Brown Plant Hopper (BPH) and Their Management in Rice

K. Elanchezhyan1*, T. Sathyan2 and K. R. Manikandan2

1Dept. of Agricultural Entomology, Agricultural College and Research Institute, TNAU, Killikulam, Vallanadu, Tamil Nadu (628 252), India
2Dept. of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu (641 003), India

Abstract

Rice is one of the important cereals of the world particularly in Asian countries and forms staple diet for more than 50 per cent of the population. Brown plant hopper is one of the major culprits for huge economic crop losses of rice. The BPH infestation occurred in all rice growing areas of Asian countries and cause huge yield losses by destruction of the crop. Integrated management of BPH should be followed by combining the availability of resources and economics of farmers. Surveillance and monitoring are the prime strategies to make effective management operations.

Introduction

Rice (Oryza sativa L.) is the staple food for more than two billion people. Almost 90 per cent of the rice is grown and consumed in Asia. India is the second largest rice producing country in the world. One of the major yield limiting factors of paddy is the insect pests cause 20 to 30 per cent yield losses every year. Nearly 300 species of insect pests infest in rice crop from sowing to harvest and among them only 23 species cause notable damage. Brown plant hopper is one of the major culprits for huge economic crop losses of rice. Generally, the yield losses due to hoppers ranges from 10% to 90% but if timely control measures are not taken up, there may be possibility of total crop loss within a very short period. Farmers rely heavily on insecticides for their management and almost 50% of the insecticides used in rice are targeted against this pest alone.

Factors responsible for BPH outbreaks

* Wide spread planting of modern varieties
* Closer spacing
* Inadequate weed control
* Water stagnation for prolonged periods
* Increased use and excess dose of N fertilizers
* Indiscriminate use of insecticides especially, synthetic pyrethroids

Temperature, relative humidity and prevailing wind direction determine the severity of incidence and spread of BPH.

Symptoms of Damage

It attacks the crop from late vegetative stage to grains hardening stage. Nymphs and adults congregate at the base of the plant above the water level and suck the sap from the tillers. The affected plant dries up and gives a scorched appearance called ‘hopper burn’. Circular patches of drying and lodging of matured plant are typical symptoms caused by this pest. Their excretion called honeydew which
invites sooty mould growth on the foliage. It is a vector of grassy stunt and ragged stunt diseases.

Life Cycle

The brown plant hopper has a brown body and chestnut brown eyes. Adult measures about 4 - 4.5 mm in length. Adults are of two forms viz., macropterous (long winged) and brachypterous (short winged). The macropterous forms are responsible for migration and colonization in rice crops. Subsequent 2 or 3 generations are brachypterous. Towards crop maturity, they become macropterous.

<table>
<thead>
<tr>
<th>Macropterous (Long winged)</th>
<th>Brachypterous (Short winged)</th>
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</thead>
<tbody>
<tr>
<td>Well-developed wings, smaller abdomen</td>
<td>Poorly developed wings, larger abdomen</td>
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<tr>
<td>Move from one field to another field as colonies</td>
<td>Cannot fly; move by irrigation water.</td>
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<tr>
<td>Dominant at post-flowering stage.</td>
<td>Dominant at pre-flowering stage.</td>
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<tr>
<td>Egg laying capacity is less.</td>
<td>Egg laying capacity is more.</td>
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The female makes an incision in the leaf sheath and inserts 200-300 small eggs. Eggs are inserted in two rows on the leaf sheath. Each cluster has 9-32 eggs that are elongate, banana-shaped, whitish with a cap. The average number of eggs laid varies from 250-350. The incubation period is 6-11 days. Nymph undergoes 5 nymphal instars in 13-15 days. They have a distinct movable spur on of the hind tibia. The total life cycle occupies 19-23 days.

Management

- Avoid closer spacing.
- Avoid excessive use of nitrogenous fertilizers.
- Control irrigation by intermittent draining (alternate wetting and drying)

BPH on rice leaves

- Set up light traps during night or yellow pan traps during day time.
- Predators: Spiders, coccinellid beetles, veliid bugs, mirid bugs and ground beetles prey on BPH:
  - Wolf spider (Lycosidae) - *Pardosa* (=Lycosa) pseudoannulata
  - Mirid bug (Miridae) - *Cyrtorhinus lividipennis*
  - Ladybird beetle (Coccinellidae) - *Coccinella coarctata*
  - Velid bug (Velidae) - *Microrvelia* spp.
  - Rove beetle (Staphilinidae) - *Paederus fuscipes*
  - Ground beetle (Carabidae) - *Ophionea indic*.
- Spraying neem. Repeated application or higher concentrations may cause chlorosis (phytotoxicity) to the leaves.
- ETL: 1/tiller; 2/tiller when spiders are present.
- Apply insecticides on need basis
- Drain water before use of insecticides.
- Direct the spray towards the base of the plants.
- Spraying acetamiprid 20% SP 50-100 g (or) buprofezin 25% SC 800 ml (or) chlorantraniliprole 18.5% SC 150 ml (or) chlorantraniliprole 0.4 G 10 kg (or) chlorpyriphos 20% EC 1250 ml (or) fenobucarb 50% EC 500-1500 ml (or) fipronil 5%
SC 1000-1500 ml (or) imidacloprid 17.8 SL 100-125 ml / ha.

Avoid resurgence causing insecticides, namely, methyl parathion, diazinon, fenthion, quinalphos and synthetic pyrethroids.

Conclusion

Integrated management of BPH should be practiced by combining above mentioned practices as per the availability of resources and economics of farmers.

Surveillance and monitoring are the prime strategies to make effective management operations.

References