renditta: 5.5-6.0
- Better digestibility and higher survival
- Suitable for all regions and seasons

**Recommended for**

All regions

**Tips for best results**

Adopt recommended rearing package
Year of recommendation: **2015**

**Salient features**
- Productive bivoltine hybrid
- Marked larvae with bluish white body colour
- Larval period: 23-24 days
- Bright white hybrid shaped cocoons with medium grains
- Cocoon yield: 70-75 kg /100 dfls
- Pupation rate: >90 %
- Raw silk: 19-20 %
- Reelability: 86-90 %
- Filament length: 1100 m
- Fibre quality: 2A-3A
- Renditta: 5.0-5.2
- Highly productive and suitable for all seasons

**Recommended for**
All agro-climatic conditions

**Tips for best results**
Adopt recommended rearing package
PM × CSR2

- Year of recommendation: 2000

**Salient features**

- Productive multi x bivoltine
- Plain larvae with bluish white body color
- Larval period: 24 days
- Light greenish yellow oval cocoons with slightly more floss and medium grains
- Cocoon yield: 60 kg /100 dfls
- Pupation rate: >95.4%
- Raw silk: 79-80%
- Reelability: >84-85%
- Filament length: 800-900 m
- Renditta: 6.0-7.0
- Better crop stability in the field

**Recommended for**

South Indian States

**Tips for best results**

Adopt recommended rearing package
Cauvery Gold
(MV1 × S8)

- Year of recommendation: 2015

**Salient features**
- Productive improved cross breed tolerant to silkworm diseases
- Plain larvae with bluish tinge white body
- Larval period: 22-23 days
- Pupation rate: >90%
- Cocoon yield: 75-85 kg/100 dfls
- Light greenish yellow oval cocoons with less floss, compact shell and medium grains
- Reels completely till pelade layer resulting in high raw silk recovery of 75–79%
- Raw Silk: 14.80%
- Reelability: 85-90%
- Filament length: 910 - 960 m
- Renditta: 6.0-6.5
- High tenacity (>3.7 g/d), elongation (>22%) and cohesion (>60 strokes) making the cocoons fit for reeling on multi-end and Automatic Reeling Machines
- Fibre quality: 2A-3A

**Recommended for**
South Indian States throughout the year

**Tips for best results**
Adopt recommended rearing package
Silkworm: Production & Protection
Chawki Rearing Technology

- Year of recommendation: 1997

**Salient features**

- Chawki rearing (rearing of young age silkworms up to II moult) is the most crucial stage in silkworm rearing and one of the deciding factors in the success of cocoon crop.
- Young age silkworms are characterized by maximum growth rate and should be grown under high temperature (27-28°C) and high humidity (80-90%) for optimal growth.
- As chawki worms are susceptible to diseases, pathogen free conditions are maintained by adopting strict disinfection and hygiene measures.

**Chawki rearing**

- Expose the eggs to bright diffused light for 2-3 hours.
- Apply nylon brushing net (2-4 mm mesh) on the hatched larvae and sprinkle freshly chopped soft chawki leaves and cover with paraffin paper for 3-4 hours. Transfer the bed to the rearing tray and spread the larvae and feed some more chopped leaves.
- Maintain optimal temperature and humidity in the chawki room adopting suitable methods.
- Provide nutritious leaf twice a day and provide adequate spacing by increasing number of trays as the chawki worms grow (65 sq. ft./100 dfls at the end of II instar).

**Don'ts**

- Maintain strict hygiene.

**Do's**

- Black box the eggs at pin head stage.
Chawki Rearing Technology Contd...

- Remove paraffin paper one hour before every feeding and allow cross ventilation
- Dust slaked lime when worms settle for moult and dust bed disinfectant when larvae come out of moult
- Conduct chawki certification during II moult, dust lime and transport to the farmers in cool hours

**Usage**

Scientific chawki rearing is vital for development of healthy larvae and harvesting of successful cocoon crops

**Do's**

- Maintain exclusive chawki mulberry garden to get soft, succulent and nutritious mulberry leaves
- Equip CRCs with necessary equipments like rearing trays, heaters, humidifiers, hygrometers, sprayer, etc., and vehicles for transportation and distribution of worms
- Black box the eggs at pin head stage
- Maintain strict hygiene

**Dont's**

- Do not transport eggs during hot hours; Do not cover beds with paraffin paper during moult
Chawki Certification for successful silkworm crops

- Year of recommendation: 2002

**Salient features**
- To ensure appropriate growth and health of young silkworms prior to distribution
- Essential to implement the CRC concept efficiently for achieving better production and productivity at farmers’ level

**Components**
- Quantification of missing larvae
- Quantification of larval uniformity
- Assessment of larval growth
- Health status of the larvae

**Certification**
- Missing larval percentage should be less than 5%
- Percentage of undersized larvae should be less than 15%
- Standard weight of 100 bivoltine hybrid larvae during II moult should be 3.4 to 3.8 g & for cross breeds it should be 2.2 to 2.6 g
- If pebrine is detected, the batch is not fit for distribution & it should be rejected & burnt. Disinfect the CRC immediately

