POPULATION DYNAMICS OF INSECT PESTS OF PEA

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ABSTRACT

The seasonal incidence of major insect pests on pea Pisum sativum at different growth stages has been assessed in this study. Major pests observed include gram pod borer Helicoverpa armigera (Hubner), blue butterfly Lampedes boeticus (L.), pea leaf miner Chromatomyia horticola Goureau and pea aphid Acyrthosiphon pisum (Harris). These results revealed that peak incidence of H. armigera (7.80 larvae/ plant) and L. boeticus (8.60 larvae/ plant) was during the 8th and 9th SMW, respectively; while for C. horticola (5.50 larvae/ leaf) and A. pisum (94.1 aphids/ plant) it was 5th SMW. Helicoverpa armigera incidence revealed a significant negative correlation with minimum temperature (r= -0.628) while for L. boeticus it was positive one with maximum temperature (r= 0.604). The incidence of C. horticola was observed to be significantly negatively correlated with minimum temperature and rainfall (r= -0.826 and r= -0.584, respectively); while A. pisum revealed a significant negative correlation with minimum temperature (r= -0.806).

Key words: Field pea, Pisum sativum, insect pests, seasonal incidence, Helicoverpa armigera, Lampedes boeticus, Chromatomyia horticola, Acyrthosiphon pisum, weather parameters, correlation, pod borers

Pea Pisum sativum L., belonging to the family Fabaceae, is an important vegetable grown in the Indian subcontinent, in the milder temperate zones. It is cultivated on 0.64 million ha in India, with production of 0.88 mt and productivity of 1375 kg/ ha (Anonymous, 2020) It serves as a cheap source of digestible protein, carbohydrates, fat, vitamins, and minerals (Tiwari et al., 2019). Losses due to insect pests are a handicap for its maximum yield. From seedling to harvest, 24 insect pests have been reported (Bijjur and Verma, 1995). Of these, the gram pod borer Helicoverpa armigera (Hubner), blue butterfly Lampides boeticus (L.), pea pod borers Etiella zinckenella (Treitschke), pea aphid Acyrthosiphon pisum (Harris), pea leaf miner Phytomyza horticola (Goureau), pod fly Melanagromyza obtuse (Malloch), pea stem fly, Melanagromyza phaseoli (Tryon) and thrips Caliothrips indicus (Bagnall) cause serious losses (Mittal and Ujagir, 2007; Yadav et al., 2015). The correlation studies between seasonal insect pest occurrence and succession patterns helps to understand how changing plant communities and habitats influence pest populations. For an effective IPM, knowledge on the seasonal incidence and abundance of pests, and their population dynamics is required and hence the present study.
RESULTS AND DISCUSSION

During rabi, 2020-21, four major insect pests viz., *H. armigera*, *L. boeticus*, *C. horticola* and *A. pisum* were observed at different stages of growth. Larvae of *H. armigera* started to appear from the 48th Standard Meteorological Week (SMW) (29th November to 05th December) with 0.4 larvae/plant (Fig. 1); it continued to increase from 49th to 7th SMW (2nd week of December to the 3rd week of February), which varied from 1.00 to 7.20 larvae/plant, with peak incidence during 8th SMW (24th February) with 7.80 larvae/plant; this continued till maturity of the crop during 11th SMW (14th to 20th March). The correlation analysis showed that there was significant negative correlation of minimum temperature with larval incidence ($r= -0.628$), while others were non-significant. These findings are in agreement with those of Dubey et al. (1993) on *H. armigera*, with its peak activity beginning in February and lasting up to March. Prasad et al. (1997) also found that the adults of *H. armigera* reached maximum during late March. Pandey et al. (2002) observed a significant positive linear relationship with maximum temperature (0.64), minimum temperature (0.62) and evaporation (0.60). Yadav et al. (2019) also found that *H. armigera* larval incidence starts increasing during third week of December to first week of March. *Lampides boeticus* started appearing during flowering and pod formation stage and continued up to the full maturity of the crop (Fig. 1); it first appeared during 52nd SMW (27th December to 02nd January- 0.9 larvae/plant), continued to increase from 1st to 8th SMW (1st week of January to the 4th week of February), and peak was during 9th SMW (26th February to 4th March- 8.60 larvae/plant). Its incidence continued till maturity with 7.70 larvae/plant during 11th SMW (14th to 20th March). A statistically significant and positive association was found between the larval incidence and the maximum temperature ($r=0.604$). These findings are partially in accordance with Kaushik and Singh (1982).

The incidence of *C. horticola* commenced during 51st SMW (4th week of December- 3.4 larvae/leaf), and then continued to increase from 52nd to 4th SMW (27th...
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ACKNOWLEDGEMENTS
The authors acknowledge the Head of the Department of Entomology, Genetics and Plant Breeding and the Dean, Rafi Ahmed Kidwai College of Agriculture, Sehore for providing facilities and for support.

FINANCIAL SUPPORT
No funding received.

AUTHOR CONTRIBUTION STATEMENT
S T and N K conceived, designed research and conducted experiments. S T and N contributed to analytical tools. S T wrote the manuscript. All authors read and approved the manuscript.

CONFLICT OF INTEREST
No conflict of interest.

(Manuscript Received: May, 2023; Revised: August, 2023; Accepted: September, 2023; Online Published: October, 2023)

Online First in www.entosocindia.org and indianentomology.org Ref. No. e23287