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# Integrated Pest Management for Sesame Leaf Roller and Capsule Borer, *Antigastra catalaunalis* (Duponchel)

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## Abstract

The valuable oilseed crop sesame (*Sesamum indicum* L.) is susceptible to *A. catalaunalis* that can result in severe productivity losses. Farmers use a variety of techniques to mitigate this harm. Insect predators and entomopathogenic nematodes are some examples of natural enemies that are used in biological control techniques to reduce pest populations. These biocontrol chemicals provide sustainable and environmentally beneficial solutions. Additionally, due to their inherent insecticidal qualities, botanical chemicals made from plants, such as neem, pyrethrum and tobacco, have showed promise in controlling this pests of sesame crops. For its efficient use, proper formulation and application methods are essential. Chemical pesticides also contribute significantly to pest management when utilised properly. For minimising adverse environmental effects, their planned application, suitable selection and adherence to safety regulations are crucial.

**Keywords:** Environment, Integrated pest management, Sesame (*Sesamum indicum*), Sesame leaf webber

## Introduction

The sesame plant, *Sesamum indicum* L., is one of the earliest oilseed crops in India. There are several more names for till, including gingelly, simsim, beniseed, safed til, kala til and tillie. Sesame is renowned as the "Queen of Oilseeds" due to its massive yield and high-grade oil. The majority of the sesame crop in the nation is utilised for oil extraction (70-75%), a significant percentage is used up as food approximately (20-25%) and a very little proportion (2.2%) is saved as seed. Calcium, iron and phosphorus are among the minerals found in sesame seeds, which also comprise 46 to 50% oil and 25% protein. Its oil has a higher concentration of unsaturated fatty acids, *viz.*, linoleic acid (37-47%), oleic acid (35-43%), palmitic acid (9-11%) and stearic acid (5-10).

Sesame seed is used in baking, confectionery making and other food-related industries. The oil is used in cooking, salad dressings and margarine. Because it contains sesamol, an antioxidant, its oil has a long shelf life. It's also used to make soap, pharmaceuticals, cosmetics, paints and other industrial products. Its oil has a synergistic pesticide effect when combined with rotenone and pyrethrins.

Sesame meal is a high-quality protein feed (40%) for poultry and animals. Sesame's production potential has not been fully realised as a result of a variety of biotic and abiotic factors. The invasion of insect pests is the most important limiting factor for raising yield among the numerous biotic variables. At various stages of growth, 29 insect pests attack the sesame crop (Biswas *et al.*, 2001), especially *Antigastra catalaunalis* (Duponchel), family Crambidae, order Lepidoptera, is one of India's most dangerous pests. Except for the root, it attacks the entire sesame plant. During the early phases of crop development, larvae feed on sensitive leaves via webbing the upper foliage. It feeds inside the flower during the blossoming stage and on developing capsule seeds during the capsule stage. If the infestation is not detected early on, the plant will die. When an infestation appears at a later stage, the sick shoot's growth is impeded. In a week, a single larva can cause damage to two to three

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plants (Figure 1). According to Ahuja and Bakhetia (1995), *A. catalaunalis* might reduce yield by up to 90%.

a) Plant damage b) Capsule damage

Figure 1: Plant damage and capsule damage by larvae of sesame leaf webber

## Biology of the Sesame Leaf Webber

The total duration of each stage of the Sesame Leaf roller's life cycle, the *Antigastra catalaunalis*, can vary depending on environmental conditions, mainly temperature. The approximate day durations for each stage are listed below in broad strokes.

The sesame leaf roller is a four-stage holometabolous lepidopteron pest.

*1. Egg*

*A. catalaunalis* had pre- and post-ovipositional intervals of 3 to 5 days. Females could lay up to 232 eggs, with an average of 86. From April to early November, the incubation period was two days. Kumar and Goel (1994) studied whether *A. catalaunalis* eggs were deposited alone or in groups of 2-5. The eggs were round in shape and or in groups of 2-5. The eggs were round in shape and had a tint of green.

*2. Larva*

When completely grown, larva has a black head, body tubercles and minute hairs. Its colouring is light green. Its length is about 20 mm. The larval stage lasts 11 to 16 days. In 8.46 days, the larva progresses through five instars before becoming a pupa. The larval durations were 1.00, 1.37, 1.59, 2.09 and 2.41 days for the first, second, third, fourth and fifth instars, respectively.

3. *Pupa*

Pupation can be found all over the web. Approximately 7 to 10 days pass during the pupal stage. With an increase between July and September, invasion starts when the crop is 15 days long-standing. *A. catalaunalis* pupated inside the webbed leaves for an average of 4.50±0.45 days.

*4. Adult*

Adults lived between 5 and 16 days. The entire life cycle lasted 18 to 40 days, with female fecundity reaching 223.

## Integrated Pest Management Strategies for *A. catalaunalis*

*1. Adopt Cultural Practices*

• *Crop Rotation*: Implementing crop rotation with non-host crops disrupts the sesame leaf roller's life cycle and minimises pest population accumulation.

• *Field Sanitation*: Field sanitation includes eradicating weed hosts and clearing agricultural waste to eliminate potential breeding and overwintering locations for pests.

• *Timely Planting*: Planting at the right time can help prevent peak insect populations and lower the vulnerability of sesame plants to infestations.

*2. Scouting and Monitoring: Field Inspections on a Regular Basis*

Regularly assess the field for the existence and population levels of sesame leaf roller larvae and adult moths. Pheromone traps can be used to attract and monitor male moths, providing early warning of pest activity.

*3. Biological Control: Natural Enemies Conservation*

Encourage the existence and conservation of natural enemies that feed on sesame leaf roller larvae, such as parasitic wasps and carnivores. Insecticides based on *Bacillus thuringiensis* (*Bt*) or other microbial agents are used to specifically target caterpillars while remaining harmless to beneficial organisms.

*Chemical Control*

Spray 5% NSKE or 5% neem oil or spinosad 45SC @ 0.2 ml $l^{-1,}$ flubendiamide 480 SC @ 0.3 ml $l^{-1}$, chlorantraniliprole 18.5SC @ 0.4 ml $l^{-1}$, quinalphos 25EC @ 2 ml $l^{-1}$ or profenofos 50EC @ 2 ml $l^{-1}$ as a chemical control.

## Conclusion

In the *kharif* season, Indian farmers are now working to handle pest problems in the sesame crop. However, from the time the seeds germinate until the stage at which the crop reaches maturity, the sesame crop is affected by sesame leaf roller and capsule borer larvae, which causes the farmers to suffer economic loss. Up to 90% of the damage was caused by this insect. In order to help farmers get rid of dangerous pests and illnesses quickly, affordably and without harming the environment, we want to share integrated pest management strategies with them.

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