**Usage**

To certify the chawki larval growth and health status prior to distribution to the farmers

**Do's**
- Certify the batch when worms are settled for II moult / immediately after II moult.
- Use good binocular microscope having 600x magnification for examination

**Dont's**
- Don’t certify the batch when the worms are in 1st instar
- If pebrine is detected, don’t distribute to the farmers
Nutrid – Semi-synthetic diet for rearing young age silkworms

- Year of recommendation: 2001

**Salient features**
- The diet allows Chawki rearers to rear multi x bivoltine hybrids of their choice on semi-synthetic diet up to II moult
- A nutritive and hygienic alternative that reduces infections in the early larval stages

**Advantages**
- Only two feeds per instar
- No cleaning of rearing beds required
- No dusting of disinfectants or lime required
- Saves on cost of manpower by 70% in Chawki rearing

**Usage**

Recommended for rearing Chawki worms

**Do's**
- Follow the temperature and humidity regime strictly
- Pile up the trays one above the other to preserve bed humidity
- Transfer the trays onto rearing stands while larvae settle for moult to keep the beds dry

**Dont's**
- Don’t keep the rearing bed moist while the larvae are moult
- Don’t ever apply the diet onto the larvae, do the opposite
- Don’t leave the trays open when the larvae are feeding
Late age Silkworm Rearing Technology

- Year of recommendation: 1997

**Salient features**

- Rearing of silkworm larvae from III to V instar and up to cocooning is called late age rearing
- Late age silkworm rearing must be conducted in a separate rearing house with good ventilation and structure/design facilitating effective disinfection
- An ante-chamber should be built at the entrance of the rearing house to prevent entry of uzi fly
- For mounting and harvesting cocoons, Verandah is built along eastern and western walls of rearing house

**Late age rearing**

- Always use chawki worms reared up to II moult in CRCs.
- Spread the larvae on the shoot bed and dust bed disinfectant 30 minutes before resuming feeding
- Provide two feedings with fresh coarse mulberry leaves in a day
- Maintain optimal temperature and humidity (24-26°C and 75-80% RH) in the rearing house by adopting appropriate methods
- Dust slaked lime when worms settle for moult and dust bed disinfectant when larvae come out of moult
- Provide adequate space for the optimal growth of larvae. In shoot rearing method provide 3 sq.ft bed area and in tray rearing method 2 sq.ft for every dfl reared
Late age Silkworm Rearing Technology

- Provide spacing of 700-800 sq. ft. bed area for 100 dfls
- Provide sufficient quality mulberry shoots from irrigated mulberry plantation

**Usage**

Shoot feeding and shelf rearing of silkworms optimizes and improves the cocoon yield and quality; reduces cost of cocoon production and drudgery

**Do's**

- Harvest mulberry shoots for IV & V instar larvae during cooler hours of the day with sharp saw/brush cutte
- Preserve shoots by wrapping with wet gunny cloth and stack vertically in upright position
- Shoot feeding is effective in saving on labour and time with less chances of secondary contamination
- 50-70 larvae per square feet is ideal for rearing.
- Collect unequal/diseased worms and destroy
- Adopt proper bed disinfection methods to prevent diseases and maintain hygiene
- When more than 40% of worms mature, mount using appropriate mountages

**Don't's**

- Do not dust bed disinfectants on feeding larvae
- Do not delay feeding after dusting of bed disinfectant
Mounting and Harvesting Techniques

- **Year of recommendation:** 1997

**Salient features**

- 25°C temperature, 60-65% humidity, good ventilation and uniform light are necessary in the mounting room for obtaining good quality cocoons
- Mount only matured larvae. Mounting of un-ripened or over mature larvae results in defective and inferior quality cocoons
- Presently, bamboo mountages (chandrike), plastic collapsible mountages and rotary mountages are in use
- Rotary mountages are ideal to produce quality cocoons of uniform size and high reelability
- Mounting on bamboo *chandrikes* results in higher defective cocoons and large variations in cocoon size and shape
- Plastic collapsible mountages are used mainly as self mounting devices to save labour during spinning. Quality of cocoons harvested is inferior to those spun on rotary mountages
- Cocoons should be harvested after the completion of pupation (6th day after spinning) manually or using harvesting tools

**Do’s and Don’ts**

- Do’s
  - Proper mounting and harvesting results in production of quality cocoons fetching higher economic returns to the stakeholders

- Don’ts
  - Do not expose mountages to direct sunlight during spinning
  - Do not pile bamboo *chandrikes* one over the other
  - Do not harvest cocoons before complete pupation
  - Maintain temperature around 25°C and relative humidity around 65% during spinning to produce quality cocoons
  - Provide cross ventilation and uniform illumination in the mounting room
  - Moulting hormone (Sampoorna) may be used for quick and uniform maturity and stimulating spinning
  - Use deflossing machines to remove floss on the cocoons
Mounting and Harvesting Techniques Cont...

**Usage**

Proper mounting and harvesting results in production of quality cocoons fetching higher economic returns to the stakeholders.

