

Relative infestation of red pumpkin beetle on different cucurbit vegetables

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Abstract:

Cucurbits are mostly grown in tropical and sub tropical conditions but some of the vegetables are grown in temperate zone under artificial conditions like cucumber. A number of insect pests vines like striped and spotted cucumber beetle, spider mite, melon aphid, fruit fly, leaf minor and red pumpkin beetle. Red pumpkin beetle is the most important and destructive pest of cucurbit vegetables present throughout the world mainly in tropical and sub tropical zones. This study was conducted to check the relative infestation of red pumpkin beetle on Cucurbit vegetables. Results of this study showed red pumpkin beetle shows very minute attraction towards the Bitter gourd while it is highly attracted towards the musk melon. This study will provide helpful information to cucurbit breeders to develop resistance in musk melon in future.

Key words: Relative infestation, Cucurbit varieties, Red pumpkin beetle.

Introduction

Cucurbitaceous vegetables i.e. cucumber (*Cucumis sativus*), bottle gourd (*Lagenaria siceraria*), Water melon (*Citrullus lanatus*), Muskmelon (*Cucumis melo*), Round gourd and Bitter

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gourd (*Momordica Charentia*) belongs to same family cucurbitaceae and it is very important and biggest group of vegetable. Cucurbits are mostly grown in tropical and sub tropical conditions but some of the vegetables are grown in temperate zone under artificial conditions like cucumber (Dhaliwal, 2008). The family cucurbitaceae have 118 genera and 825 spp, most of them derived from the old world (Rai M, (2008).). Most of the cucurbits are annual and grown through the seeds by direct sowing in the field but some cucurbits are perennial. Cucurbit vegetables are grown in warm weather and these vegetables can't grow under the cold conditions. Area under cultivation of cucumber, bottle gourd, melons and bitter gourd is 715, 449, 19711 and 681 hectares. Cucurbitaceous vegetables are tender annual wine vegetables and are grown only for their fruits. All these vegetables belong to family cucurbitaceae and have same cultural requirements, most of diseases and insect pests. These vegetables flourish under temperature of about 18 to 30°C (68-85 F) (Saljoqi and Khan, 2007). All these vegetables are harvested at immature stage and used as raw or after cooking.

A number of insect pests vines like striped and spotted cucumber beetle, spider mite, melon aphid, fruit fly, leaf minor and red pumpkin beetle. Red pumpkin beetle among these pests is the most destructive pest of the cucurbitaceous vegetables. This pest is distributed over Asia Australia Europe and Africa (Atwal and Dhaliwal, 1997). Red pumpkin beetle were active at 27 to 32°C but they become inactive at temperature above the 35°C (J, 1943.). Large number of insect pests infesting cucurbit vegetables right after the germination to the maturity but few of them have serious concern i.e. hadda beetle, red pumpkin beetle and fruit flies (AK, 1992). Originally red pumpkin beetle is a pest of pumpkin, bottle gourd, and Musk melon, but it feed all cucurbitaceous vegetables (Raman, 1985.). Red pumpkin beetle is polyphagous insect distributed all over the India (Butani DK and Jatwani MG 1984). Red pumpkin beetle is

distributed all over the world i.e. Greece, cyperus, Sri Lank, Nepal, and Burma, Aden, Iraq, south Europe (AS, 1983).

It causes damage to cucurbits at both larval and adult stages. Damage caused by red pumpkin beetle may range 35 to 75 % (Saljoqi and Khan, 2007). Vines are damaged by feeding on cotyledon or leaves from seedling stage to maturity. Beetles start attack right after the germination and slower down the growth of plants due to serious attack. Both adult and larvae stage attack on the vegetables and larvae lives underground are destructive for the roots. Roots start rotting due to attack of saprophytic fungi. Beetle starts activity from March and remains in the field till October. Peak activity period of red pumpkin beetle is from April to June and its population decreases from September (Butani DK and Jatwani MG 1984) and (ML, 1978.).

This study was carried out from 1st week of April to 1st week of May for one month. Attacks of red pumpkin beetle although, started in month of March and remained till end of April in high population and it decreased by degrees during first week of May.

