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Major insect-pests infesting mung bean (*Vigna radiata*) cultivars and its natural enemies

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Abstract

Mungbean (*Vigna radiata*), a vital pulse crop globally recognized as moong or green gram, holds a significant position in India's agriculture. This study explores the seasonal dynamics of key insect pests affecting *khairif* mungbean in 2022 and their correlation with weather parameters. The investigation on population dynamics of mungbean showed that insect pests lady bird beetle infected crop in the entire cropping season. Whereas, in LBB negative significant correlation seen between maximum temperature and relative humidity at evening.

Keywords: Mungbean, insect pests, natural enemies, weather parameters, coefficient relation

Introduction

Pulses, the food legumes, have been grown by farmers since millennia, providing nutritionally balanced food to the people of India (Nene, 2006) [9] and many other countries of the world. Pulses are the major source of protein in the vegetarian diet in our country, and they maintain soil fertility through biological nitrogen fixation in soil, thus playing a vital role in furthering sustainable agriculture (Kannaiyan, 1999) [6].

According to Anonymous (2015) [1], India is the world's greatest producer of pulses, with 25.26 million hectares under cultivation, 16.47 million tons of output, and a yield of 652 kg/hectare. In our nation, 15.35% of the whole cultivated land is planted with pulses. It is estimated that 200 insect pests, including 7 mites of the order Acarina, infest greengram and blackgram. These pests are classified into 48 families and orders, including Coleoptera, Diptera, Hemiptera, Hymenoptera, Isoptera, Lepidoptera, and Thysanoptera. The primary insect pests of green gram include spotted pod borer, Bemisia tabaci, jassids, Empoasca kerri, aphids, and Maruca vitrata. In addition to harming other related legumes, they severely harm the leaves and pods of greengrams.

Therefore, considering the importance of these pests, the present studies were carried out to study the population dynamics of major insect pests in mungbean as well as to record the activities of natural enemies in mungbean ecosystem

Methodology

To record the activities of natural enemies in mungbean, experiment was conducted at research farm of Pulse Entomology section of Agriculture Research Station, Badnapur during *khairif* season of 2021-22. 100 m² area was used to grow the crop. To observe the behavior of the insect pests as well as their natural enemies, the crop was left untreated until it was harvested. Observations of natural enemies (Lady bird beetle) population were recorded from ten randomly selected plants from vegetative stage continuing till harvesting on weekly from 29th to 39th SMW. Correlation of natural enemies population with weather parameters was worked out using appropriate statistical method i.e. Pearson method.

Observation

Five randomly chosen and tagged plants in each plot were used to record the population of various insect pests and their associated natural enemies once a week.

For the majority of bug species, this was done between 6:30 and 8 a.m., and for others, between 9:00 and 11:00 a.m.

Results & Discussion

The study of population dynamics of insect pest in mung bean was carried out during kharif 2022 at research farm of agriculture research station in badnapur. The crop was grown on 100m² area. The crop was kept untreated till harvest to record the activities of major insect pest as well as their natural enemies. Weekly observations were recorded since from vegetatively growth to till harvest. The data generated was correlation with weather parameters using appropriate statistical analysis i.e. Pearson method. In the *kharif* of 2022, research was conducted on the population dynamics of insect pests in mung beans at the research farm of the agriculture research station in Badnapur. A 100m² area was used to grow the crop. To observe the behaviour of the insect pests as well as their natural enemies, the crop was left untreated until it was harvested. Weekly observations were kept from vegetative stage continuing till harvesting. The data generated was correlation with weather parameters using appropriate statistical analysis i.e. Pearson method.

Population dynamics of lady bird beetle (*Coccinella septempunctata*)

The activation of natural enemies was recorded with the occurrence of sucking pests i.e. Lady bird beetle was noticed during 31st SMW (0.6 /plant) and it was at it peak in 34th SMW i.e. (2.3/plant). The peak of lady bird beetle was coincided with the highest population of aphid, whiteflies as well as pod borer. The overall range of 0.6 to 2.3 larvae/plant. Maximum population was recorded in 40th SMW. Similar Mohapatra *et al.*, (2018) stated that the incidence of adult beetle/plant was first observed during 39th standard week and it remained present on the crop up to 43th SMW (one week before harvest). The maximum population 2.00 was found in the 41th standard week and Singh *et al.*, (2019) ^[11] reported that the lady bird beetle, *Coccinella septempunctata* was recorded in the experimental field of green gram. The population of *C. septempunctata* is the range of 0.40 to 3.80 per plant, minimum being in the 33th SMW and maximum in the 37th SMW. A gradual decline was observed after the latter date.

Table 1: To study the population dynamics of major insect pests and their natural enemies in Mungbean

SMW	Natural enemies	Weather parameter				
	LLB	Temperature (c)		Rainfall (mm)	R.H (%)	
		Max	Min.		Morn.	Eve.
31	0.6	31	24	125.5	90.5	81
32	1.2	27	22.5	18.5	89	90
33	1.9	24.3	22.2	9	88	82.2
34	2.3	27.5	22	-	91	83
35	1.8	31	23.5	38	87	84
36	1.7	28	23	120.5	92	92
37	0	27	23.5	72	94	92
38	0	28.5	23.5	12	95	91
39	0	29	22.5	6.5	91	92

Table 2: Correlation coefficient between lady bird beetle and weather parameters in mung bean ecosystem

Name of pest	Correlation coefficient(r)				
	Temperature		Rainfall	Relative humidity	
	Max T	Min T		RH m	RH e
Ladybird beetle	-0.837**	0.405NS	0.531NS	0.045NS	-0.858**

**Significant at 1% level *Significant at 5% level

The table 2 revealed the correlation coefficient between lady bird beetle and weather parameters. A non-significant positive correlation were observed in minimum temperature $r=0.405$, Rainfall (RF) $r=0.531$ and morning Relative humidity (Rhm) $r=0.045$ with population of lady bird beetle. Significant correlation seen between maximum temperature $r=-0.837$ and relative humidity at evening (Rhe) $r=-0.858$ but it was also negatives. The data shows that the activities of lady bird beetle was fluctuated with all the weather parameters.

This finding are in accordance Mohapatra *et al.*, (2018) whitefly showed the population of *C. septempunctata* showed non-significant positive correlation with maximum temperature where as non-significant negative correlation with minimum temperature and rainfall and significant negative correlation with relative humidity.

Conclusion

The activities of natural enemy LBB varied from (0.6 to 2.3 larvae/plant.) and commenced from 31st SMW. Whereas LBB reached at its peak in 40th SMW. In regards correlation among

LBB with weather parameters showed Significant correlation seen between maximum temperature and relative humidity at evening but it was also negatives.

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