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*chandrike*
Disinfection and hygiene in silkworm rearing using Chlorine dioxide (Sanitech/Serichlor)

- Year of recommendation: 1996

**Salient features**

- Effective disinfectant against all silkworm pathogens
- Cost effective chlorine based disinfectant
- The technology involves spraying of 2% bleaching powder in 0.3% slaked lime solution

**Preparation**

- To prepare 100 liters disinfectant solution, mix 2 kg bleaching powder and 300 g slaked lime powder in 100 litres of water

**Usage**

- Disinfection of rearing houses, surroundings and appliances
- Maintenance of personal and rearing hygiene

Expenditure: ₹ 140/- for rearing 100 dfls
Cost benefit ratio: 1: 7

**Do's**

- Use quality bleaching powder (with 30-32% available chlorine)
- Use freshly prepared lime powder for mixing with bleaching powder
- Use mask while spraying the solution

**Dont's**

- Never prepare the solution in direct sunlight
- Don’t spray on metals as it is highly corrosive
- Don’t use muddy and impure water
Disinfection and hygiene in silkworm rearing using Chlorine dioxide (Sanitech/Serichlor)

- **Year of recommendation:** 1996

**Salient features**
- Commercially available as Sanitch/Serichlor at 20,000 ppm
- It is less corrosive, less hazardous and highly germicidal

**Preparation of 100 l 2.5% (500 ppm) Chlorine dioxide in 0.5% slaked lime solution**
- Take 250 g activator crystals in a basin/bucket
- Add Sanitech/Serichlor solution (2.5 l)
- Keep for 10 minutes
- Add activated Sanitech/Serichlor to 97.5 l water
- Add 500 g slaked lime
- Mix thoroughly and use for disinfection

**Usage**
- Disinfection of rearing houses, surroundings and appliances
- For maintenance of personal and rearing hygiene

Expenditure: ₹ 500/- for rearing 100 dfls
Cost benefit ratio: 1:8

**Do's**
- Make sure that the mixture turns yellow after mixing the activator crystals
- Use recommended quantity of activator crystals
- Wear a mask while spraying

**Don't's**
- Never prepare the solution under direct sunlight
- Don’t mix Sanitech/Serichlor solution, activator crystals and slaked lime powder together
- Don’t add components to the water before release of chlorine
- Don’t use impure and muddy water
Disinfection and hygiene in silkworm rearing using Asthra

- Year of recommendation: 2009

**Salient features**
- A general disinfectant for Sericulture
- Effective against all silkworm pathogens at 0.05% conc.
- Easy to prepare and spray

**Preparation**
- Mix 50 g of Asthra in 100 litres of water to prepare 0.05% disinfectant solution
- After adding Asthra, stir thoroughly
- Keep for 2 hours before spraying

**Usage**
- Disinfection of rearing houses, surroundings and appliances
- For maintenance of personal and rearing hygiene

Expenditure: ₹ 200/- for rearing 100 dfls
Cost benefit ratio: 1:9

**Do's**
- Use the disinfectant solution 2 hours after mixing Asthra powder
- Wear a mask while spraying the solution

**Dont's**
- Don’t use impure and muddy water
Disinfection and hygiene in silkworm rearing using Sanitech Super (Chlorine dioxide)

- Year of recommendation: 2014

**Salient features**
- Commercially available as Sanitech Super at 40,000 ppm
- Less corrosive, less hazardous and highly germicidal
- Spray 1.25% Sanitech Super (500 ppm Chlorine dioxide) prepared in 0.5% slaked lime solution & spray @ 1.5 litre /sq. m

**Preparation of 100 lit. Sanitech Super in 0.5% slaked lime soln.**
- Take 125 g activator crystals in a basin/bucket
- Add 1.25 litres Sanitech Super solution to it
- Keep it for 10 minutes
- Add activated solution to 98.75 litres water
- Add 500 g slaked lime
- Mix thoroughly and use

**Usage**
- Disinfection of rearing houses, surroundings & appliances
- For maintenance of personal and rearing hygiene

Expenditure: ₹ 350/- for rearing 100 dfls
Cost benefit ratio: 1:8

**Do's**
- Make sure that the mix turns yellow on adding activator crystals
- Use recommended quantity of activator crystals
- Wear a mask while spraying the solution

**Dont's**
- Never prepare the solution under direct sunlight
- Don’t mix Sanitech Super solution, activator crystals and slaked lime powder together
- Don’t put Sanitech Super solution, activator crystals and slaked lime powder directly to the water
Disinfection and hygiene in silkworm rearing using **Serifit**

- **Year of recommendation:** 2015

**Salient features**

- **Serifit** is effective against all common pathogens of silkworm
- It suits all types of rearing houses and does not need air tight conditions
- Less corrosive, less hazardous and highly germicidal
- Spray of 0.20% Serifit solution for disinfection of rearing house and rearing appliances @ 1.5 litre/sq. m

**Preparation of 100 litres of 0.20% Serifit Solution**

- Add 200 g of **Serifit** granules in 100 litres of water
- Mix thoroughly
- Keep for 30 min before spraying