Materials and Methods

These experiments were conducted to study relative infestation of red pumpkin beetle on different cucurbit vegetables. Six crops namely Cucumber, Bottle gourd, water melon, musk melon, round gourd, and bitter gourd with two varieties of each crop were selected for these trails. These field trials were sown on 15th march 2013 at Barani agricultural research institute Chakwal. There were twelve treatments and each treatment was replicated thrice in Randomized complete block design each block is 6x4m in dimension. With crops in main plots and varieties in sub plots repeated thrice. A plot size of 6m*4m was kept for experimental unit. The design used for the experiment was factorial RCBD with crops in main plots and varieties in

sub plots repeated thrice. A plot size of 6m*3m was kept for experimental unit.

Pest infestation statistics were initiated to record from the 1st April for six weeks. Red pumpkin beetle were counted from 3 plants selected from each plot per replication. Vine was divided into 3 parts basal, middle, and the end part for beetle infestation data recording. Pesticides were sprayed when pest infestation reached economic injury level and this happened two times during these studies.

Results

Results are given in the table attack of red pumpkin beetle was started from 1st week of study. Vegetables were sown from 11th to 15th March 2013. When the study was begin number of red pumpkin beetle was high. All the host varieties were infested by the red pumpkin beetle except Bitter gourd it was the least infested crop of cucurbits. But the infestation of red pumpkin beetle was not same on all the crops.

During the whole study infestation of red pumpkin beetle was higher on cucumber. Red pumpkin beetle was high on the cucumber (Liza) during 1st, and 5th week of study. Cucumber (Sulaman) shows the higher infestation of red pumpkin beetle during 1st and 2nd week of study. Beetles were calculated higher during 1st week on bottle gourd (Arya). Bottle gourd (BSS-687) supported higher red pumpkin beetle during 1st, 4th, 5th and 6th week of study. Water melon (Asia black star) shows higher infestation during 5th and 6th week of study. Water melon (sugar body) hosted higher number of red pumpkin beetle during 1st, 3rd and 5th week of study. Musk melon shows relatively lower infestation. Infestation of red pumpkin beetle was observed higher round gourd (Asian) during 6th week of study. Round gourd (Jade ball F1) supported higher infestation during 5th and 6th week of study. Both

varieties of bitter gourd (PALEE F1 and Nirali) show nearly equal to zero infestation of red pumpkin beetle.

Population of red pumpkin beetles were calculated higher on Cucumber and water melon. Bottle gourd, musk melon and round gourd show the lower infestation of red pumpkin beetle. Infestation of red pumpkin beetles were calculated nearly equal to zero shown in the pooled mean of crops.

Infestation of red pumpkin beetle with respect to weeks

Mean pooled data of the weeks shows that the relative infestation of red pumpkin beetle was highest during the 9th to 14th week of study. But population of red pumpkin beetle is lower during at the 1st, 2nd, 3rd and 17th and 18th week of study. Population of red pumpkin beetle was moderate during the 4th, to 8th week and during the 16th week of data collection (table 1).

Table 1: Mean values of attracted red pumpkin beetles on weekly basis

Weeks	2	3	4	Mean	Total
1	*	*	*	9.944	358.000
2	*	*	*	12.833	462.000
3	*	*	*	18.083	651.000
4	*	*	*	23.250	837.000
5	*	*	*	26.722	962.000
6	*	*	*	38.361	1381.000
7	*	*	*	49.111	1768.000
8	*	*	*	66.083	2379.000
9	*	*	*	73.389	2642.000
10	*	*	*	82.556	2972.000
11	*	*	*	84.889	3056.000
12	*	*	*	86.861	3127.000
13	*	*	*	91.750	3303.000
14	*	*	*	81.861	2947.000
15	*	*	*	41.778	1504.000
16	*	*	*	30.889	1112.000
17	*	*	*	21.333	768.000

18 * * * 18 10.083 363.000

Infestation of red pumpkin beetle with respect to Crops

Mean pooled data shows that Bitter gourd shows the resistance against red pumpkin beetle while the Musk melon is highly susceptible against the red pumpkin beetle. Tinda gourd, water melon and Bottle gourd show the intermediate susceptibility (table 2).

