EFFECT OF LANTANA CAMERA AND OCIMUM SANCTUM EXTRACTS ON THE FECUNDITY OF MUSTARD APHID, LIPAPHIS ERSYMI (KALT.)

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Abstract: Naturally occurring compounds extracted from the plants have been identified to possess strong feeding deterrence to a number of insects. Lantana Camera and Ocimum sanctum extracts were also found priming against several pests. The present investigation has been done on the effect of Lantana and Ocimum extracts against the fecundity of mustard aphid, Lipaphis erysimi (Kalt.). The results revealed that both the plant extracts gave better results in comparison of control treatment. Therefore, use of both plant extracts can be incorporated in integrated pest management (IPM) in reducing the reproduction rate of aphids in mustard ecosystem.

Keywords: Lantana, Ocimum, Mustard aphid, Fecundity, Plant extract

INTRODUCTION

Rapeseed –mustard is one of the important oleiferous crops and constitute major source of edible oil for the human consumption and cake for animals. The use of synthetic chemical pesticides has accounted for astonishing gains in production, as the pesticides have reduced the hidden toll exacted by the aggregated attack of insect-pests. The mustard aphid, Lipaphis erysimi (Kalt.) is a major pest of Brassica crops (Bakhetia & Ghorbandi, 1987; Bakhetia & Sekhon, 1989). Good control of mustard aphid can be obtained by spraying traditional organic insecticides (Bakhetia, 1984 and Khurana et al., 1989). Moreover, the realization of toxic hazards of pesticides and their side effects on man and biosphere has diverted the attention to find out some alternative and feasible control of pests by utilizing some plant products which are non hazardous to man. Thus, newer approaches for pest control are continuously being sought. The naturally occurring, biologically active plants appear to have a prominent role for the development of future commercial pesticides not only for increased productivity but for the safety of the environment and public health.

Naturally occurring compounds extracted from plants have been identified to possess strong feeding deterrence to a number of insects. Earlier, Ocimum basiliscus (L.) and Lantana Camera (L.) were found to be effective against Heliothis armigera (Hub.). It has been observed that Lantana Camera has an insecticide, synergist, antifeedal and repellent action against H. armigera (Pandey et al., 1983).

Lantana was also found effective against mustard aphid, L. erysimi. It was reported that the ether extract of lantana affects the fecundity of females and gave highest present mortality of aphids (Pandey et al., 1987). Ocimum sanctum (L.) a strongly scented herbaceous plant is commonly known as basil or tulsi. It has been tested for its antifeedant, repellent and insecticidal effects. Reddy and urs (1988) reported that Ocimum gratissimum significantly reduced brown plant hopper Nilaparvata lugens (stal.) oviposition. Mallick and Banerji (1989) reported the antifeeding effect of the extract of Ocimum sanctum against jute semilooper, Anomis sabulifera (Guen.) prominent up to 24 hrs in the leaves treated with 1 percent concentration.

In view of these considerations, the present investigation was conducted to find out the effect of plant extracts of Lantana camera and Ocimum sanctum on the fecundity of mustard aphid, Lipaphis erysimi under laboratory conditions.

MATERIAL AND METHOD

The extracts of Lantana camera and Ocimum sanctum were tested against Lipaphis erysimi K. (Mustard aphid) under laboratory condition at room temperature. The plant parts, leaves of Lantana and inflorescence of Ocimum were shade dried and ground to from powder. The powder was then mixed with petroleum ether and ground properly with the help of pestle & mortar. The extract was filtered through filter paper and was allowed to dry under sunlight for the evaporation of petroleum ether. For the preparation of 0.1 and 0.01 % concentrations, 0.01 gm and 0.001 gm of extracts were weighed and taken in 10 ml flask to make the volume of 10 ml by adding petroleum ether. The treatments were replicated thrice with control.

The mustard leaves were taken and washed them properly with water. After drying, one leaf was kept in each Petri plate. The leaf was smeared with the plant extract of desired dose and allowed to dry for few minutes in Petri plate. Five gravid females were released in each Petri plate on the treated leaf and Petri plates were covered with lids. In the control, leaves were soaked in water. The observations on the fecundity were taken at 24, 48, 72, 96, 120, 144 and

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168 hrs after exposure. The average fecundity (rate of reproduction) was compared on the basis of emergence of nymphs in both the concentrations of both plant extracts.

