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# Facilitator Guide



Sector
**Agriculture**

Sub-Sector
**Agriculture Allied Activities**

Occupation
**Silkworm Rearing**

Reference ID: **AGR/Q5201,** Version **3.0**
NSQF **Level: 3**

# Sericulturist

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> Skilling is building a better India. If we have to move India towards development then Skill Development should be our mission.

**Shri Narendra Modi**
Prime Minister of India

## Acknowledgements

We are thankful to all organizations and individuals who have helped us in preparation of this Facilitator Guide. We also wish to extend our gratitude to all those who reviewed the content and provided valuable inputs for improving quality, coherence and content presentation of chapters. This Facilitator Guide will lead to successful roll out of the skill development initiatives, helping greatly our stakeholders particularly trainees, trainers and assessors etc. We are thankful to our Subject Matter Expert for the content and helping us in preparation of this Facilitator Guide.

It is expected that this publication would meet the complete requirements of QP/NOS based training delivery. We welcome the suggestions from users, industry experts and other stakeholders for any improvement in future.

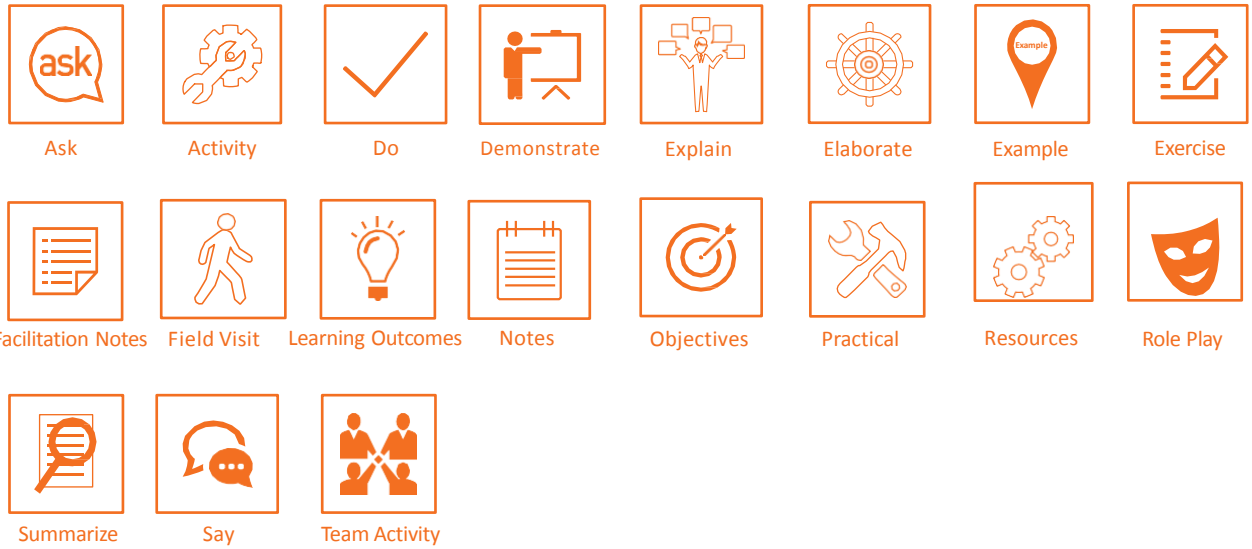
## About this Guide

The objective of the guide is to provide an approach map for interacting with the trainees undergoing training on this job role. The aim of the course is to provide both theoretical and practical knowledge to the trainees. The guide is neither a substitute nor complete road map, but an aid to help to pass on the knowledge on all the aspects to the trainees in a systematic manner. It is expected that the trainer is fully conversant with all the contents of the guide. The guide is just to indicate that how to proceed for covering a topic and includes some additional information that may be necessary for the trainer to develop better comprehension on following aspects:

- **Knowledge and Understanding:** Satisfactory operational learning and comprehension to play out the required chore.
- **Performance Criteria**: Pick up the required aptitudes through hands on preparing and play out the required operations inside the predetermined measures.
- **Professional Skills**: Capacity to settle on operational choices relating to the zone of work.

The job will also include judging the comprehension and also help them learn more by hands on training. But it has to be ensured that these are in accordance with the knowledge imparted and time spent on each unit. It is expected that irrespective of the region, knowledge on all aspects will be imparted to trainees.

## Symbols Used



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# 1. Introduction to the Role of a Sericulturist

Unit 1.1 - Introduction to Sericulture

Unit 1.2 - Mulberry and Non Mulberry Silk

Bridge Module

# Key Learning Outcomes

**At the end of this module, you will be able to:**

1. Describe the size and scope of the agriculture industry and its sub-sectors.
2. Discuss the role and responsibilities of a Sericulturist.
3. Identify various employment opportunities for a Sericulturist

# UNIT 1.1: Introduction to Sericulture

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Explain Sericulture
2. Describe the life cycle of silkworm
3. Explain silk production in India and other parts of the world
4. Explain the Importance of Sericulture in Employment Generation

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides, Pictures/ Posters, that can depict various role of a sericulturist and specific innovative images related to sericulture.

## Say

- Greetings to the participants and thank everyone for their participation in the program.

## Do

- Take introduction of participants by following a group activity

## Explain

- Describe on the scope and importance of sericulture as a commercial venture.
- Economic importance of sericulture and job role of a sericulturist.
- Introduce participants to definition of skill, silkworm rearing and mulberry cultivation.
- Legal/Government guidance applicable to sericulture.

## Team Activity

Divide the class into three teams. Assign one question to each group from below list. No team should be given same topic. Give sufficient time for teams to refer to the text in participant manual related to assigned topics and discuss among them. Facilitate team members to answer any query related to topics.

- Definition of sericulture and the life cycle of silkworm
- Importance of sericulture for gainful employment its global and Indian status.
- Types of silk in India and about their food plants.

After completion of discussion of group, each team will take their turn and will present the assigned topic in front of class. This will facilitate peer learning.

## Ask

- Explore with participants what they understand about the word Skill, Garden etc.
- Ask three volunteers to give a short speech as what will they do to improve their own Skills in sericulture
- Ask few participants to describe people and their occupations who are directly dependent on sericulture to earn living.

## Notes for Facilitation

- A brief general explanation of terms used in participant manual will help participants to take part in discussions.
- Help participants to get rid of inhibition and anxiety (if any) thus ensuring maximum class participation.
- Make participants understand what is sericulture, comparison with farming, Establishing a garden and silkworm rearing.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on future job role.
- Assist participants to streamline their thought process while discussing the question.
- You can invite representative of any organization who employs sericulturist to speak on 'expectations from trainees'.
- Understand their job role as a sericulturist
- Indicate briefly the option for career progression and career mobility of sericulturist completing training under NSQF framework. He /she can work anywhere in India or even seek employment outside the country.
- Create a sense of pride amongst the participants as an important self employment job.
- Inculcate the serving attitudes and create awareness of 'people' dimensions associated with sericulture.
- Learn about their limitations and pre-requisite to follow legal / government guidelines.
- Empower participants to systematically think about sericultural activities.

## Exercise

**Key Solutions to PHB Exercises**

1. The life cycle of silkworm includes the following stages:
   - Egg: The female silkworm lays 300 to 500 eggs at a time, which hatch into larvae in about 10 days.
   - Larva: The larvae or caterpillars feed on mulberry leaves and grow in size. They molt four times and shed their skin as they grow.
   - Pupa: After the fourth molt, the silkworm secretes a fluid that hardens into a cocoon around it. The pupa undergoes metamorphosis inside the cocoon and transforms into a moth.
   - Adult: The adult moth emerges from the cocoon after two to three weeks, breaks the silk threads and flies away to mate and lay eggs.

2. The following are some ways in which sericulture helps in employment generation:
   - Rearing of silkworms: Farmers and rural households rear silkworms and sell the cocoons to silk mills, generating employment for themselves and their families.
   - Silk processing: Silk mills employ workers for processing the cocoons, spinning the silk yarn, dyeing and weaving the fabric, and finishing the final product.
   - Handloom and handicrafts: Silk fabrics are used in a variety of traditional handloom and handicraft products like sarees, scarves, shawls, and furnishings. Artisans and weavers working in these industries also generate employment.

3. The major states in India producing silk are:
   - Karnataka
   - Tamil Nadu
   - Andhra Pradesh
   - West Bengal

# Unit 1.2: Mulberry and Non Mulberry Silk

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Explain the different types of silk available and name of the insect producing the silk.
2. Identify the food plants of different silkworms.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides, Pictures/ Posters, that can depict various role of a sericulturist and specific innovative images related to sericulture, cocoon and silk samples.

## Explain

- Describe the different types of silk available in India such as:
  - ✓ Mulberry silk
  - ✓ Eri silk
  - ✓ Tasar silk
  - ✓ Muga silk
- Explain the difference of Mulberry and non mulberry silk.
- Explain the food plants used for rearing different varieties of silk
- Explain briefly on the conservation of wild silkworms.

## Demonstrate

- With the help of available resources demonstrate the following: Mulberry, Eri, Tropical tasar, Oak tasar, Muga.
- You can refer Participants Handbook

## Ask

- Explore with participants what they understand about the word silk and nonmulberry silk etc.
- Ask three volunteers to give a short speech as what will they do to improve their own Skills in sericulture
- Ask few participants to describe people and their occupations who are directly dependent on sericulture to earn living.

## Notes for Facilitation

- Encourage participants to listen and learn from each other's experiences and perspectives.
- Summarize the key points covered in the session
- Encourage participants to ask questions and clarify any doubts they may have.
- Get participants to open up their participant handbooks and solve the exercises given at the end of the unit. Discuss the answers.

## Exercise

**Key Solutions to PHB Exercises**

1. Refer table 1.2.1 of PHB.
2. Non-mulberry silkworms are a type of silkworms that produce silk from other sources of food, such as castor, oak, and tassar leaves, instead of mulberry leaves. These silkworms are primarily grown in tropical and subtropical regions of India.

## Notes

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# 2. Cultivate Plantation for Silkworm Feed

Unit 2.1 - Selection of Land for Mulberry Cultivation

Unit 2.2 - Raising of Mulberry Plantation for Young Age and Late Age Silkworms

Unit 2.3 - Mulberry Diseases and Pests

AGR/N5201

## Key Learning Outcomes

**After the completion of this module, the participant will be able to:**

1. Explain the criteria for selecting a mulberry variety to be grown for silkworm feed such as the agroclimatic conditions at the site.
2. Explain the criteria for selecting a site for mulberry cultivation, such as temperature, Relative Humidity (RH), sunlight exposure and rainfall, etc.
3. Explain the importance of ensuring the site is situated away from any factories, highways, source of effluents, etc.
4. List various inputs required for mulberry cultivation.
5. Describe the process of preparing the field for mulberry cultivation, such as clearing, tilling and levelling the field: soil fumigation: soil sampling, testing and application of necessary fertilisers, and mulching the field.
6. Explain the importance and process of creating drains for the field for effective drainage and harvesting of water.
7. Explain the importance of using mulberry cuttings of recommended dimensions for propagation.
8. Describe different planting methods such as paired row system, pit system, etc.
9. Explain the importance of maintaining the recommended planting depth, density and temperature in the nursery bed.
10. State the recommended irrigation schedule for irrigating mulberry saplings.
11. Explain the recommended practices to be followed to prevent root and collar rot in saplings.
12. State the recommended organic and inorganic fertilisers to be applied to mulberry saplings.
13. Explain the recommended preventive and remedial practices to be followed to protect mulberry saplings from relevant pests and diseases.
14. State the signs of maturity of mulberry saplings.
15. State the recommended temperature and humidity for storing the harvested mulberry saplings.
16. Explain the importance and ways of protecting the saplings from direct sunlight and strong winds during the early stages of their growth.
17. State the recommended organic and inorganic fertilisers to be applied to mulberry trees for their healthy growth.
18. State the water requirements of mulberry trees during different stages of their growth.
19. Explain the recommended preventive measures to be followed to protect mulberry saplings from pests and disease.
20. State the signs of pest and disease infestation in mulberry trees and the recommended treatment to be applied to cure them.
21. Explain the importance of ensuring no waterlogging in the mulberry field.

22. Explain the importance of mulching to prevent the growth of weeds and the process of weeding.
23. State the signs of maturity of mulberry leaves.
24. State the recommended temperature and humidity for storing the harvested mulberry leaves to preserve their freshness.

# UNIT 2.1: Selection of Land for Mulberry Cultivation

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Find suitable climate for mulberry cultivation.
2. Prepare land for mulberry cultivation.
3. Nursery raising and identification of direct planting of cuttings.
4. Explain Mulberry Plantation Management.
5. Knowing the type of mulberry suitable for different regions and different cultural practices.
6. Explain about the yield potential of different varieties.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing preparation of land for mulberry cultivation, nursery raising, planting of cuttings. Pictures/ Posters, that can depict various role of a sericulturist and specific innovative images related to irrigated and rainfed mulberry garden.

## Elaborate

- Choose appropriate climate for cultivating the plant
- Prepare land for cultivation, rainfed and irrigated mulberry garden.
- Select cuttings and planting
- Transplant saplings to the field and manage plantation
- Raise and manage nursery or saplings
- Manage nutrients, irrigation and weeds
- Harvest leaves/ shoot

## Example

- Show different types of mulberry garden through power point presentation and describe their features in detail.

## Activity

**Purpose:** The purpose of this activity is to practice making nursery beds
**Expected time:** 60-90 minutes

**Resources:** Small plot of land, tools for making nursery bed.

**Methodology:** Hands on practice and discussion.

**Instructions:**

- Conduct a practical session.
- For the purpose of evaluation divide the entire class into groups (depending upon the batch strength)
- Demonstrate the process of making nursery beds.
- Ask them to make nursery beds on their own with the process that is discussed.
- You will present the final marks based on the performance of each group

## Say

- Sum up the key learning features of above group discussion activity. Emphasis and elaborate on important aspects of each group discussion topic.

