Seasonal incidence and population dynamics of *Aulacophora foveicollis* on bottle gourd (*Lagenaria siceraria* M.) and their correlation with abiotic factors

Abstract

The present Investigation carried out at Students' Instructional Farm, A. N. D. U. A. & T., Kumarganj, Ayodhya (U.P.) during *Zaid*, 2022. Red pumpkin beetle was first recorded during incidence initiated in the 7th SMW (3rd week of February) with a mean population 1.4 beetles per five plants which reached its peak to maximum (21.20 beetles/five plants) during 14th SMW (1st week of April). There was a weakly positive association between the red pumpkin beetle population and the minimum and maximum temperature (0.067 & 0.40), maximum rainfall and relative humidity displayed an insignificant inverse relationship (-0.467 & -0.129) while significant negative correlation with minimum relative humidity (-0.506*).

Key words: Standard Meteorological Week, red pumpkin beetle, non-significant, minimum relative humidity and Population.

1. Introduction

Bottle guard are the most commonly grown and essential crops in the world, being planted in all tropical and subtropical countries. Bottle guard, generally known as vine crops, are made up of around 118 genera and 825 species (Khan *et al.*, 2012)[2]. Cucurbitaceae, or gourd family, is an excellent example of a plant family having numerous economically useful members. Bottle gourd belongs to the Cucurbitaceae family and is one of the most significant vegetable crops farmed in India. In India, the total area covered by Bottle Gourd was 187 ha, with a production of 3165 MT. (DES Report, 2021)[1] It is frequently farmed in India since it is a good source of minerals, it helps to avoid sodium loss and weariness, especially in the heat. It is a low-calorie diet that is beneficial to those with diabetes and jaundice. Bottle gourd also has a wide range of medical purposes, including cooling, diuretic, and cardiotonic effects. The bottle gourd fruit edible portion contains 96.3% moisture, 63 kJ (15 kcal) of energy, 5.87 grams of carbohydrates, 0.02 grams of fat, 0.6 grams of protein, 10.10 milligrams of vitamin C, 3.77 milligrams of zinc and 332.0 milligrams of iron (Milind and Satvir, 2011)[4]. One of the most critical limiting factors for low cucurbit productivity is insect infestations. Poor quality seeds, insect pest infestations, and severe environmental conditions are all reasons that contribute to low bottle gourd production. Insect pests are the most important of them, as they have a negative impact on plant growth and productivity.

Many insect pests attack the crop, among which the *Aulacophora foveicollis* (Lucas) and *Bactrocera cucurbitae* are two prominent insect pests that attack cucurbit crops.

2. Material and methods

The seasonal incidence of the major insect pests was recorded under natural conditions of infestation in three plots each measuring 5 m x 4 m (126 m^2). During *Zaid* with RXP distance of 400cm x 50cm, design RBD, treatments 09, replication 03. Among the various insect pests infesting bottle gourd, the seasonal incidence of red pumpkin beetle were recorded "Rashmi" variety, of Bottle gourd. Five plants per plot were randomly selected and tagged to record the observations throughout the experiment.

$$\textbf{Mean fruit infestation (\%)} = \frac{\textbf{Number of infested fruits} x^2}{\textbf{Total number of fruits}} \text{ X } \mathbf{100}$$

The incidence of fruit fly was also be recorded by installing a fruit fly trap (Bardo-lure) per plot and the number of fruit flies trapped in trap were recorded regularly and expressed as mean catch per week.

3. Result and discussion

The results presented in the table-1 clearly reveals that red pumpkin beetle *Aulacophora foveicollis* (Lucas) incidence initiated in the 7th standard meteorological week (3rd week of February) with a mean population 1.4 beetles/5 plants. The population extended gradually and reached its peak (21.20 beetles/five plants) during 14th standard meteorological week (1st week of April) thereafter, leaning trend was observed till the crop maturity when population of red pumpkin beetle activity gradually decreased from 20th standard week (3rd week of may) and it was lowest (1.80 beetles/five plant). The population of red pumpkin beetles on cucumber peaked (4.80 bugs/five plants) during the first week of October, according to Kumar and Saini (2018)[3], who noted that the population started in the last week of August. Additionally, they noted a substantial negative link between mean relative humidity and rainfall and a positive correlation between the population of the red pumpkin beetle and mean temperature. The findings are consistent with those of Rathod and Borad (2010)[6], who noted that the kharif season months of August to September had the highest occurrence of red pumpkin beetles.

