Insect pests and its natural enemies on marigold in northern hill region of Chhattisgarh

Vipin Prakash Bhagat, GP Painkra, PK Bhagat and KL Painkra

Abstract
The sucking pests, aphid and thrips were observed in last week of November to first week of February. Aphid and thrips peak population were observed in second week of January. Mites population was noticed on the crop in the third week of November to first week of February. Mite population observed peak in first week of January. The pod borer, Helicoverpa armigera population was observed on fourth week of December to first week of February, larvae population of reached its peak during the fourth week of January. The population of natural enemies on marigold field was observed on the basis of number from third week of November to first week of February 2016-17.

Keywords: Insect pests, natural enemies, marigold

1. Introduction
Marigold (Tagetes erecta L.) is an important loose flower in Chhattisgarh and India. Its native place is central and South America, especially Mexico from where it spreads to different parts of the world during early parts of the 16th century, but it has adopted so well to Indian condition that it is as good as a native to India as well. The marigold rank first of the flower cultivation in Chhattisgarh. The area of marigold is 4007 hectare, production 29270 million tons and productivity 7.30 million tons per hectare respectively in Chhattisgarh (Anonymous 2016). Marigold is one of the most important flower crop grown commercially in different parts of India. In the year 2003-04, the estimated area under marigold in India was 17600 hectare and production 2 lacks metric ton. In marigold a number of insect pests such as aphids, mites, leaf miner, mealy bug, thrips and Heliothis feed on marigold. The genus Neohydatothrips John is the largest thrips genus belonging to order Thysanoptera, with 103 described species. Neohydatothrips species are all phytophagous, feeding and breeding on leaves. The capitulum borer, Helicoverpa armigera is highly polyphagous, with about 181 host plants including important crop plants such as pulses, cotton, vegetables etc. (Manjunath et al., 1985) [4]. Now days marigold uses successful control of the nematodes in vegetable crops such as brinjal, tomato and chilli.

1.1 Objectives
(i) To ascertain the various leaf feeding insect pest in marigold.
(ii) To study the various sucking insect pests in marigold.

2. Materials and Methods
The experiment was undertaken in Marigold cultivar Pusa Narangi was planted on October 23, 2016 to February 06 2017 as winter crops, respectively at farmer’s field located in Ajabnagar, Block - Surajpur, Distt. - Surajpur during winter-spring season of 2016-17. It is situated about 5 km away from Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (C.G.) The crop was raised on ridges with 50 cm row to row and 50 cm plant to plant distance was maintained. The fertilizer and other agronomic practices were applied according to the local recommendations.

2.1 Method of recording observations
Thrips and aphid populations were recorded by randomly selected 10 plants collecting them on white paper by beating the flower/feet/twig with finger and dropped thrips were counted. Mites were observed in flowers and tender parts of the crop like leaves, developing shoots and fruits.
Ten plants were selected at random and tagged. The leaf samples of 1 cm size from top, middle and bottom were collected and observed for the occurrence of mites with the help of microscope, at weekly intervals. *Helicoberpa armigera* larvae was randomly selected 5 plants on total number of larvae recorded on each leaf from top, middle and bottom canopy and capitulum of the observed plants. The pests population was counted and averaged the number of insect pests. 

### 3. Results and Discussion

**Aphid (Myzus persicae)** was a serious pest of marigold causing heavy damages to different crops (Table 1 & Fig. 1-4). Shah et al., (2015), had reported that the aphids started in the first week of November with (1.018 aphids/leaf), it increased gradually in the coming weeks till it reached to (1.930 aphids/leaf) in the first week of December. Its populations was noticed on the crop in the third week of November 2016 to first week of February 2017. Then the aphid population gradually increased with maximum (20.67 aphids/10 plants) during the second week of January 2017 and another worker Varmora et al. (2009) [3] who recorded the aphid population on cabbage started from 49th standard week (1st week of December). The average population recorded was 10.60 aphids per plant of cabbage. The aphid population increased gradually and attained its peak of 281.20 per plant. The aphid population on cabbage started from 49th standard week (fourth week of February) which was gradually increased up to 50th standard week (third week of December). The maximum larval population (2.24 larvae / 5 plants) was observed in 4th week of January 2017. The larval population gradually increased with maximum (2.66 larvae / 5 plants) of 2nd week of January. The larval population of reached its peak during the 4th week of January 2017 (4.33 larvae / 5 plant). Patel et al. 2015 who reported that during the first year (2013-14), the activity of *H. armigera* on chickpea crop was commenced from 46th standard week (second week of November), which was gradually increased up to 50th standard week (third week of December). The maximum larval population (2.24 larvae / 5 plants) was observed in 49th and 50th standard week (first and second week of December), whereas it was minimum (0.08 larvae / 5 plants) in 9th standard week (fourth week of February). Thus, larval population during the entire period ranged from 0.08 to 2.24 larvae / 5 plants.

