

## Influence of weather factors on light trap catches of green leaf hopper at Pattambi, Kerala\*

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### ABSTRACT

In the present study, data of green leaf hopper for two species, namely, *Nephotettix nigropictus* (Nn) and *Nephotettix virescens* (Nv) have been used. First peak was observed for both the species during 38th to 41st standard meteorological week, the second peak was observed during 45th std. week and the third peak was observed during 52nd to 2nd std. week (i. e. from last week of December to 2nd week of January of the succeeding year) for all study years. Overall, around six overlapping generations of green leaf hopper appeared from March to November and were found most active during tillering to panicle initiation stages of the crop. The correlation studies between light trap net sweep collection with weather parameters on population build-up showed that lower minimum temperature, low rainfall and abundant sunshine had major impact on population build up of green leaf hopper for both the species.

**Key words :** Green leafhopper, population dynamics, weather parameters and photoperiods

Pattambi (10°48' N, 76°12' E), a yearly rice growing region of Kerala, gets affected by several rice pests during different rice growing seasons. The rice yield loss reported due to different pests is upto 50% in India. Rice pests include weeds, pathogens, insects, rodents and birds. A variety of factors can contribute to pest outbreaks, including the overuse of pesticides and high rates of nitrogen fertilizer application and favourable weather conditions. For example, rice gall midge and army worm outbreaks tend to follow high rainfall early in the wet season, while thrips outbreaks are associated with drought. Therefore, one of the challenges facing crop protection specialists is to develop rice pest management techniques which are sustainable. In other words, to manage crop pests in such a manner that future crop production is not threatened. Major rice pests include brown plant hopper, army worms, green leafhopper, rice gall midge, rice bug, hispa, rice leaf folder and stem borer at Pattambi, Kerala. In view of the above facts, the field experiments were conducted at Regional Rice Research Station (RARS), Pattambi, Kerala from 1987 using light trap to catch the moths of different rice pests. The major peaks of green leaf hopper are in *kharif* season from September to December. Abrol and Gadgil (1999) found that the maximum temperatures ranging from 26.9 to 36.0°C and minimum temperatures from 20.6 to 24.7°C and high humidity (75 to 95% RH) appear to favour green leaf hopper. Shamim *et al.* (2009) also observed that bright sunshine hours had a

positive significant correlation with the population dynamics of green leaf hoppers in middle Gujarat region, also it attained peak population during 43rd standard meteorological week and decreased considerably thereafter. Anuj and Saxena (1999) reported that GLH had a significant correlation with bright sunshine hours and maximum temperature, while negative correlation with minimum temperature, evening relative humidity and rainfall. The life cycle of green leaf hopper is completed in 45-56 days. The nymphs and adults cause direct damage to rice crop by sucking sap from leaf sheaths and blades. The economic threshold level for green leaf hopper is two insects per hill at mid-tillering in *tungro* endemic areas, 10 insects per hill in other areas at tillering stage and 20 insects per hill at mid-tillering to panicle initiation to booting stages.

### MATERIALS AND METHODS

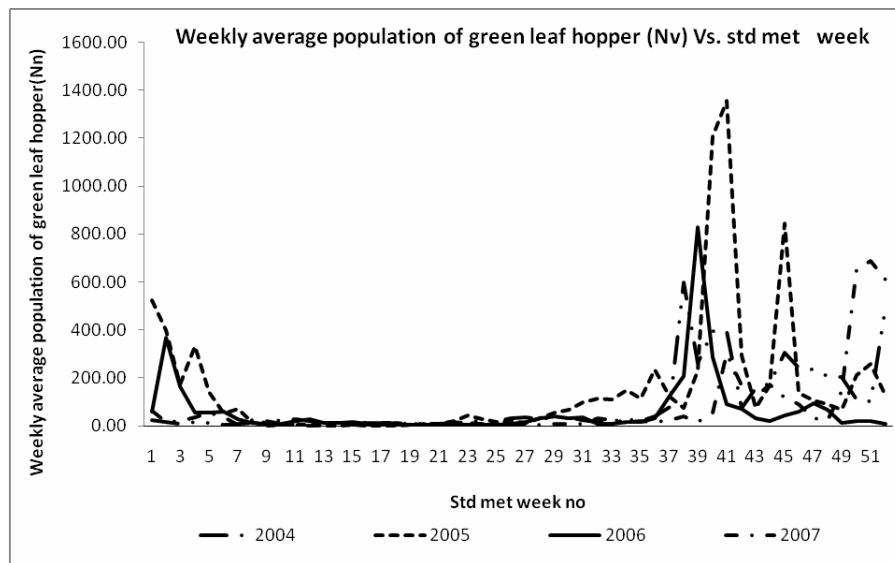
Field experiments were conducted throughout 14 years from 1987 to 2004 at Regional Agricultural Research Station (RARS), Pattambi, Kerala. The population build-up of green leaf hopper was monitored throughout the year. Light traps were fixed in the field and the insects catch/trap was counted daily and weekly mean was calculated. The weekly meteorological data during the period of experiment were collected from the Meteorological Observatory, Pattambi.

