

# Incubation Technology of Silkworm Seed

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Incubation is a process of preserving silkworm eggs under optimum temperature, humidity and photoperiod conditions to facilitate uniform development of embryo and ensure good hatching of healthy larvae on a single day. Incubation is the last step of seed production and first step in silkworm rearing.

The objectives of incubation are;

- To ensure uniform development of embryo and good hatching on a single day.
- To ensure hatching of different races on designated dates to facilitate Fl production by commercial grainages.
- To maintain vigour and health of the newly hatched larvae.
- To maintain the voltinism of a race.

## Activities of incubation

### Disinfection of the incubation place

Disinfection is a very important activity prior to the commencement of incubation, where eradication of disease causing germ, from the place of incubation is ensured. Hence, prior to incubation, disinfection of the incubation chamber, appliances and surface sterilization of silkworm seeds become an unavoidable task.

### Surface sterilization

Before the silkworm seeds are shifted to the incubation chamber, they should be surface sterilized with 2% formalin solution for 5- 10 minutes. Formalin owing to its reducing action on the pathogens effectively destroys them if they are lodged on the seeds or seed sheets during the course of oviposition. If the seeds are not properly surface sterilized, the pathogens lodged on the chorion will be consumed by the larvae during the process of hatching. As result of which there will be infection and larvae die due to diseases and form the source of secondary contamination for other larvae. Improper surface sterilization can be one of the major causes for cocoon

crop losses. Silkworm seeds can be safely surface sterilized on any day of the development except during pin head and blue egg stages. In addition to the initial sterilization performed at grainage level as a measure of precaution, the sterilization process could be repeated once again by the CRCs, if transported before pin head (head pigmentation) stage. This is done to ensure that contamination from other sources during the transit is not carried over. In the case of loose eggs, they have to be taken out of the container, transferred into a cloth bag or nylon bag and immersed in formalin solution for about 5-10 minutes. The eggs are then dried and subsequently processed.

### Transportation of silkworm eggs

Transportation of silkworm eggs is usually done during its incubation period. Thus utmost care should be taken during transportation.

- Egg should be transported only during cool hours of the day.
- The eggs should not be transported during 4th /5th day of development.
- During transportation, the eggs should be provided with optimum temperature, humidity and proper aeration.
- The eggs should not be transported in polythene covers or airtight containers as it increases the incidence of dead egg.

### Environmental conditions for incubation

Main environmental factors are temperature, relative humidity photoperiod and aeration.

#### Temperature

Temperature is one of the most important factors, which decides the growth and development of embryo. Optimum temperature for incubation is 25±1°C. Incubation at this temperature also helps in maintaining diapause characters of bivoltine race.

#### Humidity

Humidity helps in maintaining water content of the eggs. Optimum humidity of 75 to 80 per cent

helps in maintaining uniform development of eggs and prevents desiccation.

### Aeration

Aeration during incubation is very much essential as eggs are physiologically very active. Aeration helps in providing oxygen for developing embryo and driving out poisonous gases.

### Photoperiod

Photoperiod of 16 L: 08 D (Light: Dark) upto pinhead stage is very essential for uniform growth and development of embryo and maintaining voltinism.

### Black boxing

It is a technique adopted to obtain synchronized hatching. The eggs are subjected to complete darkness for 48 hours prior to hatching i.e., when the eggs have attained head pigmentation stage.

- The suitable time for black boxing is when more than 50% eggs reach to head pigmentation stage. For CSR bivoltine breeds black boxing has to be

ensured 60 hours prior to hatching for acid treated eggs and 72 hours in case of hibernated eggs.

- The eggs should be black boxed by wrapping with black cloth or paper. It is preferable to make the incubation room or incubation chamber totally dark.
- After black boxing, on the day of hatching the eggs are exposed to diffused light to stimulate hatching.

### Brushing

Brushing of silkworm eggs is a process of transferring the hatched larvae to the rearing bed and feeding with mulberry leaf.

- On the expected day of hatching usually at 6 am. The eggs should be exposed light. Natural daylight is sufficient to obtain hatching.
- Immediately after hatching the larvae should be brushed by providing tender Chawki leaves with 75 % or above moisture content.

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