### 3.1 Natural Enemies

During the course of investigation various natural enemies of marigold insect pests depicted (Table 2 and Fig.5) were also recorded viz., lady bird bettle (*Coccinella sexmaculata*), *Canthoconodia forcelata*, syrphid fly (*Syrphusconfractor*). The population of natural enemies on marigold field was observed on the basis of number from 3rd week of November to 1st week of February 2016-17. The lady bird beetle population was observed on the crop in the (00.2 - 0.20 beetle / 10 plants) 3rd week of December 2016 to 1st week of February. The maximum lady bird beetle population (0.20 beetle / 10 plants) was counted in 3rd week of January 2017. The predatory bug population was noticed (0.04 – 0.14 bug / 10 plants) during 2nd week of January 2017 to 1st week of February 2017. The maximum predatory bug population (0.20 predatory bug / 10 plants) was observed in 2nd week of January 2017. The syrphid fly population was observed (0.02 – 0.33 fly / 10 plants) from 1st week of January to 1st week of February. The maximum syrphid fly population (0.33 syrphid fly / 10 plants) was observed in 3rd week of January. These findings are according with those of Joshi et al. 2009 reported that the population of coccinellid beetles ranged from 1.60 to 15.30 per five plants. The coccinellid beetles started from 1st standard week (1st week of January), with an average population of 1.60 beetles per five plants of cabbage and population increased gradually to the peak of 15.30 per five plants in 6th standard week (2nd week of February). This finding are according with those of Varshney et al., (2017) [7] highest syrphid population (2.80 syrphids/plant) on PSB-1 was observed during 9th SW while CCN-06- 1 and sheetal exhibited highest syrphid population (1.60 and 1.53 syrphids/plant) in 10th SW.

<table>
<thead>
<tr>
<th>Date of Observation</th>
<th>Standard Week No.</th>
<th>Aphid</th>
<th>Thrips</th>
<th>Mites</th>
<th>Helicoberpa armigera</th>
</tr>
</thead>
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<tr>
<td>21/11/2016</td>
<td>47</td>
<td>15.40</td>
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<td>3.50</td>
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<tr>
<td>28/11/2016</td>
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<td>17.27</td>
<td>8.07</td>
<td>2.67</td>
<td>0.00</td>
</tr>
<tr>
<td>05/12/2016</td>
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<td>17.57</td>
<td>7.37</td>
<td>3.10</td>
<td>0.00</td>
</tr>
<tr>
<td>12/12/2016</td>
<td>50</td>
<td>19.34</td>
<td>8.50</td>
<td>3.45</td>
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</tr>
</tbody>
</table>
Fig 1: Average aphid populations on marigold crop during 2016 - 17

Fig 2: Average thrips populations on marigold crop during 2016 – 17

Fig 3: Average mites populations on marigold crop during 2016 – 17

Fig 4: Average Helicoverpa armigera populations on marigold crop during 2016 – 17

Table 2: Average population of various natural enemies recorded on marigold during 2016-17

<table>
<thead>
<tr>
<th>Date of observations</th>
<th>Lady bird beetle</th>
<th>Canthoconidia sp.</th>
<th>Syrphid fly</th>
</tr>
</thead>
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<td>0.00</td>
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</tr>
<tr>
<td>26/12/2016</td>
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<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>02/01/2017</td>
<td>0.08</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>09/01/2017</td>
<td>0.05</td>
<td>0.14</td>
<td>0.08</td>
</tr>
<tr>
<td>16/01/2017</td>
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<td>0.33</td>
</tr>
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<td>23/01/2017</td>
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<td>0.07</td>
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<td>0.08</td>
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4. Conclusion

Various insect-pests like aphid (*Myzus persicae*), Thrips (*Neohydatothrips* sp.), mites (*Tetranychus urticae*) and *Helicoverpa armigera* were found damaging on marigold crop. The population of natural enemies on marigold like lady bird beetle, Canthaconidia sp and Syrphid fly were observed on the basis of number from third week of November to first week of February 2016-17.

5. Acknowledgement

The authors are highly thankful to Director Instructions, IGKV, Raipur for giving the instructions and so many good suggestions for working on marigold insect-pests and also thankful to Horticulture Section of Raj Mohini Devi College of Agriculture & Research Station, Ambikapur for helping during the study.

6. References