Introduction and importance
Rice brown planthopper is a common and widely distributed pest in all the rice growing areas of the country. It is common in rainfed and irrigated wetland environments during the reproductive stage of the rice plant. The nymphs and adults of the insect are usually found at the bases of the canopy, where it is shady and humidity is high. The yield reduction due to brown planthopper can be 100% depending on the degree of infestation.

Nature of Damage:
The insect prefers rainfed and irrigated wetland fields to upland rice and transplanted fields to direct sown fields. It infests rice crop at all stages of plant growth.

The nymphs and adults stay at the base of the rice plant and suck the plant sap and as a result of feeding plants turn yellow and dry up rapidly. At early infestation, round yellow patches appear which soon turn brownish due to the drying up of the plants. This condition is called hopperburn. The patches of infestation may then spread out and cover the entire field. In field conditions, plants nearing maturity develop hopperburn if infested with about 400-500 BPH nymphs.

Crop loss is usually considerable and complete destruction of the crop occurs in severe cases. N. lugens is a vector of the virus diseases-grassy stunt, ragged stunt and wilted stunt.

Life Cycle:

Egg: Eggs are inserted in groups in a straight line in midrib of leaf sheaths. The egg laying sites appear as brownish streaks. The eggs are banana shaped and 0.99 mm long. Newly laid eggs are whitish. They turn darker when about to hatch. Before egg hatching, two distinct spots appear, representing the eyes of the developing nymph. Some of the eggs are united near the base of the flat egg cap and others remain free. Eggs hatch into tiny nymphs within 7-11 days.

Nymph: The nymph has triangular head with a narrow vertex. Its body is creamy white with a pale brown tinge. It has a prominent median line from the base of the vertex to the end of its metathorax. These nymphs undergo four moult with five nymphal instars. Mature nymph is 2.99 mm long. The nymphal period varies with food conditions, density during development and other environmental factors and is completed within 12-20 days.

Adult: BPH adult is brownish black with yellowish brown body. It has a distinct white band on its mesonotum and dark brown outer sides. The adults exist in two forms, macropterus and brachypterus. Macropterus adults or long-winged have normal front and hind wings, whereas brachypterus forms or the short-winged have reduced hind wings. A prominent tibial spur is present on the third leg. Macropterus forms are adapted for long distance flights and are known to migrate thousands of kilometers across land and sea. These forms are the first to appear in the newly planted field and begin colonization. The adults mate on the day of emergence and the female start laying the eggs from the day following mating. The adults survive for 10 to 25 days.

Factors favouring brown planthopper development:
- High nitrogen levels and close plant spacing, continuous submerged, shady and humid conditions in the field tend to favor the BPH increase.
- Extensive rice areas with irrigation facilities, multiple rice cropping are important factors for insect abundance.
- Outbreaks of the insect pests are closely associated with insecticide misuse, especially during the early crop stages. These insecticide sprays usually directed at leaf feeding insects disrupt the natural biological control, which favor the BPH development as secondary pest.
- The insect prefers rainfed and irrigated wetland fields to upland rice and transplanted fields to direct sown fields.

Economic Threshold level (ETL): 10-20 nymphs/ hill

Resistant/ Tolerant varieties:
- Vijetha, Chaitanya, Krishnaveni, Nandi, Sonasali, Manoharsali

Integrated Pest Management:
- Avoid excess use of nitrogenous fertilizers and apply them in splits
- Avoid close planting and provide 30 cm alleyways at every 2 m to reduce the pest multiplication.
- Synchronous planting by all farmers of a location
- Crop rotation with non-rice crops to avoid continuous supply of food to the insect
- Periodic surveillance for the pest population once in a week or 10 days.
- Set up light traps to monitor pest population and to attract and kill the insect
- Conservation of natural enemies like predatory spiders, mirid bugs (Cytorhinus lividipennis, Tytthus parviceps), Microvelia spp, coccinellids, ground beetles and rove beetles and parasitoids like Anagrus sp, Oligosita sp etc.
- When the BPH population exceeds ETL spray monocrotophos 36WSC @1300 ml/ha, or carbaryl 50WP @1500 g/ha or acephate 75SP @ 1500 g/ha or BPMC 50WP @1250g/ha which gives protection for a week or spray ethofenprox 10EC @1000 ml/ha or buprofezin 25WP @750 g/ha or carbofuran 3G granules @ 25 kg/ha which are effective for 15 to 20 days, or spray neonicotinoids like imidacloprid 200SL @125 ml/ha where insecticide resistance is not reported.
- Avoid resurgence causing insecticides like synthetic pyrethroids

Developed with inputs from Dr. V. Jhansi Laxmi, Senior Scientist, Entomology Section, DRR