SEASONAL ABUNDANCE OF LADY BIRD BEETLE, *Coccinella septempunctata* (LINN.) IN MUSTARD CROP

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ABSTRACT

Field survey was carried at college farm and kept unsprayed in winter season during 2011-2012. In mustard field, the average population of C. septempunctata range 0.00 to 7.2/sq. m. area with an average of 2.03/sq. m. area when an average minimum and maximum temperature was 8.4°C to 27.3°C, respectively. The mean relative humidity was 74 per cent in morning and 25 per cent in evening. The predator appeared to build up from second week of January. Its population was increased with increase of the population of mustard aphid and peak (7.2/sq. m. area) in second week of February. Correlation coefficient between C. septempunctata and weather parameters revealed that positive association were found between C. septempunctata and morning (r = 0.483) and evening (r = 0.379) humidity, maximum temperature (r = 0.372) and sunshine hours (r = 0.178), whereas minimum temperature showed negative correlation (r = -0.141). The highly significant positive correlation (r = 0.914**) was recorded between C. septempunctata and aphid population.

KEY WORDS: Aphid, C. septempunctata, mustard

INTRODUCTION

Brassica (rapeseed-mustard) is the second most important edible oilseed crop in India after groundnut and accounts for nearly 30 per cent of the total oilseeds produced in the country. The aphid, *L. erysimi* is an important pest of mustard and has become a serious pest; the crop is severely attacked by aphid at the flowering stage. Different types of predators were found among that the *Coccinellids septempunctata* are considered to be efficient predators on mustard aphid and keep the aphid infestation naturally checked. The *Coccinellids septempunctata* are popularly called as the lady bird beetle. They are of great economic importance because a large majority of them are predaceous both in their grub as well as adult stages on the various small bodied insects including aphid (Rawat and Modi, 1969).

MATERIALS AND METHODS

Field survey was carried out to know the seasonal abundance of *Coccinellids septempunctata* predators on mustard grown in 20 m x 20 m plot at the college farm and kept unsprayed in winter season during 2011-2012. In order to determine the seasonal

abundance of coccinellid beetle (*C. septempunctata*), the populations of *C. septempunctata* and its host, *L. erysimi* were observed on 10 plants which were randomly selected from a spot of the mustard field. Five spots (1 m x 1 m) were observed throughout the crop season at weekly interval. The population of coccinellids both larvae and adults were recorded on the whole plant carefully. Correlation study was carried out with weather parameters.

The aphid index was recorded as under:

0 Plant free from aphid.
1 Aphid present but colonies not built up. No injury due to pest appearance on plant.
2 Small colonies of aphids present on leaves of plant. Such leaves exhibit slight curling due to aphid feeding.
3 Large colonies of aphids present on leaves and other parts, damage symptoms visible due to aphid feeding.
4 Most of the leaves covered with aphid colonies. Counts are not possible and the plant shows more damage symptoms due to aphid feeding.
5 The plant completely covered with aphid colonies, plant growth hindered due to pest feeding.

The average aphid index was worked out by using following formula:

$$\text{Av. aphid index} = \frac{0N + 1N + 2N + 3N + 4N + 5N}{\text{Total no. of plants observed}}$$

Where,

0, 1, 2, 3, 4, 5 are the aphid index, and N= Number of plants showing respective aphid index.

RESULTS AND DISCUSSION

The result presented in Table 1 showed that the aphid incidence continued throughout the crop season except fourth week of November and first week of December. The infestation of aphid commenced from second week (5^{th} week after sowing) of December with initial population of 0.42 aphid index/plant. Thereafter, it increased at steady rate. The peak population of 3.80 aphid index/plant was recorded in first week (13 week after sowing) of February. After that the aphid population was gradually declined and aphid population remains up to first week of March (17 week after sowing).

