Pacific Pests, Pathogens, Weeds & Pesticides - Online edition

Rice pink stem borer (409)

Common Name

Rice pink stem borer; also known as the Asiatic pink stem borer or the purple stem borer.

Scientific Name

Sesamia inferens. A moth of the Noctuidae.

Distribution

South and Southeast Asia, North America (Hawaii), Oceania. It is recorded from Guam, Papua New Guinea, and Solomon Islands.

Hosts

Rice, maize, millet, sorghum, sugarcane, wheat, and many grasses and some sedges, e.g., *Coix lacryma-jobi* (Job's tears), *Echinochloa colona* (jungle rice), *Panicum repens* (torpedo grass), *Setaria pumila* (yellow foxtail), and others.

Symptoms & Life Cycle

The larvae do the damage, similar to other species of rice borer (**see Fact Sheet nos. 408, 410, 411**). The larvae tunnel into the stems towards the base of the plant, causing it to wilt and die, a condition known as 'deadheart'. The stems are easily pulled out (Photo 3). Feeding at the base of the panicles may prevent emergence, or result in white unfilled grain of those that have emerged, a symptom known as 'whitehead' (Photo 4).

Eggs are laid between the leaf sheaths and stem, up to 100 in rows; they are almost round, creamy-white, later turning pink and black before hatching. Often, the larvae disperse onto nearby tillers after hatching. They are white at first, but when mature deep pink with an orange head, and 25-35 mm long. Pupation occurs in a larval tunnel, but it can occur between leaf sheath and stem. If in a tunnel, the larvae cut an exist hole for the adult. Usually the external opening of the exit hole is covered with fine web and cannot be easily seen from the outside.

Adults have a pale yellow-brown body, with thick brown tuft of hair over the head and thorax. Wingspans of males are from 28 mm male, and females from 35 mm. Forewings are light brown, hindwings are whitish. The antennae differ between the sexes: male antennae are feather-like, females antennae are long and thin. Adults are nocturnal and strong flyers. The life-cycle is about 55 days in tropical countries, and there may be six generations a year.

Photo 1. Adult pink stem borer, *Sesamia inferens* (underside)

Photo 1. Adult pink stem borer, *Sesamia inferens* (top).


Photo 3. Damage ('deadheart') to rice stem by *Chilo auricilius* (damage by *Sesamia inferens* is similar).


Photo 4. 'Whitehead' - a symptom caused by stem borers: the base of the panicle is damaged preventing it from emerging or, if already emerged, the grain is unfilled and white.

Impact

Sesamia inferens is considered one of the least destructive of the group that attack rice. Outbreaks in rice are usually late in the crop, and occur when sugarcane and maize are growing nearby and become infested.

In Asia, the most destructive and widely distributed stem borers are the yellow stem borer, *Scirpophaga incertulas*, the striped stem borer, *Chilo suppressalis*, the white stem borer, *Scirpophaga innotata*, the darkheaded stem borer, *Chilo polychrysus*, and the pink borer, *Sesamia inferens*. Rice plants can compensate the damage caused by stem borers up to the stage of maximum tillering; however, infestation during panicle initiation and ear emergence, can cause a loss in yield.

Detection & inspection

Look for deadhearts and whiteheads at the vegetative and flowering stages, respectively. Look for eggs between leaf sheaths and stems, and frass, larvae and pupae in the stems. It is suggested (CABI) that the presence of eggs would be the most useful to monitor, and all stem borer species should be counted. A threshold of 1-2 egg masses per m^2 during i) stem elongation, and ii) during panicle extension would warrant action.

Management

BIOSECURITY

Countries not yet infested by the pink stem borer should consider all likely pathways for entry, and apply quarantine measures accordingly. Many countries throughout Asia, Africa, the Americas and Oceania are at risk. Pathways of introduction are likely to be via produce contaminated by pieces of stem of the many hosts infested by larvae or pupae.

NATURAL ENEMIES

There are many predators (e.g. grasshoppers, crickets and ladybird beetles) and parasitoids that attack the pink stem borer. Parasitoids of eggs, larvae and pupae. The egg parasitoids *Telenomus*, *Tetrastichus*, and *Trichogramma* are the most important. Taiwan and the Philippines have introduced the tachnid fly, *Stumiopsis inferens*. However, CABI's conclusion is that further introductions are probably not necessary as most countries have sufficient: importantly, the aim should be to conserve those that exist by limiting insecticide use. But note, biocontrol at the egg stage needs to be very high because the moth reproduces rapidly.

