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EVALUATION OF SEASONAL INCIDENCE OF RICE GUNDHI BUG (*LEPTOCORISA ACUTA* THUNBERG) IN RELATION TO WEATHER PARAMETERS

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ABSTRACT

The present investigation entitled "Evaluation of Seasonal Incidence of Rice Gundhi Bug in Relation to Weather Parameters" was conducted during *Kharif* 2022 at Students' Instructional Farm, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya (UP.). The experiment was conducted in Randomized Block Design with three replications and Eight treatments on Rice var. 'NDR-2065'. The studies revealed that the seasonal incidence of *L. accuta* was minimum during 34th standard week when the crop is in tillering stage as 0.5 nymphs/adults/hill. Maximum population as 5.8 nymphs/adults/hill was recorded in 42th SW i.e. second week of October when the corresponding minimum and maximum temperature were 21.60°C and 31.50°C while the relative humidity and sunshine hours were 80.00 per cent and 8.20 hours, respectively. The correlation studies between the nymph and adult population and major weather parameters showed non-significant positive correlation with sunshine hours ($r = 0.164$) and non-significant negative correlation with minimum temperature ($r = -0.286$), maximum temperature ($r = -0.140$), relative humidity ($r = -0.161$) and rainfall ($r = -0.098$). Overall, this study contributes to understanding the interactions between the Gundhi bug and weather parameters in the Rice ecosystem, facilitating more targeted and sustainable pest management.

Keywords : Rice, gundhi bug, *Leptocorisa acuta*, seasonal incidence, weather parameters.

Introduction

Rice (*Oryza sativa* Linn.), a self-pollinated plant with the chromosomal number 2n=24 and belong to Gramineae family, is a self-pollinated crop. After wheat, it is the second most widely grown cereal crop worldwide. (Abodolereza and Racionzer, 2009). Rice, *Oryza sativa* (Linnaeus) is an important cereal crop, the staple food for more than 65 percent of the world population (Fahad *et al.*, 2021). Generally, Rice is cultivated in near about all the tropical, subtropical, and temperate countries of the world. The presence of

insect pests at different phases of crop growth is one of the main factors limiting rice production and low productivity in India. More than 100 different insect species attack the rice plant, and 20 of them have the potential to be economically destructive (Sulagitti *et al.*, 2017). Rice covers 12 percent of the world's crop area of 165.3 m/ha and the cultivation of rice in more than 214 countries with global production is 787.3 m. ton. More than 90 percent of world rice is produced and consumed in Asia. (FAO STAT, 2021). These are reducing crop yield and different types of insect pest attack to the rice crop during the crop period, in which

Gundhi bug, stem borer and leaf folder are considered as the major insect pests responsible for reducing the yield of rice during crop periods. among them, Rice gundhi bug, *Leptocorisa* spp. Fab. (Hemiptera: Alydidae), is recognized as one of the most significant pests of rice, responsible for an estimated yield loss of approximately 15–30% (Baharally and Simon, 2014; Tiwari *et al.,* 2014). Both nymphs and adults inflict damage by extracting sap from the grains during the milky stage, rendering them chaffy. The population dynamics of the Gundhi bug are influenced by a range of biotic factors, including the presence of adjacent woodlands, abundant weeds near rice fields, wild grasses along canals, and staggered rice cultivation. Additionally, abiotic factors such as temperature, relative humidity, heavy rainfall, and frequent drizzles play a critical role. This pest is commonly found in rainfed and upland rice ecosystems and shows a marked preference for the flowering to milky stages of the rice crop. The present study was undertaken to examine the influence of abiotic factors on the population dynamics of the rice Gundhi bug in Ayodhya District, Uttar Pradesh, during the 2022–23 cropping season.

Material and Methods

The research work was conducted at the student instructional farm, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya-224229 (U.P.) in the Kharif season 2022. The experimental site is located 113 meters above sea level and is geographically located between 26.470 North and 82.120 East. The average annual rainfall in this region is 1200 mm, and the climate is subtropical and semiarid. The majority of the rain fell between mid-June and September. The region's lowest and maximum temperatures, respectively, fall between 7.9 and 27.4°C and 17.9 and 38.5°C.

