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Varietal Preference of Tur Pod Bug, *Clavigralla gibbosa* Spinola for Oviposition in Pigeonpea

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ABSTRACT

The studies on the ovipositional behaviour of tur pod bug were carried on pigeonpea varieties viz., Paras, Manak, H03-41 and UPAS120 under screen house at College of Agriculture, CCS Haryana Agricultural University from mid October 2013 to January 2014.Total number of eggs laid on leaves, flower buds, flower and pods were recorded till the end of season.Maximum number of eggs were laid on variety Paras (67.33 eggs/plant) and it was statistically on par with variety Manak (64.16 eggs) and these were significantly superior and preferred by C. gibbosa than H03-41 (39.33) and UPAS 120 (57.00). The maximum eggs were observed on UPAS 120 and minimum on H03-41. In case of stem, eggs laying was zero in all varieties.

Key words: *Clavigralla gibbosa, Ovipositional behaviour, Pigeonpea.*

INTRODUCTION

Pigeonpea ranks sixth in area and production in comparison to other legumes such as beans, peas and chickpea. Pigeonpea (*Cajanus cajan*) is an important crop in semi-arid tropical and subtropical farming systems, providing high quality vegetable protein, animal feed, and firewood. Pigeonpea is a rich source of vegetable protein and thus play an important role in vegetarian human diet. Its grain are of high nutritional value with high protein content (21% to over 25%), making it very valuable for improving food security and nutrition for many poor families who cannot afford dairy and meat based diets. Pigeonpea has a wide range of products, including the dried seed, pods and immature seed used as green vegetables, leaves and stems used for fodder and the dry stem as fuel. Pigeonpea seeds are eaten fresh (green) primarily in Africa and the Caribbean and as dried, split and dehulled (*dal*) in South Asia. It also improves soil fertility through nitrogen fixation as well as from the leaf fall and recycling of the nutrients[17]. Pigeonpea performs well in poor soils and region where moisture availability is unreliable or inadequate[9] and preferred in dry land areas where it is intercropped or grown in mixed cropping systems with cereals or other short duration annuals[7]. It is grown as *kharif* crop in month of June and July and its production is detrimental due to biotic and abiotic constraints.

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Among biotic factors, a vast array of insects attack from seedling to maturity and cause 27 to 100 per cent crop loss. Among various limiting factors for low yield of pigeonpea crop, the incidence of insect pests assumes a great significance. Insect pests feeding on flowers, pods, and seeds are the most important biotic constraint affecting pigeonpea yields. Among the sucking bugs, tur pod bug is the most important in India[3]. It was once considered to be a minor pest of pigeonpea but, has assumed the status of a major pest[16]. Dolling[6] reported that a density of 10 adults of *C. gibbosa* on a pigeonpea plant was enough to cause total loss of the crop. The pod bug damage in pigeonpea was recorded from 25 to 40% [1]. Both the nymphs and adults of the pest suck the cell sap from the developing grains of the green pods. In case of heavy infestations of the tender pods, they get shrivelled. The bug also sucks sap from leaves, flowers and tender shoots, but pods are most preferred. Damaged seeds are dark, shrivelled, do not germinate and are not acceptable as human food. On an average it causes 25.20% pod and 28.38% grain damage[18].

MATERIALS AND METHOD

The studies on the ovipositional behaviour of tur pod bug were carried on pigeonpea under screen house at, CCS Haryana Agricultural University from mid October 2013 to January 2014.

Total six pairs of adults (one pair on each plant) were released on each variety, at flowering stage representing one replication, were placed in a screen house .Total number of eggs laid on leaves, flower buds, flower and pods were recorded till the end of season. Newly formed pods were tagged with dates and those pods on which eggs were laid, were also tagged again with date. On the basis of number of eggs hatched, hatching per cent fertilized and unfertilized eggs were calculated. For egg laying pattern, the number of eggs laid in cluster were counted. Time of egg laying was also recorded throughout the crop season. One pair of adult was released on each plant per replication.

All the data pertaining to egg laying on different parts of the plant, per cent fertilized and unfertilized eggs, ovipositional behaviour of *C. gibbosa* on different pigeonpea cultivar were statistically analyzed by using factorial CRD.

RESULT AND DISCUSSION

Fertilized and unfertilized eggs of *C. gibbosa* on different varieties of pigeonpea

The egg hatchability of *C. gibbosa* was recorded on different varieties of pigeonpea. Maximum fertilized eggs were recorded on UPAS 120 (88.83%) as this variety mature late in early maturing group of pigeonpea. Minimum egg hatchability was recorded in H03-41 and maximum unfertilized eggs (14.50%) were laid on this variety (Table1).

