POPULATION DYNAMICS OF MUSTARD APHID AND ITS NATURAL ENEMIES

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ABSTRACT

A field experiment was conducted on mustard aphid Lipaphis erysimi Kalt. and its natural enemies to document its seasonal incidence over four varieties of mustard during rabi season at the Instructional Farm, Chandra Shekhar Azad University of Agriculture and Technology, Kanpur. The aphids appeared in first week of January at the flowering stage, which peaked during 7th standard week were 115.5-155.0, 98.01-121.0, 75.5-108.6 and 55.80-86.49, aphids/ plant on mustard variety Urvashi, Vardan, Varuna and Rohini, respectively. Correlation coefficients of incidence with weather factors have been worked out.

Key words: Mustard, Lipaphis erysimi, incidence, natural enemies, weather parameters, seasonal variation, varieties, correlation coefficients, population dynamics

Mustard is an important oilseed crop which is considered to be highly economic important crop for national and international trade. A number of insect-pests are found to be associated with rapeseed-mustard crops in India, which include mustard aphid, Lipaphis erysimi Kaltenbach (Homoptera: Aphididae), sawfly, Athalia lugens Klug (Hymenoptera: Tenthredinidae), painted bug, Bagrada hilaris Burmeister (Hemiptera: Pentatomidae), diamond back moth (Plutella xylostella Linnaeus), cabbage butterfly (Pieris brassicae Linnaeus), larger moth (Crocidolomia binotalis Zeller), green peach aphid (Myzus persicae Sulzer) etc. (Dhaliwal and Arora, 2006) but mustard aphid is very important among them which may alone prove as limiting factor in the production of mustard. However, this insect-pest can be managed through chemicals, which have been found detrimental for their natural enemies as well as to human health. Therefore, development of ecofriendly techniques in IPM are required and with this in view this study evaluates the seasonal incidence of these.

MATERIALS AND METHODS

Before sowing the mustard, the experimental fields were prepared by ploughing with the soil turning plough-followed by two ploughings with cultivator and levelled. The most popular varieties of Indian mustard in Uttar Pradesh like Varuna, Vardan, Rohini and Urvashi were selected. The trial was conducted in 2.8 x 5m² net plot size replicated thrice with split plot design, with 45 x 10 cm spacing. The occurrence of grubs and adult of species of Coccinella septempunctata predators were recorded on selected plants at weekly intervals. To determine the population dynamics of aphid in relation to weather parameters, aphid incidence was recorded at weekly intervals on 10 randomly selected plants on 10 cm top shoots (Mathur and Singh, 1986b). The meteorological data was obtained from the Department of Agronomy of the University. The seed yield was recorded at harvest. The method for counts of aphids followed All India Co-ordinated Research Project on oilseeds and Bakhetia et al. (1989). The data were analysed for the correlation coefficients (p=0.05).

RESULTS AND DISCUSSION

The observations on aphid incidence and weather factors given in Table 1, Figs. 1 and 2 reveal that the aphid L. erysimi appeared in first week of January, and reached a peak of 115.5-155.0 aphids plant⁻¹ on Urvashi, 98.01-121.0 on Vardan, 75.5-108.16 on Varuna, and 55.80-86.49 aphids plant⁻¹ on Rohini varieties during 7th standard week in second week of February; and it was nil in the last week of February and first week of March during 2010-11 and 2011-12, respectively. The natural enemies of mustard aphid observed led to the observations on the coccinellid Coccinella septempunctata. This appeared during second and third week of February and reached its peak mid-February when the aphid incidence was maximum. Srivastava et al. (1995) observed L. towards the end of December on flowering. Rohilla et al. (1996) studied the abundance of Aphidoidea on five rapeseed cultivars, and observed
Table 1. Seasonal incidence of *L. erysimi* on varieties of mustard

<table>
<thead>
<tr>
<th>Varieties</th>
<th>2010-11</th>
<th>2011-12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of aphids/plant</td>
<td>No. of aphids/plant</td>
</tr>
<tr>
<td></td>
<td>SW-1</td>
<td>SW-2</td>
</tr>
<tr>
<td>Urvashi</td>
<td>2.50 (1.58)</td>
<td>5.95 (2.44)</td>
</tr>
<tr>
<td>Vardan</td>
<td>2.34 (1.53)</td>
<td>3.39 (1.84)</td>
</tr>
<tr>
<td>Varuna</td>
<td>1.80 (1.34)</td>
<td>3.57 (1.89)</td>
</tr>
<tr>
<td>Rohini</td>
<td>1.51 (1.23)</td>
<td>2.96 (1.72)</td>
</tr>
</tbody>
</table>

SE(d): 0.03, 0.97, 0.11, 0.11, 0.12, 0.15, 0.19, 0.17, 0.1, 0.04, 0.08, 0.1, 0.13, 0.18, 0.21, 0.27, 0.14, 0.13

CD (p=0.05): 0.07, 0.2, 0.38, 0.24, 0.27, 0.32, 0.42, 0.37, 0.22, 0.08, 0.16, 0.22, 0.29, 0.39, 0.45, 0.58, 0.31, 0.27

Figures in parentheses square root transformed values; SW- standard week.
REFERENCES


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