CULTURAL CONTROL

Sesamia inferens usually occurs with other rice stem borers, e.g., *Chilo* and *Scirpophaga* species and is controlled by the same measures applied to them.

Before planting:

- Handpicking is not practical as the eggs are hidden between leaf sheath and stem.
- Prepare the land thoroughly ensuring vigorous plant growth when planted, and to destroy larvae and pupae from a previous crop.
- Plant at high density to compensate for damage that may occur.
- Rotate rice with non-host crops, e.g., legumes.

During growth:

- Try to synchronise planting in any area, avoiding overlapping crops and preventing pest populations moving from harvested to standing crops. Additionally, choose varieties with similar times to maturity.
- If the crop is seasonal, plant early. Two early-maturing crops have been found to be less damaged than a single late-maturing variety.
- If irrigating, raise the level of the water from time to time to submerge the eggs on the lower parts of the plant.
- Weed as soon as required to promote good crop growth.
- Cut out the stems with deadhearts and remove from the field. Destroy the larvae or burn the stalk. Note, this is labour intensive and not very effective as the pest may already have left.
- Apply nitrogen fertilizer in split applications: check local recommendations for rates and timing.

After harvest:

- Harvest crops at ground level to remove the larvae in the stubble.
- Plough remaining rice stubble into the soil to kill larvae and pupae, and avoid leaving unharvested plants. Alternatively, irrigate the field, if that is possible.
- Remove or plough in weeds (grasses and sedges), which may be alternative hosts.

RESISTANT VARIETIES

Modern rice varieties that are relatively thin-stemmed, short, high tillering, and early maturing, may result in less damage from this moth, and stem borers generally. This aspect is important as well-grown, vigorous crops can withstand 20% deadhearts and 10% whiteheads before yield is affected.

CHEMICAL CONTROL

It is unlikely that chemical control would be effective because eggs are laid between the leaf sheaths and stem and difficult to reach. Systemic products might have greater impact, but are likely to be more expensive, and perhaps uneconomic. There is also the risk of destroying natural enemies. If chemicals are needed:

- Use abamectin, a natural fermentation product from a bacterium.
- In Fiji, diazinon and bifenthrin are recommended for (unspecified) stem borers.
- Chlorpyrifos and fipronil, have also been recommended (for all stem borers), but note that chlorpyrifos is an organophosphate insecticide, and is a potent nerve agent; the World Health Organization (WHO) considers chlorpyrifos to be moderately hazardous (Class II). The use of fipronil is under review in Australia by the APVMA because of environmental concerns. A report is expected in 2020. Reviews on the use of chlorpyrifos are on-going in Europe, USA and Australia.
- All synthetic products are likely to reduce the impact of natural predators and parasitoids against this moth, and can only be recommended as a last resort.

When using a pesticide, always wear protective clothing and follow the instructions on the product label, such as dosage, timing of application, and pre-harvest interval. **Recommendations will vary with the crop and system of cultivation. Expert advice on the most appropriate pesticide to use should always be sought from local agricultural authorities.**

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Information (and Photo 4) from Rice Knowledge Bank. IRRI. (http://www.knowledgebank.irri.org/training/fact-sheets/pest-management/insects/item/stem-borer); and CABI (2019) Sesamia inferens (purple stem borer). Crop Protection Compendium. (https://www.cabi.org/cpc/datasheet/49751); and Walker, K (2005) Asiatic pink stem borer *(Sesamia inferens)*: PaDIL - (http://www.padil.gov.au); and from Pathak MD, Khan ZR (1994) Insect Pests of Rice. IRRI/ICIPE. (http://books.irri.org/9712200280_content.pd). Photos 1&2 Pest and Diseases Image Library, Bugwood.org. Photo 3 Anderson S, Tran-Nguyen L (2012) Gold-fringed Rice Borer (*Chilo auricilius*). (Source: N. Sallam DAFF Biosecurity.) PaDIL - (http://www.padil.gov.au).

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