**Usage**

- Disinfection of rearing houses, surroundings and appliances
- For maintenance of personal and rearing hygiene

Expenditure: ₹ 180/- for rearing 100 dfls
Cost benefit ratio: 1: 9

**Do's**

- Use the disinfectant 30 min after mixing **Serifit** granules
- Wear a mask while spraying the solution

**Dont's**

- Don’t use impure and muddy water for preparing the solution
Prevention of common silkworm diseases with *Vijetha*

**Year of recommendation:** 1995

**Salient features**

- Silkworm body and rearing seat disinfectant against spread of all silkworm diseases
- The first powder formulation for preventing all silkworm diseases
- A patented technology (Indian Patent No. 186852/28-09-1998)

**Application**

- After every moult before resumption and on 4\textsuperscript{th} day of V instar after ensuring that no eatable leaf is left in the rearing bed
- Dust on silkworm body and rearing seat @ 3 g/sq. ft. during I & II instars and @ 5 g/sq. ft. during III, IV & V instars

**Usage**

For prevention of common silkworm diseases during rearing

Expenditure: ₹ 300/- for rearing 100 dfls  
Cost benefit ratio: 1:6

**Do's**

- Feed the silkworms 30 minutes after dusting
- Wear a mask while dusting
- Keep the powder in air tight containers
- Dust the recommended quantity

**Dont's**

- Don’t dust the mixture on feeding larvae
- Don’t cover the tray or rack after dusting
- Don’t use Vijetha after expiry date
Prevention of muscardine disease using *Vijetha Supplement*

- Year of recommendation: **2001**

**Salient features**
- Anti-fungal formulation for the prevention of spread of muscardine
- A specific bed disinfectant for preventing muscardine disease during rainy and winter seasons, in addition to Vijetha

**Application Schedule - Req. quantity/100 dfls (g)**

<table>
<thead>
<tr>
<th>Larval stage</th>
<th>Tray rearing</th>
<th>Shoot rearing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3rd day of IV instar</strong></td>
<td>600</td>
<td>900</td>
</tr>
<tr>
<td><strong>2nd day of V instar</strong></td>
<td>1,000</td>
<td>1,300</td>
</tr>
<tr>
<td><strong>6th day of V instar</strong></td>
<td>1,400</td>
<td>1,800</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,000</strong></td>
<td><strong>4,000</strong></td>
</tr>
</tbody>
</table>

For prevention of Muscardine disease

Expenditure: ₹ 300/- for rearing 100 dfls
Cost benefit ratio: 1:5

**Do's**
- Dust on silkworm body and rearing seat @ 3g/sq. ft.
- Feed the silkworms after 30 minutes of dusting
- Wear a mask while dusting
- Keep the powder in air tight containers

**Dont's**
- Never dust the mixture on feeding larvae
- Don’t cover the tray or rack after dusting
- Dusting should not be done when silkworms are under moult or eatable leaves are available in the bed
Prevention of all common diseases of silkworm using Ankush

- Year of recommendation: 2003

**Salient features**
- An eco- & user-friendly silkworm body & rearing seat disinfectant
- Effective against the spread of all major diseases of silkworm
- Ingredients are biodegradable and eco-friendly

**Application Schedule for 100 dfls (g)**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Rearing method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tray</td>
</tr>
<tr>
<td>After I moult *</td>
<td>72</td>
</tr>
<tr>
<td>After II moult *</td>
<td>144</td>
</tr>
<tr>
<td>After III moult *</td>
<td>288</td>
</tr>
<tr>
<td>After IV moult *</td>
<td>768</td>
</tr>
<tr>
<td>3rd day of V instar</td>
<td>1,076</td>
</tr>
<tr>
<td>5th day of V instar</td>
<td>1,348</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,696</strong></td>
</tr>
</tbody>
</table>

* before resumption

**Do's**
- Use as a general bed disinfectant for prevention of all common diseases of silkworm
- Wear a mask while dusting
- Feed the silkworms after 30 minutes of dusting

**Dont's**
- Never dust the mixture on feeding larvae
- Don’t cover the tray or rack after dusting

*Usage*

- For prevention of all common diseases of silkworm during rearing
- Dust on silkworm body and rearing seat @ 3g/sq. ft.
- Feed the silkworms after 30 minutes of dusting
- Wear a mask while dusting
- Keep the powder in air tight containers

**Expenditure:**
- ₹ 300/- for rearing 100 dfls
- Cost benefit ratio: 1:7

*Usage*

- Prevention of all common diseases of silkworm using Vijetha Supplement

- Year of recommendation: 2001

**Salient features**
- Anti-fungal formulation for the prevention of spread of muscardine
- A specific bed disinfectant for preventing muscardine disease during rainy and winter seasons, in addition to Vijetha

**Application Schedule - Req. quantity/100 dfls (g)**

<table>
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<td>1,800</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,000</strong></td>
<td><strong>4,000</strong></td>
</tr>
</tbody>
</table>

