**Brown Plant Hopper (BPH):** *Nilaparvata lugens* Stal. *(Hemiptera : Delphacidae)*

**Kannada name**: Kandu Jigi Hulu

**Vernacular name**: Bili Dhomi, Solle

The Brown Plant Hopper is the most destructive pest in all rice growing areas of India.

**Pest Morphology:**

**Adult:**
- Tiny (4-5 mm), wedge shaped, brown coloured
- Exist in two forms, macropterous (long winged) and brachypterous (short winged).
- Prominent tibial spur present on the hind leg.

**Egg:**
- Crescent shape (0.99 mm), whitish

**Nymph:**
- Small, creamy white with pale brown tinge
- Prominent median line from base of vertex to metathorax

**Period of occurrence**: Tillering to Panicle initiation stage

**Extent of yield loss**: 10-70%

**Alternate hosts**: Sugarcane and some grasses

**Factors favoring pest development**:
- High humidity (>90%) with temperature of 25-32 °C
- Excessive use of nitrogenous fertilizer (more than recommended)
- Closer crop canopy (spacing 15X10 cm)
- Indiscriminate use of pesticides especially at the early stage of the crop which kill their natural enemies.
- Continuous submerged condition in the field

**Damaging stage of the insect**: Nymphs and adults.
Nature of damage:

- Nymphs and adults congregate at the base of the plant and suck the plant sap from stem and leaf sheath.
- Female inserts eggs in two rows on either side of the midrib of the leaf sheath.

Act as vector of ragged stunt and grassy stunt virus disease

Life cycle:

In south India Maximum population between October and February, depending on the climatic conditions. The incidence of BPH is severe on Kharif crop.

Incubation Period: 4 - 8 days.

Nymphal period: 2-3 weeks with 5 moults.

Adult longevity: 10 - 20 days.

<table>
<thead>
<tr>
<th>Period</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>June -October</td>
<td>18-24 days</td>
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<tr>
<td>November - January</td>
<td>38 - 44 days</td>
</tr>
<tr>
<td>February - April</td>
<td>18 - 35 days</td>
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</table>

Symptoms of damage:

- Leaves turn yellow initially and later brownish due to drying up of the plants. Under severe cases field gives a burnt appearance in concentric circles, known as "Hopper burn". Ovipositional marks at the base of the stem and along the midrib
- Lodging of the plant.
- Sooty mould development due to honeydew secretion by hoppers.
- Rugged stunt or grassy stunt virus disease

Hopper burn symptom
Management

A. Preventive measures:

- Use of resistant varieties Annanga, Aruna, Bharatidasan, Bhadra, Chandana, Chaitanya, Co42, Cotton Dora Sannalu (MTU 1010), Daya, Jyoti, Kanaka, Karthika, Krishnaveni, Manasarovar, Mekom, Nagarjuna, Neela Annanga, Pavizham, Pratibha, Rashmi, Remya, Sonasali, Vajram, and Vijetha, IR26, IR64, IR36, IR56 and IR72.
- Provide alleyways or pathways of 30 cm width after every 2-3 meters while transplanting.
- Remove excess seedlings and weeds from the field and bunds.
- Apply recommended dose of nitrogen based on soil fertility.
- Split application of fertilizers at the time of transplanting, tillering and panicle initiation stage (apply after weeding).
- Set up light traps at night to. Care should be taken not to place light traps near seed beds or fields.

B. Biological control:

I. Larval Parasitoids:

**Pseudogonatopus nudus** Perkins (Hymenoptera: Dryinidae)

**Adult:** Look ant like, brown, female wingless with a pair of pincher like front claws. Act as both predator and parasitoid.

**Larva:** Feed on the body fluids. As they grow protrude from the abdomen of their hosts covered with a black to grayish sac. The sac splits and the whitish larvae wiggles free, then pupates and secretes a whitish oval silk cocoon to cover the pupa on the plant.

II. Predators

**Green mirid bug**, Cytorhinus lividipennis Reuter (Hemiptera: Miridae)

**Carabid beetle**, Ophionea nigrofasciata (Schmidt-Goebel) (Coleoptera: Carabidae)

- Both the shiny black larvae and reddish-brown adults search the rice canopy for prey
- Consumes 3-5 hoppers per day
**Lady beetle** *Harmonia octamaculata* (F.) (Coleoptera: Coccinellidae)

- Larvae are black with dark yellow spots and have body horns dorsally and laterally
- Active during the day in the upper half of rice canopy
- Larvae are more voracious than adults
- Consume 5-10 prey a day

**Micraspis sp.** (Coleoptera: Coccinellidae)

Adult: Oval in brightly coloured shades of red.

