BIOLOGY OF DIAMONDBACK MOTH PLUTELLAXYLOSTELLA ON DIFFERENT CRUCIFERS

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ABSTRACT

The present study was done at the Department of Entomology, College of Horticulture and Forestry, Neri (Hamirpur), Himachal Pradesh. The biology of diamondback moth Plutellaxylostella was evaluated on four crucifers as hosts. It was observed that in cauliflower and cabbage life cycle was shorter compared to radish and mustard; in cauliflower it was 35.60 days and in cabbage 41.20 days. Egg hatching was more with mustard (98%) followed by cauliflower (97.80%).

Key words: Plutellaxylostella, cabbage, cauliflower, radish, mustard, life cycle, fecundity, Oviposition, egg hatching, instars, pupa, adult

As many as 42 insect pests had been reported on crucifers (Jat et al., 2017). In Himachal Pradesh, 27 species occur on cabbage and out of these, eight are regular pests (BadenesPderez and Shelton, 2006). Pest problem is one of the major constraints for achieving higher production in agriculture crops (Singh et al., 2015). Different species of the insect pests like tobacco caterpillar, Spodopteralitura (F.); diamondback moth, Plutellaxylostella (L.); cabbage caterpillar, Pierisbrassicae (L.); cabbage semilooper, Thysanoplusiorichalcea (F.); cabbage borer, Hellulaundalis (F.) etc. cause considerable yield losses. Among these, diamondback moth (DBM), Plutellaxylostella (L.) (Plutellidae: Lepidoptera) is serious (Devi and Raj, 1995). Damage by these pests had been reported earlier (Hutchison et al., 2011). The diamondback moth, DBM, has four stages in its life cycle (Talekar and Shelton, 1993), and the duration of each stage is dependent on temperature (Golizadehet al., 2009). The present study evaluates the biology of DBM in four cruciferous hosts.

MATERIALS AND METHODS

Development and growth of P. xylostella was observed under laboratory conditions at constant temperature. Five pairs of male and female were maintained in insect cages provided with 10% sugar syrup in cotton swab, and observed for egg laying. A batch of 100 eggs obtained were further observed for the biology with daily observations. Emerged larvae were observed, until all eggs either hatched or expired. On hatching, the neonate larvae (12 h old) were transferred with a camel’s hair brush to the cabbage, cauliflower, radish and mustard leaves placed in glass jars covered with muslin cloth/insect cages/ petri plates. The leaves were changed periodically until exhausted. Observations on the duration of larval instars were made daily under stereo zoom microscope. Experiment was replicated five times with 10 larvae/replication. The pupae formed were kept separately and observed further for pupal period, and for adult longevity, fecundity etc. Preoviposition period, oviposition and larval, pre-pupal, pupal periods and total life cycle were observed.

RESULTS AND DISCUSSION

The details of biology of DBM observed in the study are presented in Table 1. Eggs were laid in groups or singly usually on the surface of leaves, near veins and occasionally on both surfaces. Eggs were cylindrical in shape and very minute and pale yellowish. Similar observations on egg shape appearance were reported by Ahmad et al. (2008). There was maximum hatching of eggs with mustard (98.80 ± 0.58), and maximum fecundity per day by a female ranged from 367.80 ± 1.16 eggs. Similar results were observed by Kannan et al. (2011). The least preoviposition period was observed in cauliflower (0.60 ± 0.25 days) followed by mustard; oviposition period was shorter (5.20 ± 0.20 days) in...
Fecundity* = Number of eggs/5 pairs of adults after one day; egg hatched* n=100ggs

<table>
<thead>
<tr>
<th>Host</th>
<th>Preoviposition period (in days)</th>
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<td>4.00 ± 0.25</td>
<td>9.20 ± 0.25</td>
<td>90.60 ± 0.25</td>
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CD$_{0.05}$

| CD$_{0.05}$ | 0.83                           | 0.71                         | -                            | 1.05                   | 3.44          | 5.45                  | -                        | 1.00                   | 1.51                   |

Fecundity* = Number of eggs/5 pairs of adults after one day; egg hatched* n=100ggs

cauliflower followed by cabbage (5.60 ± 0.25 days). Eggs hatched in 3.00 ± 0.32, 3.60 ± 0.25, 4.00 ± 0.32 and 3.80 ± 0.37 days on cauliflower, cabbage, radish and mustard, respectively. The results showed that cauliflower was a good host as had been reported by (Huaripata and Sánchez, 2019).

The neonates were whitish yellow to pale green with a pale brownhead and young larvae initially wandered over the leaf surface and then became miners, made hole from side of the leaves and started mining. The entry was marked by very small dot like scratched area. Initially the feeding was leaf mining, but mines were difficult to notice. The larvae emerged from their mines at the conclusion of first instar moult beneath the leaf and thereafter fed on the lower surface of the leaf. These resulted in irregular patches of damage and upper layer of epidermis was often left intact. Larval period was completed earlier in cauliflower (Yadav et al., 2016). Similar results were obtained by Uthamasamy et al. (2011). On cauliflower, it completed its life cycle faster (35.60 days) as confirmed with Kannan et al. (2011).

Table 1. Biology of diamondback moth *P. xylostella* on four crucifers

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REFERENCES


Biology of diamondback moth *Plutellaxylostella* on different crucifers

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