**Do's**
- Dust on silkworm body and rearing seat @ 3g/sq. ft.
- Feed the silkworms after 30 minutes of dusting
- Wear a mask while dusting

**Dont's**
- Never dust the mixture on feeding larvae
- Don’t cover the tray or rack after dusting
Suppression of Grasserie and Flacherie diseases in silkworm using Amruth

- Year of recommendation: 2003

**Salient features**

- An eco and user friendly botanical based formulation for the control of grasserie and flacherie diseases
- The first ever curative formulation against silkworm diseases

**Preparation (for 100 dfls)**

- Mix Amruth powder in water @ 20 g/litre. Sprinkle 70 ml of Amruth solution per kg of mulberry leaf/shoot

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Amruth (g)</th>
<th>Water (ml)</th>
<th>Leaf/Shoot (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>After 2\textsuperscript{nd} feed of II moult</td>
<td>07</td>
<td>350</td>
<td>5</td>
</tr>
<tr>
<td>After 2\textsuperscript{nd} feed of III moult</td>
<td>53</td>
<td>2,650</td>
<td>38</td>
</tr>
<tr>
<td>After 3\textsuperscript{rd} feed of IV moult</td>
<td>90</td>
<td>4,500</td>
<td>67</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>7,500</strong></td>
<td><strong>110</strong></td>
</tr>
</tbody>
</table>

**Usage**

For suppression of Grasserie and Flachierie diseases in silkworms

Expenditure: ₹ 150/- for rearing 100 dfls
Cost benefit ratio: 1:5

**Do’s**

- Use freshly prepared solution
- Mix the solution with hand

**Dont’s**

- Don’t use sprayer for sprinkling the solution
- Don’t dry the leaves for longer time
IPM of Uzi fly, *Exorista bombycis*

- Year of recommendation: **2002**

**Salient features**
- Uzi fly is an endo-larval parasitoid of silkworm
- Inflicts 10-15% loss to silkworm crop
- Occurs throughout the year, but predominant during rainy season
- Lays 400-500 eggs with an incubation period of 2-3 days
- Larval and pupal periods last for 6-8 days and 10-12 days, respectively
- Completes life cycle in 18-20 days
- Adults survive for 15-21 days

**Management approaches**

*Exclusion Method*
- Fix wire mesh/nylon net on all doors and windows
- Fix doors with automatic closing mechanism
- Provide *ante*-chamber at the entrance of the rearing house

*Uzi trap*
- Dissolve one tablet in 1 litre of water and keep in white trays both inside and outside the rearing house on window sills throughout the rearing period

*Biological Method*
- Release *Nesolynx thymus* (ecto-pupal parasitoid) during V instar @2 pouches/100 dfls
- From each pouch, about 10,000 *N. thymus* adults emerge
- Single parasitoid may parasitize 4-5 uzi pupae
- 40-60 parasitoids develop on each uzi pupa
IPM of Uzi fly, *Exorista bombycis* Cont...

- After mounting of spinning worms, keep the pouches near mountages
- After harvesting of cocoons, keep them near manure pit

**Cultural Method**

- After completion of rearing, separate the silkworm litter from mulberry twigs
- Pack the litter in plastic bags, close and keep for a minimum of 15 days before throwing in the litter pit
- Alternatively, litter can be buried in soil immediately after rearing

**Advantages**

- Maintains uzi infestation consistently below 2%
- Eco-friendly, effective and economical

**Usage**

- Effective in the management of Uzi fly

- Expenditure: ₹ 150/- 100 dfls rearing
- Cost benefit Ratio: 1: 5

**Do's**

- Continue keeping uzi trap inside the rearing house even after spinning for up to 15 days to ensure trapping of flies emerging from uzi pupae present in the room
- Collect uzi fly pupae from inside rearing house/mounting & harvesting place and burn immediately

**Don't's**

- Do not throw uzi infested silkworms in open area, instead put them in 2% bleaching powder solution for 24 h before discarding
- Do not keep the door open even after rearing to avoid escaping of uzi flies
**Sampoorna - A hormone for uniform maturity of Silkworms**

- Year of recommendation: 2003

**Salient features**
- Orally administer to silkworms by spraying the diluted *Sampoorna* over mulberry at the onset of spinning
- All the larvae will mature within 12-18 hours after spraying
- Can be used to save the crop under exigency conditions (disease outbreak or leaf shortage)

**Advantages**
- Spinning will be initiated within 12-18 hours
- Increase in pupation rate
- Marginal increase in yield and price of cocoons
- Less defective cocoons
- Cocoons can be marketed one day early

**Usage**

- **Do’s**
  - Use each vial of 10 ml *Sampoorna* for about 20,000 larvae
  - One vial of *Sampoorna* should be mixed in 2 litres of water.
  - Spray the mixture onto a thin layer of leaf spread on the larvae at the onset of spinning
  - Wear a hand gloves while preparing the mixture

- **Dont’s**
  - Don’t spray directly on the larvae
  - Don’t feed large quantities before spraying
  - Don’t leave the larvae unattended for more than six hours after treatment

---

**Early uniform maturity of silkworms & synchronised spinning**
**Young-age silkworm (Chawki) rearing houses**

**Year of recommendation:** 2002

**Chawki rearers** can create and maintain optimum environmental conditions for young-age silkworms—27 to 28°C and 85 to 90% RH.