## Notes for Facilitation

- A brief general explanation of all terms used in participant manual in the unit.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on any topic
- Encourage peer learning among participants in the class by answering other participant's questions
- Assist participants to streamline their thought process while discussing the above question
- Ensure more pictorial presentation of learning where ever possible in classroom
- Ensure practical session where ever required

## Exercise

**Key Solutions to PHB Exercises**

1. Agronomic practices for mulberry cultivation:
   Soil preparation, Planting, Irrigation, Mulching, Pruning, Pest and disease management.

2. Process of collecting soil samples:
   - Soil samples should be collected from multiple locations in the field to get a representative sample.
   - Samples should be collected at a depth of 0-15 cm using a soil auger or spade.
   - Samples should be air-dried, mixed well, and sieved to remove stones, roots, and other debris.
   - The sample should be sent to a soil testing laboratory for analysis.

3. Planting and transplanting in a mulberry garden:
   - Mulberry plants are usually transplanted from the nursery to the main field after 6-8 months of growth.
   - The planting distance varies depending on the variety and the purpose of cultivation.
   - Planting should be done during the monsoon season when there is adequate soil moisture.

4. For irrigated conditions, the S-146 variety of mulberry is considered to be one of the best choices. It is a high-yielding variety and is suitable for multiple harvests in a year.

5. Refer section 2.1.2 of PHB.
6. Refer section 2.1.2 of PHB.

# UNIT 2.2: Raising of Mulberry Plantation for Young Age and Late Age Silkworms

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Explain the technology of raising mulberry for chawki worms.
2. Describe technology for raising mulberry for late age silkworms.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing cultural practices for raising mulberry garden for chawki rearing and late age rearing. Pictures/ Posters, that can depict specific requirement of chawki garden and late age garden.

## Elaborate

- Leaf quality requirement for young age silkworms
- Leaf quality requirement for late age silkworms.
- Cultural practice for producing chawki mulberry leaf.
- Cultural practice for producing mulberry shoots.
- Mulberry leaf yield in different varieties
- Mulberry leaf yield under irrigated and rainfed conditions.
- Leaf yield under different harvest methods, leaves/ shoot

## Example

- Show different types of mulberry garden suitable for chawki and late age rearing through power point presentation and describe their features in detail.
- Show power point presentation on cultural practices followed for producing chawki and late age mulberry leaves/shoot.

## Demonstrate

Make a demonstration plot for raising chawki leaves and mulberry shoots and involve participants to:

1. Understand the cultural operations for raising mulberry garden for chawki leaves.
2. Understand raising of mulberry plants for late age rearing
3. Leaf yield in the mulberry garden.

## Activity

**Purpose:** The purpose of this activity is to understand the procedure to estimate leaf yield.
**Expected time:** 40-45 minutes
**Resources:** Mulberry garden, pen, paper
**Methodology:** Garden visit, Calculation, discussion
**Instructions:**

- Organize a field visit practical session
- Demonstrate the procedure of estimating leaf yields.
- Ask the students to calculate the leaf yield of different small plots in groups.
- After each group calculated the yield check their calculation.
- Tell them that the estimation depends on the leaf availability on the peak growth period.
- Declare the final marks based on the performance of students group.

## Say

- Sum up the key learning features of above activity. Emphasis and elaborate on important aspects of each group discussion topic.

## Notes for Facilitation

- A brief general explanation of all terms used in participant manual in the unit.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on any topic
- Encourage peer learning among participants in the class by answering other participant's questions
- Assist participants to streamline their thought process while discussing the above question
- Give award to winning group in team activity based on quality of used presentation, content relevancy, group participation etc. Ensure more pictorial presentation of learning where ever possible in classroom
- Ensure practical session where ever required

## Exercise

**Key Solutions to PHB Exercises**

1. Chawki rearing is the process of raising silkworms using young and tender mulberry leaves. The following are the agronomic practices for producing Chawki leaf:
   - Planting of mulberry should be done during June-July.
   - Before planting, the land should be ploughed and prepared with well-decomposed organic matter.
   - Mulberry is planted at a spacing of 60 cm × 30 cm.
   - The first harvest of leaves is done 40 days after planting.
   - The Chawki rearing period starts from the second harvest (60 days after planting) and continues for 30-35 days.
   - The Chawki rearing period requires a continuous supply of fresh and tender leaves.
   - The leaves are harvested in the early morning hours and transported to the rearing shed in a covered basket.
   - The leaves should be stored in a cool and humid place.

2. Mulberry shoots are produced to obtain soft, succulent, and nutritious leaves for silkworm rearing. The following are the agronomic practices for producing mulberry shoots:
   - Mulberry is planted during the months of June-July.
   - The land is prepared by ploughing and adding organic matter.
   - Mulberry is planted at a spacing of 60 cm × 30 cm.
   - The first harvest of leaves is done 40 days after planting.
   - Shoots are obtained by pruning the mulberry plant to 50-60 cm height above the ground level.
   - Shoots are harvested from 3rd month onwards.
   - The shoots are harvested in the early morning hours and transported to the rearing shed in a covered basket.

3. Under irrigated conditions, the yield of mulberry leaf is higher due to the continuous supply of water. The average yield of mulberry leaf under irrigated conditions is 30-35 tonnes per hectare per year.

   Under rainfed conditions, the yield of mulberry leaf is lower due to the irregular rainfall. The average yield of mulberry leaf under rainfed conditions is 15-20 tonnes per hectare per year. The yield can be improved by providing supplemental irrigation during the dry spell.

# UNIT 2.3: Mulberry Diseases and Pests

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Know about mulberry diseases and its control measures through integrated management.
2. Elaborate the mulberry pests and its control measures.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing various mulberry diseases and their control. Power point slides showing mulberry pests and their control.. Pictures/ Posters, that can depict the incidence of pest and diseases of mulberry plants and their control measures.

## Elaborate

- Each of the diseases infecting mulberry garden.
- Control measures for each mulberry diseases
- Leaf yield loss due to various mulberry diseases.
- Each of the pests attacking mulberry garden
- Control measures for each mulberry pests.
- Integrated mulberry disease management.
- Integrated pest management

## Example

- Show pathogens causing different mulberry diseases through microscopic slides and power point presentation and describe their features in detail.
- Show mulberry pests samples and power point presentation on control of mulberry pests.

## Field Visit

- Arrange visit to farmers field to demonstrate the occurrence of mulberry diseases and pests in the filed and control measures followed.
- The preparations of various formulations for control of mulberry diseases and pests.
- Allow the participants to prepare the formulations.

## Activity

**Purpose:** The purpose of this activity is to get to know different mulberry diseases and pests
**Expected time:** 30-40 minutes

**Resources:** pen, notebook, relevant images of different symptoms.

**Methodology:** Class activity

**Instructions:**

- Conduct a class activity session
- Show symptoms of different diseases of mulberry such as leaf spot disease, powdery mildew, leaf rust, bacterial leaf rust, stem canker etc
- Ask them to discuss about the disease, its cause and identification.
- Give time to discuss on the diseases and how they can identify these.
- Show disease pictures and ask them names and their description
- Mark the students based on their individual performance

## Say

- Sum up the key learning features of above group discussion topics. Emphasis and elaborate on important aspects of each group discussion topic.

## Ask

- Ask Participants to describe the key features of each topic in chart paper.

## Notes for Facilitation

- A brief general explanation of all terms used in participant manual in the unit.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on any topic
- Encourage peer learning among participants in the class by answering other participant's questions
- Assist participants to streamline their thought process while discussing the above question
- Give award to winning group in team activity based on quality of used presentation, content relevancy, group participation etc. Ensure more pictorial presentation of learning where ever possible in classroom
- Ensure practical session where ever required

## Exercise

**Key Solutions to PHB Exercises**

1. Chawki rearing is the process of raising silkworms using young and tender mulberry leaves. The following are the agronomic practices for producing Chawki leaf:
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   - Mulberry is planted during the months of June-July.
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# 3. Preparation for Rearing Silkworms

Unit 3.1 - Rearing Houses for Silkworm Rearing

Unit 3.2 - Disinfection of Rearing House

Unit 3.3 - Silkworm Breeds and Supply of Silkworm Eggs

Unit 3.4 - Selection of Mulberry Leaves for Young Age Rearing

AGR/N5202

## Key Learning Outcomes

**After the completion of this module, the participant will be able to:**

1. Explain the use of relevant PPE, tools and equipment such as disinfection mask, protective gumboots, sprayer, room heater, water air cooler, kerosene blowlamp, wet and dry thermometer, forceps, etc.
2. List various items and accessories required for rearing silkworms.
3. Describe the process of procuring silkworm eggs, tools, implements, equipment and other resources.
4. Explain the importance of arranging safe and hygienic transportation and storage of silkworm eggs under the recommended temperature and humidity.
5. Explain the criteria for selecting a site for the construction of the rearing house.
6. Describe the process of constructing the rearing house and the importance of ensuring adequate space and number of windows for ventilation in it.
7. Explain the importance of having temperature control equipment in the rearing house to control the temperature during unfavourable weather along with provision for making it air-tight for the purpose of disinfecting it.
8. Explain the importance of ensuring effective drainage of water in the rearing house.
9. Explain the importance and process of disinfecting and preconditioning the rearing house, tools, implements and equipment, using the recommended disinfectant.
10. Explain the importance of using the trays of recommended dimensions during the rearing of young larvae.
11. Describe the process of preparing mulberry leaves for feeding silkworms and ensuring the leaves are succulent and rich in nutrients and moisture.
12. Explain the use of a leaf preservation chamber for maintaining the freshness of mulberry leaves.

# UNIT 3.1: Rearing Houses for Silkworm Rearing

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Identify the requirement of silkworm rearing house.
2. Building plans for rearing houses of various capacity.
3. Rearing house for chawki and late age rearing.
4. Use equipment required for rearing silkworms.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster,
- Power point slides showing different types of rearing houses, building plans and equipments required for silkworm rearing, Pictures/ Posters, that can depict specific requirements for rearing young and late age silk worms and low oct rearing houses.

## Elaborate

- Environmental adjustments in rearing house for young age silkworms.
- Points to be considered while constructing rearing house for late age silkworm which includes:

1. Selection of building site
2. Orientation of building
3. Wall and roof structure of the building

- Equipment required for rearing silkworms
- Classification of equipment as recurring and non-recurring.

## Demonstrate

- With the help of available resources demonstrate different types of rearing houses such as

1. Chawki rearing house for 200-300 Dfls
2. Chawki rearing house for 500-600 Dfls
3. Chawki rearing house for 2500 Dfls

- You can refer Participants Handbook

## Notes for Facilitation

- A brief general explanation of all terms used in participant manual in the unit.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on any topic
- Encourage peer learning among participants in the class by answering other participant's questions
- Assist participants to streamline their thought process while discussing the above question
- Give award to winning group in team activity based on quality of used presentation, content relevancy, group participation etc.
- Ensure more pictorial presentation of learning where ever possible in classroom
- Ensure practical session where ever required

## Exercise

**Key Solutions to PHB Exercises**

1. Facilities required for chawki worms include a well-ventilated and hygienic room, temperature control mechanisms, trays for holding the silkworms, a chawki-rearing stand, feeding trays, and adequate mulberry leaves.

2. The requirements for rearing late age silkworms include a rearing house with a temperature control mechanism, trays for holding the silkworms, feeding trays, mulberry leaves, and adequate ventilation.

3. Some cost-effective methods for constructing a silkworm rearing house include using locally available materials such as bamboo, mud, and thatch, and incorporating natural ventilation methods such as using mosquito nets instead of windows. Proper insulation can also be achieved by using mud walls or thatch roofing.

# UNIT 3.2: Disinfection of Rearing House

## Unit Objectives

**At the end of this unit, students will be able to:**

1. Describe disinfection methods using physical and chemical methods.
2. Explain how to make rearing house and appliances pathogen free.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing preparation of disinfectants and process of disinfection by physical and chemical methods. Pictures/ Posters, that can depict the process of disinfection of rearing house and equipments by sun drying and using chemicals

## Elaborate

- Physical methods like sun drying and hot water treatment.
- Preparation of various chemicals for disinfection.
- Equipments used for disinfection and their operation.
- Disinfection of appliances used in rearing.
- Disinfection of surrounding of rearing house.
- Maintenance of hygiene in rearing house and surroundings

## Activity

**Purpose:** The purpose of this activity is to get to know the process of preparing disinfectant solution
**Expected time:** 60-90 minutes

**Resources:** pen, notebook, relevant tools and chemicals

**Methodology:** Hands on, Discussion

**Instructions:**

- Conduct a practice session
- Divide the entire class into groups, depending upon the batch strength
- Demonstrate the process of preparing 2.5% Sanitech solution
- Ask each group to perform this process under the supervision of the trainer.
- Evaluate the performance of each group on a step by step basis

## Notes for Facilitation

- Ask the participants if they have any questions.
- Encourage other participants to answer it and encourage peer learning in the class.
- Answer all the doubts made by the students in the class.
- Ask them to answer the questions given in the participant manual

## Exercise

**Key Solutions to PHB Exercises**

1. Disinfection is the process of eliminating or reducing the number of microorganisms, including pathogens, on surfaces, equipment, and other objects.
   To achieve a pathogen-free environment in silkworm rearing houses, the following steps can be taken:
   - Clean the rearing house thoroughly with soap and water.
   - Use a suitable disinfectant solution to kill any remaining microorganisms. A commonly used disinfectant in silkworm rearing is formalin.
   - Fumigate the house with formalin to kill any remaining pathogens.
   - Allow the house to dry completely before introducing silkworms.

