

Management of Flacherie Disease in Silkworm Rearing: A Devastating Disease at Present

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Diseases of silkworm are a big challenge for the rearers. Due to prolong domestication, silkworm develops less immunity and less adaptability for which they are often attacked by different pathogens leading to silkworm mortality and cocoon crop loss. In the recent days, silkworms are highly susceptible to flacherie disease due to favorable environment for the pathogens. Hence, effort has been made here to make understand the causes, causative agent, period of occurrence, source of infection, predisposing factors, symptoms of damage and most importantly its management.

Causes

- Physiological weakness of silkworm combined with the pathogenic/non-pathogenic microbes is the primary cause of Flacherie disease in silkworm.
- The adverse environmental conditions during silkworm rearing, starvation of silkworm, feeding of silkworms with poor nutritive quality of mulberry and improper handling of silkworm during the rearing are the causes for weakness in silkworms.
- The physiological weakness in silkworms makes them susceptible to pathogenic microbes.
- In such physiologically weak larvae, even the non-pathogenic bacterial micro flora of the mid gut multiply at faster rate, alter the gut environment and penetrate to haemolymph and cause flaccidity.
- Improper handling of silkworm leads to physical injury. The wound gets infected with microbes leading to Flacherie.

Causative agent

The main causative pathogens are Infectious Flacherie Virus (BmIFV), Densonucleosis virus (BmDNV) and bacteria such as *Streptococcus sp.*, *Staphylococcus sp.*, *Bacillus thuringiensis* and *Serratia marcescens*. Flacherie is also caused by the combined infection of bacteria and viruses.



Flacherie infected larvae

Occurrence

The disease prevails all through the year but its severity is more during summer and rainy season.

Source of infection

By eating contaminated mulberry leaf. Dead/diseased silkworm, its faecal matter, gut juice, body fluid forms the source of contamination. The infection can also take place through injuries, cuts and wounds.

Predisposing factors

Fluctuations in temperature, high humidity and poor quality of leaves.

Symptoms

- At the early stage of infection, symptoms are not clear and difficult to identify.
- The larvae become soft and flaccid.
- The growth of affected larvae retards, become inactive and vomit gut juice.
- The faeces become soft with high moisture content. Sometimes chain type of excreta is observed. Often, rectal protrusion is also observed.
- Cephalothoracic region becomes translucent.
- When infected with *Bacillus thuringiensis*, symptoms of toxicity such as paralysis and

sudden death are observed. After death larvae turn black in colour and give foul smell.

- Sometimes, the dead larvae turn red when infected with *Serratia marcescens* during injury.

Management

- Procure silkworm eggs produced from healthy parent moths so that the progeny would be least susceptible to microbial infections.
- Ensure meticulous disinfection of silkworm rearing house, appliances and the surroundings of the rearing house and use quality disinfectants at recommended concentration, quantity and schedule. Ensure rearing and personal hygiene during the rearing.
- An additional disinfection with 0.3% slaked lime solution is also recommended in case of high incidence of viral flacherie noticed in the previous crop.
- Feed silkworm with quality mulberry leaves, so that they grow physiologically strong and express high level of resistance to microbial infection. Provide quality leaf grown under good sunlight and recommended inputs. Do not provide over matured/ over stored / soiled leaves to the silkworm.
- Rear silkworms under recommended optimum temperature and humidity conditions so that the larvae grow healthy and resistive to infection. Avoid rearing silkworms under fluctuating temperature and humidity. Such conditions make silkworm weak and lose ability to resist infection.
- Never feed the silkworms with mulberry sprayed with insecticides/pesticides before the completion of the recommended 'safe period'. The silkworms fed on such leaves develop flacherie symptoms.

- Avoid overcrowded rearing of silkworm. It leads to larval starvation, undesirable environmental condition, resulting in loss of resistance to infection. Provide good cross ventilation in the rearing room.
- Avoid feeding excess mulberry leaves, which may lead to accumulation of uneaten leaves. The uneaten leaves as well as accumulated faeces ferment leading to increased bed temperature and humidity and make silkworm weak and lose resistance to infection.
- Avoid improper handling of silkworm causing injury especially during feeding, bed extension and mounting.
- Pick up suspected diseased larvae as early as possible and dispose them by burning/burying.
- Dust bed disinfectant, Ankush or Vijetha or as per the recommended schedule and quantity.
- Feed Amruth (Nandi Amruth or Rainbow Amruth) as per recommended schedule and quantity to control flacherie disease in silkworm.

Note: AMRUTH - An Eco and user-friendly botanical based formulation for suppression/ control of Grasserie and Flacherie diseases. The first ever curative formulation against silkworm diseases. Mix Amruth powder in water @20g/lit.

Schedule	Qty of Amruth (g)	Qty of water (ml)	Qty of leaf/shoot (kg)
After 2 nd moult 2 nd feed	7	350	5
After 3 rd moult 2 nd feed	53	2650	38
After 4 th moult 2 nd feed	90	4500	67