**Rearing hall:** wall to wall 8 m x 8 m (25’ x 25’) with a height of 14’ at the centre and 10’ at the side walls for rearing 5,000 dfls per batch.

**Separate rooms** for leaf storage and storing equipment.

**Ante-room** at the entrance to ensure hygiene.

**6’ open verandah** around the rearing hall facilitates maintenance of optimum temperature and humidity conditions.

**Thorough disinfection & maintenance of hygiene** are possible.

---

**Samruddhi (JHA Technology) for enhanced cocoon/silk production**

**Year of recommendation:** 2007

**Salient features**

- *Samruddhi* can be administered to any silkworm breed/hybrid.
- V instar larval duration prolongs by 12 to 24 h necessitating two additional feeds.

**Application**

- Mix one vial (5 ml) of *Samruddhi* in 2.5 litres of water to form an emulsion.
- Spray directly on larvae (50 dfls) after 48 h in V instar.

**Advantages**

- 6 to 12 kg increase in cocoon yield or 1 kg silk / 100 dfls.
- Cocoon yield increases by up to 15%.

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**Usage**

(*Increases cocoon and shell weight by 12-15% with no adverse effect on shell percentage*).

**Do's**

- Administer the product at 48 h of V instar in bivoltine and at 24 h in cross breeds.
- Apply the product only after mixing thoroughly in water.
- Spray the emulsion directly onto the larvae before feeding preferably in the morning.

**Dont's**

- Never apply *Samrudhi* if sufficient leaf is not available.
- Do not feed the larvae immediately after the treatment, wait for a minimum of 30 min.
- Do not mount the treated larvae until properly ripe.
Young-age silkworm (Chawki) rearing houses

- Year of recommendation: 2002

**Salient features**

- *Chawki* rearers can create and maintain optimum environmental conditions for young-age silkworms - 27 to 28°C and 85 to 90% RH
- Rearing hall: wall to wall 8 m x 8 m (25’ x 25’) with a height of 14’ at the centre and 10’ at the side walls for rearing 5,000 dfls per batch
- Separate rooms for leaf storage and storing equipment
- *Ante*-room at the entrance to ensure hygiene
- 6’ open verandah around the rearing hall

**Advantages**

- Facilitates maintenance of optimum temperature and humidity conditions
- Thorough disinfection & maintenance of hygiene are possible

**Usage**

- Appropriate for large scale commercial chawki rearing
- Cost: ₹ 3.0 lakhs

**Do's**

- Construct as per plan
- Ensure adequate ventilation and illumination

**Dont's**

- Do not store leaf inside the rearing hall
Late-age silkworm Rearing Houses

- Year of recommendation: 2007

**Salient features**

- Facilitates maintenance of optimum environmental conditions
- Suitable for rearing both bivoltine and multivoltine silkworms
- Rearing hall: 6 x 6 m (20’ x 20’) for 100 dfls. Add 6 m to the length of the hall for every additional 100 dfls
- Height: 14’ at the centre and 10’ on the sides to accommodate 5 shelves for rearing

**Advantages**

- Separate room for leaf storage and ante-room to maintain hygiene and restrict entry of pests & predators
- Facilitates effective disinfection and maintenance of optimum rearing environment

**Usage**

Long term benefits to rearers through production of quality cocoons

Cost: ₹ 4.0 Lakhs for 1,000 sq.ft. (for rearing 250 dfls)

**Do's**

- Construct as per plan

**Dont's**

- Do not store leaf and other rearing materials inside rearing hall
PVC Stands for young-age (Chawki) silkworm rearing

- Year of recommendation: 2004

**Salient features**
- Sericulturists can assemble the stands by themselves
- Non-corrosive and hence disinfectants do not cause any damage
- 40% cheaper than metal stands
- Light in weight and hence can be moved easily
- Do not absorb or release heat. Hence, does not add to temperature inside rearing hall

**Advantages**
- Easy, durable and cost effective

**Usage**
Appropriate for large scale commercial chawki rearing

Cost: ₹ 12,000/- per stand of 100 trays capacity

**Do's**
- Use quality material

**Dont's**
- Never use flame gun for disinfection of PVC units
PVC Stands for late-age silkworm rearing

- Year of recommendation: 2016

**Salient features**
- Durable
- Light in weight
- Corrosion free
- Easy to clean and disinfect
- Simple to erect

**Advantages**
- Easy maintenance of rearing conditions
- Saves energy as the PVC is non absorbent of heat
- Height and space between racks can be altered as per requirement

**Usage**

Large scale silkworm rearing for cocoon production

Cost: ₹ 60/sq. ft.

**Do's**
- Use quality material

**Dont's**
- Never use flame gun for disinfection of PVC units
Mechanisation

PVC Stands for late-age silkworm rearing

Year of recommendation: 2016

§

Salient features

Advantages

Large scale silkworm rearing for cocoon production

Usage

Cost: 60/sq. ft.