2. To make a 2.5% sanitech solution, follow these steps:
   - Weigh out 25 grams of sanitech powder.
   - Add the powder to one liter of water.
   - Stir the solution until the powder is completely dissolved.
   - The resulting solution will be a 2.5% sanitech solution, which can be used as a disinfectant.

# UNIT 3.3: Silkworm Breeds and Supply of Silkworm Eggs

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Explain about the breeds to be reared for different season and its yield potential.
2. Describe about sheet eggs and loose eggs.
3. Get to know about Care taken during egg transportation.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing characters of different breeds and its yield potential. Pictures/ Posters, that can depict sheet eggs and loose eggs and also care during transportation of silkworm eggs.

## Elaborate

- Most popular breeds reared in India and their yield potential.
- Bivoltine, multivoltine and cross breeds.
- Breeds reared in different regions and seasons.
- Sheet eggs and loose eggs.
- Care taken during egg transportation.
- Egg transportation bags.

## Example

- Show different types of silk worm breeds reared in India through power point presentation and describe their features in detail.
- Show power point presentation on sheet eggs and loose eggs.
- Show care taken during egg transportation.

## Demonstrate

Demonstrate the use of egg sheet and loose eggs and their transportation.

1. Yield potential of different silk worm breeds
2. Sheet eggs and loos eggs.
3. Egg Transportation.

## Team Activity

Divide the class into three teams. Assign one topic to each group from below list. No team should be given the same topic. Give sufficient time for teams to refer to the text in participants manual related to assigned topic and discuss among them. Facilitate the team members to answer any query related to topics. After this each team will take their turn and present the assigned topic.
At the end of three rounds of discussion ask each team to suggest other teams pointers that they have missed while discussing on their chosen topic.

1. Silk worm breeds and yield potential.
2. Sheet eggs and loose eggs.
3. Egg transportation.

## Say

- Sum up the key learning features of above group discussion topics. Emphasis and elaborate on important aspects of each group discussion topic.

## Notes for Facilitation

- A brief general explanation of all terms used in participant manual in the unit.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on any topic
- Encourage peer learning among participants in the class by answering other participant's questions
- Ensure more pictorial presentation of learning where ever possible in classroom
- Ensure practical session where ever required

## Exercise

**Key Solutions to PHB Exercises**

1. Refer table 3.3.1 of PHB.
2. Silkworm eggs are transported safely by using insulated packaging materials, sealing containers, labeling, fast transportation, and monitoring environmental conditions.
3. Sheet eggs are laid on large paper sheets and are compact, durable, and preferred for commercial production.
   Loose eggs are individual eggs not attached to a sheet, smaller, delicate, and mainly used for local breeding.

# UNIT 3.4: Selection of Mulberry Leaves for Young Age Rearing

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Explain the agronomical practice for chawki mulberry garden.
2. The quality and quantity of mulberry leaf required for chawki rearing

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing cultural practices for raising mulberry garden for chawki rearing, quantity and quality of leaf for young age worms. Pictures/ Posters, that can depict specific requirement of chawki garden.

## Elaborate

- Cultural practice for producing chawki mulberry leaf.
- Leaf quality requirement for young age silkworms
- Leaf quality requirement for late age silkworms.
- Feeding frequency of chawki larvae.
- Mulberry leaf preservation for chawki worms.

## Example

- Show different types of mulberry garden suitable for chawki rearing through power point presentation and describe their features in detail.
- Show power point presentation on leaf preservation, feeding quantum, quality and spacing for chawki worms.

## Demonstrate

Make a demonstration plot for raising chawki leaves and involve participants to

1. Understand the cultural operations for raising mulberry garden for chawki leaves.
2. Chawki leaf feeding quantity, quality and frequency of feeding.
3. Understand the leaf preservation methods
4. Leaf yield in the mulberry garden.

## Activity

**Purpose:** The purpose of this activity is to Understand about pruning method of chawki mulberry garden.
**Expected time:** 60-90 minutes

**Resources:** pen, notebook, relevant tools

**Methodology:** Demonstration, group presentation

**Instructions:**

- With the help of available resources demonstrate the process of pruning method for chawki mulberry garden
- Divide the entire class into groups, depending upon the batch strength
- Ask each group to present Infront of others what they have learnt.
- Declare the final marks based on the performance of individual groups

## Notes for Facilitation

- Ask the participants if they have any questions.
- Encourage other participants to answer it and encourage peer learning in the class.
- Answer all the doubts made by the students in the class.
- Ask them to answer the questions given in the participant manual

## Exercise

**Key Solutions to PHB Exercises**

1. Refer section 4.1.1 of PHB.
2. Harvested mulberry leaves/ shoot lets must be preserved in a clean germ free area under high humidity and low temperature. For preservation of small quantity of mulberry leaves earthen pots buried in wet sand is ideal and cheaper. For large quantity of leaf preservation wooden leaf chamber covered with wet gunny cloth can be used. The length of leaf preservation should not exceed 12 hrs and leaves should be periodically turned to avoid fermentation and deterioration of leaf quality. In summer sprinkling of water on the leaves and frequent wetting of gunny cloth covering on the leaf chamber is good.

## Notes

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# 4. Process of Hatching Silkworm Eggs (Incubation) and Rearing Larvae

Unit 4.1 - Incubation of Silkworm Eggs

Unit 4.2 - Young Silkworm Rearing Technology

Unit 4.3 - Mulberry Leaves/Shoots for Late Age Silkworm Rearing

AGR/N5203

## Key Learning Outcomes

**After the completion of this module, the participant will be able to:**

1. Explain the importance of preserving the silkworm eggs in an earthen pot for the recommended duration prior to incubation.
2. Explain the importance of maintaining the silkworm eggs in a dark storage area at the head pigmentation stage and exposing them to light at the appropriate time.
3. Explain the use of a net of the recommended mesh size for feeding the larvae.
4. Explain the importance of feeding the larvae with the recommended quantity of tender and uniformly-chopped mulberry leaves, and ensuring the leaves are rich in nutrients and moisture.
5. State the recommended feeding schedule to be followed for the optimum growth of larvae.
6. Explain the importance and process of maintaining cleanliness in the rearing bed.
7. Explain the recommended practices to be followed to prevent insects from coming to the rearing bed.
8. State the recommended temperature and humidity, and space to be maintained on the rearing bed.
9. State the recommended duration for maintaining larvae in the rearing bed until their development into pupae.
10. Explain how to detect moulting in larvae.
11. Explain the importance and ways of maintaining the recommended temperature and humidity in the rearing bed under different climatic conditions.
12. Explain the importance of stopping or resuming feeding of larvae during moulting for the uniform growth of silkworms, and maintaining the rearing bed thin and dry.
13. Describe the process of moulting of larvae and the importance of ensuring no disturbance to them during the process.
14. Explain the different stages of growth of larvae and the terminology used to refer to them.
15. Explain the importance of using mulberry leaves of medium maturity or coarse leaves according to the stages of growth of larvae.
16. Explain how to identify mature mulberry leaves and the importance of not using them to prevent disease outbreaks.
17. Explain the use of the recommended rearing bed disinfectants.

# UNIT 4.1: Incubation of Silkworm Eggs

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Describe the incubation methods for silkworm eggs.
2. Explain the optimal environmental conditions for incubation.
3. Elaborate the brushing of sheet eggs and loose eggs

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing different incubation devices for silkworm eggs, black boxing of eggs and process of brushing. Pictures/ Posters, that can depict specific environmental requirements for incubation of eggs.

## Elaborate

- What is incubation of silkworm eggs.
- Methods of egg incubation.
- Environmental conditions required for incubation.
- Incubation of sheet eggs and loose eggs.
- Black boxing of silkworm eggs.
- Brushing of sheet eggs and loose eggs.
- Postponement of brushing.

## Example

- Show different incubation devices through power point presentation and describe their features in detail.
- Show power point presentation on black boxing of silkworm eggs and brushing of silkworm eggs.

## Demonstrate

With the help of available resources Demonstrate the following

- Incubation frames
- Hatched eggs
- Black boxing of eggs
- Loose egg box
- Incubation of loose eggs
- Brushing of loose eggs

## Activity

**Purpose:** The purpose of this activity is to learn about the process of incubating silkworm eggs and to understand the importance of maintaining proper environmental conditions for successful hatching.

**Expected Time:** 2-2.5 hrs

**Resources Needed:** Silkworm eggs, Incubator, Thermometer, Humidity meter, Distilled water, Spray bottle, Marker, Egg trays or containers

**Methodology:** Demonstration, Hands on

**Expected Outcome:** By the end of this activity, participants should have learned about the process of maintaining proper environmental conditions for successful hatching.

**Instructions:**

- Start by acquiring silkworm eggs from a reputable supplier.
- Set up the incubator according to the manufacturer's instructions and ensure that the temperature and humidity are at the correct levels.
- Place the silkworm eggs carefully in the egg trays or containers provided, making sure not to jostle them too much.
- Use a marker to label the trays or containers with the date the eggs were placed in the incubator.
- Tell the participants it will take around 1-2 weeks for the eggs to hatch depending on the temperature and humidity level in the incubator.

## Notes for Facilitation

- Ask the participants what they have learnt from the activity.
- Encourage other participants to answer it and encourage peer learning in the class.
- Answer all the doubts made by the students in the class.
- Ask them to answer the questions given in the participant handbook

## Exercise

**Key Solutions to PHB Exercises**

1. The devices used for incubation of silkworm eggs include incubators, bamboo baskets, and trays made of plastic or metal. Incubators are temperature-controlled devices that provide optimal conditions for egg hatching, while bamboo baskets and trays are used for manual incubation.

2. Incubation is the process of providing optimal environmental conditions for the development of eggs. The environmental requirements for good hatching include a temperature range of 23-28°C, humidity of 75-85%, and proper ventilation. Additionally, the eggs should be protected from direct sunlight, predators, and disease.

3. Brushing loose eggs is a process of removing unfertilized, dead, or unhealthy eggs from the healthy ones. This helps to prevent the spread of disease and ensures a higher hatching rate. The procedure involves gently brushing the eggs with a soft-bristled brush, sorting them based on their health, and discarding the unhealthy ones.

4. Incubation plays a crucial role in getting good hatching rates because it provides optimal environmental conditions for the development of eggs. Proper incubation ensures that the eggs receive the required temperature, humidity, and ventilation, which are essential for the development of healthy silkworms. Additionally, brushing loose eggs and removing unhealthy ones during incubation helps to prevent the spread of disease and ensure a higher hatching rate.

# UNIT 4.2: Young Silkworm Rearing Technology

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Know about the young age silkworm rearing technology,
2. Environmental requirement for young silkworms.
3. Types of young age rearing.
4. Transportation of chawki worms.
5. Explain the operation and management of CRC.
6. Explain the economics of running a private CRC.
7. Explain the quality and quantity of mulberry leaves required for chowki rearing.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing rearing of young age silkworms, bed cleaning, spacing, use of bed disinfectants and moulting care. Pictures/ Posters, that can depict specific requirement of chawki larvae.

## Elaborate

- On young age silkworm rearing technology.
- Methods of Young age silkworm rearing.
- Maintenance of environmental conditions for young age silkworms.
- Cleaning of rearing beds.
- Moulting care for young age silkworms.
- Application of bed disinfectants.
- Transportation of chawki worms.

## Example

- Show different methods of chawki rearing, feeding schedules, moulting care, use of bed disinfectants and transportation of young age silkworms through power point presentation and describe their features in detail.

## Activity

**Purpose:** The purpose of this activity is to introduce participants to different types of rearing methods used.

**Expected Time:** 60 minutes

**Resources:** Pictures of different types of rearing methods, Whiteboard and markers or a digital whiteboard, Handouts with information about each rearing method

**Methodology:** Presentation, group discussion

**Expected Outcome:** By the end of this activity, participants will be able to

- Identify different types of rearing methods
- Understand the benefits and drawbacks of each method
- Compare and contrast different rearing methods

**Instructions:**

- Begin by introducing the topic of rearing and explaining the different types of rearing methods that will be covered in this activity.
- Present pictures of each type of rearing method and provide a brief explanation of the benefits and drawbacks of each method.
- Lead a group discussion about the different types of rearing methods, encouraging learners to share their thoughts, questions, and opinions.
- Participants will be divided into small groups, and each group will be given a handout with detailed information about one of the rearing methods. They will read and discuss the information and answer the questions provided.
- Each group will share their findings with the larger group, and together, they will compare and contrast the different rearing methods.

## Do

- Summarize the key points discussed during the activity and ask learners to reflect on what they have learned.

## Notes for Facilitation

- Ask the participants if they have any questions.
- Encourage other participants to answer it and encourage peer learning in the class.
- Answer all the doubts made by the students in the class.
- Ask them to answer the questions given in the participant manual

## Exercise

**Key Solutions to PHB Exercises**

1. The technology for young silkworm rearing involves creating a suitable environment for the young silkworms to thrive. This includes providing them with the appropriate temperature, humidity, and ventilation, as well as a steady supply of fresh mulberry leaves for feeding. The silkworms are usually reared in trays or on racks that are placed in a controlled environment, such as a room or a chamber.

2. The environmental requirements for rearing young silkworms include maintaining a temperature of around 25-30°C and a relative humidity of around 75-85%. Proper ventilation is also necessary to ensure that the air inside the rearing chamber is not stagnant. The rearing area should be kept clean and free from pests, and a continuous supply of fresh mulberry leaves should be provided.

3. Chawki worms transportation refers to the process of transporting young silkworms (chawki worms) from the egg-laying units to the rearing units. This process is usually done manually, and care must be taken to ensure that the silkworms are not damaged or stressed during transportation. The chawki worms are usually transported in small boxes or baskets, and the temperature and humidity conditions must be maintained during transportation.

