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Population dynamics of *Maruca vitrata* on pigeonpea in coastal Andhra Pradesh

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Abstract

Pulses are the major protein supplements in human nutrition. Pulse crops also called grain legumes, have been valued as food, fodder and feed in the Indian agriculture centuries, but they have rather a very low profile compared to cereals. The studies conducted on population dynamics of *Maruca vitrata* on pigeonpea revealed that the incidence of *Maruca vitrata* was noticed from 51st standard week (1.75 No's) with peak incidence in 2nd standard week (14.54 No's) and it was reduced to 1.01 No's on 6th standard week. All the weather variables (maximum and minimum temperature, morning and evening relative humidity and rainfall) together accounted for 82.1% variation in larval population which was significant. Only minimum temperature showed significant influence independently on variation in larval population.

Keywords: *Maruca vitrata*, pigeonpea, minimum temperature, population, relative humidity

Introduction

Pulses are source of protein in human diet in India. The protein content varies from 20 to 30 per cent and is almost three times that of cereals. Among the pulse crops, pigeon pea, *Cajanus cajan* (L.) Millsp. is the main pulse crop grown in India and it is grown in area of 24.45 million ha producing 15.24 million tones (The Hindu Pyralidae) is a serious pest of grain legumes. 2005). In Andhra Pradesh it is grown in an area of 5.2 lakh ha, producing 2.17 lakh tones. (Andhra Pradesh Economic and Statistical Bulletin, 2005).

The pod borers have been identified as the major constraint in increasing productivity of pigeonpea. Among pod borers the legume pod borer, *Maruca vitrata* (Geyer) (Lepidoptera Pyralidae) is a serious pest of grain legumes in tropics and sub tropics which attacks the crop from pre-flowering stage to pod maturing stage, causing yield loss estimated between 20 to 60 per cent. The pod borer larva feed by remaining inside the webbed mass of leaves flowers and pods.

Studies on population fluctuation and biology of pest in relation to environment especially abiotic components reveal vital information needed for formulating IPM strategies.

Materials and Methods

Population dynamics of spotted pod borer, *M. vitrata* was studied during kharif on pigeon pea at Regional Agricultural Research Station, Lam. The experiment was conducted with redgram variety ICPL 85063 in a bulk plot of 100 m². The incidence of spotted pod borer by way of larval population was recorded from 50 randomly selected plants at weekly interval.

The spotted pod borer *M. vitrata* incidence on pigeonpea and the meteorological data during the crop season were analysed to know the effect of weather parameter on the population of spotted pod borer.

The influence of weather parameters viz., maximum temperature, minimum temperature, morning relative humidity, evening relative humidity and rainfall on *M. vitrata* was analyzed statistically by Multiple Linear Regression (MLR) analysis.

Results and Discussion

The larval incidence started during second fortnight of December (1.75 No's), reached peak during second week of January (14.54 No's) coinciding with maximum flowering and pod initiation stage and declined by 1st week of February (1.02 No's) (Table-1). The peak occurrence of spotted pod borer during January month is in agreement with the findings of Ramesh babu (2006) [4] who observed peak population of *M. vitrata* during January-February months on groundnut.

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Multiple regression analysis between larval incidence and weather parameters (maximum temperature, morning and evening relative humidity and rainfall) revealed that all the weather variables accounted for 82.1 per cent variation in larval population which was significant (Table-2). Minimum temperature was found to exert independent effect on variation on larval population while the remaining parameters viz. maximum temperature, morning and evening relative humidity and rainfall were non-significant. The 1°C raise in minimum temperature over mean level is expected to decrease the larval population by 2.366. Maximum population of spotted pod borer coincide with the decline in minimum temperature and with higher R.H. Similar observation was made by Akhauri *et al.* (1996) [1] with regards to

temperatures. Narendra Reddy (2001) [3] stated that daily minimum temperature and morning RH showed positive association with pest population. Minimum temperature was found to exert independent effect on variation in larval population of *M. vitrata*. The population decreased with increase in temperature was reported by Ramesh babu (2006) [4] was in agreement with the present observation. Kuldeep Saxena and Ram Ujagir (2007) [2] reported that minimum temperature showed positive correlation with pest population. The deviation with present studying could be due to the time of synchronization of flowering with the temperatures. The results showed that the minimum temperature is most important abiotic components of environment on the incidence of *M. vitrata* in pigeonpea.

Table 1: Influence of weather parameters on population fluctuation of *M. vitrata* on redgram during kharif.

Date	Temperature(°C)		Relative Humidity		Rainfall (X ₅)	Pest Population
	Maximum (X ₁)	Minimum (X ₂)	Morning (X ₃)	Evening (X ₄)		
3 rd Dec	28.97	19.60	85.14	49.29	0	0
10 th Dec	29.67	19.87	83.86	55.14	0	0
17 th Dec	30.20	18.40	74.70	39.30	0	1.75
24 th Dec	32.50	17.50	89.00	43.40	0	3.54
1 st Jan	29.60	14.90	90.70	38.20	0	4.00
8 th Jan	30.30	15.20	94.80	41.70	0	11.30
15 th Jan	30.70	14.60	93.00	46.20	0	14.54
22 nd Jan	30.30	18.10	85.80	49.70	0.2	7.01
29 th Jan	30.60	19.80	87.20	51.70	0.2	1.66
5 th Feb	29.60	19.90	92.50	65.00	8.77	1.02
12 th Feb	29.90	20.90	94.40	55.85	3.2	0
19 th Feb	31.80	21.10	90.00	48.20	0	0

Table 2: Multiple linear regression analysis of larval population of *M. vitrata* on certain weather parameters

Variable	Partial regression co-efficient	Standard error	T value
X ₁ Maximum temperature (°C)	1.0087	0.5290	0.920
X ₂ Maximum temperature (°C)	-2.3669*	0.6259	3.781
X ₃ Morning Relative humidity (%)	0.0360	0.1940	0.185
X ₄ Evening Relative humidity (%)	0.3883	0.2460	1.578
X ₅ Rain fall	-0.5462	0.5290	1.032

Conclusion

Population dynamics of *M. vitrata* with reference to phenology of crop growth suitable for feeding and breeding will give the period of peak occurrence as well as its low level activity. This information can be used to adjust the cropping period, sowing dates and to take up plant protection measures to check the pest population.

Maximum incidence of *M. vitrata* was observed during the second week of January coinciding with maximum flowering stage.

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