

Original Research Article

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Incidence of Insect-Pests on Rice in Faizabad

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ABSTRACT

Keywords

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The field experiment was conducted at main experimental station of Narendra Deva University of Agriculture and Technology, Kumarganj Faizabad (U.P.) during the season *kharif*, 2015 to know the occurrence and abundance of insect-pests of paddy on rice crop was monitored on rice variety Pusa Basmati. This investigation revealed that pest activity commenced from 31th Standard meteorological week (SMW) and continued upto 49th SMW. The peak population of rice hispa was found in the 31st SMW, green leaf hopper was found in the 37th SMW, grass hopper and yellow stem borer was found in the 39th SMW and leaf folder was found in the 41st SMW. Population of yellow stem borer (YSB) was positively correlated with maximum temperature. The population of rice hispa had non-significant and positive correlation with rainfall and maximum temperature. The population of green leaf hopper showed positive and significant correlation with minimum and maximum temperature, relative humidity and rainfall. The population of rice leaf folder showed negative correlations with minimum and maximum temperature and relative humidity.

Introduction

Rice is the main staple food not only for India but also for other countries. It is mainly grown on the low line deltas of the Brahmaputra and Barak valley which consider as rice bowl of India. Apart from that Uttar Pradesh also contributes 56.57 lakh ha area with a productivity of 2.12 per ha and 119.92 lakh ton production of rice (Anonymous, 2012). The production and productivity of rice is governed by biotic and abiotic factors. The abiotic factors like temperature, rainfall,

Sunshine, relative humidity etc. play vital role in growth and development of rice. The biotic factors such as disease and pests affect the rice at different growth stages. Among them pests, insect showed more incidences on rice at different growth stages. Among insect pests, yellow stem borer *Scirpophaga incertulas*, Leaf folder *Cnaphalocris medinalis*, Rice hispa *Diuraphis armigera*, Green leaf hopper *Nephotettix* spp. and Grass hopper *Hieroglyphus banian* etc. were attacks on rice at different growth stages and caused huge losses in rice (Anonymous, 2003). The

abiotic factors also determine the dynamic nature of insect-pests (Kennedy and Storer, 2000) and show their influence on the incidence at different growth stages of rice. The knowledge of insect-pest populations play an important role in the formulating of protection strategies (Milford and Dugdale, 1990) and but also helps in the forecasting of the population on daily, seasonally or as long term in concern with the climate change (Denholm *et al.*, 2000). Keeping in this view a study was carried out to know the occurrence of insect-pests of rice under Uttar Pradesh condition.

Materials and Methods

The field experiment was carried out to know the occurrence of insect-pests of rice at Crop Research Station (crop research station), Masodha unit 1st of Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad-224 229 (U.P.) which fall under the subtropical region in indo-gangatic plains and lies at 26.4^oNorth latitude and 82.12^oE east longitude at an altitude of 113 meter from mean sea level. The fields were having sandy loam soil condition. Total experimental plot size measured 1500 m². The seedlings were transplanted in the experimental plot with spacing 20 cm between plant to plant and 15 cm row to row. 25 days old seedlings of Pusa Basmati-1 rice variety were transplanted 25 July 2015 from the nursery sown 24 days ago, in experimental year. The normal cultural practices were performed throughout the growing season of the crop. Data were recorded after 15 days of transplanting and subsequent after 7 days of intervals upto harvest of the crop by using net and hand collection method.

Results and Discussion

The incidence of rice insect pests like yellow stem borer *Scirpophaga incertulas*, Leaf