Never use flame gun for disinfection of PVC units

Dont’s

Use quality material

Do’s

Easy maintenance of rearing conditions

Saves energy as the PVC is non absorbent of heat

Height and space between racks can be altered as per requirement
Mulberry cutting preparation machine

- Year of recommendation: **1995**

**Salient features**
- Mulberry cuttings preparation is fast and efficient
- Cuttings obtained are without any damage
- The machine is electrically operated

**Advantages**
- While a worker can prepare 1,500-2,000 cuttings in a day manually, this machines can produce 1,200-1,400 cuttings in one hour
- The machine reduces drudgery in cutting preparation

**Usage**
- Cuttings preparation is made easy
- Can save labour and time
- Avoids damage to the cuttings

Cost: ₹ 10,000/-

**Do's**
- Hold the shoots firmly against the cutting blade

**Dont's**
- Never use very thick shoots for preparation of cuttings
Mulberry leaf chopper

- Year of recommendation: 2001

**Salient features**

- Can cut 150-175 kg mulberry leaves in one hour
- The machine is powered by ½ hp electric motor
- Can also be operated manually

**Advantages**

- Cuts large quantities of mulberry leaves in a short time
- Can cut leaf into different sizes to suit the age of larvae

**Usage**

- Facilitates chopping large quantity of mulberry leaves in short time
- Useful in Commercial Chawki Rearing Centres

Cost: ₹ 30,000/-

**Do's**

- Feed the leaves gently into the machine
- Provide sufficient work area around the machine

**Dont's**

- When manually operated, should not be connected to power supply

---

Mulberry cutting preparation machine

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- While a worker can prepare 1,500-2,000 cuttings in a day manually, this machines can produce 1,200-1,400 cuttings in one hour
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- Cuttings preparation is made easy
- Can save labour and time
- Avoids damage to the cuttings

**Usage**

- Never use very thick shoots for preparation of cuttings

Cost: ₹ 10,000/-

---

Do's

- Feed the leaves gently into the machine
- Provide sufficient work area around the machine

Dont's

- When manually operated, should not be connected to power supply
Mulberry shoot crushing machine

- Year of recommendation: 1995

**Salient features**

- This machine is very useful for production of compost or vermi-compost out of sericulture residue
- The machine cuts and crushes all types of plant materials including coconut fronds
- The machine is powered by a 5 hp electric motor

**Advantages**

- Facilitates quick conversion of bio-degradable material into compost or vermi-compost
- Saves time and energy

**Usage**

- This machine cuts and crushes mulberry shoots into small pieces, which facilitates fast decomposition

Cost: ₹ 40,000/-

**Do’s**

- Feed moderate quantum for crushing

**Dont’s**

- Too hard wooden parts should not be put into the machine
Dusting machine for young age silkworm rearing

- Year of recommendation: **2014**

**Salient features**
- Facilitates dusting of lime and bed disinfectants over young age silkworms
- This is an electrically operated machine

**Advantages**
- Durable and efficient
- Ensures uniform dusting
- User friendly as exposure to chemicals is minimum

**Usage**
- Useful in chawki rearing centres, where a large number of rearing trays are handled

Cost: **₹ 30,000/-**

**Do's**
- Use smooth and clumps free lime/bed disinfectant

**Dont's**
- Do not use wet or dampened powders in the machine
Mature Silkworm Separator

- Year of recommendation: 2002

**Salient features**
- Manual separator for small and medium farmers
- Motorised separator for large scale farmers

**Advantages**
- Saves time and manpower
- Manually operated machines separate about 40-50 dfls silkworms in one hour
- Motorised machines can separate over 125 dfls worms in one hour
- Avoids delay in spinning due to manual operations, especially while using rotary mountages

**Usage**
- To facilitate separation of mature silkworms from mulberry shoots

Cost: Manual machine ₹ 6,000/-; Motorised machine ₹ 10,000/-

**Do's**
- Gentle operation is enough for separation process
- Handle carefully to avoid damages to worms

**Don't's**
- Do not resort to separation before larvae mature
Seri Room Heater

- Year of recommendation: **2006**

**Salient features**
- Heavy duty electrically operated heater
- Suitable to maintain desired temperature in the silkworm rearing houses

**Advantages**
- Durable and efficient

**Usage**
- To maintain desired temperature in rearing houses

Cost: ₹ 5,000/-

**Do's**
- Place on a level ground

**Dont's**
- Do not use in open type rearing houses
Seri Humidifier cum heater

- **Year of recommendation:** 2007

**Salient features**
- Functions as a humidifier as well as a heating unit
- Desired humidity and temperature can be maintained in the rearing house

**Advantages**
- Dual use as humidifier and heater
- Desired relative humidity and temperature can be set
- Temperature or humidity or both can be set as per requirement

**Usage**
- Suitable for young age silkworm rearing
- Suitable for late age rearing during summer to maintain desired humidity

