



Integrated Pest Management of Shoot and Fruit Borer in Okra

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Abstract

Fruit and shoot borer is one of the most prominent pests of okra causing harm to crops in various growth stages. It is distributed all over the country and has various species. Chemical pesticides typically have broad-spectrum effects, killing both beneficial and harmful insects while having detrimental effects on the ecology of the surrounding area. In the current okra situation, integrated pest management (IPM) has a lot of potential for increasing crop output while lowering insect incidence. Large-scale extension education and demonstration activities are required to encourage the nation's farmers to use an integrated strategy to pest control.

Keywords: - okra, shoot and fruit borer

Introduction

Okra, also known as lady finger or *Abelmoschus esculentus* (L.) is a commercial vegetable crop that belongs to the Malvaceae family. It is grown extensively throughout India and holds a significant position among vegetable crops, primarily for its immature fruits. Okra is also referred to as "Bhindi." Global okra production is dominated by India. With 1,019.42, 893.96, and 794.10 thousand tonnes of okra produced in 2021–2022, respectively, Gujarat, West Bengal, and Bihar were the top three producing states in India¹. In 2021, 531 thousand hectares of okra were harvested throughout India. Okra is a vital component of the human diet and a good source of nutrients that are frequently deficient in the diets of developing nations, such as protein, carbs, vitamins, calcium, potassium, enzymes, and all minerals. Each 100 g edible portion of okra pods has the following nutrients: water (88.6 g), energy (144.00 kJ; 36 kcal), protein 2.10 g, carbohydrate (8.20 g), fat (0.20 g), fibre 1.70 g, calcium (84.00 mg), potassium (90.00 mg), iron (1.20 mg), beta-carotene (185.00 µg), riboflavin (0.08 mg), thiamine (0.04 mg), niacin (0.60 mg), and ascorbic acid (47.0 mg).

Although okra is a more profitable crop for farmers, its productive cultivation is hindered by the presence of several insect pests at different phases of its growth. Okra infestations by over 13 pests have been documented in India. The prominent pests of okra are Aphid, Jassid, Whitefly, Shoot and fruit borer. While few minor pests are Leaf rollers, mites, green plant bugs, and green semi-loopers. Among them the most damaging pests of okra are shoot and fruit borer (*Earias insulana* and *E. vittella*), whose immature larvae eat tender shoots during the early stages of plant growth and whose mature larvae injure fruits, severely reducing yield. The impacted fruits are no longer suitable for human eating or seed collection. It has been found that the borer damages okra shoots by 24.6 to 26.0 per cent and ruins fruits by 40 to 100 per cent. In this article, we are going to focus on the Alternate host plant and distribution, morphology, nature of the damage and damaging symptoms, biological life cycle and finally the integrative management strategies.

Alternate Host Plant and Distribution

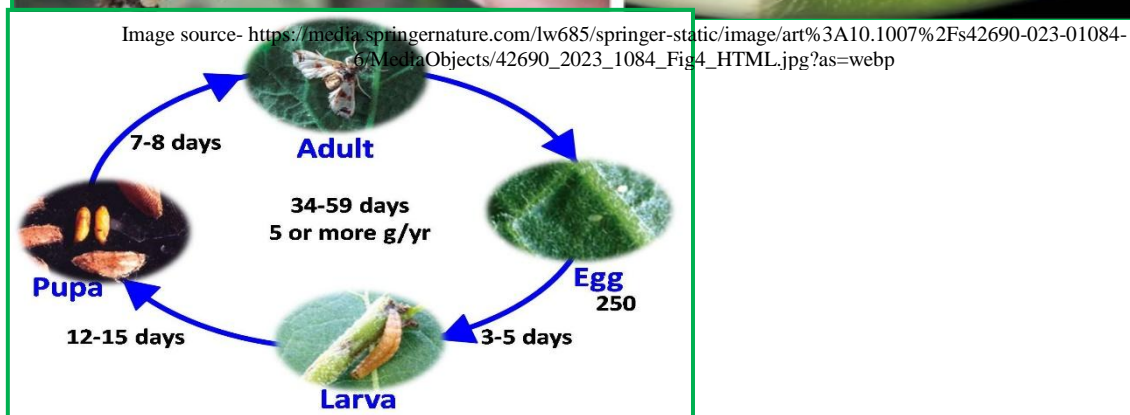
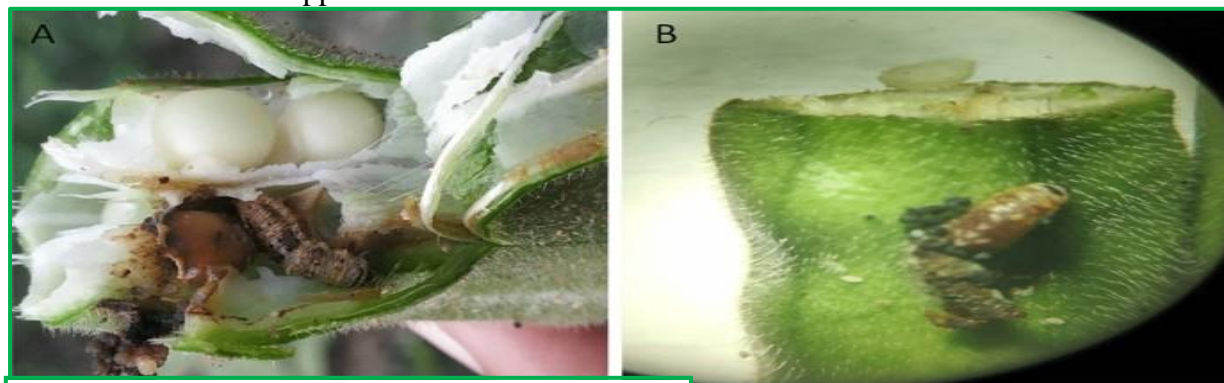
It is an oligophagous pest that mainly infests cotton, okra, hibiscus and other malvaceous vegetables. It is mainly found in India, Bangladesh, Pakistan, Sri Lanka, Myanmar, Indonesia, New Guinea and Fiji. Mostly found in South India than in North India

