

## **A.2. Identification of Insects**

# ជំងឺវារម្មនរបស់ដំណាំស្រូវ

## A.2.1. Rice Army Worm (*Mythimna separata*)



Picture 57 : Young larva.

**Description:** Young larva is green and becomes brownish with thin pale dorsal line later instars. Pupa is brown and formed in the soil. The adult moth has brown forewings with dark specks. The hind wings are pale brown.



Picture 58 : Mature larva.



Picture 59 : Pupa.

### Damage :

- Cutting off leaf tips, leaf margins, leaves and even the plants at the base.
- Cutting off rice panicles from the base.

### Factor favoring insect development:

- Presence of many alternate hosts.
- Periods of drought followed by heavy rains.



Picture 60 : Adult moth.

### Host plants:

Rice, corn and other plants.

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## A.2.2.

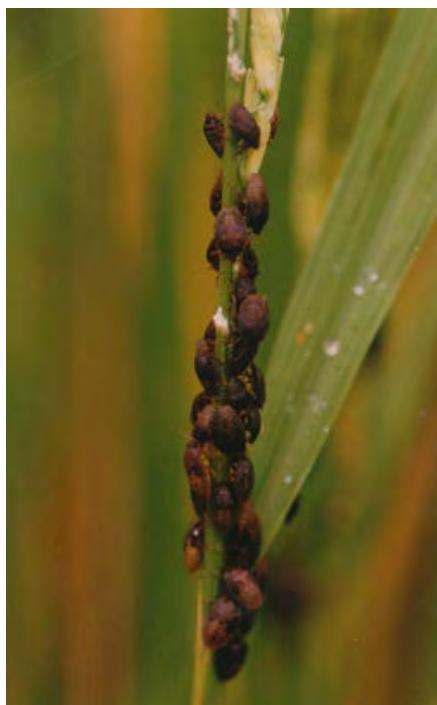
## Black Bug (*Scotinophara coarctata*)

### Description:

Eggs are laid in clusters on the basal parts of the rice plants near the water surface. Nymph is light brown. Adult is shiny brownish black to shiny black as it matures. It prefers to feed on the rice stem than on the leaves. During the day, the adults are found at the base of the plant and at nighttime they move upwards.



Picture 61 : Female adult with its eggs.



Picture 62 : Nymph on the rice stem.

### Damage:

Both the adults and nymphs suck the plant saps. They prefer to infest the bases of the rice stems causing the plant to weaken. Heavy infestation causes stunted growth, formation of white heads, half-filled or empty grains, and browning of leaves or bug burn.

### Factor favoring insect development:

- Rainfed and irrigated wetland environments.
- Vegetative stages of the rice plant.
- Poorly drained fields.
- Densely planted fields.
- Staggered planting of the rice crop.
- Excessive use of nitrogen.
- Presence of alternate hosts/plants.
- Lunar phase.



Picture 63 : Black bug on the rice stem.

**Host plants:** Rice and corn.

## មហាចង្កោត

### A.2.3. Brown Planthopper (*Nilaparvata lugens*)



Picture 64 : Eggs of brown planthopper.

#### Description:

Eggs are whitish. Nymphs are creamy white and pale brown. Adults have 2 forms, long winged and short winged. BPH is usually more abundant in the dry season than in the wet season.

It is commonly found in rainfed and irrigated fields during the reproductive stage of the rice plant.



Picture 65 : Nymph of brown planthopper.

#### Damage :

The adults and nymphs suck the plant sap of the leaf blades and leaf sheaths causing the yellowing of the plants. Hoppers burn or a complete drying of the plants is observed when there is a very high population density of BPH. The feeding exposes the plants to fungal and bacterial infections. BPH transmits ragged stunt and grassy stunt viruses.

#### Factor favoring insect development:

- Rainfed and irrigated wetland environments.
- Continuous submerged conditions in the field.
- Reproductive phase of the rice plant.
- High shady and humidity.
- Densely seeded crops.
- Excessive use of nitrogen.
- Early season insecticide spraying.



Picture 66 : Short winged and long winged adult.

#### Host plant:

Rice.

# ខ្យងពណ៌មាស

## A.2.4. Golden Apple Snail (*Pomacea canaliculata*)



Picture 67 : Eggs of gold apple snail.

### Description:

Eggs are light pink.

Adult is yellowish to dark brown shell. Most destructive stage is when the length of the shell is from 10 mm to 40 mm. It is active in the night.



Picture 68: Young golden apple snail.

### Damage:

- Rasp plant tissue.
- Feeding damage causes missing seedlings and floating cut leaves.



Picture 69: Adult golden apple snail and its eggs.

### Factor favoring insect development:

- Wetland and dryland habitats.
- Irrigation canals and rivers.
- Presence of alternate hosts.
- Presence of young seedlings.
- Continuous flooding of the rice fields.
- Presence of both gills and lung-breathing organs.
- Ability to survive in any environmental condition.

**Host plants:** Rice, taro and other crops.

# មហាចង្រ្កឹត

## A.2.5. Green Leafhopper (*Nephotettix virescens*)



Picture 70 : Eggs laid inside leaf sheaths.

### Description:

Eggs are cylindrical, whitish or pale-yellow and later become brown with red eyespots.

Nymphs are pale-yellow with small spines on the dorsal surface of abdominal segments.

Adults are slender and green and may have black markings on the head or wings. They are generally found in small numbers at the leaf blade and feed on the upper portion of the rice canopy.



Picture 71 : Nymph of green leafhopper.

### Damage:

- Feeds on rice by sucking the plant sap.
- Transmits virus diseases such as tungro, yellow dwarf, yellow-orange leaf, and transitory yellowing.