4. Commercial Chawki Rearing Centres are usually organized with the aim of producing healthy and high-quality silkworms.The centers usually maintain a controlled environment with the required temperature, humidity, and ventilation, and the chawki worms are fed with fresh and clean mulberry leaves.

5. The cultural practices followed in mulberry gardens for Chawki Rearing Centres involve the careful management of mulberry trees to ensure a steady supply of fresh and healthy leaves for feeding the chawki worms. This includes regular pruning, fertilization, and irrigation, as well as the use of pest control measures to prevent damage to the trees.

6. Harvested mulberry leaves/ shoot lets must be preserved in a clean germ free area under high humidity and low temperature. For preservation of small quantity of mulberry leaves earthen pots buried in wet sand is ideal and cheaper. For large quantity of leaf preservation wooden leaf chamber covered with wet gunny cloth can be used. The length of leaf preservation should not exceed 12 hrs and leaves should be periodically turned to avoid fermentation and deterioration of leaf quality. In summer sprinkling of water on the leaves and frequent wetting of gunny cloth covering on the leaf chamber is good.

# UNIT 4.3: Mulberry Leaves/Shoot for Late Age Silkworm Rearing

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Elaborate the characteristics of late age silkworms.
2. Explain the quality, quantity and frequency of feeding mulberry leaves to late age silkworms.
3. Describe the leaf preservation of mulberry shoots.
4. Explain the role of different methods of late season silkworm rearing.
5. Explain the role of environmental conditions on late maturing silkworms.
6. Describe the Importance of Shoot Cultivation.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing cultural practices for late age rearing, quality, quantity and feeding frequency in late age silkworms. Pictures/ Posters, that can depict specific requirement for late age silkworms like maturity of mulberry leaves/shoot etc

## Elaborate

- Characteristics of late age silkworms,
- Leaf quality requirement for late age silkworms.
- Estimation of leaf yield in a mulberry plot.
- Leaf/shoot quality, quantity and maturation during different seasons
- Leaf transportation and preservation for late age silkworms.

## Demonstrate

With the help of available resources demonstrate the following:

- Thinning of mulberry shoots
- Mulberry shoot harvesting
- Shoot preservation
- Feeding in shoot rearing rack

## Team Activity

Divide the class into two teams. Assign one topic to each group from below list. No team should be given the same topic. Give sufficient time for teams to refer to the text in participants manual related to assigned topic and discuss among them. Facilitate the team members to answer any query related to topics. After this each team will take their turn and present the assigned topic.

At the end of two rounds of discussion ask each team to suggest other teams pointers that they have missed while discussing on their chosen topic.

1. Characteristics of late age silk worms
2. Cultural operations for raising mulberry garden for late age rearing.
3. Estimation of leaf yield in a mulberry plot.
4. Leaf transportation and preservation.

## Say

- Sum up the key learning features of above group discussion topics. Emphasis and elaborate on important aspects of each group discussion topic.

## Ask

- Ask Participants to describe the key features of each topic in chart paper.

## Notes for Facilitation

- A brief general explanation of all terms used in participant manual in the unit.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on any topic
- Encourage peer learning among participants in the class by answering other participant's questions
- Assist participants to streamline their thought process while discussing the above question
- Give award to winning group in team activity based on quality of used presentation, content relevancy, group participation etc.
- Ensure more pictorial presentation of learning where ever possible in classroom
- Ensure practical session where ever required

## Exercise

**Key Solutions to PHB Exercises**

1. Late season silkworm can be reared using different methods such as indoor rearing, outdoor rearing, and combined indoor-outdoor rearing. In indoor rearing, temperature and humidity are controlled, and silkworms are kept in trays or racks. Outdoor rearing involves keeping silkworms in baskets or frames, and they feed on mulberry leaves from the field. In combined indoor-outdoor rearing, silkworms are kept indoors during the early stages and transferred outdoors for feeding in the later stages.

2. Environmental conditions such as temperature, humidity, and ventilation play a crucial role in the growth and development of late silkworm. Optimum temperature ranges from 25 to 30°C, and relative humidity should be maintained between 75% to 85%. Proper ventilation is necessary to prevent the accumulation of toxic gases such as carbon dioxide.

3. Larval protection measures for late silkworms include proper sanitation of rearing house, maintaining proper temperature and humidity, removing diseased or dead larvae, providing adequate ventilation, using disinfectants to control bacterial and fungal infections, and avoiding overcrowding.

4. Late age silkworms have characteristics such as large size, heavy weight, high silk productivity, and fast growth rate. They require more food and care than early-stage silkworms.

5. The technology for late age silkworm rearing involves maintaining optimal environmental conditions, feeding high-quality mulberry leaves, providing adequate space for larval growth, and timely disease control. Artificial diets can also be used to supplement mulberry leaves.

6. Leaf preservation method for late age silkworms involves the preservation of fresh mulberry leaves using different techniques such as drying, freezing, and ensiling. Dried leaves can be stored for an extended period and rehydrated before feeding to silkworms. Frozen leaves can be thawed and used as needed. Ensiled leaves are preserved by acidification and can be stored for several months without losing their nutritional value.

## Notes

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# 5. Pest and Disease Management

Unit 5.1 - Silkworm Diseases and Management

Unit 5.2 - Pests and Management

AGR/N5203

## Key Learning Outcomes

**After the completion of this module, the participant will be able to:**

1. Explain the importance of maintaining cleanliness along with appropriate temperature and humidity in the rearing house.
2. State the recommended treatment to be applied in the rearing house to prevent pests and disease.
3. Explain the use of relevant PPE.
4. Explain the recommended practices to be followed to prevent infestation by silkworm pests such as beetles, ants, straw mites, vertebrate predators, etc.
5. List the signs of pests and disease infestation in silkworms.
6. Explain importance and process of coordinating with an approved laboratory to determine diseases and disorders in silkworms.
7. Describe the process of quarantining the unhealthy silkworms and treating them with the treatment prescribed by the laboratory.
8. List the signs of recovery in unhealthy silkworms.
9. Explain the importance and process of maintaining the record of treatment used to treat silkworms.
10. Describe the process of identifying, segregating and disposing the moribund and dead silkworm.

# UNIT 5.1: Silkworm Diseases and Management

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Know about the silkworm diseases and its control measures.
2. Learn about integrated management of silkworm diseases

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing silkworm diseases and its control measures. Pictures/ Posters, that depict integrated management of diseases in silkworms

## Elaborate

- List out the major silkworm diseases and the pathogns.
- Control measures for silkworm diseases.
- Preparation of chemical and biological formulations.
- Role of hygiene and disinfection in control of silkworm diseases
- What is integrated disease management.

## Demonstrate

- Show different silkworm diseases and their pathogens through microscopic slides and power point presentation and describe their features in detail.
- Show power point presentation control measures used to prevent occurrence of silkworm diseases.

## Explain

- Why Pebrine is known as one of the most destructive diseases of silkworms?
- Source of infection and symptoms for Pebrine
- How does Muscardine and Aspegillosis cause and how the fungi infect the larva?

## Team Activity

Divide the class into three teams. Assign one topic to each group from below list. No team should be given the same topic. Give sufficient time for teams to refer to the text in participants manual related to assigned topic and discuss among them. Facilitate the team members to answer any query related to topics. After this each team will take their turn and present the assigned topic.
At the end three rounds of discussion, ask each team to suggest other teams pointers that they have missed while discussing on their chosen topic. Some topics could be:

1. Trans ovarial diseases in silkworms
2. Viral diseases in silkworms.
3. Bacterial and fungal diseases in silkworms.

## Notes for Facilitation

- A brief general explanation of all terms used in participant manual in the unit.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on any topic
- Encourage peer learning among participants in the class by answering other participant's questions
- Assist participants to streamline their thought process while discussing the above question
- Give award to winning group in team activity based on quality of used presentation, content relevancy, group participation etc.
- Ensure more pictorial presentation of learning where ever possible in classroom
- Ensure practical session where ever required

## Exercise

**Key Solutions to PHB Exercises**

1. Major silkworm diseases include:
   - Pebrine: It is one of the most destructive disease of silkworms and is charecterized by trans-ovarial transmission from mother moths to off-spring.
   - Grasserie: Grasserie or the milky disease is a major viral silkworm disease
   - caused by nuclear polyhedral virus.
   - Flacherie: Flacherie is a syndrome associated with infectious flascherie, densonucleosis, cyto plasmic polyhedrosis and bacterial flacherie.
   - Muscardine and aspegillosis: These are two fungal diseases prevalent during winter and rainy season. Muscardine is caused by the fungus Beauveria bassiana and aspergillosis by Aspergillus flavus.

# UNIT 5.2: Pests and Management

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Explain about the various pests infesting silkworms and silkworm cocoons.
2. Describe the integrated pest control methods.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing silkworm pests causing damage to silkworms and their management. Pictures/ Posters, that can depict integrated pest management.

## Elaborate

- The incidence of silkworm pests.
- Integrated management of pests in silkworms.
- Protection measures to be employed to prevent pests.

## Example

- Show example of silkworm pests through power point presentation and describe their features
- Show power point presentation on integrated control of pests in silkworms.

## Demonstrate

Make a demonstration of pests infesting silkworms and involve participants to

1. To identify the pests.
2. Preparation of chemical formulations for preventing pests.
3. Preparation of biological control measures to prevent pests

## Team Activity

- Divide the class into three teams. Assign one topic to each group from below list. No team should be given the same topic. Give sufficient time for teams to refer to the text in participants manual related to assigned topic and discuss among them.

Facilitate the team members to answer any query related to topics. After this each team will take their turn and present the assigned topic.
At the end of three rounds of discussion ask each team to suggest other teams pointers that they have missed while discussing on their chosen topic. Some of them could be:

1. Pests of silkworms
2. Integrated management of silkworm pests.
3. Biological control of pests.

## Say

- Sum up the key learning features of above group discussion topics. Emphasis and elaborate on important aspects of each group discussion topic.

## Notes for Facilitation

- A brief general explanation of all terms used in participant manual in the unit.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on any topic
- Encourage peer learning among participants in the class by answering other participant's questions
- Assist participants to streamline their thought process while discussing the above question
- Give award to winning group in team activity based on quality of used presentation, content relevancy, group participation etc.
- Ensure more pictorial presentation of learning where ever possible in classroom
- Ensure practical session where ever required

## Exercise

**Key Solutions to PHB Exercises**

1. Major silkworm pests include Uzi fly, Dermatised beetles, Ants, Lizards, Rats, Birds, and Squirrels.
2. Integrated Pest Management (IPM) is a holistic approach to pest management that focuses on using multiple pest control techniques to minimize the impact of pests while minimizing the use of harmful chemicals.

## Notes

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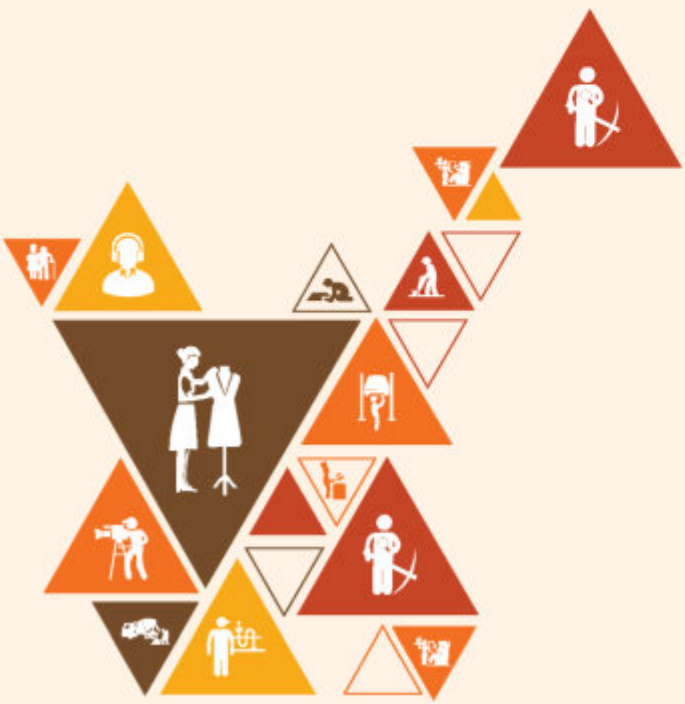
# 6. Pupa Handling, Harvesting and Cocoon Processing, and Marketing Activities

Unit 6.1 - Silkworm Mountages and Mounting Methods

Unit 6.2 - Cocoon Harvesting, Transportation, and Marketing

Unit 6.3 - Economics of Sericulture

Unit 6.4 - Mechanization in Sericulture



AGR/N5204

## Key Learning Outcomes

**After the completion of this module, the participant will be able to:**

1. Explain the importance of ensuring adequate space on mountage to allow pupae to spin cocoon.
2. Explain the importance of positioning the mountage appropriately to prevent staining of cocoons by pupae's urine.
3. Describe the process of identifying and removing the unhealthy and dead pupae from the mountage.
4. State the recommended temperature, humidity and light exposure to be maintained during thecocoon spinning process.
5. Explain the recommended practices to be followed to prevent attack by predatory ants during the spinning process.
6. Explain how to achieve uniform spinning of cocoons.
7. State the appropriate time and stage for transferring the pupae to mountage.
8. State the recommended number of pupae to be maintained on the mountage.
9. Explain the importance and need of maintaining the mountage under shade and good ventilation.
10. Explain the importance and ways of controlling fluctuations in humidity to prevent thinning and thickening of silk filament.
11. List the signs of maturity of pupae such as colour and hardness.
12. State the appropriate time, and process of harvesting the cocoons.
13. Describe the process of exposing the cocoons to heat or steam via sunlight exposure or boiling, and undertaking the reeling process to separate and obtain raw silk fibre from them.
14. Explain how to identify, connect and negotiate with the potential buyers of raw fibre silk and cocoons.
15. State the appropriate packing material to be used to pack raw silk fibre and cocoons.
16. Explain the relevant labelling requirements.
17. Explain use of different types of e-payment methods.
18. Explain the importance of maintaining the record of sales and payments.

