

Botanical Pest Management in Eri Host Plants: A Sustainable Approach for Sericulture

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Eri sericulture is an eco-friendly and sustainable farming practice that supports rural livelihoods while producing environmentally responsible silk. The productivity and quality of eri host plants, such as castor, kesseru, borpat, payam and tapioca are often threatened by various pests. Defoliating insects like the castor semilooper, tobacco caterpillar and Castor Hairy Caterpillar, along with sap sucking pests such as aphids, whiteflies, jassids, spiraling whiteflies, mites as well as stem borers and leaf miners can significantly reduce leaf yield and quality. Sustainable management combines good cultural practices, manual pest removal, biological control and the use of eco-friendly pesticides to maintain healthy host plants.

Keywords: Host plants, Pest management, Sustainable, Eco friendly

Introduction

Sericulture is an important agro-based and labour-intensive cottage industry that provides livelihood to millions of rural families in India, especially women, tribal communities and small farmers in Assam. However, the sector faces challenges such as declining soil fertility, pest outbreaks, rising input costs and environmental problems due to excessive use of chemical fertilizers and pesticides. Proper pest management is essential for sustainable silkworm rearing as it improves larval survival, growth and cocoon yield (Chauhan *et al.*, 2025). Continuous use of chemical pesticides has also led to pesticide residues, environmental pollution and harmful effects on silkworms and beneficial organisms (Boudh *et al.*, 2018; Liu *et al.*, 2024).

Major Pests of Castor (*Ricinus communis*)

Castor plants are affected by pests such as castor semilooper (*Achaea janata*) and spiny caterpillar (*Ergolis merione*) (Plate 1) which cause defoliation. Whiteflies (*Trialeurodes ricini*) (Plate 2) and jassids (*Empoasca flavescens*) suck sap from leaves, while tobacco caterpillar (*Spodoptera litura*) and shoot and capsule borer (*Conogathes punctiferalis*) damage leaves, shoots and capsules (Sujatha *et al.*, 2011).



Spiny caterpillar (*Ergolis merione*)



Adult whiteflies (*Trialeurodes ricini*)

Major Pests of Kesseru (*Heteropanax fragrans*)

Kesseru plants are mainly attacked by aphids that suck sap and promote sooty mould growth. Leaf rollers feed inside rolled leaves, while termites damage roots and stems. Brown bugs may also reduce plant growth (Kumar *et al.*, 2015). Severe infestation weakens the plant and reduces leaf quality. This ultimately affects the availability of nutritious leaves for silkworm rearing.

Major Pests of Tapioca (*Manihot esculenta*)

Common pests of tapioca include red spider mites, scale insects, whiteflies and mealybugs, which cause yellowing, deformities and stunted growth. Termites and white grubs damage the roots and may lead to plant death (Mani *et al.*, 2017). High pest infestation can significantly reduce leaf yield and plant vigour. Proper pest management is therefore necessary to maintain healthy host plants.

Major Pests of Payam (*Evodia fraxinifolia*)

Payam plants are affected by hairy caterpillars and semi-loopers that cause defoliation, while thrips suck sap from young leaves, leading to curling and reduced growth. Continuous feeding by these pests decreases the leaf area available for silkworm feeding. Severe infestation may also slow down the overall growth and development of the plant.

Major Pests of Borpat (*Ailanthus grandis*)

Borpat plants are attacked by hairy caterpillars and other leaf-feeding larvae that cause defoliation. Borers and weevils damage stems and branches, reducing leaf production and affecting silkworm rearing. Such damage weakens the plant and limits the supply of healthy leaves. Effective pest management is important to maintain proper growth and productivity of the host plant.

Plant extract as pesticide

Ginger Extract (*Zingiber officinale*)

- **Natural pest repellent** : The strong scent and oils in ginger help deter insects and other pests from attacking crops.
- **Fights fungal infections** : Ginger contains compounds like gingerol that protect plants from harmful fungi.
- **Safe and environmentally friendly** : It poses no risk to humans, animals, or beneficial insects, making it gentle on nature.
- **Enhances plant health** : Applying ginger can strengthen plants, improving their growth and resistance to pests naturally.

Neem Extract (*Azadirachta indica*)

- **Protects against diseases** : Neem's antifungal and antibacterial compounds help safeguard plants from infections.
- **Disrupts insect growth** : Neem interferes with the life cycle of insects, reducing their ability to reproduce and spread.
- **Boosts plant defenses** : Using neem regularly helps strengthen plants, making them naturally more resistant to pests and diseases.
- **Naturally repels pests** : Chemicals such as azadirachtin in neem help keep insects and other pests off crops.

Garlic Extract (*Allium sativum*)

- **Repels pests naturally** : The strong aroma and sulfur content of garlic help keep insects and other pests from attacking plants.
- **Acts as a soil enhancer** : Garlic extracts can improve soil quality and reduce harmful microbes.
- **Lowers use of chemicals** : Using garlic as a pesticide reduces the need for synthetic chemical sprays on crops.
- **Disrupts pest growth** : Compounds in garlic can interfere with the development and reproduction of insects, helping to control pest populations naturally.

Turmeric Extract (*Curcuma longa*)

- **Controls pest activity** : Compounds in turmeric can disturb how pests feed and reproduce, helping keep their numbers under control naturally.
- **Bioactive components** : Turmeric has curcumin, tumerone and other essential oils that give it a strong aroma and natural pest-fighting properties.
- **Disrupts pest growth** : Some bioactive compounds can interfere with pest feeding, reproduction and development, helping to naturally control their population.
- **Fights fungi and bacteria** : Curcumin and other compounds in turmeric protect plants from fungal and bacterial infections.

Mint Extract (*Mentha spicata*)

- **Strong aroma and essential oils** : Mint has compounds such as menthol, menthone, and pulegone, which produce a strong smell that naturally keeps insects away.
- **Controls pest behavior** : Menthol and other compounds in mint can disturb how insects feed and reproduce, helping to naturally lower their numbers.
- **Environmentally safe** : Mint is harmless to humans, animals, and beneficial insects, making it an eco-friendly option.
- **Prevents egg-laying** : Compounds in mint can deter insects from laying eggs on plants, helping reduce future pest infestations naturally.

Conclusion

Effective pest management in eri host plants is important for maintaining healthy leaves and successful silkworm rearing. Using eco-friendly plant extracts along with cultural and biological methods helps control pests while protecting the environment. These sustainable practices support better productivity and long-term growth of eri sericulture. They also reduce dependence on chemical pesticides and minimize harmful effects on silkworms and beneficial organisms. Adopting such integrated pest management approaches can improve the sustainability and profitability of eri farming.

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