May and June are the hottest months of the year, sometimes topping 40°C. the seed of NDR-2065 was sowed on July 10, 2022, in several different seedbeds. on July 10, 2022, during Kharif 2022-23, 28-day-old seedlings were transplanted into a well-puddled 4 x 3 m2 plot with 20 cm between rows and 15 cm between plant spacing. To incidence of natural insect pests incidence on the crop occurred without any pesticides being applied throughout the crop time. In this uncontrolled plot, the pest population was monitored up until maturity just seven days after the incidence or onset of the infestation. For every insect, the incidence of pests was determined on 10 randomly selected hills. Meteorological observations recorded from the Department of Agricultural Meteorology of the Acharya Narendra Deva University of Agriculture

and Technology, Kumarganj, Ayodhya. and the information on weather conditions every week from July to November, during the crop season and also correlated with the percentage incidence of the insect-pest populations. The correlation coefficient method was applied to the relationship between the incidence of insect pests and the weather parameters. Correlation analysis with the support of SAS software (SAS, 2005), it was feasible to determine the relationship between meteorological factors that included maximum and the lowest temps (°C), early and late afternoon relative humidity (%), rainfall amount (mm), and the amount of insect-pest damage.

Result and Discussion

The findings of this study are presented in Table 1 and Figure 1, which illustrate the incidence of gundhi bug on rice and their relationship with abiotic factors. Table 2 presents the correlation coefficients. Based on the data from these tables, the infestation levels of the major insect pests during the Kharif season of 2022 were as follows:

Gundhi bug infestation: Correlation coefficients with major weather parameters were determined to relate the effects of abiotic factors on rice gundhi bug (Table 2). The correlation studies between the nymph and adults' population and major weather parameters showed non-significant positive correlation with sunshine hours (r=0.164) and non-significant negative correlation with minimum temperature (r = -0.286), maximum temperature (r = - 0.140), relative humidity (r = -0.161) and rainfall (r = -0.098). Present results endorse the findings Sharma *et al.*, (2019) who opined that rice gundhi bug had significant negative correlation with rainfall while the remaining weather parameters like average relative humidity and average temperature were found negative and non-significantly correlated. Paikra *et al.* (2021) also revealed that the correlation between Rice gundhi bug with biotic factors showed minimum temperature (r =-0.668), average temperature (r=-0.547), morning relative humidity (r =-0.671), evening relative humidity (r = -0.853), average relative humidity (r =-0.859) and rainfall (r=-0.616) had significant negative correlation and significantly positive correlated with sunshine hours (r =0.767), while the maximum temperature showed non-significant correlation with nymphs and adults of gundhi bug.

Conclusion

This research sheds light on the intricate relationship between weather parameters determined to relate the effects of abiotic factors on Gundhi bug in the Rice ecosystem. The study's findings provide

valuable insights into the timing and severity of infestations by the gundhi bug in rice. The population rice gundhi bug revealed distinct wepatterns, with peak infestations occurring during specific weeks of the growing season. The correlation studies between the nymph and adult populations and major weather parameters showed a non-significant positive correlation with sunshine hours and a non-significant negative correlation with minimum temperature, maximum temperature, relative humidity and rainfall. These findings highlight the importance of considering weather parameters in pest management strategies for

Rice cultivation. By understanding the seasonal dynamics of these pests and their responses to temperature and humidity variations, farmers and researchers can develop more precise and effective pest control measures, potentially reducing yield losses and minimizing the environmental impact of pest management practices. This research contributes to an enhanced and thorough comprehension of the interaction between insect pests and weather parameters in the Rice ecosystem, facilitating more targeted and sustainable pest management approaches in agricultural systems.

Table 1 : Seasonal occurrence of rice gundhi bug, *Leptocorisa acuta* on rice cultivar NDR 2065 and abiotic factors during *Kharif*, 2022.

