Studies on Insect Pest Succession and natural enemies of ash gourd in Chhattisgarh

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ABSTRACT

The present investigation entitled "Record and identification of different insect pests and natural enemies of ash-gourd during reproductive phase along with insect pest succession on it" was conducted during Kharif season of the year 2014-15 at Horticultural Instructional cum Research Farm of Department of Horticulture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). During the course of studies, ash gourd was found attack by five species of insect pest belonging to four order and four families in which viz., red pumpkin beetle (Aulacophora foveicollis Lucas) (Coleoptera: Chrysomelidae), fruit fly (Bactrocera cucurbitae Coq.), cucumber moth (Diaphania indica), Hadda beetle (Henosepilachna vigintioctopunctata Fabricius) and aphid (Aphis gossypii) were observed. Population of insect pest other than red pumpkin beetle and fruit flies appeared in trace number. First appearance of Red pumpkin beetle, Fruit fly, Cucumber moth on the crop was observed from first week of September (36th SMW), and active from September to December. Whereas, appearance of Hadda beetle and Aphid was started from 37th SMW and 41st SMW, respectively. During the experiment maximum population of red pumpkin beetle, cucumber moth, fruit fly, hadda beetle and aphids were accounted 4.5 grub and adult/plant, 3.1 larvae/plant, 3.8 maggot/plant, 3 grubs and adult/plant, 3.1 nymphs and adult/three leaf, respectively. However, peak population of lady bird beetle and spider was noticed 2.5 adult/plant and 1.9 per plant with fifth week of October and second week of November, respectively.

Key words: Ash guard, Red pumpkin beetle, pest succession, natural enemies, weather parameter.

INRODUCTION

Vegetable cultivation in India is mostly practiced by small and marginal farmers, for additional income generation. The worldwide area, production, and productivity under vegetable crop cultivation in the year 2013 was 58971 ha, 1159179 million tonnes and 19.7 million tonnes ha⁻¹, respectively. The total area, production, and productivity under vegetable crop cultivation in India during 2012-2013 was 9396 ha, 162897 million tonnes, and 17.3 million tonnes ha⁻¹ (FAOSTAT, 2013). In Chhattisgarh, it is cultivated in an area of 380.7 ha and production of 4993.9 million tonnes (Anonymous, 2013).

Cucurbits are vegetable crops belonging to family Cucurbitaceae which are consumed as food worldwide. The family Cucurbitaceae consists of about 118 genera and 825 species in which Benincasa hispida, commonly known as ash gourd, tallow gourd, Chinese preserving melon, Chinese water melon, white gourd, wax gourd and ‘chaal kumra’ in Bengali (Tindall, 1986). They are attacked by a wide range of cucurbitacious and non-cucurbitacious insect-pests including red pumpkin beetle, striped cucurbit beetle, twelve spotted cucumber beetles, fruit fly, spider mites, melon aphids, squash borer, squash bug, leaf minors etc. (Dhillon and Wehner, 1991).

MATERIALS AND METHODS

The investigation was conducted during kharif season of the year 2014-15 at Horticultural Instructional cum Research Farm of Department of Horticulture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). Weekly observation of different insect pest and natural enemies were recorded on ash gourd up to harvesting of fruits.

RESULTS AND DISCUSSION
During the course of studies, ash gourd was found attack by five species of insect pest belonging to four order and four families in which viz. red pumpkin beetle (*Aulacophora foveicollis* Lucas), fruit fly (*Bactrocera cucurbitae* Coq.), cucumber moth (*Diaphania indica*), Hadda beetle (*Henosepilachna vigintioctopunctata* Fabricius) and Aphid (*Aphis gossypii*) were observed. Population of insect pest other than red pumpkin beetle and fruit flies appeared in trace number (Table 1). Similarly, along with insect pest of ash gourd association of different natural enemies were also found viz. Lady bird beetle belonging family Coccinellidae; order Coleoptera and Spider belonging to order Acari. These findings are also agreement with Dhillon and Wehner (1991) who reported that insect – pest viz. red pumpkin beetle, fruit fly, spider mites, aphid, squash borers, leaf minors *etc.* are the important insects pest of ash gourd.

