

# SHRI GURU RAM RAI UNIVERSITY

## DEPARTMENT OF ENTOMOLOGY , SCHOOL OF AGRICULTURAL SCIENCES

Subject: MANAGEMENT OF BENEFICIAL INSECTS (BSAC-605)

Instructor : Dr. Hitendra Kumar, Associate Professor & Head (Entomology)

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**Q.: Describe rearing equipments and rearing process of mulberry silkworm.**

**Ans: Equipment for Silkworm Rearing**

Silkworm rearing requires a controlled environment and specialized tools to ensure healthy growth, high cocoon yield, and disease prevention. Equipment can be grouped based on their function and stage of rearing.

### **1. Rearing House Equipment**

These are used to maintain proper environmental conditions.

#### **a) Rearing Room**

- Well-ventilated, clean, and disinfected room
- Maintains temperature (24–28°C) and humidity (70–85%)
- Protection from pests (ants, rats, lizards)

#### **b) Windows & Ventilators**

- Ensure air circulation
- Covered with nylon mesh to prevent insect entry

#### **c) Heating and Cooling Devices**

- Heaters (during winter)
- Fans or air coolers (during summer)
- Humidifiers to maintain moisture

### **2. Rearing Appliances (Basic Equipment)**

#### **a) Rearing Trays**

- Made of bamboo, plastic, or wood
- Used to keep silkworms during feeding
- Different sizes for young and late instars



### **b) Rearing Stands (Chandrike Stand)**

- Multi-tier racks to hold trays
- Efficient space utilization



### **c) Ant Wells**

- Small cups filled with water placed under stand legs
- Prevent ants from reaching silkworms

## **3. Feeding Equipment**

### **a) Leaf Chopper / Cutter**

- Cuts mulberry leaves into small pieces
- Important for early instar larvae



### **b) Leaf Storage Basket**

- Keeps mulberry leaves fresh and moist



### c) Feeding Nets

- Placed over worms to spread fresh leaves
- Helps in easy cleaning



## 4. Bed Cleaning Equipment

### a) Bed Cleaning Nets

- Used to separate silkworms from leftover leaves and litter
- Ensures hygiene and disease control

### b) Litter Collection Trays

- Collect waste materials after cleaning

## 5. Mounting Equipment (Cocoon Formation Stage)

### a) Mountages (Chandrike)

- Structures where mature larvae spin cocoons
- Types:
  - Bamboo mountage
  - Plastic mountage



## **6. Disinfection Equipment**

### **a) Sprayers**

- Used to spray disinfectants (e.g., bleaching powder solution)

### **b) Disinfectant Containers**

- For preparing and storing solutions

### **c) Foot Bath**

- Tray with disinfectant at entry
- Prevents contamination

## **7. Environmental Monitoring Tools**

### **a) Thermometer**

- Measures temperature

### **b) Hygrometer**

- Measures humidity

### **c) Thermo-hygrometer**

- Combined device for both

## **8. Protective Equipment**

### **a) Aprons and Gloves**

- Maintain hygiene
- Protect silkworms from contamination

### **b) Face Masks**

- Prevent spread of diseases

## **9. Harvesting Equipment**

### **a) Cocoon Collection Baskets**

- Used to collect cocoons

### **b) Sorting Trays**

- For grading cocoons (good, defective, double, etc.)

## 10. Miscellaneous Equipment

- Brushes (for handling young larvae)
- Foam pads (for delicate worms)
- Light source (for inspection)
- Record registers (for maintaining rearing data)

## Rearing Methodology of Mulberry Silkworm

The mulberry silkworm (scientific name: *Bombyx mori*) is reared for silk production and requires systematic care, controlled environment, and proper feeding. The rearing process is divided into three main stages:

### 1. Pre-Rearing Preparations

#### a) Rearing House Preparation

- Clean and disinfect the rearing room thoroughly
- Use disinfectants like bleaching powder or formalin
- Maintain:
  - Temperature: **24–28°C**
  - Humidity: **70–85%**
- Ensure proper ventilation and light

#### b) Equipment Preparation

- Clean trays, stands, mountages, and nets
- Disinfect all appliances before use

#### c) Mulberry Leaf Preparation

- Use fresh, tender, and disease-free leaves
- Store leaves in cool, moist conditions

### 2. Incubation of Eggs

#### a) Egg Procurement

- Obtain disease-free layings (DFLs) from certified sources

#### b) Incubation Conditions

- Temperature: **24–25°C**
- Humidity: **75–80%**

#### c) Black Boxing

- Eggs are kept in dark conditions before hatching
- Ensures **uniform hatching**

#### **d) Hatching**

- Occurs in about **10–12 days**
- Newly hatched larvae are called **chawki worms**

### **3. Rearing of Silkworm Larvae**

Silkworms pass through **5 instars (larval stages)** with 4 moults.

#### **A. Young Age Rearing (1st–3rd Instar)**

##### **Characteristics:**

- Small, delicate larvae
- Highly sensitive to environment

##### **Conditions:**

- Temperature: **26–28°C**
- Humidity: **80–85%**

##### **Feeding:**

- Feed **tender chopped mulberry leaves**
- Frequency: 4–5 times/day

##### **Care:**

- Maintain strict hygiene
- Use **bed cleaning nets** regularly
- Avoid overcrowding

#### **B. Late Age Rearing (4th–5th Instar)**

##### **Characteristics:**

- Rapid growth stage
- Maximum food consumption

##### **Conditions:**

- Temperature: **24–26°C**
- Humidity: **65–75%**

##### **Feeding:**

- Provide **mature whole leaves**
- Feed 3–4 times/day

##### **Care:**

- Provide more space (bed spacing)
- Frequent cleaning

- Ensure good ventilation

#### **4. Moulting Process**

- Silkworm stops feeding and rests
- Shedding of old skin occurs
- Do not disturb worms during moulting

#### **5. Mounting (Cocoon Formation)**

##### **a) Maturity Signs**

- Worm becomes **translucent and yellowish**
- Stops feeding
- Starts searching for a place to spin

##### **b) Mounting Process**

- Transfer worms to mountages (chandrike)
- Provide dry and clean environment

##### **c) Spinning**

- Larvae spin cocoons in **2–3 days**

#### **6. Cocoon Harvesting**

##### **a) Harvesting Time**

- After **5–7 days of spinning**

##### **b) Sorting**

- Separate:
  - Good cocoons
  - Defective cocoons (double, pierced, etc.)

#### **7. Post-Harvest Operations**

##### **a) Stifling**

- Killing pupae inside cocoons using heat
- Prevents moth emergence

##### **b) Drying**

- Reduces moisture for storage

##### **c) Marketing/Reeling**

- Cocoons sent for silk extraction