# UNIT 6.1: Silkworm Mountages and Mounting Methods

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Describe the features of a good mountage for silkworms.
2. Identify the mature larvae ready for spinning.
3. Get to know the different mountages used in the field.
4. Explain the methods of mounting silkworms.
5. Elaborate the role of environmental factors on cocoon quality.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing different mountages used, identification of mature larvae for spinning, Pictures/ Posters, that can depict specific environmental requirements during spinning for producing quality cocoons.

## Elaborate

With the help of PHB and suitable audio visual aids, elaborate:

- Features of a good mountage for silkworms
- Different mountages used for mounting silkworms.
- Identification of a mature larvae for spinning.
- Different mounting methods.
- Optimum environmental requirements for spinning quality cocoons

## Demonstrate

- Show different types of mountages used and methods of mounting through power point presentation and describe their features in detail.
- Show power point presentation on improving cocoon quality.

## Activity

**Purpose:** The purpose of this activity is to learn about silkworm mountages and the different mounting methods used to preserve them.

**Expected Time:** This activity should take approximately 1-2 hours to complete.

**Resources Needed:** Silkworm specimens, Mounting pins, Mounting boards, Insect pins, Labels, Magnifying glass

**Methodology:** Demonstration, hands on, discussion

**Expected Outcome:** By the end of this activity, participants should have a better understanding of silkworm mountages and the different mounting methods used to preserve them. They should also have practiced mounting their own specimens and be able to label and display them properly.

**Instruction:**

- Start by introducing the topic of silkworm mountages and the importance of proper mounting techniques. Discuss the different types of silkworm specimens that can be mounted and the different mounting methods used to preserve them.
- Demonstrate the mounting process using one or two silkworm specimens as examples. Show the participants how to properly pin and label their specimens.
- Provide participants with their own silkworm specimens, mounting pins, boards, and labels. Allow them to practice mounting their specimens under supervision.
- Discuss the different mounting methods used to preserve silkworm specimens, such as dry mounting and wet mounting. Ask participants which method they prefer and why.

## Notes for Facilitation

- A brief general explanation of all terms used in participant manual in the unit.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on any topic
- Encourage peer learning among participants in the class by answering other participant's questions
- Assist participants to streamline their thought process while discussing the above question
- Give award to winning group in team activity based on quality of used presentation, content relevancy, group participation etc.
- Ensure more pictorial presentation of learning where ever possible in classroom
- Ensure practical session where ever required

## Exercise

**Key Solutions to PHB Exercises**

1. Late season silkworm can be reared using different methods such as indoor rearing, outdoor rearing, and combined indoor-outdoor rearing. In indoor rearing, temperature and humidity are controlled, and silkworms are kept in trays or racks. Outdoor rearing involves keeping silkworms in baskets or frames, and they feed on mulberry leaves from the field. In combined indoor-outdoor rearing, silkworms are kept indoors during the early stages and transferred outdoors for feeding in the later stages.

2. Environmental conditions such as temperature, humidity, and ventilation play a crucial role in the growth and development of late silkworm. Optimum temperature ranges from 25 to 30°C, and relative humidity should be maintained between 75% to 85%. Proper ventilation is necessary to prevent the accumulation of toxic gases such as carbon dioxide.

3. Larval protection measures for late silkworms include proper sanitation of rearing house, maintaining proper temperature and humidity, removing diseased or dead larvae, providing adequate ventilation, using disinfectants to control bacterial and fungal infections, and avoiding overcrowding.

4. Late age silkworms have characteristics such as large size, heavy weight, high silk productivity, and fast growth rate. They require more food and care than early-stage silkworms.

5. The technology for late age silkworm rearing involves maintaining optimal environmental conditions, feeding high-quality mulberry leaves, providing adequate space for larval growth, and timely disease control. Artificial diets can also be used to supplement mulberry leaves.

6. Leaf preservation method for late age silkworms involves the preservation of fresh mulberry leaves using different techniques such as drying, freezing, and ensiling. Dried leaves can be stored for an extended period and rehydrated before feeding to silkworms. Frozen leaves can be thawed and used as needed. Ensiled leaves are preserved by acidification and can be stored for several months without losing their nutritional value.

# UNIT 6.2: Cocoon Harvesting, Transportation and Marketing

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Describe the correct time for harvesting of cocoons.
2. Find out what are defective cocoons and how they are formed and measures to reduce defective cocoons.
3. Assessment of cocoons to find out the cocoon quality

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing maturation of pupae, harvesting methods and assessment of cocoons. Pictures/ Posters, that can depict specific conditions to reduce defective cocoons.

## Elaborate

- Proper time for harvesting of cocoons.
- What are defective cocoons and how to avoid them
- Cocoon harvesting methods
- Procedure for assessment of cocoons.

## Example

- Show maturation of pupae, cocoon harvesting, and assessment of cocoons through power point presentation and describe their features in detail.
- Show power point presentation to provide optimum conditions to avoid defective cocoons

## Demonstrate

Demonstrate harvesting of cocoons and involve participants to identify

- Maturation of pupae
- Harvesting methods from different mountages.
- Assessment of cocoons.

## Team Activity

Divide the class into four teams. Assign one topic to each group from below list. No team should be given the same topic. Give sufficient time for teams to refer to the text in participants manual related to assigned topic and discuss among them. Facilitate the team members to answer any query related to topics. After this each team will take their turn and present the assigned topic.

At the end of four rounds of discussion ask each team to suggest other teams pointers that they have missed while discussing on their chosen topic.

1. Maturation of pupae.
2. Harvesting methods
3. Assessment of cocoons
4. Defective cocoons.

## Explain

- Explain the harvesting and deflossing which is the process of sorting of cocoons
- Types of defective cocoons such as:
  - ✓ Melted cocoons
  - ✓ Double cocoons
  - ✓ Flimsy/thin shell cocoons
  - ✓ Deformed cocoons
  - ✓ Pierced cocoons
  - ✓ Pressed cocoons
  - ✓ Thin end cocoons
  - ✓ Stained cocoons
  - ✓ Multi-layered cocoons
- Procedure for calculation of defective cocoon percentage
- Transportation and marketing of cocoons

## Notes for Facilitation

- Ask the participants if they have any questions.
- Encourage other participants to answer it and encourage peer learning in the class.
- Answer all the doubts made by the students in the class
- Ask them to answer the questions given in the participant manual

## Exercise

**Key Solutions to PHB Exercises**

1. Process of cocoon: Silkworm larvae feed on mulberry leaves, spin cocoon by secreting silk fibers, pupate inside the cocoon. Cocoon is then placed in hot water to soften silk fibers, which are unwound, washed, and processed into silk fabric.
2. Mechanism for transportation of cocoon for commercial purpose: Harvest cocoons, sort by size and quality, pack in boxes, transport to silk processing facility, store until ready to process.

3. Types of defective cocoons such as:
    - Melted cocoons
    - Double cocoons
    - Flimsy/thin shell cocoons
    - Deformed cocoons
    - Pierced cocoons
    - Pressed cocoons
    - Thin end cocoons
    - Stained cocoons
    - Multi-layered cocoons

4. Refer section 6.2.6 of PHB.

# UNIT 6.3: Economics of Sericulture

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Describe the economics of silkworm rearing:

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing sericultural economics from different level of farming.. Pictures/ Posters, that can depict specific requirement for improving return from silkworm rearing.

## Elaborate

- Different economic model for silkworm rearing.
- Economics of silkworm rearing in rainfed and irrigated garden
- Economics of silkworm rearing from rearing productive silkworm breeds.
- Methods to improve productivity, cocoon quality and higher return

## Example

- Show different working models of farming through power point presentation and describe their features in detail.
- Show power point presentation on improving cocoon quality and higher return.

## Demonstrate

Visit farmers of different economic models and assess the economic return and ask the participants to calculate the economics of silkworm of rearing from farmer's data.

1. Understand the cultural operations for raising mulberry garden for chawki leaves.
2. Understand raising of mulberry plants for late age rearing
3. Leaf yield in the mulberry garden.

## Team Activity

Divide the class into four teams. Assign one topic to each group from below list. No team should be given the same topic. Give sufficient time for teams to refer to the text in participants manual related to assigned topic and discuss among them.

Facilitate the team members to answer any query related to topics. After this each team will take their turn and present the assigned topic.
At the end of four rounds of discussion ask each team to suggest other teams pointers that they have missed while discussing on their chosen topic.

1. Economics of rearing Cross breed dfls in one acre of M5 mulberry garden by leaf rearing
2. Economics of rearing Bivoltine silkworm hybrids in one acre of M5 mulberry garden by shoot feeding.
3. Economics of rearing Bivoltine pure Dfls in one acre of V1 mulberry garden shoot feeding
4. Economics of rearing Improved Bivoltine hybrids in one ha of V1 mulberry garden by shoot rearing.

## Say

- Sum up the key learning features of above group discussion topics. Emphasis and elaborate on important aspects of each group discussion topic.

## Notes for Facilitation

- A brief general explanation of all terms used in participant manual in the unit.
- Encourage participants of group discussion to ask questions so that they can clear their doubts (if any) on any topic
- Encourage peer learning among participants in the class by answering other participant's questions
- Assist participants to streamline their thought process while discussing the above question
- Give award to winning group in team activity based on quality of used presentation, content relevancy, group participation etc.
- Ensure more pictorial presentation of learning where ever possible in classroom
- Ensure practical session where ever required

## Exercise

**Key Solutions to PHB Exercises**

1. Refer section 5.5.2, 5.5.3, and 5.5.4 of PHB

# UNIT 6.4: Mechanization in Sericulture

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Explain the use of machines for various activities of mulberry cultivation and silkworm rearing to reduce the labor cost.

## Resources

- Participants Handbook, Pens/Pencils, Sticky Notes, Notepad, Computer, Projector, White Board, Flip chart/ Paper, Marker, duster
- Power point slides showing machines used in mulberry cultivation and silkworm rearing. Pictures/ Posters, that can depict he operation of equipments used in sericulture to reduce labor.

## Elaborate

- What is mechanization.
- Importance of mechanization in reducing labor i
- Mechanization in agriculture.
- Mechanization in mulberry cultivation.
- Mechanization in silkworm rearing.
- Mechanization in application of chemicals.

## Demonstrate

- Show different types of machines used in mulberry cultivation through power point presentation and describe their features in detail.
- Show power point presentation on mechanization in silkworm rearing.

## Explain

- Explain in detail various myths disproved in relation to mechanization which includes:
- Tractors, combines and other heavy machinery will displace labour
- Heavy machines are not suitable for small and medium farmers
- Each change in mechanization must be justified solely by economics
- Agriculture sector can utilize all the surplus untrained and possibly un-trainable people

## Activity

**Purpose:** The purpose of this activity is to introduce participants to the benefits and techniques of mechanization in silkworm rearing.

**Expected Time:** 90-120 minutes

**Resources:** Silkworm eggs or larvae, Silkworm rearing trays, Mechanized feeding and cleaning equipment, Silkworm food (mulberry leaves or artificial diet), Sterilization equipment, Personal protective equipment

**Methodology:** Demonstration and Hands-On

**Expected Outcome:** Participants will gain an understanding of how mechanization can improve the efficiency and productivity of silkworm rearing. They will be able to use mechanized feeding and cleaning equipment to raise silkworms and prepare their food.

**Instructions:**

- The facilitator will introduce the concept of mechanization in silkworm rearing and explain the benefits of using mechanized equipment.
- The facilitator will demonstrate how to set up and use mechanized feeding and cleaning equipment. They will also demonstrate how to sterilize equipment and prepare silkworm food.
- Participants will be provided with silkworm eggs or larvae and silkworm rearing trays. They will practice using mechanized equipment to feed and clean the silkworms and prepare their food.
- Participants will discuss their experiences using mechanized equipment and the benefits they observed.
- The facilitator will summarize the key points of the activity and answer any remaining questions.