**Red pumpkin beetle, *Aulacophora foveicollis* Lucas**

First appearance of Red pumpkin beetle on the crop was observed in fourth week of September (36th SMW), and active from September to December. Whereas, it is evident from observation on beetle population indicating the fourth week of September, it was most favourable for buildup of red pumpkin beetle population. During the experiment maximum population red pumpkin beetle was 4.5 grub and adult / plant. These findings are in accordance with Rathod and Borad (2010) who observed the pest population was fluctuated between 2.95 to 5.15 per plant from 35th standard week (end of August) to 41st standard week (2nd week of October). Thereafter, the activity suddenly decreased from 42nd and 43rd standard week (second fortnight of October).

**Fruit fly, *Bactrocera cucurbitae***

Periodical observations of fruit fly incidence on ash gourd, revealed that the maggot population of fruit fly appeared in mid October and remain active up to last week of November. Whereas, peak activity of fruit fly population was noticed during fourth week of October, 3.8 maggot/plant. The present finding are accordance with Banerjiet al. (2005) who recorded the activity of melon fruit fly during first week of August, however, the highest incidence was noticed during middle of October and then infestation started declining at Kalyani, West Bengal during *Kharif*.

**Cucumber moth, *Diaphania indica***

Periodical observations on the incidence of leaf damaging insect pests of ash gourd revealed that the larvae of cucumber moth, *Diaphania indica* active during first week of September to third week of November. During the experiment, peak activity was observed between last week of October with maximum population of cucumber moth 3.1 larvae / plant. Present finding are agreement with Kinjo and Arakaki (2002) who found that the development of *Diaphania indica* slowed down at high temperatures, and the development time at 35°C was significantly greater than 30°C.

**Hadda beetle, *Henosepilachna vigintioctopunctata***

The adult of hadda beetle, *Henosepilachna vigintioctopunctata* appeared in second week of September (37th SMW) and active from second week of September to third week of November month. Whereas, it is evident from observations, indicating that third week of November, it was most favorable for buildup of hadda beetle. During the experiment maximum population of hadda beetle was 3 grubs and adult / plant. There is no report found to the activity of hadda beetle on ash gourd. Whereas our finding are supported by Iftekar and Khan (1980) who reported epilachna beetle remained active from July to November on brinjal and was more prevalent during the month of August.

**Aphid, *Aphis gossypii***

The nymph and adult of aphid *Aphis gossypii* appeared in the second week of October (41st SMW) and active second week of October to last week of November month. On the experimental field nymph and adult population constitutively remain lower in number throughout period. However it reaches maximum population only 30.2 nymphs and adult / three leaf (U,M,L) during mid November. Similarly, Mohapatra (2008) observed three major sucking pests viz., leaf hopper, aphids and whitefly infestation in cotton from 30th to 50th standard week. Peak population of the three pest was attained during 41st standard week (October 8-14), 44th standard week (October 29th to November 4th) and 35th standard week (August 27th to September 2nd) respectively.

**Natural enemies of ash gourd insect pests**

In the experimental field, maximum population of natural enemies was recorded during the crop maturity stage. Natural enemies associated with insect pest of ash gourd included the ladybird beetles and lynx spider is presented in Table 1.

**Lady bird beetles**

Two species of lady bird beetles, *Coccinella septempunctata* and *C. sexmaculata* were observed as potential biotic agents. Nymph and adult of thrips, aphids and jassids were preyed upon by lady bird beetle and their peak activity noticed in the fourth week of October as 2.1 adult per plant. Lady bird beetle remain active from September to November. These findings are supported by Singh and Brar...
(2004) who reported that coccinellids are the most important predators they prey upon large numbers of sucking insect pests.