**Cost:** ₹ 16,000/-

**Do's**
- Ensure sufficient water in the machine
- Set desired temperature and humidity to suit the larval age

**Dont's**
- Do not use in open type of rearing houses
Plastic tray washing machine

- **Year of recommendation:** 2015

**Salient features**
- Equipped with pressurised water spray and scrubbing system
- Facilitates maintenance of hygiene in *chawki* rearing and egg production centres
- Helps in efficient management in Chawki Rearing Centres

**Advantages**
- Time and labour saving device
- About 100 trays can be washed in one hour

**Usage**
- Washing of plastic trays in *Chawki* Rearing Centres and egg production centres

**Cost:** ₹ 35,000/-

**Do's**
- Ensure use of sufficient quantum of water and disinfectants

**Don't's**
- Do not put trays of dimensions other than specified
Cocoon Harvesters for Rotary Mountages

- Year of recommendation: **2001**

**Salient features**

- Facilitates harvesting of cocoons from rotary mountages easily and quickly
- Hand operated and foot operated harvesters are available

**Advantages**

- Saves time and labour
- No damage to cocoons while harvesting

**Usage**

- For easy & quick harvesting of cocoons from rotary mountages

Cost: ₹ 8,000/-

**Do’s**

- Fix the rotary frame with the cocoons in the slot properly
- Apply gentle pressure

**Dont’s**

- In case of hand operated harvester, do not apply pressure on one side only
Cocoon Harvester for Collapsible Plastic Mountages

- Year of recommendation: 2015

**Salient features**
- Electrically operated machine
- Saves time and labour

**Advantages**
- Can harvest from 150-160 mountages in one hour
- Deflossing and cleaning also takes place while harvesting

**Usage**
- Harvest cocoons from plastic collapsible mountages

Cost: ₹ 18,000/-

**Do's**
- Insert the mountages between the shafts and move gently

**Dont's**
- Do not put more than one mountage at a time
- Pluck flimsy cocoons from mountages before harvesting
Cocoon Deflosser

- Year of recommendation: **2002**

**Salient features**
- The loose layer of unreelable floss can be effectively removed
- Manual, motorised and motorised-cum-hand operated versions are available

**Advantages**
- Fast and labour saving
- Deflossing is efficient
- Cost effective

**Cost:**
- Manual machine ₹ 2,500/-
- Motorised machine ₹ 12,500/-
- Motorised-cum-hand operated ₹ 10,000/-

**Usage**
- Helps in removal of floss and cleaning the cocoons before reeling

**Do's**
- Feed the cocoons in a single layer
- Clean the floss collected on the machine frequently

**Dont's**
- Do not feed cocoons in more than one layer
Folding and bundling tool for plastic mountages

- Year of recommendation: **2002**

**Salient features**
- Facilitates maintaining the shape of plastic mountages

**Advantages**
- Well maintained mountages help in better cocoon formation
- Helps in utilization of less space for storing the mountages

**Usage**
- To fold and bundle plastic mountages for better durability

Cost: ₹ 200/-

**Do's**
- Fold the mountages one by one into the frame

**Dont's**
- Do not preserve without bundling
Seed cocoon cutting machine

- Year of recommendation: **1998**

**Salient features**
- Facilitates fast cutting of seed cocoons in the grainages
- Reduces drudgery in cocoon cutting
- Adjustable to cocoon size

**Advantages**
- Helps in efficient management of silkworm seed production centres
- Can cut 5,000-5,500 cocoons per hour

**Usage**
- For efficient seed cocoon cutting in grainages

Cost: ₹ 35,000/-

**Do's**
- Select and place uniform sized cocoons in the slot

**Dont's**
- Avoid double and flimsy cocoons
CSRTI-Mysuru
In pursuit of excellence

Central Sericultural Research & Training Institute (CSRTI), Mysuru is a pioneering institution in the field of sericulture striving for the overall development of mulberry silk industry in the country. CSRTI-Mysuru is a full-fledged centre of excellence providing R&D and HRD support to enhance silk productivity and quality ensuring higher economic returns sericulturists. With a vision to become an International Sericulture Institute par Excellence in Bivoltine Sericulture, CSRTI-Mysuru made immense contributions through scientific and technological innovations, extension management strategies and skill development in different aspects of mulberry sericulture from soil to cocoon production. CSRTI-Mysuru is well-equipped with modern laboratories, quality mulberry gardens and adequate infrastructure to undertake advanced research, modern Library, Computer networking and Bioinformatics Centre for aiding in R&D activities. CSRTI-Mysuru also has established a mechanism to validate the developed technologies/products through on-station and on-farm trials at its Regional Sericultural Research Stations, Research Extension Centres and sub-units. Sericultural Engineering division facilitates designing machines for mulberry cultivation and silkworm rearing and fabrication of prototypes. The training division of CSRTI-Mysuru caters to the needs of capacity building and skill development of stakeholders in tropical sericulture not only in the mandated states, but also in other states of India and overseas students. The staff of CSRTI-Mysuru, on ISO 9001:2015 accredited institution, is oriented towards achieving excellence in application oriented research to transform Indian sericulture into a vibrant globally competitive industry.

V. Sivaprasad
Director

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