Bio-efficacy of some insecticides against mustard aphid, Lipaphis erysimi (Kalt.) (Hemiptera: Aphididae)

Atanu Seni and Bhima Sen Naik

Abstract
Laboratory bioassay of eight insecticides namely Chlorpyriphos 20 EC, Ethiprole+ imidacloprid 80 WG, Pymetrozine 50 WP, Lamda cyhalothrin 4.9 CS, Imidacloprid 30.5 SC, Acephate 95 SG, Thiacloprid 240 SC and Fipronil 5 SC was conducted in the Regional Research and Technology Transfer Station (OUAT), Chiplima, Odisha against mustard aphid, Lipaphis erysimi (Kalt.) using leaf dip method in Feb-March, 2016. Among insecticides, chlorpyriphos 20 EC was the most toxic (LD₅₀ 5.38 ppm) followed by imidacloprid 30.5 SC (LD₅₀ 22.14 ppm), ethiprole+ imidacloprid 80 WG (LD₅₀ 22.94 ppm), thiacloprid 240 SC (LD₅₀ 27.17 ppm), pymetrozine 50 WP (LD₅₀ 25.59 ppm), Lamda cyhalothrin 4.9 CS (LD₅₀ 31.34 ppm), acephate 95 SG (LD₅₀ 111.22 ppm), fipronil 5 SC (LD₅₀ 234.15 ppm).

Keywords: Bioassay, chlorpyriphos 20 EC, insecticides, LD₅₀, mustard aphid

1. Introduction
Rapeseed-mustard is the third important oilseed crop in the world after soybean (Glycine max) and palm (Elaeis guineensis Jacq.) oil [6]. Among the different edible oilseed cultivated in India, rapeseed- mustard (Brassica spp.) contributes 28.6% in the total production of oilseeds. In India, it is the second most important edible oilseed after groundnut sharing 27.8% in the India’s oilseed economy [6]. India contributes 28.3% in world acreage and 19.8% in world production. India produces around 6.7 mt of rapeseed-mustard next to China (11-12 mt) and EU (10–13 mt) with significant contribution in world rapeseed-mustard industry [6]. But its production is hampering by infestation of many insect pests. Nearly 38 insect pests are known to be associated with rapeseed-mustard crop at different stages in India [1]. Among them mustard aphid, Lipaphis erysimi (Kalt.) is the key pest in all the mustard growing regions of the country. Nymphs and adults of the mustard aphid suck cell sap from the leaves, inflorescences and immature pods resulting into poor yield. It is also found that they prefer flowers to leaves for feeding [15]. Large colonies can cause the plants to become deformed and the leaves curled, shriveled and yellowed [8]. They also produce a large amount of honey dew which facilitates the growth of the fungus that makes the leaves and pods dirty appearance [1]. Lipaphis erysimi causes 35.4 to 96 % yield loss, 30.9 per cent seed weight loss and 2.75 per cent oil loss [2, 3, 12, 14]. Mustard aphids have the capability to increase their population and spread rapidly within very short span of time in favourable environmental condition. For this, other control measures except chemical control is time consuming [12]. So, chemical control is the last resort to check the aphid population within short period of time. Keeping in view, the present study was aimed to evaluate the efficacy of certain new and conventional insecticides against this pest in order to monitoring insecticide resistance and to identify the potential molecules for developing proper management strategy against this pest.

2. Materials and Methods
The present experiment was conducted in the Regional Research and Technology Transfer Station (OUAT), Chiplima, Sambalpur, Odisha during February-March, 2016.

2.1 Source of the insecticides
Commercial formulations of Chlorpyriphos 20 EC (Sumitomo Chemical India Pvt. Ltd.), Ethiprole+ imidacloprid 80 WG (Bayer Crop Science Ltd), Pymetrozine 50 WP (Syngenta Korea Ltd.), Lamda cyhalothrin 4.9 CS (Safex Chemicals [India] Ltd.), Imidacloprid 30.5 SC...
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Table 1: Dosage mortality response and LD₅₀ values of different insecticides for L. erysimi after 24 hours of exposure

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Heterogeneity</th>
<th>Slope±SE</th>
<th>LD₅₀ (ppm)</th>
<th>Fiducial limits</th>
<th>Relative toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorpyriphos 20 EC</td>
<td>0.02</td>
<td>1.797±0.359</td>
<td>5.38</td>
<td>4–8</td>
<td>43.52</td>
</tr>
<tr>
<td>Ethiprole+ imidacloprad 80 WG</td>
<td>0.25</td>
<td>4.568±1.048</td>
<td>22.94</td>
<td>19–30</td>
<td>10.21</td>
</tr>
<tr>
<td>Pymetrozine 50 WP</td>
<td>1.10</td>
<td>2.372±0.413</td>
<td>25.59</td>
<td>13–43</td>
<td>9.15</td>
</tr>
<tr>
<td>Lambda cyhalothrin 4.9 CS</td>
<td>0.36</td>
<td>2.160±0.531</td>
<td>31.34</td>
<td>21–72</td>
<td>7.47</td>
</tr>
<tr>
<td>Imidacloprid 30.5 SC</td>
<td>0.68</td>
<td>2.341±0.415</td>
<td>22.14</td>
<td>16–31</td>
<td>10.57</td>
</tr>
<tr>
<td>Acephate 95 SG</td>
<td>0.02</td>
<td>5.219±1.415</td>
<td>111.22</td>
<td>91–153</td>
<td>2.10</td>
</tr>
<tr>
<td>Thiacloprid 240 SC</td>
<td>0.48</td>
<td>2.650±0.476</td>
<td>27.17</td>
<td>21–37</td>
<td>8.62</td>
</tr>
<tr>
<td>Fipronil 5 SC</td>
<td>0.45</td>
<td>4.804±1.027</td>
<td>234.15</td>
<td>191–292</td>
<td>1</td>
</tr>
</tbody>
</table>
6. References