Morphological identification

Light greenish blue eggs with longitudinal ridges are laid by the fruit borer *Earias vittella*, which also feeds on okra shoots. The fully developed larvae (caterpillars) are 1.64 cm long, with colours ranging from green to black and orange. The larvae are brownish with pale yellow streaks ventrally and white streaks dorsally. Its rough, bluntly rounded, chocolate-brown, inverted boat-shaped pupa is developed on the stem or fruits and is a grey cocoon. The adult borer's head and thorax are ochreous white, while the forewings are pale white with a wedge-shaped pattern and a silvery, creamy white tint. The adults are little, measuring 1.25 cm across the forewing. The middle of the forewing of *E. vitella* moths has a thin, light green longitudinal band. The key difference between a male and a female is that the male has thick hair at the anal end of the body, while the female is larger than the male and has a V-shaped anal region. The middle and rear wings have a horizontal green patch. Whereas the larva of *Earias insulana* is a cream-coloured body with orange dots on the prothorax. Adults are smaller than *E. vitella* head and thorax is of pea green colour. Forewings uniformly pale yellowish green.

Nature of damage and damaging symptoms

The growing shoots' terminal portions are drilled by the caterpillars, allowing the shoots to descend through internal tunnels. Consequently, the shoot either dries up or drops. Second the larvae infiltrate, by creating holes in the fruit. Attacked fruits have excreta-filled boreholes, rendering them unfit for ingestion and losing their marketability. The infested fruits present also have a deformed appearance.



pupal phases took 3–4 days, 10–17 days, and 6–10 days, respectively. Its

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<https://i.pinimg.com/564x/82/a5/e6/82a5e673fc03e55d5bb3aa4d74b8ae8d.jpg>

adult medium-sized head and thorax are ochreous white, while its larvae are brown with longitudinal white stripes on the dorsal side. It severely damages fruits and tender shoots by boring into them. After developing into an adult with white wings and triangular brown and red patterns on the forewing, the pupa forms an inverted boat-shaped cocoon. In twenty to twenty-five days, their whole life cycle is over.

Integrative management strategies for shoot and fruit borer in okra

- Collection and destruction of damaged plant parts to prevent population buildup.
- Dispose of alternate host, weeds, crop residues and other debris
- Avoid mono-cropping of okra
- Practices like crop rotation and avoiding malvacea crops in sequence, deep summer ploughing is effective against the pupa.
- After 25- 30 days after sowing weeding and earthing up in rows should be done. The field should be free from weeds and other wild plants
- Heavily infested plants should be uprooted and burned.
- Resistant varieties such as Parkins Long Green, Karnual Special, AE-57, PMS-8, PKX-9275 should be used.
- For monitoring and mass trapping of the shoot and fruit borer (*Earias vittella*), pheromone traps should be placed at a rate of five per acre. After every 15 to 20-day period, swap out the lures for new ones.
- Light traps should be placed at 12 ha⁻¹ to attract in and destroy moths.
- Establish bird perches at 10 acres per person. This will allow predatory birds to visit your field.
- Avoid using insecticides at the time of fruit maturation and harvest because the synthetic pyrethroids cause a resurgence in insects.
- 4-5 times in the gap of a week, release the egg Parasitoid *Trichogramma chilonis* or *T. brasiliensis* at a rate of 1-1.5 lakh ha⁻¹ for shoot and fruit borer.
- Preserve the current bio-control agents in the field, such as Coccinellids, spiders, syrphid flies, and so on, by encouraging the use of microbial and botanical biopesticides instead of chemical pesticides and avoiding, postponing, and minimising their use.
- Increase the amount of bio-control agents such as predators such as *Chrysopa* sp. and *Coccinella* sp., larval parasitoids such as *Bracon* sp. and *Campoletis chlorideae* and *Chelonus blackburni*, and egg parasitoids such as *Trichogramma chilonis*, *Trichogramma achaea*, *Trichogrammatoidea* sp., *Telenomus* sp., *Encarsia* spp.
- If a severe infestation is observed spraying of Neem oil 1500 ppm @ 1-1.5 ml lit⁻¹ or NSKE 5% 50 gm lit⁻¹ or *Beauveria bassiana*, *Metarhizium anisopliae* @ 5-10 ml lit⁻¹ or *Bacillus thuringiensis* Var. *Kurstaki* @ 3-5 ml lit⁻¹ of water spray any one of the insecticides starting from one month after planting at 15 days intervals.
- Spray Lambda-cyhalothrin at 2 ml lit⁻¹, Emamectin benzoate at 5% SG at 1 gm lit⁻¹, Spinosad at 45% SC at 0.20-0.30 ml lit⁻¹ or Buprofezin 70 DF @ 0.55 ml lit⁻¹ Water if the borer incidence surpasses the economic threshold level.

Conclusion

Okra is a significant vegetable crop that is farmed on 1.26 million hectares worldwide and is extensively cultivated in nearly every state in the country. Shoot and fruit borer are common and serious issues with okra, causing 45–57 per cent damage to fruits. A Shoot and fruit borer infestation can be efficiently controlled with an integrated pest management (IPM) strategy. This pest management technique, which functions as an anti-resistant mechanism in pests, is thought to be environmentally friendly.

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