## Notes for Facilitation

- Ask the participants if they have any questions.
- Encourage other participants to answer it and encourage peer learning in the class.
- Answer all the doubts made by the students in the class
- Ask them to answer the questions given in the participant manual

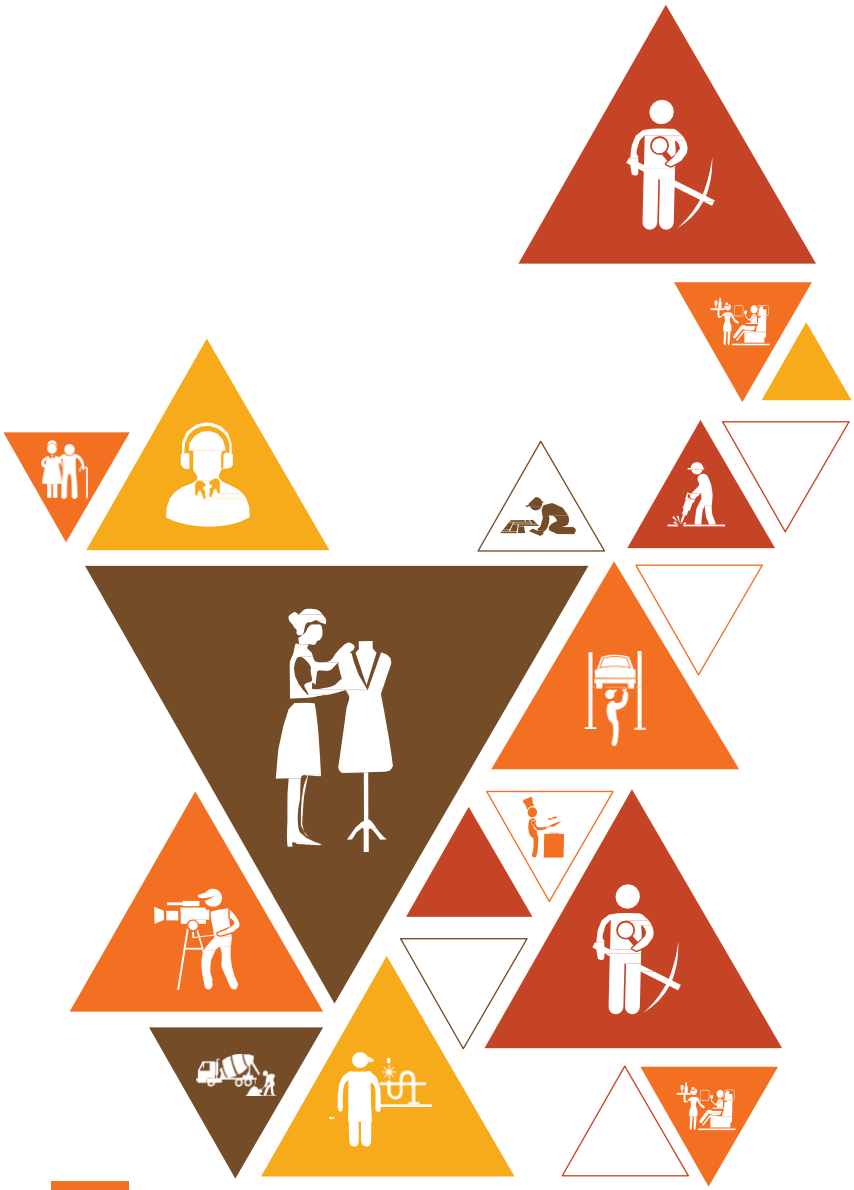
## Exercise

**Key Solutions to PHB Exercises**

1. The machines used in Mulberry farming include mulberry harvester, pruning shears, hedge trimmers, and mulberry chopper.

2. The machines used in silkworm rearing include egg incubators, silkworm rearing trays, temperature and humidity controllers, and silkworm cocoon processing machines.

## Notes



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# 7. Hygiene and Cleanliness

Unit 7.1 - Hygiene and Workplace Housekeeping

AGR/N9903

## Key Learning Outcomes

**After the completion of this module, the participant will be able to:**

1. Explain the requirements of personal health, hygiene and fitness at work.
2. Describe common health-related guidelines laid down by the organizations/ Government at the workplace.
3. Explain the importance of good housekeeping at the workplace.
4. Explain the importance of informing the designated authority on personal health issues related to injuries and infectious diseases.

# UNIT 7.1: Hygiene and Workplace Housekeeping

## Unit Objectives

**After the completion of this unit, the participant will be able to:**

1. Explain the requirements of personal health, hygiene and fitness at work.
2. Describe common health-related guidelines laid down by the organizations/ Government at the workplace.
3. Explain the importance of good housekeeping at the workplace.
4. Explain the importance of informing the designated authority on personal health issues related to injuries and infectious diseases.

## Resources to be Used

- Participant handbook, Presentation slides, Whiteboard, Markers, Pictures, Posters, Newspaper clippings, Laptop, Internet connection (if possible).

## Say

- Greet the participants and before beginning the session and recapitulate the previous session discussions.

## Activity

**Purpose:** To identify the need for personal hygiene

**Resources:** Power point slide

**Methodology:** Discussion

**Expected Outcome:** Participants have to list the external parts of the body that need to be kept clean and healthy, while explaining why it is needed.

- Put up the power point slide and start a discussion around the subject – what is personal hygiene and why it is needed.

## Elaborate

- On different articles related to safety and health given in Agriculture convention, 2002 (No.184). You can refer handbook for the articles.

## Explain

- Using the slide, explain the points that came up during the discussion and sum up as follows:
  - ✓ What is personal hygiene
  - ✓ Why it is important
  - ✓ The external parts of the body that are prone to dust, dirt, oil, food particles, heat, cold, body odor.

- Further, using the slides, explain how to maintain personal hygiene at work place as well as otherwise.
- Explain how germs spread from our hands to the various parts of the external body before eventually entering the body. It is, therefore, important to wash our hands often. Using the slide, speak about the instances when we must wash our hands.
- Explain that safe and healthy working environment is a fundamental right of every citizen. Organizations and the government recognizing the need to develop a safety and health culture, have developed a framework and guidelines to reduce incidence of work-related injuries, fatalities, diseases, building awareness on safety and health at workplace. To achieve this, both the employer and employee at workplace have certain duties to comply with.
- Using the slide, discuss the duties of employers and employees in providing/ maintaining safe and clean work environment at work place.

## Notes for Facilitation

- Conclude the unit by calling for volunteers to sum up one by one the learning on importance of sanitizing the workplace, the procedure to sanitize and disinfect work area.
- Encourage active participation and engagement from students, such as through group discussions and hands-on exercises.
- Provide a balance of both theoretical and practical information on the use PPEs, Cleaning disinfectants and other objects needed in this process.
- Get participants to open up their participant handbooks and solve the exercises given at the end of the unit. Discuss the answers.

## Exercise

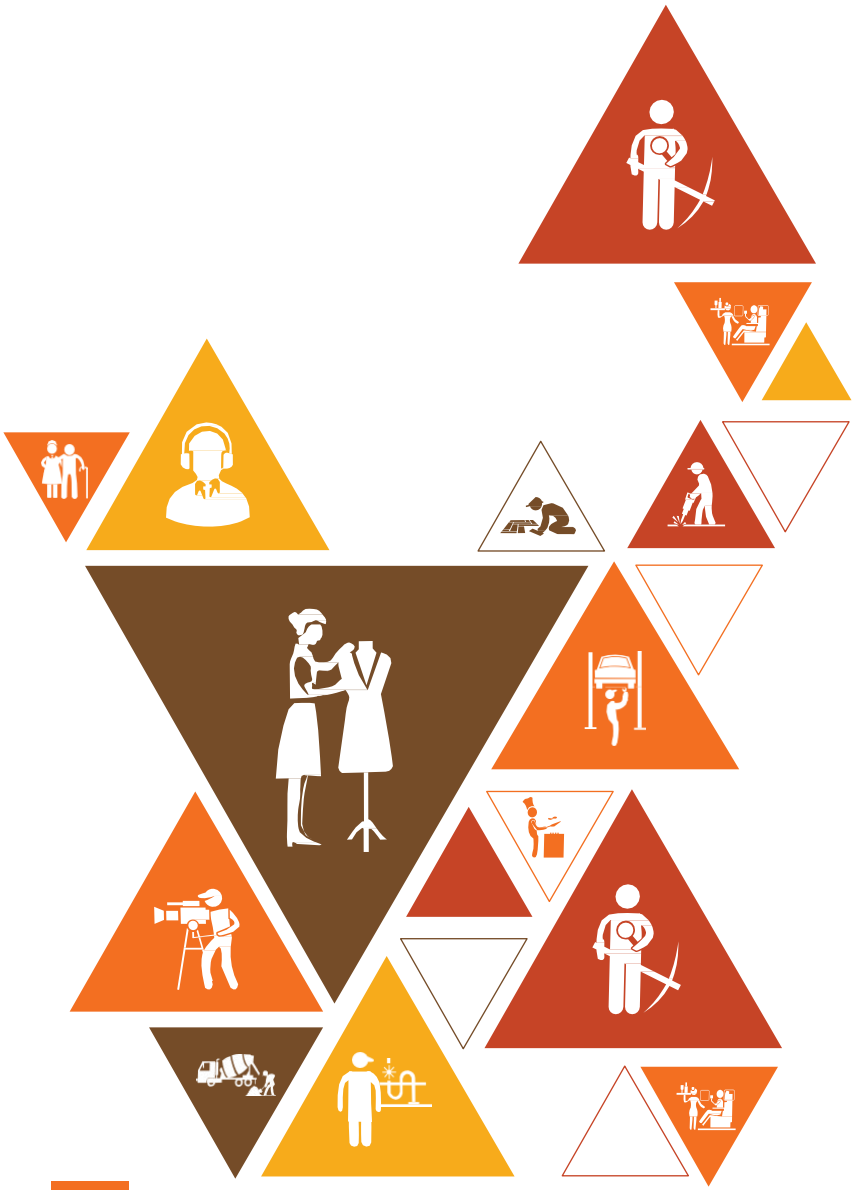
**Short Answer Type Questions**

1. There are several ways to maintain personal hygiene:
    - Bathing regularly - daily showers or baths help keep the skin clean and refreshed.
    - Brushing teeth - brushing at least twice a day helps prevent cavities and gum disease.
    - Washing hands - frequent hand washing, especially before eating and after using the bathroom, helps prevent the spread of germs.
    - Trimming nails - keeping nails trimmed and clean can prevent the spread of bacteria and fungi under the nails.

2.
    - Hand hygiene - providing hand sanitizers and encouraging frequent hand washing to reduce the spread of germs.
    - Social distancing - implementing measures to keep employees at least 6 feet apart to reduce the spread of infectious diseases.
    - Cleanliness - regularly cleaning and sanitizing high-touch surfaces, such as desks, keyboards, and door handles, to reduce the spread of germs.
    - PPE - providing personal protective equipment, such as masks, gloves, and goggles, to employees who need it to do their jobs safely.
    - Ventilation - ensuring adequate ventilation in the workplace to reduce the concentration of airborne infectious agents.

3. Paying attention to housekeeping at work is important for several reasons:
    - Safety - A clean and well-organized workplace can help prevent accidents, such as slips, trips, and falls.
    - Health - A clean and sanitary workplace can reduce the spread of germs and illnesses, promoting a healthy work environment.
    - Productivity - A cluttered and disorganized workspace can lead to distractions and reduced efficiency, while a clean and organized workspace can improve focus and productivity.

## Notes



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# 8. Safety and Emergency Procedures

Unit 8.1 - Emergency Procedures and First Aid

AGR/N9903

## Key Learning Outcomes

**After the completion of this module, the participant will be able to:**

1. List the Personal Protective Equipment (PPE) required at the workplace.
2. Describe the commonly reported hazards at the workplace.
3. Describe the hazards caused due to chemicals/pesticides/fumigants.
4. Describe the basic safety checks to be done before the operation of any equipment/machinery.
5. Describe the common first aid procedures to be followed in case of emergencies.
6. State measures that can be taken to prevent accidents and damage s at the workplace.
7. Explain the importance of reporting details of first aid administered, to the reporting officer/doctor, in accordance with workplace procedures.
8. State common health and safety guidelines to be followed at the workplace

# UNIT 8.1: Emergency Procedures and First Aid

## Unit Objectives

1. Inspect and report on workplace regularly.
2. To ensure prevention of accidents and losses.
3. Workplace Safety Using Personal Protective Equipment (PPE).
4. Dealing with accidents, fires and emergencies.
5. Using emergency evacuation.
6. Administering first aid.
7. Follow the do's and don'ts related to security.

## Resources to be Used

- Participant handbook, Presentation slides, Whiteboard, Markers, Pictures, Posters, Newspaper clippings, Laptop, Internet connection (if possible), fire extinguisher.

## Say

- Greet the participants and before beginning the session, recapitulate the previous session discussions.

## Activity

**Purpose:** To acquaint participants with the emergency situations that occur at the workplace.

**Resources:** Presentation slides.

**Methodology:** Quiz

**Expected Outcome:** Participants will be able to identify the emergency situations that can occur at the workplace.

- Show the presentation slides and ask the participants to identify the emergency situations one by one. Note their response.
- Post the Quiz, show the presentation slide with the correct answers.

## Explain

- An emergency can be a natural disaster or an accident. Workers can be involved in accidents at workplace, and these can be caused by the physical, biological or chemical hazards.
- There are three factors that contribute to accidents at the workplace chance occurrence, unsafe condition at the workplace and unsafe acts on the part of the employees.

## Team Activity

**Purpose:** To increase the knowledge of participants about the different factors that contribute to accidents at workplace.

**Resources:** Presentation slides

**Methodology:** Game

**Expected Outcome:** Ability to identify the factors that contribute to accidents at the workplace.

**Instructions:**

- First prepare 3 chits of paper. These will have one factor each that causes accidents. Select 3 participants and allot one chit each for factors:
  - ✓ Chance occurrence
  - ✓ Unsafe condition at the workplace and
  - ✓ Unsafe acts on the part of the employees
- Prepare small chits which will contain the names of all the examples that come under the three main factors. You can refer to the Participant Handbook for all the examples. Jumble up the chits and keep them in a bowl. Ask participants to pick a chit from the bowl and then walk to the factor under which the example given occurs. Show the presentation slide and explain the factors and the examples.

## Say

- Chance occurrences include medical emergencies like heart attack, weather conditions like floods and storms, natural calamities like earthquakes and sudden power failures. Unsafe conditions at the workplace are the biggest cause of accident at workplace. These are also called 'technical causes or 'improperly guarded equipment'. Unsafe acts on the part of employees are tasks or acts that a worker performs without any knowledge or skill.

## Ask

- What do you understand by first aid?

## Activity

**Purpose:** To train the participants to administer first aid for different type of injuries and to understand the guidelines to be followed if a fire occurs.

**Resources:** Presentation slides, fire extinguisher

**Methodology:** Guest Lecture and Demonstration

**Expected outcome:**

Participants will gain basic knowledge on administering first aid for different types of injuries. Participants will be able to understand and follow the guidelines in case of a fire.

