

Mustard Saw fly, (Athalia lugens): Identification, Life cycle and Integrated Pest Management

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ABSTRACT

India's important oil seed crop mustard contributes significantly to edible oil production. *Athalia lugens proxima* (Klug) or mustard sawfly is one of the major defoliating pests causing considered damage in the early stages of crop growth. Larval feeding causes leaf skeletonisation, reduce plant vigour and yield loss. Severe infestations may have adverse effect on seed yield and oil content. This article reviews the distribution, identification, damage symptoms and distribution and integrated pest management strategies of mustard sawfly. Integrated use of cultural, mechanical biological and need based chemical control measures is effective in pest management and sustainable mustard production.

INTRODUCTION

Mustard is one of the major winters (*Rabi*) oilseed crop is mainly grown in northern India. Usually sowing starts in late October and continues into November. The crop flowers in December and January, and harvesting is generally from mid-February to April. Mustard is the third largest source of vegetable oil in the world after soybean and palm oil and the second

largest source of protein meal after soybean meal. Mustard contains 33–46% oil, with average oil recovery being about 32–38% (Patel *et al.*, 2022). India grows mustard in 13 states, with Rajasthan, Uttar Pradesh, Haryana, and West Bengal accounting for the majority of production. These states contribute about 45%, 13%, 11%, and 8% of total production, respectively, and they together contribute

nearly 77% of the country's mustard production (Shaila *et al.*, 2022). The mustard sawfly, *Athalia lugens proxima* (Klug) (Hymenoptera: Tenthredinidae), is one of the major insect pests of mustard. It is one of the few hymenopteran species that attacks cultivated plants. The pest was first reported from Bombay and Bengal and subsequently from almost all the mustard-growing states of India. Over the years, the mustard sawfly has emerged as a serious pest of cruciferous crops throughout the Oriental region and caused considerable damage to their growth and yield.

Distribution and status: The mustard sawfly, *Athalia lugens* is widely distributed in India. It is also widespread in many Asian countries including Indonesia, Taiwan, Myanmar and other parts of the Indian sub-continent. The pest is regarded as one of the major defoliators of rapeseed-mustard crops in early growth stages.

Host range: Mustard sawfly attacks a wide range of host plants such as mustard, cabbage, radish, turnip and okra.

Identification of Mustard saw fly:

Egg: Freshly laid eggs are milky white in colour and gradually black before hatching. The female inserts eggs singly into the leaf tissue near the margins by making slits with its serrated, saw-like ovipositor. The characteristic egg-laying structure gives its common name, "sawfly."

Larva: The newly hatched larvae are greenish grey with a shiny black head. The body has a cylindrical shape black head. The body has a cylindrical shape with five longitudinal black stripes on the dorsal surface. Mature larvae are roughly 15-18 mm long and have eight pairs of abdominal prolegs. The larval life stage has five instars.

Pupa: The mature larva spins silken cocoon in the soil at a depth of about 9 cm. Cocoons can

be found under fallen leaves and other plant debris. The pupa period is generally one to two weeks.

Adult: The adults are pale brown markings on the body. The wings are red - brown. Adults are most active in the early morning hours, especially at sunrise. The insect aestivates during the hot summer months.

Nature of Damage: In the pest larval stage is the destructive. Young larvae feed on the leaf epidermis from the margins towards the midrib, giving a scraped appearance. As they feed, the larval eat all the leaf tissue, leaving only the veins, so the leaves have a skeletonized appearance. Heavy infestations at the seedling stage can defoliate the crop completely.

The mustard sawfly infestation has been reported to cause yield loss ranging from 5-18%. In extreme cases, especially at the seedling stage, farmers may have to replant the crop. Heavy infestation can cause wilting of the plant leading to considerable reduction in seed yield and oil content.



Control Measures

Cultural Control:

- ❖ Use of resistant and tolerant variety.
- ❖ Early sowing plays a crucial role in protecting mustard crop from sawfly infestation (October in North India).
- ❖ Deep summer ploughing helps destroy larvae and pupa present in the soil.

- ❖ Follow in crop rotation with non-cruciferous crops such as wheat or pluses breaks the pest life cycle.
- ❖ Timely removal of cruciferous weeds and around the field eliminates alternate host plants and reduces pest carryover.

Mechanical Control:

- ❖ Handpick and destroy in the larvae, particularly during early morning and late evening they are most active, is essential.
- ❖ Regular field scouting, particularly during the seedling stage, is essential for the early detection management of infestations.

Biological Control:

- ❖ Application of entomopathogenic fungi such as *Beauveria bassiana* and *Metarhizium anisopliae* can help suppress larval populations under favorable humid conditions (Vinyas et al., 2022).
- ❖ Predatory birds insectivorous such as common Myna and Black Drongo, which feed on sawfly larvae.
- ❖ Entomopathogenic nematodes of *Steinernema Heterorhabditis* may infect and kill soil-dwelling stages of the pest.
- ❖ *Perilissus cingulator* parasitoids in release 50,000 larvae per hectare.
- ❖ Predators like ladybird beetles, ground beetles and spiders may prey upon eggs and young larvae.

Chemical Control:

- ❖ Application of Emamectins Benzoate 5 SG @ 250 g/ha. has been reported to provide effective control of mustard sawfly larvae.
- ❖ Emamectin Benzoate 0.0025%, Quinalphos 0.0600% and Flubendiamide 0.0100% were found to be the most effective (Aggarwal and Patel 2025).
- ❖ Cyantaniiprole 10.26 OD 0.0025 per cent /ha.

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