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Integrated Pest Management of Rice Brown Plant Hopper (NilaParvata Lugens)

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Abstract
The article on Integrated Pest Management for Leafhopper in Rice Cultivation provides a comprehensive overview of the pest Nilaparvata Lugens, which poses a significant threat to rice cultivation in India. The life cycle of the pest, the damage caused, and control strategies are discussed in detail. The leafhopper causes damage by feeding on the leaves and sucking the cell sap from the leaves, resulting in a significant reduction in yield. Integrated pest management strategies include agronomic practices such as deep ploughing, avoiding close spacing, crop rotation and intercropping. Furthermore, the article emphasizes the use of resistant varieties to effectively control this pest. By implementing these strategies, farmers can reduce the impact of Brown Plant Hopper.

Keywords: IPM, Brown Plant Hopper, major pests, rice, BPH .

Introduction
Rice [*Oryza sativa*] is the most important staple food in the world. Millions of people around the world depend on rice for their economic income because of its high calorie content. Crop is attacked by 300 different pest species at different stages of harvest, but only 23 of them cause significant damage. Pests continue to cause problems, pose a threat to rice cultivation as they act as host plants. Brown rice leafhopper is one of the main causes of huge economic crop losses in rice. It attacks late harvest from vegetative stage to grain hardening stage. Both nymphs and adults suck sap from the plant. It affects plants and causes chlorosis, wilting and drying of rice.

BPH is also an effective vector for various rice viruses, such as Ragged Rice Stunt Virus and Grassy Stunt Virus. Together these viruses can have a significant impact on rice, causing up to 60% yield loss in susceptible varieties. If control measures are not taken in a timely manner, there is a risk of complete crop loss within a very short period of time.

This pest is often difficult to control due to its high reproductive rate, long distance migration, and even rapid adaptation to resistant varieties. The use of chemical insecticides is the preferred method to control BPH, but this can inevitably lead to the development of resistance and reduced effectiveness. BPH has acquired resistance to many of the major classes of insecticides: organophosphates, carbamates, pyrethroids, neonicotinoids, and phenyl pyrazoles. Understanding the biology and ecology of this pest improves the development, formulation, and application of effective control measures. Control strategies specified in integrated pest management (IPM) should be environmentally friendly and limit the use of synthetic insecticides to a minimum while promoting the activity of natural enemies and other biological controls. IPM promotes the biodiversity of natural enemies in rice paddies, a key factor for successful biological pest control. IPM has no clear definition, but it discourages the indiscriminate use of chemical pesticides and promotes biological techniques that utilize natural parasitoids and predators to control pests. Unlike the use of chemical pesticides, which has become the traditional method of pest control, farmers need to be well informed and educated about the importance of biological pest control.

Image Source

Ipm Stratgey for Brown Plant Hopper

Cultural Control

- Cultural control does not give immediate results, but it provides a first line of defense against pest infestations and is based on ecological and economic concepts.
- Fallow periods during which rice is not cultivated help reduce pest occurrence.
- Alternating rice with other annual crops or leaving fields fallow during the rice season disrupts the pest's life cycle and population formation.
- Integrating resistant varieties (IR26, IR28, IR30) and crop rotation should further reduce BPH populations and impacts.

Biological Control: Biological pest control may involve the use of natural enemies such as predators, parasitoids, and entomopathogens. Predatory spiders, water bugs (Micro Velia spp.), ladybugs (Coccinellidae), ground beetles (Carbidie), and beetles (Staphylinidae) also suppress *B. prostatica* populations. *Cyrtorhinus lividipennis* is a predator of both B. *prostatica* eggs and larvae and appears to prevent *B. prostatica* population growth in excavated rice fields. At least 19 species of Hymenoptera, Eulophidae, Mymaridae (*Anagrus sp*.), and Trichogrammatidae (*Oligosita sp*.), are egg parasitoids of *B. prostatica.*

Chemical Control: ue to intensive and indiscriminate use of insecticides, this pest has gradually acquired resistance to most types of chemical insecticides. Resistance to this insect's neurotoxins spread in field populations throughout Asia between 2005 and 2012. Insect resistance to insecticidal chemicals involves mutations in genes for detoxification enzymes and amino acid mutations in target genes. Monitoring and early detection of changes in resistance or susceptibility status is important for immediate introduction of alternative control measures against this pest. Monitoring and early detection of changes in resistance or susceptibility status is important for immediate introduction of alternative control measures against this pest.

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