Table 1: Fertilized and unfertilized eggs of *C. gibbosa* on different varieties of pigeonpea

Percent fertilized and unfertilized eggs		
Variety	**Fertilized eggs (%)**	**Unfertilized eggs (%)**
Paras	86.17 (68.46)	13.83 (21.50)
Manak	88.00 (70.06)	13.67 (21.55)
H03-41	85.50 (67.74)	14.50 (22.22)
UPAS 120	88.83 (70.80)	9.50 (17.60)
C.D. (P=0.05)	(N.S.)	(N.S.)

** Figures in parentheses are angular transformed value*

Ovipositional behaviour of *C. gibbosa* on different varieties of pigeonpea

One pair of adults (male and female) was released per plant on each variety to record the egg laying behaviour of test insect. Most preferred part for egg laying was pod followed by leaves and flowers and no eggs were laid on stem. Most of eggs laid by female were in group. The female deposited the eggs one by one making flat group on pods. Number of eggs laid on pods in test varieties ranged from 39.33 to 67.33 (Table 2). Significantly maximum number of eggs were laid on variety Paras (67.33 eggs/plant) and it was statistically on par with variety Manak (64.16 eggs) and these were significantly superior and preferred by *C. gibbosa* than H03-41 (39.33) and UPAS 120 (57.00). The remaining two varieties were statistically on par with each other. Number of eggs on leaves ranged from 8.83 to10.00, there was no significant difference among varieties, however, maximum number of eggs were observed on the leaves of Paras and Manak (10.00 eggs) and minimum eggs were counted on H03-41 and UPAS 120 (8.83 eggs). The number of eggs laid on flowers ranged from 4.50 to 6.16, there was no significant difference in test varieties. However, the maximum eggs were observed on UPAS 120 and minimum on H03-41. In case of stem, eggs laying was zero in all varieties. Nawale and Jadhav[11] reported that eggs were laid in groups mainly on pods but also on leaves and flower buds. After depositing few eggs she moved little in front and again started egg laying. On the basis of 943 eggs observed in laboratory, 98.2 percent eggs were found in groups ranging from 2 to 33 eggs with an average of 6 eggs in each group. Sometimes single egg also observed on a pod. Generally, one group of eggs were laid on a pod but sometimes 2, 3 or even 4 groups were also observed. Similar result given by Ombir[19] who reported that out of 4670 eggs observed in the laboratory, 97.6 per cent of eggs were found in groups ranging from 2 to 27 eggs with an average of 6 eggs in each group and only 2.4 percent eggs laid singly. Generally on a pod one group of the eggs were recorded but sometimes 2, 3 or 4 groups were also observed. Ombir[19] reported that the female preferred to lay eggs on pods in groups of 2 to 27 eggs. As well as Bindra[4], Singh and Patel[15] and Nawale and Jadhav[11] also reported that the female preferred to lay eggs on pods in groups of 5 to 10 eggs, 2 to 24 eggs and 3 to 33 eggs, respectively. There were non significant differences in number of fertilized and unfertilized eggs on all the tested cultivars. However, maximum fertilized eggs were recorded UPAS 120 (88.83%) and maximum unfertilized eggs were recorded in H03-41 (14.50%). As well as minimum fertilized eggs were recorded in H03-41 (85.50%) and unfertilized eggs were recorded in UPAS 120 (9.50%).

Table 2: Ovipositional behaviour of *C. gibbosa* on different varieties of pigeonpea

Egg laying on different parts of the plant				
Variety	**Pods**	**Leaves**	**Flowers**	**Stem**
Paras	67.33 (8.22)	10.00 (3.31)	5.00 (2.41)	0.00 (1.00)
Manak	64.16 (7.99)	10.00 (3.31)	5.83 (2.61)	0.00 (1.00)
H03-41	39.33 (6.24)	8.83 (3.13)	4.50 (2.33)	0.00 (1.00)
UPAS 120	57.00 (7.58)	8.83 (3.13)	6.16 (2.67)	0.00 (1.00)
r value at 5%	(0.872)*	(-0.09)**	(-0.034)**	(N.S.)
C.D. (P=0.05)	(1.29)	(N.S.)	(N.S.)	

Figures in parentheses are square root transformed values

* Correlation at 5%

** Correlation at 1 %

The correlation studies between egg laying of *C. gibbosa* and pod length, flower length and leaf area (Table 1) indicates there was a positive correlation between number of eggs laid and length of pods (r = 0.0872)* in each variety while, it was negatively correlated with leaf area (r = - 0.09)** as well as flower length (r = - 0.034)**

Eggs pattern

Eggs were laid in clusters in the batches of 2 to 33 eggs. Sometimes overlapping of the eggs is also noticed. Ombir[19] reported that 97.6 per cent of eggs were found in flat groups ranging from 2 to 27 eggs with an average of 6 eggs in each group and only 2.4 percent eggs laid singly. Nawale and Jadhav[11] reported that eggs were laid in groups of 3 to 33 mainly on pods but also on leaves and flower buds. The eggs were laid in groups of 5 to 10 [4] and 2 to 24 with an average of 9.4 [15].

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