**Spiders**

Predatory spiders *viz.* *Neosconatheisisp., Araneusspsp.*, and *Oxyopespp.* were found preying upon thrips, jassids aphids and thrips. In experimental trial of ash gourd, first appearance of spider in the second week of October and their peak activity was noticed in the second week of November as 1.9 spiders per plan. Kumar et al. (2004) and Kubaret et al. (2006) they also observed many spider species in vegetable crop feeding on phytophagous insects.

Table 1 and 2: Insect pests and natural enemies of Ash gourd, Benincasa *hisida Thumb* during Kharif 2014-15.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>(A) Major insect pests</th>
<th>Active period</th>
<th>Peak activity period</th>
<th>Peak Population</th>
<th>Nature of damage</th>
<th>Pest status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red pumpkin beetle</td>
<td>September to December</td>
<td>Fourth week of September</td>
<td>4.5 grub &amp; adult / plant</td>
<td>Grub and adult feed on leaves, flower, and fruits</td>
<td>Regular</td>
</tr>
<tr>
<td>2</td>
<td>Fruit fly</td>
<td>Mid October to last week of November</td>
<td>Fourth week of November</td>
<td>3.8 maggot / plant</td>
<td>Maggot and adult feed on leaf and fruits</td>
<td>Regular</td>
</tr>
<tr>
<td>3</td>
<td>Cucumber moth</td>
<td>First week of September to third of November</td>
<td>Fourth week of October</td>
<td>3.1 larvae / plant</td>
<td>Aterpillar feed on leaves</td>
<td>Sporadic</td>
</tr>
<tr>
<td>4</td>
<td>Hadda beetle</td>
<td>Second week of September to third week of November</td>
<td>Third week of October</td>
<td>3 grub &amp; adult / plant</td>
<td>Grub and adult feed on leaves, fruits</td>
<td>Sporadic</td>
</tr>
<tr>
<td>5</td>
<td>Aphid</td>
<td>Second week of October to last week of November</td>
<td>Mid of November</td>
<td>30.2 / three leaves nymph and adult</td>
<td>Nymph and adult sucking from lower surface of leaf</td>
<td>Sporadic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>(B) Natural enemies</th>
<th>Peak activity period</th>
<th>Active period</th>
<th>Peak Population</th>
<th>Praying on</th>
<th>Natural enemies status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lady bird beetle</td>
<td>Fourth week of October</td>
<td>September to December</td>
<td>2.1 grub and adult / plant</td>
<td>Larvae and adults praying aphids and other sucking pest</td>
<td>Major</td>
</tr>
<tr>
<td>2</td>
<td>Spider</td>
<td>Fourth week of November</td>
<td>October to November</td>
<td>1.9 spider / plant</td>
<td>Nymph and adult prayed on flying insect</td>
<td>Major</td>
</tr>
</tbody>
</table>

Table 3: Major insect pests on ash gourd at weekly interval, during the crop growth period *(Kharif – 2014-15)*

<table>
<thead>
<tr>
<th>SMW</th>
<th>Months and date</th>
<th>Insect population/plant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Red pumpkin beetle</td>
</tr>
<tr>
<td>36</td>
<td>Sep 03-09</td>
<td>1</td>
</tr>
<tr>
<td>37</td>
<td>10-16</td>
<td>2.2</td>
</tr>
<tr>
<td>38</td>
<td>17-23</td>
<td>2.5</td>
</tr>
<tr>
<td>39</td>
<td>24-30</td>
<td>3.5</td>
</tr>
<tr>
<td>40</td>
<td>Oct 01-07</td>
<td>3.9</td>
</tr>
<tr>
<td>41</td>
<td>08-14</td>
<td>4.5</td>
</tr>
<tr>
<td>42</td>
<td>15-21</td>
<td>3.1</td>
</tr>
</tbody>
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## REFERENCES


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