IPM Package of Practices for Management of Sugarcane Leaf hopper/ Pyrilla

The sugarcane Leafhopper, *Pyrilla perpusilla* Walker (Lophopidae: Homoptera), commonly known as Indian sugarcane leafhopper, is one of the most destructive pests, and widely distributed in India including in Bihar, Haryana, Uttar Pradesh, Punjab, and Madhya Pradesh than in peninsular India. It is a threat to Indian sugar industry and a serious pest, causing 31.6% reduction in cane yield and 2-3% reduction in sugar recovery if not properly managed.

**Life cycle of Sugarcane Pyrilla**

**Egg:** The female *Pyrilla* lays eggs during day time, on the abaxial surface of the leaves along the midrib and it prefers a lower, shady and concealed side of leaves near midrib for oviposition. They are deposited in four to five rows (30-40 numbers/cluster) and are covered with a waxy thread-like material secreted by the female. During the winter, eggs are laid on the inside of the base of the leaf sheath, giving some protection from adverse climatic conditions. The females usually lay white to greenish yellow eggs which are 0.9-1.0 mm long and 0.45-0.64 mm wide. The interval between each laying during April-October is 2-6 days, 7-25 days during November-December and 57-126 days during November-January. Twenty to fifty eggs are laid at a time, with a life-time fecundity of 600-800. The incubation period varies with season, ranging from 6 to 30 days.

![Eggs mass of Pyrilla](image)

**Nymph:** Newly emerged nymphs are 0.8-1.0 mm long and 0.54-0.64 mm wide, milky white in colour and pass through five instars, each occupying 7-41 days with a maximum total nymphal period of 134 days, to become adult. Each nymphal instar
bears characteristic anal filaments which are slightly longer than the body. The ideal temperature for nymphal development seems to be 30°C, with RH of 80%.

- First instar has whitish thorax with a thin transverse pale brown band on the posterior end. Last abdominal segment is green with whitish threads.
- Second instar has dark brown strips along the lateral margin
- Third instar has a thoracic region with one dark brown dorsal patch on either side. Abdominal segments are pale blue on dorsal side and pale yellow on ventral side.
- Abdominal segments of fourth instar have a dark brown band on the dorsal surface and pale green ventral surface
- Abdominal segments of fifth instar have a dark brown transverse band on the dorsal surface and pale white ventral surface. Anal tufts are buff colored

Pyrilla Nymph

**Adult:** *P. perpusilla* is a pale tawny-yellow soft bodied insect with the head prominently drawn forward. Wingspan varies from 16-18 mm and 19-21 mm for males and females, respectively. The adult life span varies from 14-200 days and females live for a slightly longer period than males. The female has a pre-mating period of about 11 days, mating takes place during the day and is complete within two hours. Generally the female takes 45-60 minutes for a single oviposition after a pre-oviposition period of 3-47 days, depending on the season and climatic conditions. Successive oviposition can occur between two and 25 days.
**Number of generations:** The pest remains active throughout the year with 3-4 numbers of generations with optimum activity from July to September in India.

**Nature and symptom of damage:**

*Pyrilla* adults and nymphs, both, feed on sugarcane as well as on other secondary host plants like wheat, barley, oat, wild grasses etc., by sucking the cellsap, from underside of the leaves, but most of the damage is caused by the nymph. Feeding spots turn yellow with the loss of sap, leading to wilting of leaves with retarded plant growth. The pest also excretes a thick transparent liquid, known as honey dew on to foliage, leading to a good medium for the growth of a saprophytic fungus, called black mould. The mould reduces the photosynthetic activity of the leaves which in turn reduces the sucrose content of 2-34% and from 3-26% in the purity of the sugar of the cane. The cane juice becomes high in glucose, tunes insipid and if used, for making gur, gives a soggy mass, which does not solidify properly. An early-infestation, during the grand growth period of cane, adversely affects the yield, while the late-infestation from September onwards, mostly affects the sucrose contents of cane in the field.
Management Practices:

1. Germination and emergence phase
   - Pre-planting Practices: changing sowing dates, trash mulching
   - Setts treatment: setts should be dipped in Chlorpyriphos 20 EC solution (2ml/lit) before planting.
   - Clean cultivation without monocot weeds
   - Avoid ratoon crop
   - Inter Cropping/barrier crop/ Habitat Management
   - Crops suitable for intercropping in sugarcane in tropical region in India
     Seasonal (Suru): Summer groundnut, soybean, water melon, cucumber
     Pre-seasonal: Potato, Gram, cabbage, cauliflower, onion
     Adsali: Groundnut, soybean, cowpea, radish, coriander, fenugreek

2. Tillering and Stem elongation phase
   - Surveillance and Monitoring:
     - **Light Trap**: Set up light traps @ 1 trap/5 acres 15 cm above the crop canopy for monitoring and mass trapping of insects. Operate the light traps around the dusk time (6 pm to 10 pm).
     - **Field Scouting**: Population of nymph, adult and egg masses be recorded from a unit of 10 canes (20 leaves) and average per leaf sheath be reported.
       - ETL 3-5 Individuals/leaf or one egg mass per leaf.
     - De-trashing and destruction of older dried leaves.
     - Removal of alternate host of Pyrilla
       (Gramineae, Leguminosae, Moraceae)
     - Collection and destruction of egg masses of Pyrilla.
     - Release of 4000-5000 cocoons or 4 to 5 lakh eggs of *Epiricana melanoleuca* per acre when 3-5 Pyrilla individuals/leaf are seen.
     - Foliar spray of *Metarhizium anisopliae* @ $10^7$ spores/ml
     - Release of *Metarhizium anisopliae* laden Pyrilla adults @ 250/ha
- Redistribution of *Epiricana melanoleuca* from parasitized field to low parasitized field.

- **Chemical Management**: CIBRC Approved insecticides
  - Chlorpyriphos 20% EC 1500 ml/ha
  - Monocrotophos 36% SL 500 ml/ha

3. **Grand growth phase**

- Collection and Destruction of egg masses of Pyrilla
- Remove dry leaves from August onwards to reduce infestation
- Judicious use of nitrogenous fertilizers to curtail the rapid multiplication and further spread of Pyrilla.
- Irrigate the fields to make micro climate of ecosystem more favourable for the fast multiplication of *Epiricana*.
- Temperature above 40°C and relative humidity less than 50 per cent along with westerly wind will drastically reduce the population of Pyrilla.
- Do not spray any pesticide as this may be harmful to *Epiricana* and other beneficial fauna.
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4. Ripening phase

- Harvest the mature standing canes from the fields as early as possible. The cane leaves containing viable cocoons and egg masses of *Epiricania* may be clipped off in 8-10 cm size. These bits of leaves may be stapled on underside of leaves in younger crop having severe infestation of Pyrilla. In heavily infested fields *Epiricania* may be released @10000 cocoons or 5000 cocoons +5 lakh eggs /ha.

- Remove the egg masses of Pyrilla along with leaf bits and keep them in fine mesh net bags for emergence of parasitoids in Pyrilla infested fields and destroy the nymphs of Pyrilla emerging in bags. In ratoon two lower leaves may be stripped off as these are preferred by Pyrilla for egg laying.

- Do not burn the trash having the viable cocoons of *Epiricania*. These may be removed and released in Pyrilla infested fields.

- Release 500 adults of Pyrilla/ha loaded with entomopathogenic fungi, *Metarhizium anisopliae* during monsoon period for spread of disease in Pyrilla.