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(Short Communication)

Life systems of sawfly

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Abstract
The sawfly is one of the most important pests of mustard and other cruciferous plants, causes qualitative and quantitative loses of the crop. The mustard sawfly, *Athalia lugens* (Hymenoptera: Tenthredinidae) is a polyphagous insect and is considered as devastating pest of vegetables in India. Native: - Southern Mexico and Central America where it feeds on the foliage of *Cocoloba* spp. The life history and habits of tropical sawfly, *Athalia lugens* were reported on Roatan Islands. On Roatan Island, the only host is the sea grape, *C. unifera,* a small to medium tree, which occurs on sandy beaches just above the line. The adults are colorful insects and relatively strong fliers. Management of sawfly like summer ploughing to destroy the pupae, maintain clean cultivation and early sowing should be done.

Keywords: sawfly, mustard, adults, crucifers

Introduction

Scientific classification

1. Kingdom : Animalia
2. Phylum : Arthropoda
3. Class : Insecta
4. Order : Hymenoptera
5. Family : Tenthredinidae
6. Genus : *Athalia*
7. Species : *lugens*

- The sawfly is one of the most important pests of mustard and other cruciferous plants, causes qualitative and quantitative loses of the crop.
- The mustard sawfly, *Athalia lugens*) (Hymenoptera: Tenthredinidae) is a polyphagous insect and is considered as devastating pest of vegetables in India.
- The pest has been recorded from almost all the states of India.
- The mustard sawfly is widely distributed in Indonesia, Formosa, Burma and the Indian subcontinent.
- It feeds on various cruciferous plants like mustard, cabbage, cauliflower, knoll-khol and turnip etc.

Pest mustard sawfly, *Athalia lugens*

- **Native:** Southen Mexico and Central America where it feeds on the foliage of *Cocoloba* spp.
- The life history and habits of tropical sawfly, *Athalia lugens* were reported on Roatan Islands (Ciesla W.M. 2002) [3].
- On Roatan Island, the only host is the sea grape, *C. unifera,* a small to medium tree, which occurs on sandy beaches just above the line
- The adults are colorful insects and relatively strong fliers
- They swarm around host trees on warm, sunny days and during cool or overcast period rest on sea grape foliage and branches
- A period of peak adult activity occurred between January 8 and 10.

Biology of mustard sawfly, *Athalia lugens*

- Babendreier and Polesny (1999) [2] observed the life history of *Athalia* spp. was investigated in laboratory and field experiments (Switzerland).

- Development from egg to adult is completed in 38 days foe males and in 39 days females.
- Under laboratory conditions, males of this species live 50 days while female survived significantly longer 72 days.
- Three peak emergence times could be observed first, in June then second, in August and third, in October.
- Males emerged approximately one or two weeks earlier than females.
- Hibernation is observed in mature larvae in the cocoon or in adult (only females).
- In Switzerland, two generations were observed
- Sachan and Ujagir (1989) [10] studied the oviposition by *Athalia* spp on various cultivars of Indian mustard and on *Brassica rugosa, B. alba* (white mustard) and *B. nigra and B. tournefortii* in the laboratory
- More eggs were laid on the Indian mustard cv. RC-781 than on any of the other plants and the lowest number of eggs was laid on cv. Stoke, which is exotic
- Very low numbers of eggs were also laid on the *B. nigra*and *B. tournefortii*

Identification of mustard sawfly, *Athalia lugens*

- **Larva:** Greenish black with wrinkled body and has eight pairs of pro- legs. On touch the larva falls to ground and feigns death
- **Adult:** Head and thorax is black in colour, abdomen is orange colour, wings are translucent, smoky with black veins
- Adult fly measures 8-11 mm in length and orange yellow coloured insect with black markings on the body especially femora and thorax
- Female with saw like ovipositor and abdomen is orange colour Wings are translucent, Smokey with black coloured veins
- Roonwal (1952) [9] observed that the adult flies were short and thick- bodied and were marked with black and orange colors.
- Their wings are smoky with black veins and though called "flies", they have two pairs of wings.
- Full grown larvae are about 20 mm. long, black, smooth with 8 pairs of prolegs, in addition to three pairs of true thoracic legs and have three long stripes on the body.
- On being touched, they have a tendency to curl up and drop on the ground, feigning dead.
- Kapur (1950) [4] observed that the larvae of mustard sawfly were dark green and had 8 pairs of abdominal prolegs.
- There are five black stripes on the back and the body has a wrinkled appearance.
- When full grown, a larvae are measures about 16-18 mm. in length.
- The adults are orange yellow small insects with black markings on the body and have smoky wings with black veins