### RESULTS AND DISCUSSION

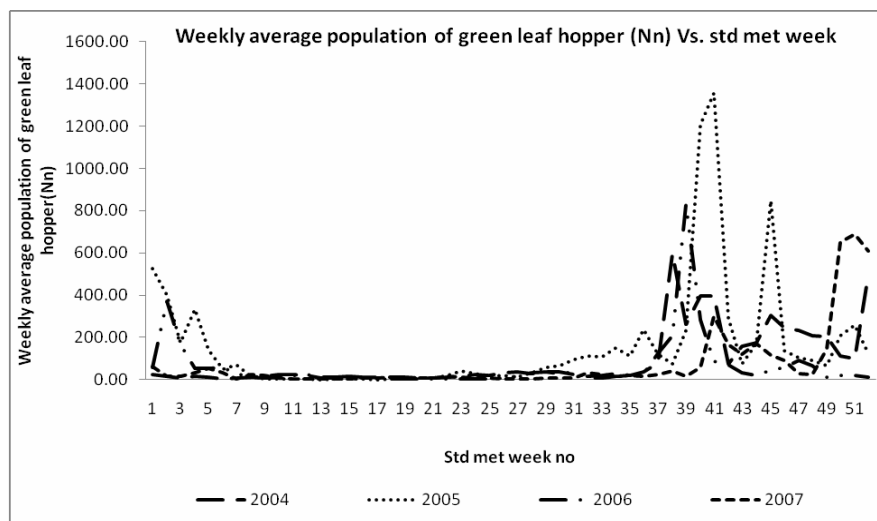
It is seen from Figs. 1 and 2 that GLH has 5-6 peaks in

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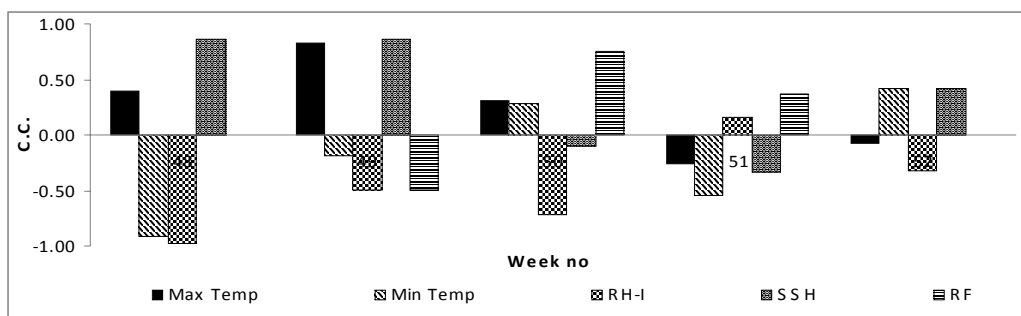
\*Papers presented at and reviewed for proceeding of national seminar on "Agrometeorology-Needs, Approaches and Linkages for Rural Development" held at CCSHAU, Hisar during 26-27 November 2009.



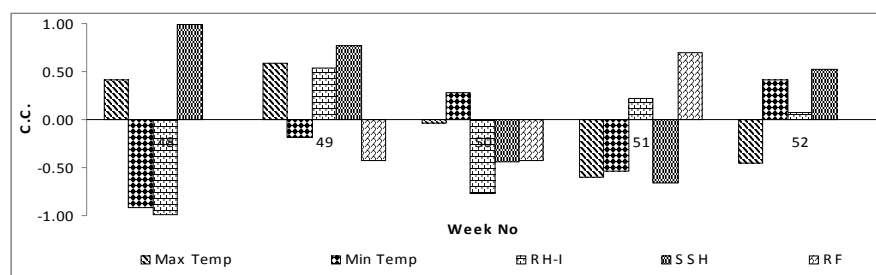
**Fig. 1:** Weekly average population of green leaf hopper ( $N_v$ ).



**Fig. 2:** Weekly average population of green leaf hopper ( $N_n$ ).



**Fig. 3:** Correlation coefficients between green leaf hopper ( $N_v$ ) population at 52nd week and weather parameters at 52nd and four weeks before.



**Fig. 4:** Correlation coefficients between green leaf hopper (*Nn*) population at 52nd week and weather parameters at 52nd and four weeks before.

a year for both the species. The maximum peak was observed at 52nd std. meteorological week (i. e. 24th to 31st December) for both the species. The correlation between weekly mean population of green leaf hopper (GLH) and meteorological parameters was worked out by pooling data from 1987-2004. The C. C. significant at 5% level was chosen using student 't' test. In the present study, we have discussed C. C. between GLH population at 52nd week and met parameters at same week and four weeks before (Fig. 3 and 4) for both the species of GLH. From the C. C. results, it seems that there was a significant positive correlation between 52nd week population of GLH and bright sunshine hours four weeks before for both the species and negative correlation between 52nd week population of GLH and minimum temperature, relative humidity four weeks before for both the species, while other weather parameters viz., maximum temperature and rainfall were not significant but 3-4 cm rainfall before 1-2 weeks was favourable for GLH development. Significant positive correlation between bright sunshine hours and population dynamics of both the species of these pests described the existence of photo periodic nature of GLH.

### CONCLUSION

Conditions favourable for green leaf hopper (*Nv* & *Nn*) are minimum temperature  $<21^{\circ}\text{C}$ , morning relative humidity

$<84\%$  and sunshine hours  $>8$  h before four weeks of maximum population at 52nd week also 3-4 cm rainfall before 2nd week (*Nv*) and 1 week (*Nn*) of maximum population at 52nd week.

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