**Micraspis crocea** (Mulsant) (Coleoptera: Coccinellidae)

- Adults and larvae prey on small plant hoppers.
- Judicious and need based application of safer insecticides will conserve the natural enemies.

**C. Control measures:**

**Cultural practices:**

- Alternate wetting and drying the field during peak infestation
- Draining out the standing water from the field 2-3 times.

**Chemical control:**

**Look for BPH at base of the plant 30 days after transplanting at weekly interval**

**ETL:**

- 10 hoppers per hill at vegetative stage (DRR)
- 20 hoppers per hill at later stage (DRR)
- 1 hopper per stem (IRRI)
### Recommended Insecticides

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Chemical Name</th>
<th>Trade Name</th>
<th>Dosage per l of water</th>
<th>Dosage for spray tank</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>10 l</td>
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<tr>
<td><strong>Liquid /Spray formulations (EC, SL, WP, WG, WDG, SC)</strong></td>
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<td></td>
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</tr>
<tr>
<td>1.</td>
<td>Monocrotophos 36 SL</td>
<td>Nuvacron, Monocil</td>
<td>1.3 ml</td>
<td>13 ml</td>
</tr>
<tr>
<td>2.</td>
<td>Chlorpyrifos 20 EC</td>
<td>Dursban, Chlorban</td>
<td>2.5 ml</td>
<td>25 ml</td>
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<tr>
<td>3.</td>
<td>Phosalone 35 EC</td>
<td>Zolone</td>
<td>2.0 ml</td>
<td>20 ml</td>
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<tr>
<td>4.</td>
<td>Carbaryl 50 WP</td>
<td>Sevin, Hexavin, carbaryl, Stanrin,</td>
<td>2.0 g</td>
<td>20 g</td>
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<tr>
<td></td>
<td></td>
<td>Sevinplow, Karavinte</td>
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<tr>
<td>5.</td>
<td>BPMC 50 EC</td>
<td>Bipvin</td>
<td>2.5 ml</td>
<td>25 ml</td>
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<tr>
<td>6.</td>
<td>Thiamethoxam 25WG</td>
<td>Actra</td>
<td>0.2 g</td>
<td>2.0 g</td>
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<tr>
<td>7.</td>
<td>Imidacloprid 200SL</td>
<td>Confidor</td>
<td>0.3 ml</td>
<td>3 ml</td>
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<tr>
<td>8.</td>
<td>Acephate 50 WP</td>
<td>Starthane, Asataf</td>
<td>1.0 g</td>
<td>10 g</td>
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<tr>
<td>9.</td>
<td>Ethofenprox 10 EC</td>
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<tr>
<td>10.</td>
<td>Clothianidin 50 WDG</td>
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<td>0.15 g</td>
<td>1.5 g</td>
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<tr>
<td>11.</td>
<td>Fipronil 5SC</td>
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<tr>
<td><strong>Solid formulations (Granules)</strong></td>
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</tr>
<tr>
<td>1.</td>
<td>Phorate 10 G</td>
<td>Thimet, Hexamar phorate</td>
<td>Nursery : 12.5 kg/ha</td>
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<td></td>
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<td></td>
<td>Main field : 10 kg/ha</td>
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<tr>
<td>2.</td>
<td>Carbofuran 3 G</td>
<td>Furadon</td>
<td>Nursery : 33 kg/ha</td>
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<td></td>
<td></td>
<td></td>
<td>Main field : 25 kg/ha</td>
<td></td>
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<tr>
<td>3.</td>
<td>Quinalphos 4 G</td>
<td></td>
<td>Nursery : 33 kg/ha</td>
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<tr>
<td>4.</td>
<td>Fipronil 0.3 G</td>
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<td>Main field : 25 kg/ha</td>
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</tbody>
</table>

**D. Precautionary measures:**

- While spraying, nozzle should be directed at the basal portion of the plants.
- Repeat the application if hopper population persists beyond a week after application.
- At hopper burn stage, treat the affected spots along with their 3-4 m periphery immediately as these spots harbour high population of the insect.
• Avoid use of synthetic pyrethroids (cypermethrin, deltamethrin) and quinalphos as they cause resurgence.
• Do not use same insecticide repeatedly when 2-3 applications are needed.
• Application with power sprayer is preferable. The quantity of insecticide required is 3 times more than the normal with knapsack sprayer.

**Ragged stunt virus disease:** Symptoms of the disease are stunting, twisting and curling of the leaves especially flag leaf with ragged or serrated margins. Sometimes galls are present along with leaf.

**Grassy stunt virus disease:** The symptoms include, stunting, profuse tillering, yellowish green leaves with numerous rusty spots which later form irregular blotches. There will not be any flowering and the plants present a bushy or grassy appearance.