

## INTRODUCTION

In excess of fifty invertebrates that often limit production have been identified as being field pests of rice in Guyana. These pests attack the crop from planting through to harvesting, often causing significant crop losses in quality and yield. Apart from insects, snails usually attack the rice plant during the first 21 days.

## INSECT AND SNAIL CONTROL

### 1. Water weevil (*Helodytes foveolatus*)



Larva (left), adult (right)

#### Damage caused

Larvae feed on the roots, resulting in stunted growth, yellowing of leaves (chlorosis) and thus, easy uprooting of plants. The adults feed on leaves and produce narrow, longitudinal scars that are parallel to the veins or slit-like leaf scars often referred to as “windowing”. Leaf scarring by adults rarely causes economic losses, but large numbers of adults feeding on very young rice can remove enough leaf tissue to kill the plants.

#### Control measures:

- Sampling activity should be done one week after permanent flooding. Inspect 100 randomly selected leaves and if 50 and above have feeding scars apply insecticide (Fastac, Pestac, Karate or Pronto).
- Control is most effective 7-14 days after a permanent flood and weevil numbers are at or above economic threshold level.
- Control of larvae can be done by draining field and allowing it to dry until it cracks.
- Good field sanitation will get rid of alternative weed hosts (also refer to the Integrated Pest Management strategies).

### 2. Leaf miner (*Hydrellia sp.*)



Larva (left), adult (right)

#### Damage caused:

Larvae tunnel into the leaves and feed between the two leaf surfaces, feeding on cell sap. Often the entire leaf tip will wilt and die. Reduced tillering and stunted growth may result, and in badly affected crops, delayed panicle initiation may occur.

#### Control measures:

- Plant early and high tillering varieties
- Drain fields after sowing to provide a poor habitat for leaf miner reproduction.
- If infestation is high, employ chemical control with a systemic insecticide such as Pronto, Actara, Regent (also refer to the Integrated Pest Management strategies).

### 3. Caterpillar (*Spodoptera frugiperda*)



#### Damage Caused:

Complete cutting of leaf tips by larva; however, the greatest damage occurs on seedling rice, where plants are too young to flood.

#### Control measures:

- Plough deeply to expose pupae to predators.
- Flood infested fields for 24-48 hrs in order to drown caterpillars.
- Spraying contact insecticides such as Fastac or Pestac during high infestation, that is, a threshold of 30 damage leaves/square metre (also refer to the Integrated Pest Management strategies).

### 4. Paddy bug (*Oebalus poecilus*)



egg masses (left), nymphal stages (center and right)

#### Damage caused

Nymphs and adults feed on the endosperm at milk and dough stages. Adults inject an enzyme to predigest sugars (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>) and

in the process contaminate the grain with fungus that causes grain discolouration.



adults

Panicles attacked by the paddy bugs result in wind grains, malformation and discoloration of grains. Consequently there are lower yields, reduced quality and brittleness, which result in increased breakage on milling.

#### Control measures

Use the Integrated Pest Management (IPM) approach, which is discussed in details below.

### 5. Snails (*Pomacea sp.*)



Egg mass (left), adult (right)

#### Damage Caused:

Snails feed on young and emerging rice plants and can completely destroy a crop during crop establishment. Feeding results in missing seedlings, with cut leaves sometimes seen floating.

#### Control measures:

- Place a wire or woven bamboo screen on the main irrigation water inlet and outlet to prevent the entry.
- Snails are active in standing water and thus there is need to ensure good land leveling and field drainage to help reduce infestation and damage to the crop.
- After the final land preparation, construct small canals, which will serve as focal nesting points for snails, making manual collection or killing easier.
- Place bamboo stakes to attract adults for egg laying. Handpick snails and crush egg masses. This is best done in the morning and afternoon when snails are most active.

## INTEGRATED PEST MANAGEMENT (IPM)

There is no one way to manage these pests effectively, since pests can never be completely eliminated. That is why Integrated Pest Management (IPM) is the recommended approach, which should begin with the decision to cultivate rice. IPM is the use of multiple control measures, which are compatible, economical, environmentally sound, and culturally feasible for managing pest populations at an acceptable level. Chemicals will continue to play a vital role but only after systematic monitoring of pest populations.

The package of suitable control measures includes:

### 1. Cultural Practices

- Block planting is recommended for areas where there is a large portion of rice land. It prevents staggered growth stages of the crop and makes pests, water and application of other resources easy to manage.
- Good land preparation or soil tillage is necessary, because it is known that ploughing not only improves soil condition but helps to disrupt the life cycle of insects that are found in the soil, through exposure to sun (extreme temperature), predators and/or mechanical injury.
- Field sanitation is an important and highly effective farm practice to reduce the incidence of pest infestation. It involves keeping weeds under control at all times from in and around the field, because these often serve as alternate hosts for pests. Always clean irrigation canals and remove crop residues after harvest.
- Water management, since proper monitoring of the amount of water in the field or timely intervals of drainage and irrigation, not only suppress weed infestation but also reduces the early season pest complex (water weevil, leaf miner and caterpillar)

### 2. Physical Practices

- Hand picking or rouging, where plants that are heavily infested, especially with egg masses of paddy bug or snails, or pulled out and properly disposed of.
- Rouging of volunteer plants and red rice, which also serve as alternative hosts to the paddy bug within the rice fields.

### 3. Monitoring

This is vital for decision making at any stage of crop development to determine whether or not to apply insecticides. It should be done systematically for a guide in determining the insect pest population, as spraying should be based on economic threshold levels. Monitoring by the sweep net method should be done in the fields for paddy bug incidence during the cool periods (early morning and late afternoon) from late tillering to harvesting. Should the number of bugs exceed 1 bug/2 sweeps, then chemical control is needed.

### 4. Biological Control

This is specific for paddy bugs: it is important that management practices aim at conserving the natural enemies of this insect pest. Some important natural enemies of the paddy bug are:

#### *Predators:*

- Lady bird beetle
- Spiders
- Dragon fly
- Damsel fly

#### *Parasitoids:*

- *Telenomus podisi*
- *Besikia aelops*

*Entomopathogen* (an organism causing disease in insects):

- *Metarhizium*

### 5. Chemical Control:

Contact Insecticides	Systemic Insecticides
Fastac @ 148 ml/ha (60 ml/ac)	Pronto @ 37g/ha (15 g/ac)
Ninja @ 350 ml/ha (140 ml/ac)	Admire @ 100 ml/ha (40 ml/ac)
Flip @ 86-124 g/ha (35-50 g/ac)	Admister @ 49 ml/ha (20 ml/ac)

**Note:** These insecticides should be applied early morning or late afternoon when the rice is flowering. Failure to do so will cause interference with pollination and hence “wind paddy will result”.



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*Pests of Rice in Guyana*

**Insects and Snail Control**