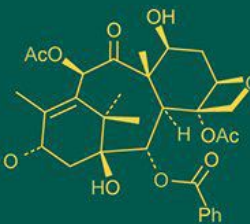
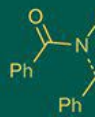
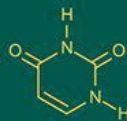


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Population dynamics of Pea pod borer (*Helicoverpa armigera*) Hub. In relation to weather parameters during Rabi season

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Abstract

Field experiment was carried out to study the population dynamics of pea pod borer (*Helicoverpa armigera*) Hub. on vegetable pea and its relation with abiotic factors, under natural conditions at college farm of Nalanda College of Horticulture, Noorsarai (Nalanda). The results revealed that the initial occurrence of a larval population 0.75 larvae/plant at the 48th Standard Meteorological Week. The population was gradually increased and attained a peak level at the 6th Standard Meteorological Week. The correlation studies reveals that Morning relative humidity and bright sunshine hours showed significantly positive correlation with the population of pea pod borer.

Keywords: Population dynamics, correlation, morning relative humidity, bright sunshine hours, pea pod borer

Introduction

Pea, *Pisum sativum* L. is an important leguminous vegetable crop and mostly grown in all states of the country during Rabi season (Singh et. al. 2001) [7]. It is grown for its taste, nutritive value and food. The high yield in vegetable pea could not be achieved due to large number of insect pests attacking vegetable pea. The crop is known to suffer from a number of insect pests like Pod borers (*Etiella zinckenella* Tr. and *Helicoverpa armigera* Hub.), pea stem fly (*Melanogromyza phaseoli* T.), pea leaf miner (*Chromatomyia horticola* G.), aphid (*Acyrtosiphon pisum*) and thrips (*Caliothrips indicus* B.). These are serious insect pests and often cause substantial loss to the crop. The insect pests i. e. Pea pod borer, *Etiella zinckenella*, gram pod borer, *Helicoverpa armigera* appear in great number during vegetative growth to pod maturation stage of pea (Lal et. al. 2006) [5]. It is considered to be a major limiting factor for the production of vegetable pea. Vaibhav et. al. 2018) [9]. The pea pod borer solely caused 50.9% pod infestation with 77.64 % seed damage which resulted in yield losses of about 23.9% (Yadav and Chauhan, 2000) [10].

Materials and Methods

The present study was conducted at the college farm of Nalanda college of Horticulture, Noorsarai, Nalanda in Rabi season 2023-24. The vegetable pea variety, Harbhajan was sown in the first week of November in the 2.20 X 2.30 Sq.m. plot. The experiment was laid out with an RBD design with a 30 x 10 cm² spacing.

Method of Recording Observations

The larval population of *H. armigera* present on the vegetable pea crop during experimental period was recorded in the morning hours at weekly interval, from sowing (DAS) to till the last picking of pods. The observation for the population of *H. armigera* larvae were recorded from ten plants per plot of each replication was selected randomly and the number of larvae calculated during each observation from untreated control plots. Weekly meteorological data on minimum temperature and maximum temperature in degree centigrade, relative humidity (%) and rainfall (mm) were recorded from Agro- meteorological observatory during the experimental period. To investigate how various abiotic factors affect the prevalence of pod borers, a straight forward correlation between the

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pest population and abiotic factors was calculated using the normal statistical method (Steel and Torrie, 1980) [8].

Table 1: Population dynamics of pea pod borer in Rabi season 2023-24.

Obs. No.	Date of obs.	SMW	Pea pod borer/plant
1.	01.12.2023	45	0.00 (0.70)
2.	08.12.2023	46	0.00(0.70)
3.	15.12.2023	47	0.00 (0.70)
4.	22.12.2023	48	0.75 (1.11)
5.	29.12.2023	49	1.22 (1.31)
6.	05.01.2023	01	1.37 (1.36)
7.	12.01.2024	02	2.64 (1.77)
8.	19.01.2024	03	(3.59) (2.02)
9.	26.01.2024	04	4.54 (2.24)
10.	02.02.2024	05	5.35 (2.41)
11.	09.02.2024	06	6.18 (2.58)
12.	16.02.2024	07	0.98 (1.21)
13.	23.02.2024	08	0.14(0.80)
The average population throughout season		-----	2.05

Table 2: Combined direct and indirect effect of the abiotic factors on the population of pea pod borer in Rabi season 2023-24

Abiotic Factor	Temp Max	Temp Min	% RH (Morning)	Rainfall (mm)	Wind Speed (km/hr)	Bright Sunshine Hours
Pea pod borer	-0.310	0.034	0.439*	0.007	0.137	-0.345

Significant at 5 per cent level

Results and Discussion

The occurrence of the data on the pea pod borer (*Helicoverpa armigera*) was noted at weekly interval and are presented in Table 1. The observation on the incidence of pea pod borer during the Rabi season 2023-24 revealed that the occurrence of *H. armigera* on pea started from 48th standard Metrological week and continued over the growing time of pea. The population of pea pod borer ranged from 0.75 to 6.18. The pest population increased and reaches its peak (6.18 larvae/plant) in 6th meteorological week. The present finding was similar to Kumar *et al.* (2018) reported that the pea pod borer population reached a peak level in the early February weeks. Mallikarjuna *et al.* (2012) [6] and Abdallah *et al.* (1998) [1] also reported that the pea pod borer is a pest of various leguminous crops attacked from February to March month attaining a peak level of population.

Table 2 revealed that Morning relative humidity and Bright Sunshine hours showed significantly positive correlation with the population of pea pod borer where as rest of the Environmental factors are non-significantly negatively correlated with pea pod borer population. The present findings are similar to Arshad *et al.* (2018) [2] reported that the correlation between the population of pea pod borer and temperature was negative. Also Vaibhav *et al.* (2018) [9] reported that the maximum temperature was negatively correlated with pest population while evening relative humidity was found positively significant. Findings of Kumar *et al.* (2017) also confirm present studies who started that the pea pod borer population was negatively correlated with maximum temperature and positively correlated with minimum temperature, relative humidity and rainfall.

Conclusion

Based on results of present study, it can be concluded that pea pod borer (*Helicoverpa armigera*) commenced from 3rd week of December and remained till 2nd week of February. Thereafter population declined in subsequent meteorological weeks. Morning relative humidity and bright sunshine hours showed significantly positive correlation with pea pod borer where as rest of the environmental factors were negatively correlated with the pest population.

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