folder *Cnaphalocris medinalis*, Rice hispa *Dicladispa armigera*, Green leaf hopper *Nephotettix* spp. and Grass hopper *Hieroglyphus banian* were observed at different growth stages of rice. In the present investigation it observed that the population of above insect-pests was fluctuated at different temperature, rainfall, Sunshine and relative humidity. The incidence of rice hispa maximum at tillering stage of rice and it caused yellowing and bronzing of leaves. The peek population of rice hispa (2.6 Rice Hispa /five sweeps) noticed at 31st standard week with temperature ranging from 26 to 35.50^oC, 77.80% relative humidity and 2.0mm average weekly rainfall. Further the incidence of rice hispa was declined from 1.70 Rice Hispa /five sweeps at 32 standard week, 1.03 Rice Hispa /five sweeps at 33 standard week, 0.74 Rice Hispa /five sweeps at 34 standard week. However, no incidence of rice hispa was observed from 35 to 46 standard weeks expect at 38 standard weeks (0.19 Rice Hispa /five sweeps) which recorded least incidence. Similar results were also observed by Kumar (2002) who recorded the incidence of rice-hispa in irrigated rice at Tungabhadra Project Area of Karnataka. In the present investigation the Green leaf hopper were occurred at dough stage of rice. However the incidence of green leaf hopper were increasing from 31 standard week (1.40 green leaf hopper /five sweeps) to 37 standard week and recorded peek population (3.93 green leaf hopper /five sweeps) where temperature ranging 25.70- 32.60^oC and 73.10% relative humidity recorded. Future, in the present investigation the incidence of green leaf hopper were decreasing from 38 standard week (2.46 green leaf hopper /five sweeps) to 46 standard week (0.76 green leaf hopper /five sweeps) and recorded to be the least population. Soekhardjan *et al.*, (1974) who observed that similar type of observations on the rice and recorded that leafhopper showed more incidences at the time of maturity of

crop. Likewise, Kumar (2002) and Rajendraprasad *et al.*, (2011) were reported the population of green leaf hopper at the time of panicle initiation of rice. The maximum population of grass hopper was recorded at tillering stage of crop with 4.30 per five sweeps at 39 standard weeks. The population was started from 31st standard week to the extent of 1.63 grass hopper per five sweeps. The incidence of grass hopper population of was increased simultaneously 2.09, 2.36, 2.60, 3.13, 3.8 and 3.60 grass hopper per five sweeps respectively from 2nd week of August to 2nd week of September. The population reached to the peak (4.30 per five sweeps) 39th standard week during this period the temperature ranging from 22.30^oC- 30.70^oC, 60.0% relative humidity and 15.20 mm an average weekly rain fall. The population of grass hopper at was build up from 3.13, 3.80, 3.61, 4.06, 4.30, 3.53, 3.73, 3.06, and 3.43 grass hopper per five sweeps were recorded from at 35 to 43 standard week and found to be the best period for the maximum incidence of grass hopper. Khan (2013) also found that the highest percent of relative abundance of grasshopper was most prevalent in the rice field. Thus confirm the result of the present investigation. The population of leaf Folder reached to the peak (22.53 per five sweeps) in 41st standard week during this period the temperature ranging from 20.30^oC-31.50^oC with 56.90% relative humidity. However, the population was decreased 42nd standard week onward up to maturity of crop. The leaf folder population of was increased simultaneously 10.13, 12.73, 18.10, 20.72, 22.53, 21.30 and 19.30 leaf Folder per five sweeps respectively from 37-43 standard week and found to be the best period for the maximum incidence of leaf folder. The present findings are in confirmation with the report made by Sachan (1992) and Faleiro *et al.*, (2001). The maximum population of yellow stem borer was recorded (5.16 per five sweeps) at 39th standard weeks during this period the

temperature ranging from 22.30^oC to 30.70^oC and 58.60% relative humidity were recorded. The population of yellow stem borer was started from 31st standard week to extent of 0.30 per five sweeps. The population of yellow stem borer was increased simultaneously 0.36, 1.20, 1.71, 2.12, 2.80, 3.73, 2.86 and 5.16 yellow stem borer per five sweeps respectively from 32 to 39 standard week and found to be the best period for the incidence of yellow stem borer. The results are in conformity with earlier findings of Rustamani *et al.*, (1985), Sharma *et al.*, (1995), Sontakke *et al.*, (1987), Kumar (2002) and Rajendraprasad *et al.*, (2011) (Fig. 1).

Correlation

Population of yellow stem borer (YSB) was non-significantly negatively correlated with minimum temperature (-0.0349) and rainfall (-0.1598) while it had negative and significant association with relative humidity (-0.5395). However the population of rice yellow stem borer was non-significant and found to be positive correlated with maximum temperature (0.1769). The correlation studies on rice hispa (RH) revealed that the population and damage had significant correlation with relative humidity (0.6510) and minimum temperature (0.4631). Where as rice hispa had non-significant and positive correlation with rainfall (0.2637) and maximum temperature (0.1711). The population of green leaf hopper (GLH) showed positive and significant correlation with minimum temperature (0.7708), maximum temperature (0.6419), relative humidity (0.5195) and rainfall (0.4419). However no negative correlation of green leaf hopper was recorded with any abiotic factor. The population of grass hopper (GH) was non-significantly and negatively correlated with minimum temperature and rainfall (-0.1085 and -0.2575) (Fig. 2).