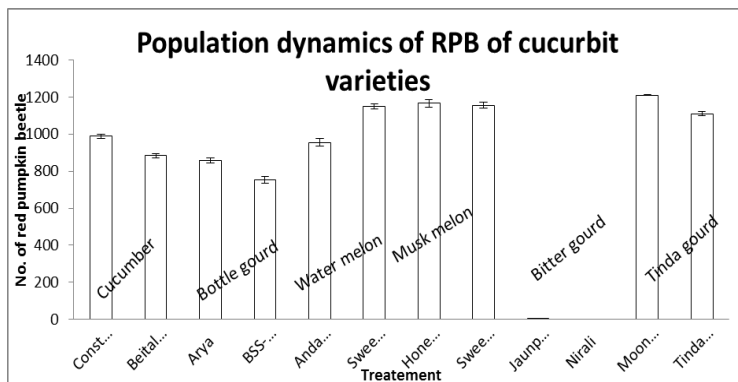
Table 2: Mean values of attracted red pumpkin beetles toward cucurbit vegetables

Vegetable		Mean	Total
Cucumber	* * *	52.019	5618.000
Bottle gourd	* * *	45.315	4894.000
Water melon	* * *	58.120	6277.000
Musk melon	* * *	64.130	6926.000
Bitter gourd	* * *	0.019	2.000
Tinda gourd	* * *	63.657	6875.000

Infestation of red pumpkin beetle with respect to varieties

Constable variety of cucumber shows the more susceptibility against the red pumpkin beetle than the Beitalpha variety of cucumber. While in case of Bottle gourd varieties BSS- 687 F1 shows the lower effect of red pumpkin beetle attack then the Arya. Water melon were the 3rd most attractive vegetables to red pumpkin beetle, Andaman shows less attraction towards of red pumpkin beetle then the sweet Delight variety. Musk melon shows the higher attack of red pumpkin beetle so on during study on both varieties honey ball and on sweet honey. While the variety which was highly susceptible to red pumpkin beetle during the whole study was Moon star and other variety Tinda

321 was not so susceptible. Very lower attack of red pumpkin beetle was done on bitter gourd nearly equal to zero (graph).



Discussion

In this study 12 varieties of cucurbit vegetables are studied for the relative abundance of red pumpkin beetle. Varieties under study were Liza, Sulaman (cucumber), Arya, BSS- 687 (bottle gourd), Asia black star, sugar body (water melon), Asian, Jade ball F1 (round gourd), PALEE F1, Nirali (bitter gourd).

Different studies are conducted to check the preference and non preference of red pumpkin beetle against different cucurbit vegetables. (Mehta, 1989) conducted experiment on ten different cucurbit vegetables and found that Bitter gourd was strongly resistance against the red pumpkin beetle but the Bottle gourd (*Lagenaria siceraria*) and Sponge gourd (*Luffa scutannils*) were less resistant. Water melon (*Citrullus lanatus*), Musk melon (*Cucumis melo*) and Cucumber (*Cucumis sativus*) were moderately susceptible to red pumpkin beetle. (Roy, 1990.) conducted study to investigate the relative susceptibility of different cucurbit vegetable to red pumpkin beetles. Studies shows that Bitter gourd were highly resistant to red pumpkin beetle while Sponge gourd and Bottle gourd were shows the moderately resistance. Vegetables showing high susceptibility were Cucumber (*Cucumis sativus*) and Musk

melon (*Cucumis melo*). Banana Squash (*Cucurbita maxima*), Bottle gourd and musk melon shows the relatively high susceptibility against red pumpkin beetle. While Water melon, Bitter gourd, Snake gourd and Sponge gourd and attains the second position in this study for the preference of red pumpkin beetle (Roy, 1991).

In present study both varieties of Bitter gourd (Jaunpuri, Nirali) were highly resistant to red pumpkin beetle attack and shows very minute amount of attack. So this result shows the similarity to previous results for the Bitter gourd.

In present case of study both varieties of Water melon shows the intermediate attraction (Andaman, Sweet Delight) towards the red pumpkin beetle hence these results are in line with the previous collected result.

In this study conducted for the determination of relative infestation of red pumpkin beetle both varieties of Cucumber and Bottle gourd shows the relatively moderate susceptibility to red pumpkin beetle. So these results are similar to previous collected results.

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Vol. 23, No. 1.