Life cycle of mustard sawfly, *Athalia lugens*

- **Eggs:** Eggs are insert singly, in slits made with saw like ovipositor along the under sides of the leaf margin.
- Each female lays 60 eggs
- I.P 4-5 days
- **Larva**: Cylindrical, greenish black in colour with wrinkled body and has 7-8 pairs of prolegs.
- A full grown larva measures 16-18mm in length, on touch the larva suddenly falls to ground and like a feign death.
- L.P – 13-18 days
- **Pupa:** Pupation in earthen cocoon in soil.
- P.P – 10-15 days
- Saini *et al.* (1987) [11] reared larvae of *Athalia lugens* on radish leaves to the adult stage under laboratory conditions at 32-390c and 70-80% RH.
- Eggs from mature females, which were removed in an isotonic solution, were placed on moist filter paper in petri dishes containing 1 cm thick layers of cotton wool.
- The eggs were touched with a fine brush dipped in solutions of various chemicals, of which the most effective doses were: calcium chloride 10.0%, hydrochloric acid (0.05%), acetic acid (0.5%) and ascorbic acid (0.4%)
- The percentage of eggs which hatched ranged from 11.43% (calcium chloride 10.0%) to 77.78% (ascorbic acid)

Incidence of mustard sawfly, *Athalia lugens*

- The incidence of insect pests, natural enemies and yield performances of 4 promising cultivars (B-9, NC-1, RW-351 and PGS-1004) of rape and mustard, sown on 21 November, 7 December and 21 December 1998 under sub-Himalayan terai zone of West Bengal, India, were sudied (Karmakar 2003) [5].
- Awasthi (1998) [1] assessed the extent of damage in Indian mustard by *Phyllotreta cruciferae* and *Athalia lugens* larvae through counting the number of damaged leaves /plant.
- Sharma *et al.* (1990) [12] carried out field studies in Palampur, Himachal Pradesh, India, to study the incidence of insect pests on sarson, toria and raya (Indian mustard).
- The major pests species were the aphids and sawfly.
- Ram *et al.* (1987) [8] observed the damage caused by the mustard saw fly and the aphids to Chinese cabbage in the field in Uttar Pradesh, India in November 1982 and 1983
- Khaire and Lawande (1986) [6] observed the incidence of pests on Chinese cabbage in the Maharashtra, India.
- The aphid and the chrysomelid *Chaetocnema indica* were more important pests than the petatomid bug and mustard sawfly.

Population dynamics of mustard sawfly, *Athalia lugens*

- Patel *et al.* (2000) [7] evaluated twenty-five radish seedlings sown during the third week of July and transplanted during the fourth week of October 1994 in Gujarat, India were evaluated for number of larvae (*Athalia lugens*) per plant at weekly intervals starting one week after germination in the seedbed and one week after transplanting in the seed production plot.
- The larval population started to increase during the fourth week of July and first week of November in the seedbed plot and transplanted crops, respectively.
- The population was negatively correlated with bright sunshine hours and positively correlated with rainfall, temperature, vapour pressure and relative humidity.
- Low larval activity was recorded when morning VP was

7-20 mm, evening RH was 24-55% and with 7-10 h of bright sunshine

Distribution of mustard sawfly, *Athalia lugens*

- Westendorff *et al.* (1999) [13] found that 34 species referred to 9 genera of 6 tribes and 4 sub families of tenthredinidae are reported.

Nature of damage by mustard sawfly, *Athalia lugens*

- Initially the larva nibbles leaves, later it feeds from the margins towards the midrib
- The grubs cause numerous shot holes and even riddled the entire leaves by voracious feeding
- They devour the epidermis of the shoot, resulting in drying up of seedlings and failure to bear seeds in older plants
- The larvae of mustard sawfly cause damage by eating the leaf radish and larvae also feed on leaves by cutting small holes into the lamina of the leaf and ultimately skeletonize the plant.

Management

- Summer ploughing to destroy the pupae.
- Maintain clean cultivation.
- Early sowing should be done.
- Apply irrigation in seedling stage is very crucial for saw fly management, because most of the larva die due to drowning effect (sink in water).
- Collection and destruction of larvae of saw fly in morning and evening hours.
- Use of bitter gourd seed oil emulsion as an antifeedant.
- Spray the crop with malathion 50EC @ 1 lit. orquinalphos 25EC @ 625ml in 500-600 lit. of water / ha once in October and again in March - April.

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