- Arrange for a guest lecture:

1. To talk about first aid and demonstrate the steps to administer first aid for different type of injuries. Ask a few participants to volunteer and demonstrate the steps to administer first aid.
2. To understand the guidelines to be followed in case of a fire. Ask a few participants to volunteer and demonstrate the steps to use a fire extinguisher and conduct a mock fire drill and evacuation.

## Notes for Facilitation

- Emphasize the importance of identifying and addressing potential hazards and risks in the workplace to prevent accidents and injuries.
- Ensure that all participants have the opportunity to practice the techniques during the training session and provide feedback.
- Emphasize the importance of following safety procedures and regulations, and the role of everyone in maintaining a safe work environment.
- Encourage participants to ask questions and share their experiences and concerns related to safety in the workplace.
- Get participants to open up their participant handbooks and solve the exercises given at the end of the unit. Discuss the answers.

## Exercise

**Key Solutions to PHB Exercises**

1.

a) General hygiene steps in workplace include: regular hand washing, covering mouth while coughing or sneezing, avoiding sharing personal items, maintaining clean surfaces, and following personal protective equipment (PPE) guidelines.

b) Steps to deal with natural disasters include: preparing an emergency plan, having an emergency supply kit, staying informed of weather updates, following evacuation orders, and avoiding dangerous areas.

c) First aid is the initial medical treatment given to a person who has been injured or is suddenly taken ill, before professional medical help arrives.

d) Fire extinguisher categories are: Class A, Class B, Class C, Class D, and Class K.

e) Steps to use a fire extinguisher: 1) Pull out the safety pin, 2) Aim the nozzle at the base of the fire, 3) Squeeze the handle to release the extinguishing agent, 4) Sweep the nozzle back and forth to cover the entire fire area.

f) Steps for evacuation in case of fire: 1) Sound the alarm, 2) Evacuate the building immediately, 3) Close doors behind you, 4) Proceed to the nearest fire exit or designated assembly area

g) First aid steps for a fracture: 1) immobilize the injured area, 2) provide pain relief, 3) transport the person to a hospital, 4) do not try to realign the broken bone, 5) monitor for signs of shock.

**B. Fill in the blanks**

1. Emergency evacuation
2. Fire Prevention plan (FPP)
3. First aid
4. Entrapment

**C. Multiple choice Questions**

1. d
2. c

## Notes

Skill India
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सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

ASCI
Agriculture Skill Council of India

# 9. Employability Skills (30 Hours)

To access content on Employability Skills, click here:
https://eskillindia.org/NewEmployability
**Scan the QR code below to access the ebook**

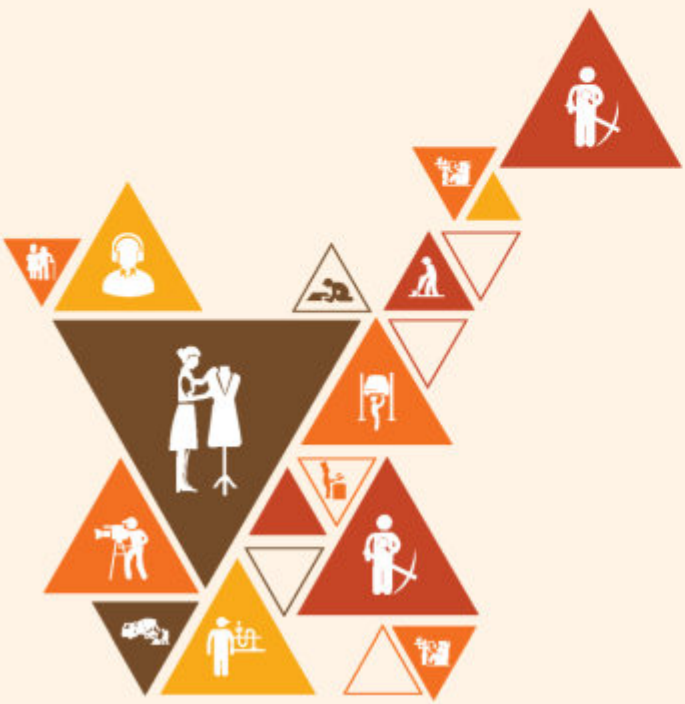
DGT/VSQ/N0101

# 10. Annexures

Annexure I - Training Delivery Plan

Annexure II- Assessment Criteria

Annexure III- QR Codes –Video Links



# Annexure - I
# Training Delivery Plan

| Training Delivery Plan | | | |
|---|---|---|---|
| **Program Name:** | Sericulturist | | |
| **Qualification Pack Name & Ref. ID** | AGR/Q5201 | | |
| **Version No.** | 3.0 | **Version Update Date** | 17/11/2022 |
| **Pre-requisites to Training (if any)** | 8th Class with 1 year of relevant experience, 5th Class with 3 years of relevant experience , Ability to read and write with 5 Years of relevant experience | | |
| **Training Outcomes** | **At the end of the program, the learner should have acquired the listed knowledge and skills to:**<br>• Demonstrate the process of cultivating mulberry trees for feeding silkworms.<br>• Describe the process of preparing for rearing silkworm.<br>• Demonstrate the process of incubating silkworm eggs and rear larvae.<br>• Demonstrate the process of performing pest and disease management during sericulture.<br>• Demonstrate the process of maintaining pupae, harvesting and processing cocoons, and<br>• carrying out marketing activities.<br>• Explain the basic entrepreneurial activities for small enterprise.<br>• Describe the process of undertaking employability and entrepreneurial practices.<br>• Demonstrate various practices to maintain health, hygiene and safety at the workplace | | |

| S.No. | Module Name | Session Name | Session Objectives | NOS Refernce | Methodology | Training Tools / Aids | Duration |
|---|---|---|---|---|---|---|---|
| 1 | Introduction<br>T: 5:00<br>(HH:MM) | 1. Orientation | • Introduce fellow participants<br>•Build rapport with fellow students and their trainer<br>•Explain the overall training outcomes of the programme | Bridge Module | Team activity: Number game | Chairs, round table in U shape sitting shape | T: 1.00 |
| | | 2. Sericulture, Mulberry and Non-Mulberry silk | • Explain Sericulture<br>• Describe the life cycle of silkworm<br>• Explain the different types of silk available and name of the insect producing the silk. | | Lecture, stage presentation, group presentations and discussion | Participant handbook (PHB) Projector, system facilitating power point presentations, microphone, camera, round tables arranged in U shape for healthy discussion, white board, marker pen of different colors | T: 4:00 |

| S.No. | Module Name | Session Name | Session Objectives | NOS Refernce | Methodology | Training Tools / Aids | Duration |
|---|---|---|---|---|---|---|---|
| 2 | Cultivate plantation for silkworm feed<br>T:10.00<br>P:15:00<br>(HH:MM) | 1. Selection of land for mulberry cultivation | • Prepare land for mulberry cultivation<br>• Know the type of mulberry<br>• Explain about the yield potential of different varieties | AGR/N5201 PC1,PC2,PC5-PC11, PC16, PC31, PC32, PC34, PC36, PC38, PC39, PC40, PC42, PC43, KU1, KU2, KU5, KU7, KU9, KU11, KU13, KU15, KU16-KU19, KU22-KU25, KU27, KU28, KU30, GS1, GS3-GS7. | Lecture, stage presentation, role plays, group presentations and discussion | PHB, Projector, system facilitating power point presentations, microphone, camera, round tables arranged in U shape | T: 3:00<br>P: 4:00 |
| | | 2. Raising of Mulberry Plantation for young age silkworms | • Explain the technology of raising mulberry for chawki worms. | | Lecture, stage presentation, role plays, group presentations and discussion | PHB, White board, duster, flip chart board/paper etc. PPT with relevant images of young age silkworms | T: 2:30<br>P: 4:00 |
| | | 3. . Raising of Mulberry Plantation for late age silkworms | • Elaborate technology for raising mulberry for late age silkworms. | | Lecture, stage presentation, discussion | PHB, available objects such as a white board, duster, flip chart, paper, pen, marker etc. PPT showing relevant images of different late age silkworms. | T: 2:00<br>P: 5:00 |
| | | 4. Mulberry Diseases and Pests | • Mulberry diseases and its control measures through integrated management<br>• Describe the mulberry pests and its control measures. | | Lecture, stage presentation, role plays, group presentations and discussion | PHB, Chart papers, pencil, eraser, sharpener, scale, Projector, system facilitating power point presentations | T: 2:30<br>P: 4:00 |
| 3 | Preparation for Rearing Silkworms<br>T: 10:00<br>P: 20:00<br>(HH:MM) | 1. Rearing Houses for Silkworm Rearing | • Identify the requirement of silkworm rearing house.<br>• Building plans for rearing houses of various capacity.<br>• Rearing house for chawki and late age rearing. | AGR/N5202 PC1, PC2, PC3, PC6, PC9, PC11, PC14, PC15, KU1, KU3-KU5, KU8-KU11, GS1-GS7 | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, projector, display screen, round table sitting arrangement, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 2:00<br>P: 4:00 |
| | | 2. Disinfection of rearing house | • Describe disinfection methods using physical and chemical methods<br>• Explain how to make rearing house and appliances pathogen free. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, projector, display screen, round table sitting arrangement, white board, duster, flip chart board/paper. | T: 3:00<br>P: 3:00 |

| S.No. | Module Name | Session Name | Session Objectives | NOS Refernce | Methodology | Training Tools / Aids | Duration |
|---|---|---|---|---|---|---|---|
| | | 3. Silkworm breeds and supply of silkworm eggs | • Explain about the breeds to be reared.<br>• Describe about sheet eggs and loose eggs.<br>• Get to know about care taken during egg transportation. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, Projector, display screen, round table sitting arrangement, white board, duster, flip chart board/paper etc., PPT and relevant audio visual aids | T: 2:00<br>P: 3:00 |
| | | 4. Selection of Mulberry leaves for young age rearing | • Explain agronomical practice for chawki mulberry garden<br>• Quality and quantity of mulberry leaf required for chawki rearing. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, Projector, display screen, round table sitting arrangement, white board, duster, flip chart board/paper | T: 1:00<br>P: 4:00 |
| | | 5. Recap | • Recapitulate complete module learning | | Lecture, activities, role plays, group presentations and discussion, field visits, demonstrations etc. | PHB, Projector, display screen, white board, marker, duster, paper, pen PPT and relevant audio-visual aids | T: 2:00<br>P: 6:00 |
| 4 | The process of hatching silkworm eggs (incubation) and rearing larvae<br>T: 20:00<br>P: 40:00<br>(HH:MM) | 1. Incubation of Silkworm eggs | • Describe incubation methods<br>• Explain optimal condition for incubation<br>• Elaborate brushing of sheets and loose eggs | AGRN5203 PC1, PC2, PC3, PC6, PC7, PC14, KU1-KU4, KU7, KU9, KU11, KU13, KU14, KU15, KU19, KU21, GS1, GS3-GS7 | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, projector, display screen, round table sitting arrangement, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 3:00<br>P: 5:00 |
| | | 2. Rearing of young age silkworm | • Know about the young silkworm rearing technology<br>• Environmental requirements for young silkworms<br>• Types of young age rearing. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, projector, display screen, round table sitting arrangement, white board, duster, flip chart board/paper. | T: 3:00<br>P: 5:00 |
| | | 3. Chowki worms handling and management | • Transportation of Chowki worms<br>• Explain operation and management of CRC<br>• Explain economics of CRC | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, projector, display screen, round table sitting arrangement, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 2:00<br>P: 5:00 |

| S.No. | Module Name | Session Name | Session Objectives | NOS Refernce | Methodology | Training Tools / Aids | Duration |
|---|---|---|---|---|---|---|---|
| | | 4. Mulberry leaves requirement | • Explain the quality and quantity of mulberry leaves required for chowki rearing. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 2:00<br>P: 5:00 |
| | | 5. Late age silkworm | • Elaborate the characteristics of late age silkworms.<br>• Explain the quality, quantity and frequency of feeding mulberry leaves to late age silkworm. | | Lecture, group presentations and discussion, field visits | PHB, projector, display screen, sitting arrangement, white board, duster, flip chart, board, paper, pen, marker etc., PPT showing relevant images and other audio visual aids | T: 2:00<br>P: 5:00 |
| | | 6. Rearing of late age silkworms | • Explain the role of different methods of late season silkworm rearing.<br>• Explain the role of environmental conditions on late maturing silkworms. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 2:00<br>P: 5:00 |
| | | 7. Cultivation and preservation of mulberry | • Describe the leaf preservation of mulberry shoots<br>• Describe the importance of shoot cultivation. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 4:00<br>P: 4:00 |
| | | 8. Recap | • Recapitulate complete module learning | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, projector, display screen, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 2:00<br>P: 6:00 |
| 5 | Pests and Disease management<br>T: 10:00<br>P: 20:00<br>(HH:MM) | 1. Silkworm Diseases and it's management | • Explain about the silkworm diseases and its management. | AGR/N5205 PC1, PC2, PC4, PC6, KU1, KU2, KU5, KU7, KU9, GS1, GS3-GS7 | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, White board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 3:00<br>P: 4:00 |

