Q.: Describe biology of mulberry silkworm.

Ans: 1. Introduction

The mulberry silkworm, Bombyx mori, is a completely domesticated insect of great economic importance in sericulture. It feeds exclusively on mulberry leaves (*Morus spp.*) and produces high-quality silk.

2. Systematic Position

- **Phylum:** Arthropoda
- **Class:** Insecta
- **Order:** Lepidoptera
- **Family:** Bombycidae
- **Genus:** Bombyx
- **Species:** *B. mori*

3. Life Cycle

The life cycle is **holometabolous (complete metamorphosis)** consisting of four stages:

Stages:

1. Egg
2. Larva (Caterpillar)
3. Pupa
4. Adult (Moth)

4. Egg Stage

Characteristics

- Small, oval, and creamy yellow (turn grey before hatching)
- Size: ~1–1.5 mm
- One female lays **400–600 eggs**

Incubation Period

- 8–12 days (depending on temperature)

Important Features

- Eggs enter **diapause** in temperate races
- Require controlled temperature and humidity for uniform hatching

5. Larval Stage (Silkworm)

General Description

- Most active feeding stage
- Cylindrical, segmented body
- Colour: white or creamy

Duration

- 20–30 days

Instars

The larva undergoes **5 instars** separated by moulting (ecdysis).

Structure of Larva

Head

- Mouthparts: Biting and chewing type
- Strong mandibles for leaf feeding

Thorax

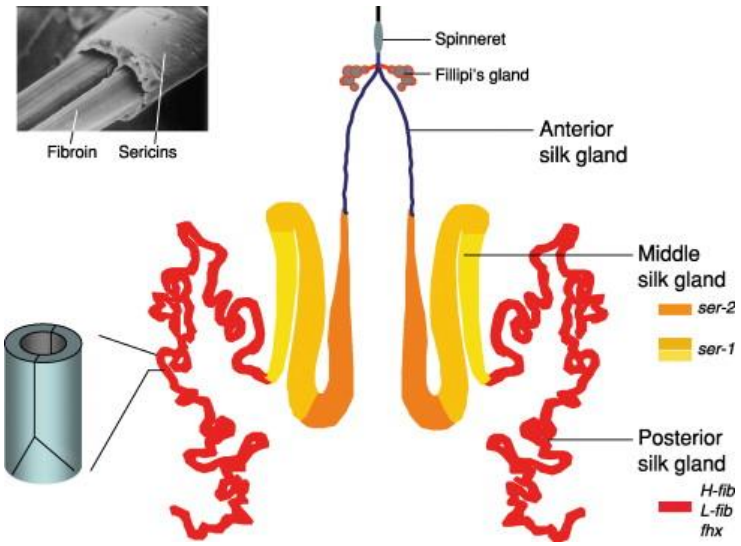
- 3 segments
- Each bears one pair of **true legs**

Abdomen

- 10 segments
- 5 pairs of **prolegs** (for locomotion)
- Last segment bears anal claspers

Silk Gland

- Highly developed **labial glands**
- Divided into:
    - Anterior (duct)
    - Middle (sericin secretion)
    - Posterior (fibroin secretion)



Feeding Behaviour

- Feeds exclusively on mulberry leaves
- Consumes large quantities (about 20,000 times its body weight)

Larval Growth Events

- **Moulting:** Shedding of old cuticle
- **Instar stages:** I → V instar
- 5th instar is the most active feeding stage

6. Spinning (Cocoon Formation)

Process

- Mature larva stops feeding
- Secretes silk from **spinneret**
- Moves head in “figure-8 pattern”

Silk Composition

- **Fibroin:** Structural protein

- **Sericin:** Binding gummy protein

Cocoon Characteristics

- Oval, compact structure
- Length of silk filament: **600–1200 meters**

7. Pupal Stage

Characteristics

- Non-feeding, inactive stage
- Transformation into adult occurs

Duration

- 10–14 days

Type

- **Obtect pupa** (appendages fused to body)

8. Adult Stage (Moth)

General Features

- Creamy white moth
- Short lifespan (3–5 days)
- Cannot fly (due to domestication)

Sexual Dimorphism

Character	Male	Female
Size	Smaller	Larger
Antennae	Bushy	Less bushy
Abdomen	Slender	Broad

Reproduction

- Mating occurs soon after emergence
- Female lays eggs and dies

9. Duration of Life Cycle

- Total duration: **45–60 days**
- Varies with race and environmental conditions

10. Voltinism

Based on number of generations per year:

- **Univoltine:** One generation/year
- **Bivoltine:** Two generations/year

- **Multivoltine:** Many generations/year

11. Environmental Requirements

Factor	Optimum Range
Temperature	24–28°C
Humidity	70–85%
Light	Diffused light
Ventilation	Good airflow

12. Economic Importance

- Produces mulberry silk (highest quality)
- Backbone of sericulture industry
- Provides rural employment