3.2. Correlation of red pumpkin beetle

The population of the red pumpkin beetle showed non-significant positive correlations with minimum and maximum temperatures (0.067 and 0.40), non-significant negative correlations with maximum relative humidity and rainfall (-0.467 and -0.129) and significant negative correlations with minimum relative humidity (-0.506*). According to Rathod and

Borad (2010)[6], the mean air temperature has a substantial positive link with the highest prevalence of the red pumpkin beetle.

4. Conclusion

Among highest red pumpkin beetle population recorded 21.20 per plants, 14th SMW (1st week of April) while 1.80 per plant, 20th SMW (3rd week of May) ware recorded the lowest.

Table 1: Incidence of red pumpkin beetle of bottle gourd

S. No.	SMW	Red pumpkin beetles/5 plants
1	5	0.00
2	6	0.00
3	7	1.4
4	8	2.2
5	9	3.8
6	10	4.4
7	11	5.30
8	12	18.10
9	13	20.30
10	14	21.20
11	15	17.50
12	16	10.80
13	17	7.40
14	18	4.60
15	19	2.20
16	20	1.80
17	21	0.00
18	22	0.0

Table 2: Relation of red pumpkin beetle incidence with abiotic factors session *Zaid* 2022

Insect name	Weather variables				
	Temperature (°C)		RH (%)		Rainfall (mm)
	Max.	Min.	Max.	Min.	
Red pumpkin beetle	0.400 NS	0.067 NS	-0.467 NS	-0.506 S	-0.129 NS

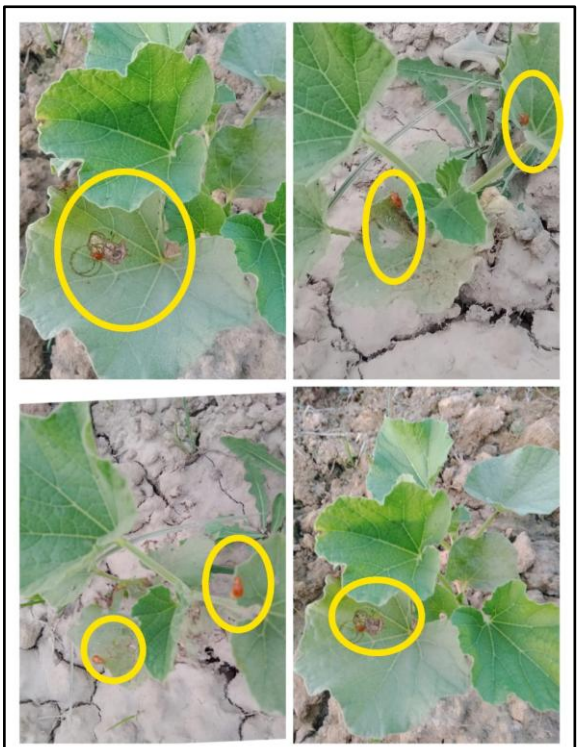

Fig. 1. Incidence of red pumpkin beetle

Fig. 2. Observation recoded

Fig. 3. Damage by red pumpkin beetle at seedling stage

5. References

1. DES, India. 2020-21. Ministry of Agriculture and Farmers Welfare. Directorate of Economics and Statistics Report. New Delhi, GOI. 2p.
2. Khan MMH, Alam MZ, Rahman MM, Miah MI and Hossain MM. 2012. Influence of Weather factors on the incidence and distribution of red pumpkin beetles infesting cucurbits. *Bangladesh Journal of Agricultural Research,* 37(2):361-367.
3. Kumar R and Saini A. 2006. Population dynamics of red pumpkin beetle, *Aulacophora foveicollis* infesting cucumber Journal of Entomology and Zoology Studies 2018; 6(6): 1023-1025
4. Milind P and Satvir K. 2011. bottle gourd a natural gourd. International *Research Journal of Pharmacy,* 2 (6): 13-17

5. Rahman MM, Sultana T, Uddin MM and Shahjahan M. 2015. Impacts of temperature, relative humidity and total number of fruits on cucurbit fruit fly infestations under field condition. *Progressive Agriculture,* 26: 1-5.
6. Rathod ST Borad PK. 2010. Population dynamics of red pumpkin beetle, *Aulacophora foveicollis* (Lucas) on pumpkin. *Current Biotica*, 3: 565-569.