S.M.W.	Gundhi Bug nymphs/ adults/ hill	Temperature °C		Average Relative Humidity (%)	Total rainfall (mm)	Sunshine (hrs)
		Minimum	Maximum			
30	0	25.10	32.40	83.60	83.60	1.40
31	0	25.70	32.80	83.00	21.20	2.50
32	0	26.20	33.60	81.50	8.00	7.50
33	0	25.40	32.50	84.40	31.80	5.70
34	0.5	25.50	32.20	83.00	65.20	7.60
35	1.2	25.50	33.70	78.40	18.80	4.00
36	1.7	24.70	34.80	74.10	11.40	7.90
37	1.3	24.40	31.50	85.40	98.60	5.00
38	2.4	24.70	31.90	83.40	70.80	4.40
39	3.3	23.90	32.50	84.20	21.20	5.00
40	2.2	23.00	31.20	82.20	163.00	3.90
41	5.6	22.50	32.50	81.80	47.00	4.00
42	5.8	21.60	31.50	80.00	00.00	8.20
43	3.5	19.00	30.90	70.00	00.00	8.50
44	2.3	14.80	30.30	74.30	00.00	8.30
45	0.0	16.30	29.50	74.30	00.00	8.50
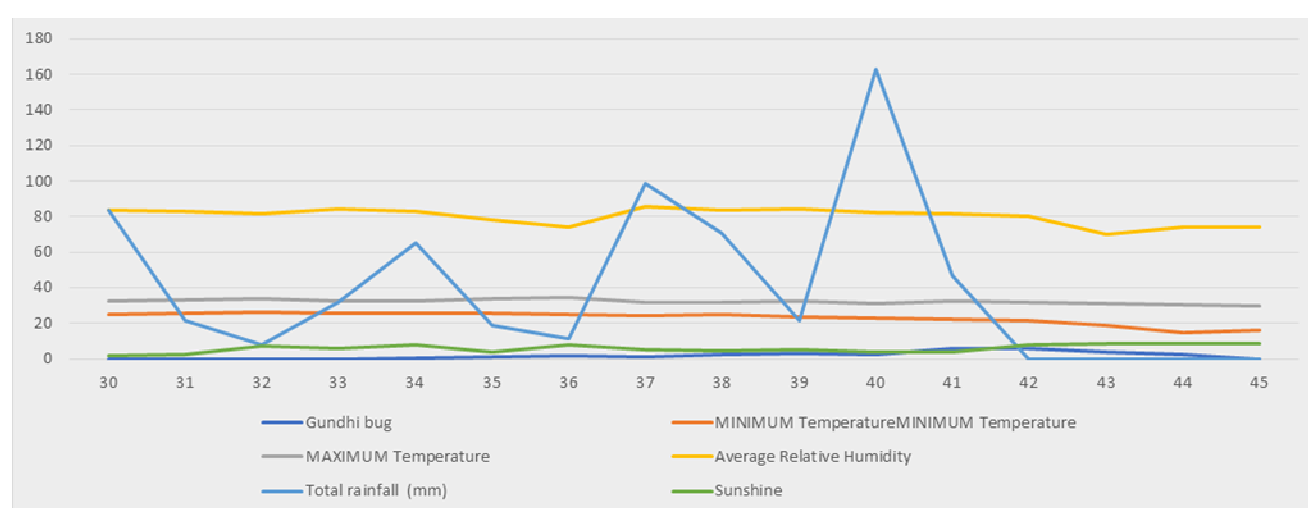
Fig. 1 : Seasonal occurrence of rice gundhi bug, *Leptocorisa acuta* on rice cultivar NDR 2065 and abiotic factors during *Kharif*, 2022

Table 2 : Correlation coefficient between rice gundhi bug, *Leptocorisa acuta* and abiotic factors during *Kharif*, 2022

Insect pests	Weather Parameters				
	Temperature °C		Relative Humidity (%)	Rainfall (mm)	Sunshine (hrs)
	Minimum	Maximum			
Rice gundhi bug	NS (-0.286)	NS (-0.140)	NS (-0.161)	NS (-0.098)	NS (0.164)

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