

Pest management of yellow stem borer *Scirpophaga incertulas* in Rice

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ARTICLE ID: 47

Introduction

Rice is the most important cereal crop in the developing world and is the staple food of over half the world's population. This crop is cultivated in at least 114, mostly developing countries. Almost 90% of the rice is grown and consumed in Asia. Rice contains less protein from other cereals crop 6-7% and 2-2.5% fat. India has the largest area under rice crop and ranks second in production next to china. West Bengal has the largest area and largest production under Rice crop in India. Rice is grown in almost all the states. West Bengal, Uttar Pradesh, Madhya Pradesh, Bihar, Rajasthan, and Andhra Pradesh, lead in the area. West Bengal and Uttar Pradesh have the highest rice production. The average yield in Punjab 3346 kg/ha.

Insect pests are severe constraints to rice production throughout the world. Rice is affected by more than 100 insects among which 10-12 an economic threat to rice cultivation. Rice stem borers occupy the major status as pests and cause considerable damage to rice cultivation in almost all rice growing stages. The status of stem borer incidence in 21 states of India. The yellow stem borer, which infests the plant from seedling to maturity stage. The yellow stem borer has been found in predominant in India. It is caused 1 to 19% yield loss in early planted and 38 to 80% loss in late transplanted in rice crop. Dead heart and whitehead caused by yellow stem borer in rice crop. It caused a 3 to 95% grain yield loss in India.

The life cycle of stem borer

Rice stem borer passes its life cycle through four stages viz, egg, larva, pupa, and adult. May get prolonged depending on the weather condition. The entire life cycle complete in 35- 70

Days. Generally, two or three generations of this pest are complete during a single crop.

Mark of identification

Eggs laid on the upper leaf surface in masses of 15-80 and covered with buff-coloured hairs. The number of eggs laid by a single female moth is up to 150. Eggs hatch in about 5 to 10 days. The instar larvae are dispersed with the help of silken threads and wind. Then they bore into the rice stem. Generally, only one larva enters the plant. The larvae feed on the internal tissues of the stem and undergo 5 to 6 moulting. A fully-grown larva formed in about 20 to 40 days depending upon the climate condition. A developed larva measures about 13 mm in length and is white and yellowish-white in colour. The larva makes an exit hole and pupates within the larval tunnel, usually at the base of the plant. The cocoon is silky white in appearance. It remains in the pupal stage for 6 to 12 days. The adult is dirty white or greenish-yellow front wings. The adult moth is small in size measuring about 10 to 15 mm with a wing expanse of 25 to 45 mm and a black spot on each of the forewing.

Nature and damage

The caterpillar causes the damage. Which bores into from the growing point to downwards. Because of feeding, the central shoot is killed causing dead hearts (vegetative stage). The dry growing part of the plant causes a dead heart. The larva attack in early-stage produce are devoid of grain and known as “white ear” or white head” (reproductive stage). White ear due to drying of the entire panicle. Basmati varieties suffer heavy damage than coarse varieties. Caterpillar alone is destructive. It bores and feeds inside the stem and constructs an emergence hole that was always located above the water level.



Growing stage Stem borer affected field



Growing stage damage White ear or white head Larva

Management

- Resistant varieties like ratna, jaya, IR20, IR26, IR36, IR50 and Chandina, may be grown.
- Close planting and continuous water stagnation at the early stage should be avoided.
- The egg masses may be collected from plants and destroyed.
- Ploughing and irrigating the fallow rice paddy in early spring to kill overwintering larva and pupae.
- To use and apply enough fertilizer to have a healthy crop so those to stand the pest attack.
- Removal and destruction of all the dead hearts and infected plants show early pinhole damage.
- Release of egg parasitoid *Trichogramma japonicom* @ 50,000/ha. During egg laid period. Weekly intervals.
- The stubbles should be removed and destroyed by ploughing the field immediately after the harvest.
- Use the light trap to attract a nocturnal moth. Pheromone traps @ five traps/ha.
- the yellow stem borer lay eggs near the tip of the leaf hence clipping and leaning of the tip of the seedling before transplanting to eliminate the egg mass.
- Apply *bacillus thuringiensis kurstaki* and neem seed kernel extract in the combination of 2.5kg/ha. Moreover, reduce to 1% oviposition.
- Application of cartap hydrochloride 4G @ 2.5kg a.i. /ha.
- A spray of triazophos 40 EC @ 1 liter/ha.



- Nursery protection by applying phorate @ 12.5kg/ha. Of nursery bed.
- Spray of fipronil 5 SC@ 2ml/liter and flubendiamide 48 SC @ 0.2ml/liter.