| S.No. | Module Name | Session Name | Session Objectives | NOS Refernce | Methodology | Training Tools / Aids | Duration |
|---|---|---|---|---|---|---|---|
| | | 2. Pests and its management | • Explain about the various pests infesting silkworms and silkworm cocoons. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, White board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images, audio-visual aid | T: 2:30<br>P: 5:00 |
| | | 3. Integrated management | • Learn about integrated management of silkworm diseases<br>• Describe the integrated pest control methods. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, White board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images, audio-visual aid | T: 2:30<br>P: 5:00 |
| | | 4. Recap | • Recapitulate complete module learning | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, projector, display screen, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 2:00<br>P: 6:00 |
| 6 | Pupa handling, harvesting and cocoon processing, and marketing activities<br>T: 20:00<br>P: 40:00<br>(HH:MM) | 1. Silkworm Mountages | • Describe the features of a good mountage for silkworms.<br>• Identify the mature larvae ready for spinning<br>• Get to know the different mountages used in the field. | AGR/N5204 PC2, PC6, PC7, PC9, PC11, PC14, PC19, PC21, KU2-KU6, KU8, KU10-KU13, KU15, KU16, KU20-KU23, KU28, GS1, GS3-GS7 | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, White board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 2:50<br>P: 5:00 |
| | | 2. Mounting of silkworm | • Explain the methods of mounting silkworms<br>• Elaborate the role of environmental factors on cocoon quality. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, White board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 2:50<br>P: 5:00 |
| | | 3. Cocoon harvesting, transportation and marketing | • Describe the correct time for harvesting of cocoons.<br>• Find out about defective cocoons<br>• Assessment of cocoons | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, White board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant Images, audio-visual aid | T: 2:50<br>P: 5:00 |

| S.No. | Module Name | Session Name | Session Objectives | NOS Refernce | Methodology | Training Tools / Aids | Duration |
|---|---|---|---|---|---|---|---|
| | | 4. Mountages and mounting of silkworm | • Practical and hands on Mountages and mounting of silkworm. | | Demonstration, field visit, practical | PHB, projector, display screen, pen, Different tools and equipment required for mountages and mounting process. | P: 7:00 |
| | | 5. Economics of sericulture | • Describe the economics of silkworm rearing | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 02:50<br>P: 03:50 |
| | | 6. Mechanization in sericulture | • Explain the use of machines for various activities of mulberry cultivation and silkworm rearing to reduce labor cost. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images of process towards quality and safety of produce, audio-visual aid | T: 02:50<br>P: 03:50 |
| | | 7. Mechanization in sericulture-Practical | • Practical and hands on use of machines for various activities in mulberry cultivation. | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 4:00<br>P: 3:00 |
| | | 8. Recap | • Recapitulate complete module learning | | Lecture, stage presentation, role plays, group presentations and discussion, field visits | PHB, projector, display screen, white board, duster, flip chart board/paper etc., Slides in power point presentation showing relevant images | T: 2:00<br>P: 6:00 |
| 7 | Hygiene and cleanliness<br>T: 05:00<br>P: 05:00<br>(HH:MM) | 1. Personal hygiene practices | • Describe the process for maintaining good hygienic practices at workplace.<br>• Explain the follow the workplace sanitization norms including distancing from sick people | AGR/N9903<br>PC1,PC4, PC6, PC7, KU2, KU8, GS1-GS9 | Classroom lecture, discussion, demonstration, activity | Whiteboard, marker, pen, note pad, participant handbook, related power point presentation, etc. | T: 3:00<br>P: 2:00 |
| | | 2. Cleanliness Around the Workplace | • Importance of workplace safety.<br>• Explain the know abouts of PPE kit.<br>• Explain cleaning, disinfection and pest control measures | | Classroom lecture, discussion, demonstration, activity | Whiteboard, marker, pen, note pad, participant handbook, related power point presentation, etc. | T: 2:00<br>P: 3:00 |

| S.No. | Module Name | Session Name | Session Objectives | NOS Refernce | Methodology | Training Tools / Aids | Duration |
|---|---|---|---|---|---|---|---|
| 8 | Safety and Emergency Procedures<br>T: 10:00<br>P: 10:00<br>(HH:MM) | 1. Emergency Procedures and First Aid- I | • Ensure prevention of accidents and damages.<br>• Deal with accidents, fires and emergencies. | AGR/N9903, PC14,PC16, PC17,PC18,PC19,KU12-KU17,GS1-GS9 | Lecture, stage presentation, role plays, group presentations and discussion | Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | T: 5:00<br>P: 3:00 |
| | | 2. Emergency Procedures and First Aid- II | • Use emergency evacuation<br>• Administer first aid. | | Lecture, group presentations and discussion, Activities | PHB, White board, duster, flip chart board/paper etc., Personal protective equipment, first aid kit, equipment used in medical emergencies. | T: 3:00<br>P: 5:00 |
| | | 3. Recap | • Recapitulate complete module learning | | Lecture, activities, role plays, group presentations and discussion, Activities | PHB, projector, display screen, white board, marker, duster, paper, pen PPT and relevant audio-visual aids | T: 04:00<br>P: 04:00 |

| S. No. | Module Name | Session Name | Session Objectives | NOS References | Methodology | Training Tools/Aids | Durations |
|---|---|---|---|---|---|---|---|
| 9. | Employability Skills (30 hrs) | Introduction to Employability Skills | • Describe the importance of Employability Skills<br>• Preparea note on different industries, trends, required skills | DGT/VSQ/ N0101 | Team Activity:<br>Interactive discussion | White-board and Markers Chart paper and sketch pens LCD Projector, Laptop for Presentation, audio visual aids, note pad, paper, pen, computers etc. | 1 hr |
| | | Constitution al Values: Citizenship | • Detail the principles of the constitutio n of India<br>• Identify the various environme ntally sustainable practices | | Class room lecture, discussion, Demonstration, practical | | 1 hr |
| | | Becoming a Professional in the 21st Century | • Discuss relevant 21stcentury skills required for employment<br>• Practice critical thinking and decision making skills | | Class room lecture, discussion, Demonstration, practical | | 1 hr |
| | | Basic English Skills | • Read English text with appropriate articulation<br>• Practice basic English words, sentence s and punctuat ion | | Team Activity:<br>Role play, video session | | 2hrs |

| S. No. | Module Name | Session Name | Session Objectives | NOS References | Methodology | Training Tools/Aids | Durations |
|---|---|---|---|---|---|---|---|
| | | Financial and Legal Literacy | • Discuss various financial institutions, products, and services<br>• Explain the common components of salary such as Basic, PF, Allowances (HRA, TA, DA, etc.), tax | DGT/VSQ/ N0101 | Class room lecture, Group discussion, demonstration, activity | | 4 hrs |
| | | Essential Digital Skills | • Detail the use and features of various MS Office tools, like MS Word, MS Excel, MS PowerPoint, etc.<br>• Demonstrate how to operate digital devices<br>• Create an e-mail id and follow e- mail etiquette to exchange e - mails<br>Describe the role of digital technology in day-to- day life and the workplace | DGT/VSQ/ N0101<br>- | | | 3 hrs |

| S. No. | Module Name | Session Name | Session Objectives | NOS References | Methodology | Training Tools/Aids | Durations |
|---|---|---|---|---|---|---|---|
| | | Financial and Legal Literacy | • Discuss various financial institutions, products, and services<br>• Explain the common components of salary such as Basic, PF, Allowances (HRA, TA, DA, etc.), tax | DGT/VSQ/ N0101 | Class room lecture, Group discussion, demonstration, activity | | 4 hrs |
| | | Essential Digital Skills | • Detail the use and features of various MS Office tools, like MS Word, MS Excel, MS PowerPoint, etc.<br>• Demonstrate how to operate digital devices<br>• Create an e-mail id and follow e- mail etiquette to exchange e - mails<br>Describe the role of digital technology in day-to- day life and the workplace | DGT/VSQ/ N0101 | | | 3 hrs |

| S. No. | Module Name | Session Name | Session Objectives | NOS References | Methodology | Training Tools/Aids | Durations |
|---|---|---|---|---|---|---|---|
| | | Entrepreneurship | • Describe the types of entrepreneurship and enterprises<br>• Describethe 4Ps of Marketing- Product, Price, Place and Promotion and apply them as per requirement | | Class room lecture, discussion, Demonstration, practical | | 7 hrs |
| | | Customer Service | • Identify types of customers and how to deal with them<br>• Identify methods to get customer feedback and how to implement them<br>• Explain various tools used to collect customer feedback<br>• Discuss the significance of maintaining hygiene and dressing appropriately | DGT/VSQ/ N0101 | Class room lecture, discussion, Demonstration, practical, Team Activity: Role play, video session | | 4 hrs |
| | | Apprenticeships and Jobs | • Practice personal grooming strategies<br>• Illustrate the use of online platforms for job hunting<br>• Detail the concept of Apprenticeship<br>• Demonstrate how to enroll for Apprenticeship programs.<br>• Draft a professional Curriculum Vitae (CV)<br>• Role play a mock interview | DGT/VSQ/ N0101 | | | 2 hrs |

# Annexure II

## Assessment Criteria

**CRITERIA FOR ASSESSMENT OF TRAINEES**

(For Updated 'Assessment Criteria', please refer to Qualification Pack of this Job role available at https://www.nqr.gov.in/)

| Assessment Criteria for ASCI- Sericulturist | |
|---|---|
| **Job Role** | **Sericulturist** |
| **Qualification Pack** | **AGR/Q5201** |
| **Sector Skill Council** | **Agriculture** |

| S.No. | Guidelines for Assessment |
|---|---|
| 1. | Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC. |
| 2. | The assessment for the theory part will be based on knowledge bank of questions created by the SSC. |
| 3. | Assessment will be conducted for all compulsory NOS, as well as the selected elective NOS/set of NOS. |
| 4. | Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below). |
| 5. | Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria. |
| 6. | To pass the Qualification Pack , every trainee should score a minimum of 50% of aggregate marks to successfully clear the assessment. |
| 7. | In case of *unsuccessful completion*, the trainee may seek reassessment on the Qualification Pack. |

| National Occupational Standards | Theory Marks | Practical Marks | Project Marks | Viva Marks | Total Marks | Weightage |
|---|---|---|---|---|---|---|
| AGR/N5201.Cultivate mulberry trees for feeding silkworms | 30 | 40 | - | 30 | 100 | 20 |
| AGR/N5202.Prepare for rearing silkworms | 30 | 40 | - | 30 | 100 | 20 |
| AGR/N5203.Incubate silkworm eggs and rear larvae | 30 | 40 | - | 30 | 100 | 20 |
| AGR/N5205.Perform pest and disease management during sericulture | 30 | 40 | - | 30 | 100 | 15 |
| AGR/N5204.Maintain pupae, harvest and process cocoons, and carry out marketing activities | 30 | 40 | 0 | 30 | 100 | 15 |
| AGR/N9903.Maintain health and safety at the workplace | 40 | 25 | - | 35 | 100 | 5 |
| DGT/VSQ/N0101.Employability Skills (30 Hours) | 20 | 30 | - | - | 50 | 5 |
| **Total** | **210** | **255** | **0** | **185** | **650** | **100** |

## Annexure-III

**QR Codes –Video Links**

| Chapter No. | Unit No. | Topic | QR Code Links | QR Code (s) |
|---|---|---|---|---|
| **Chapter -1** Introduction to the Role of a Sericulturist | Unit 1.1 - Introduction to Sericulture | Life Cycle of Silkworm | https://www.youtube.com/watch?v=a_yozW6m7UU | Life Cycle of Silkworm |
| | | Journey of Silk | https://www.youtube.com/watch?v=gDWeo0rTqbw | Journey of Silk |
| | Unit 1.2 - Mulberry and Non Mulberry Silk | Different species of non-mulberry Silkworm | https://www.youtube.com/watch?v=FIyp6mutEMo | Different species of non-mulberry Silkworm |
| **Chapter - 2** Cultivate Plantation for Silkworm Feed | Unit 2.1 - Selection of Land for Mulberry Cultivation | Mulberry Cultivation | https://www.youtube.com/watch?v=KltyZc7rudw | Mulberry Cultivation |
| | Unit 2.3 - Mulberry Diseases and Pests | Leaf eating pest of mulberry | https://www.youtube.com/watch?v=MrkK1h4FKug | Leaf eating pest of mulberry |
| | | Integrated Management of Mulberry diseases | https://www.youtube.com/watch?v=u0uPkjcbPco | Integrated Management of Mulberry diseases |
| **Chapter – 3** Preparation for Rearing Silkworms | Unit 3.1 - Rearing Houses for Silkworm Rearing | Study of Rearing House of Mulberry Silkworm | https://www.youtube.com/watch?v=k9PpAUKgSVM | Study of Rearing House of Mulberry Silkworm |

| Chapter No. | Unit No. | Topic | QR Code Links | QR Code (s) |
|---|---|---|---|---|
| | Unit 3.2 - Disinfection of Rearing House | Disinfection of rearing house and different methods of disinfection | https://www.youtube.com/watch?v=5GO--DTW6eo | Disinfection of rearing house and different methods of disinfection |
| **Chapter - 4** Process of Hatching Silkworm Eggs (Incubation) and Rearing Larvae | Unit 4.1 - Incubation of Silkworm Eggs | Incubation of Silkworm Eggs and Chawkl worm Rearing | https://www.youtube.com/watch?v=lMNAtQOr6lI | Incubation of Silkworm Eggs and Chawkl worm Rearing |
| | Unit 4.2 - Young Silkworm Rearing Technology | Mulberry cultivation for young age silkworm | https://www.youtube.com/watch?v=YYfkETZv1qI | Mulberry cultivation for young age silkworm |
| **Chapter – 5** Pupa Handling, Harvesting and Cocoon Processing, and Marketing Activities | Unit 5.1 - Silkworm Diseases and It's Management | Silkworm Diseases | https://www.youtube.com/watch?v=4hq4EvfbRU4 | Silkworm Diseases |
| | Unit 5.2 - Pests and Its Management | Important Pests of Silkworm | https://www.youtube.com/watch?v=_b91jQXtahs | Important Pests of Silkworm |

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Agriculture Skill Council of India


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