RESULT AND DISCUSSION

Average fecundity or rate of reproduction of mustard aphid was taken for 24 hr, 48 hr and 72 hr so on up to 7 days for both concentrations of plant extracts. It is clearly given in the Table 1 that 0.1 % concentration of Lantana showed lowest fecundity (6.66) after 24 hrs. While, it was found maximum (9.0) after 168 hrs. In case of 0.01 % concentration of Lantana, the average fecundity after 24 hr was 8.3 and after 6 days it became 11.3. In other words we can say that the average fecundity was less in 0.1% concentration than in 0.01% concentration of Lantana. In 0.1 % concentration of Ocimum the minimum fecundity i.e. 11 was recorded after 24 hr while, maximum (14.7) after 186 hrs. Likewise in 0.01 %, the minimum fecundity (15.3) was recorded after 24 hrs while, maximum (19.7) after 168 hrs. In control, average fecundity was found higher than the both treatments. A comparison between concentrations showed that 0.1 % concentration of Lantana found more effective than 0.1 % concentration of Ocimum. A similar trend was found in case of 0.01 % concentrations of Lantana and Ocimum i.e. 0.01 % concentration of Lantana found more effective than 0.01 % concentration of Ocimum.

Table 1. Fecundity of adult apterous mustard aphid treated with Lantana and Ocimum extract

<table>
<thead>
<tr>
<th>Treatment</th>
<th>24hr</th>
<th>48hr</th>
<th>72hr</th>
<th>96hr</th>
<th>120hr</th>
<th>144hr</th>
<th>168hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1, Lantana, 0.1%</td>
<td>6.66</td>
<td>7.33</td>
<td>7.33</td>
<td>8.0</td>
<td>8.3</td>
<td>8.7</td>
<td>9.0</td>
</tr>
<tr>
<td>T2, Lantana, 0.01%</td>
<td>8.3</td>
<td>9.7</td>
<td>9.7</td>
<td>9.7</td>
<td>10.3</td>
<td>10.7</td>
<td>11.3</td>
</tr>
<tr>
<td>T3, Ocimum, 0.1%</td>
<td>11</td>
<td>11.7</td>
<td>12.3</td>
<td>12.3</td>
<td>12.7</td>
<td>13</td>
<td>14.7</td>
</tr>
<tr>
<td>T4, Ocimum, 0.01%</td>
<td>15.3</td>
<td>15.7</td>
<td>15.7</td>
<td>15.7</td>
<td>16.7</td>
<td>18.3</td>
<td>19.7</td>
</tr>
<tr>
<td>Control</td>
<td>19</td>
<td>20</td>
<td>20.7</td>
<td>21</td>
<td>21.3</td>
<td>24.7</td>
<td>25.0</td>
</tr>
<tr>
<td>SEM</td>
<td>2.27</td>
<td>2.24</td>
<td>2.34</td>
<td>2.31</td>
<td>1.32</td>
<td>2.89</td>
<td>2.89</td>
</tr>
<tr>
<td>Cd at 5%</td>
<td>7.40</td>
<td>7.40</td>
<td>7.64</td>
<td>7.54</td>
<td>7.59</td>
<td>9.42</td>
<td>9.43</td>
</tr>
</tbody>
</table>

Fig. 1: Rate of reproduction of female mustard aphid, Lipaphis erysippi treated with Lantana and Ocimum extracts
DISCUSSION

Above results clearly indicated the effectiveness of plant extracts of Lantana camera and Ocimum sanctum on fecundity of mustard aphid Lipaphis erysimi.

Plant extract of Lantana was found to be the best in comparison to Ocimum extract. The higher concentration of lantana extract causes more reduction in fecundity of the insect. Similarly, higher concentration of ocimum extract causes more reduction in fecundity in comparison to the lower concentration of plant extract used. In comparison to control both the treatments of plant extracts are superior in reducing the rate of reproduction of aphids.

This shows that Lantana camera and Ocimum sanctum after 24, 48, 72 hrs of treatment inhibited the aphid fecundity when applied at conc. of 0.1% in comparison to control. This indicates that the extracts of Lantana & Ocimum are better than the untreated check. Both the concentrations which were taken for both the plant extracts are proved better over control treatment, similar observation were also repeated by Pandey et al., (1987).

They reported the effect of Lantana camera, Azadiracta indica, Ipomea cornea etc. against mustard aphid, Lipaphis erysimi and found that fecundity of aphids was found minimum at 1.0 and 1.5 percent concentration of A. indica and L. camera. The effective of plant extracts against insects may be due to their insecticidal, antifeedal, repellent or deterrent (ovipositional deterrent) nature.

REFERENCES