### Factors favoring insect development:

- Grasses near irrigation canals.
- Rice ratoons.
- Lot of sunshine, low rainfall, and high temperature.
- Rainfed and irrigated wetland environments.
- Excessive use of nitrogen.



Picture 72 : Adult of green leafhopper.

**Host plants:** Rice, wheat, corn, sugar cane and others.

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## A.2.6. Leaf Folder (*Cnaphalocrocis medinalis*)



Picture 73 : Young larva of leaf folder.

**Description:** Larvae are yellow, turn yellowish-green with brown heads as they mature, and are about 12-25 mm long. Each larva can make 2-4 folded leaves. Pupa is about 9-12 mm long and is found inside the rolled leaf. Adults are yellow brown in color. Adults usually emerge in the evening. Females lay eggs at night.



Picture 74 : Larva feeding inside the folded leaf .



Picture 75 : Cocoon.

### Damage:

- Larva removes the leaf tissues.
- Larva folds a leaf blade together and glues it with silk strands.
- Larva feeds inside the folded leaf creating longitudinal white and transparent streaks on the blade.



Picture 76 : Adult moth.

### Factor favoring insect development:

- Heavily fertilized fields.
- High humidity and shady areas.
- Presence of grassy weeds from rice fields and surrounding borders.

### Host plants:

Rice, maize, sorghum, wheat, oats, coconut, barley, banana, tobacco, millet, sugarcane and others.

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## A.2.7.

### Rice Bug (*Leptocorisa oratorius*)



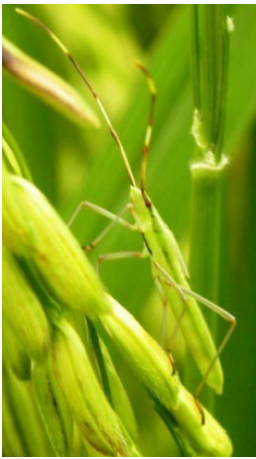
Picture 77 : Eggs.



Picture 78 : Nymph.

#### Description:

Eggs are oval, shiny, and reddish brown. Younger nymphs are pale in color with long antenna and they become yellowish green later. Adults have long legs with slender body. It is active during the early morning and late afternoon.



Picture 79 : Nymph.



Picture 80 : Adult.

#### Damage:

Both the nymphs and adults feed on the endosperm of the rice grain that results in small, shrivelled, spotty, or deformed grains. Their feeding on the soft or dough stages causes grain discoloration.

#### Factor favoring insect development:

- Staggered rice planting.
- Warm weather, overcast skies, and frequent drizzles.
- Flowering to milky stages of the rice plant.

#### Host plants:

Rice, tea, guava, millet, mango and others.



Picture 81: Adult.



Picture 82 : Adult.



# ជំងឺបំពង់កាត់ស្លឹក

## A.2.8. Rice Case Worm (*Nymphula depunctalis*)



Picture 83 : Eggs.



Picture 84 : Larva.



Picture 85: Nymph .

### Description:

Eggs are laid in single or cluster on the undersurface of the leaves. Larva is light green with a light brownish orange head. Pupa is cream and becomes silvery white in the mature. Adult is small white moth with pale brown.

### Damage:

- Cutting off leaf tips to make leaf cases.
- Ladder-like appearance of skeletonized leaf tissues.

### Factor favoring insect development:

- Rice field with standing water.
- Transplanting young seedlings.
- Wetland and irrigated environments.



Picture 86: Adult moth.

**Host plants:** Rice, Cyperaceae and others.

# ត្រីបលើដំណាំស្រូវ

A.2.9.

Rice Thrip (*Stenchaetothrips biformis*)



Picture 87 : Eggs and young larva.



Picture 88 : Larva.



Picture 89 : Pre pupa.



Picture 90 : Pupa.

## Description:

Egg is very tiny white when freshly laid and turns pale yellow toward maturation.

The nymph is elongated, elliptical, slender, and is pale-yellow in color.

The pupa has short wing buds that are not functional.

The adult has a slender small body, yellowish to dark-brown in color. It is 1-2 mm. It can exist in two forms, winged or wingless.

## Damage:

The feeding damage causes tearing of the plant tissues.

The damaged leaves are having silvery streaks or yellowish patches and curled from the margin to the middle.

Infested panicle causes unfilled grains.



Picture 91 : Mature adult.

## Factor favoring insect development :

- Dry weather.
- No standing water.
- All rice environments.
- Presence of graminaceous weeds.

**Host plants:** Rice, maize and others.

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## A.2.10. Yellow Stem Borer (*Scirpophaga incertulas*)



Picture 92 : Eggs.



Picture 93: New emergence.



Picture 94: Young larvae.

### Description:

Eggs are white in color. They are oval, flattened, and covered with brownish anal hairs of the female moth. The larva has a pale hairless yellow body with a small orange head. Pupate occurs in the stem. The female is whitish to yellowish in color. It has a pair of clear black spots in the middle of each forewing. The male is smaller and dull in color. It has two rows of black spots at the tip of the forewings.



Picture 95 : Young larva inside the stem.



Picture 96 : Mature larva inside the stem.



Picture 97 : Pupa inside the stem.

### Damage:

- Causes deadheart or drying of the central tiller during the vegetative stage.
- Causes whiteheads at reproductive stage.

### Factor favoring insect development:

- Fields planted late.
- Stubbles that remain in the field.

**Host plants:** Rice, barley, sorghum, maize, wheat, and others .



Picture 98 : Female moth.



Picture 99 : Male moth.