Fig.1 Occurrence of rice insect pests from 31st standard weeks to 46th standard weeks during 2015. (YSB=Yellow stem borer, RH=Rice Hispa, GLH=Green leaf hopper, GH=Grass hopper, LF=Leaf folder)

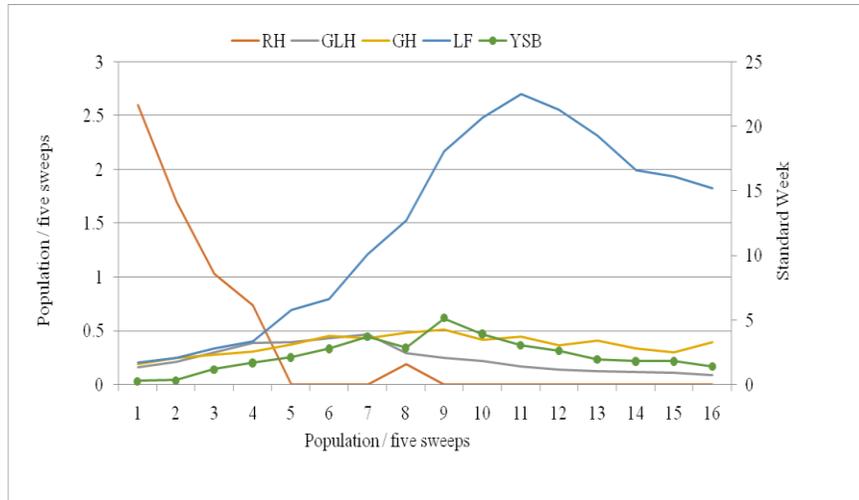
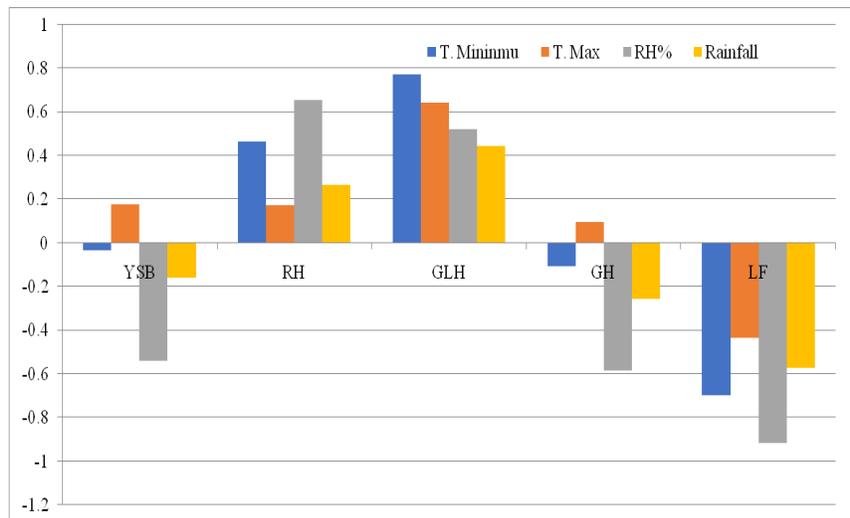


Fig.2 Correlation of major insect pests with abiotic factors *kharif* 2015

*= significant at 5% level (YSB=Yellow stem borer, RH=Rice Hispa, GLH=Green leaf hopper, GH=Grass hopper, LF=Leaf folder)



The population of grass hopper was significantly negatively correlated with relative humidity (-0.5860) and non-significant positive correlation was found with maximum temperature (0.0934). Results of correlation studies effect of abiotic factor on population of leaf folder rice revealed that there were negative correlations with minimum and maximum temperature, relative

humidity and rainfall -0.6992, -0.4347, -0.9168 and -0.57138 respectively.

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