Data also indicated (Table 1) that the population of predator (*C. septempunctata*) was ranged from 0.00 to 7.20 per sq. m. area with an average of 2.03/sq. m. area during study period. The population of *C. septempunctata* commenced from the second week of January (10 week after sowing) with 0.60 *Coccinellids* per sq. m. The *Coccinellids* population was gradually increased and reached to a peak level of 7.20 *Coccinellids* per sq. m. during second week of February (14 week after sowing) and population gradually decrease with aphid population decreased. Thus, the result clearly indicated that the *C. septempunctata* were active during the aphid population present in crop. Looking to the fluctuated population of aphid and predators as well as weather parameters, it was apparently happened that the population of *C. septempunctata* was increased with the increase of aphid population. It meant that the activity of the predator was positively related with its host density. The present findings are in agreement with those of Kulkarni and Patel (2001) and Bilashini and Singh (2010).

The data presented in Table 2 showed that the population of *C. septempunctata* had highly significant positive correlation (r = 0.914**) with

aphid population. The aphid population was increased the *C. septempunctata* population also increased. The correlation between aphid and weather parameters (Table 2) revealed that the relative humidity morning (r = 0.670*) and evening (r = 0.577*) had significant positive correlation, which indicated that with increase in the relative humidity, the aphid population was also increased. Further, it can be seen from the data that the aphid population had positive correlation (r = 0.052) with minimum temperature and negative correlation (r = -0.436) with maximum temperature, while the sunshine hours showed negative effect on the population of aphid. Thus, the results showed that when relative humidity (Mor. and Eve.) was increased, the aphid population also increased.Similarly, the correlation study of *C. septempunctata* revealed that (Table 2) the relative humidity morning (r = 0.483) and evening (r = 0.379), maximum temperature (r = 0.372) and sunshine hours (r = 0.178) had positive correlation, while minimum temperature had negative correlation (r = -0.141) with *C. septempunctata*. Similar results have been reported by Bhangare *et al.* (2010).

CONCLUSION

From the ongoing discussion, it can be seen that the population of *C. septempunctata* was increased with the increase of aphid population. It meant that the activity of the predator was positively related with its host density. It was also noted that with increase of relative humidity (Mor. and Eve.), the aphid population also increased.

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Table 1: Seasonal abundance of mustard aphid, *L. erysimi* and *C. septempunctata* and weather parameters

Date	Weeks After Sowing	Aphid Index/Plant	*C. septempunctata* /sq. m.	Average Temperature		RH. (%)		Sunshine (hrs/day)
				Max.	Min.	Mor.	Eve.	
26-11-11	3	0.00	0.00	32.8	12.0	82	29	9.2
03-12-11	4	0.00	0.00	31.1	13.2	85	26	7.1
10-12-11	5	0.42	0.00	28.4	10.8	64	19	9.3
17-12-11	6	0.64	0.00	26.0	4.9	68	22	8.4
24-12-11	7	0.70	0.00	28.7	7.0	66	21	7.9
31-12-11	8	0.90	0.00	26.8	6.4	68	22	7.5
07-01-12	9	1.12	0.00	24.9	6.6	70	28	8.2
14-01-12	10	1.54	0.60	24.5	4.6	76	21	9.0
21-01-12	11	1.80	1.80	23.1	5.2	82	28	7.9
28-01-12	12	2.18	3.60	25.6	5.3	84	31	7.5
04-02-12	13	3.80	5.40	24.6	6.4	84	35	7.4
11-02-12	14	3.50	7.20	23.8	9.4	76	24	8.9
18-02-12	15	2.92	5.60	27.6	10.9	72	21	9.6
25-02-12	16	1.90	3.80	30.4	11.6	65	24	9.8
03-03-12	17	0.80	2.40	30.7	11.7	70	22	10.2
Average		1.48	2.03	27.3	8.4	74	25	8.5

Table 2: Correlation coefficient between population of mustard aphid(*L. erysimi*), *C. septempunctata* and weather parameters

Particular	*C. septempunctata*	Weather Parameters				
		Temperature (°C)		Relative Humidity (%)		Sunshine hrs.
		Min.	Max.	Mor.	Eve.	
Aphid	0.914**	0.052	-0.436	0.670*	0.577*	-0.117
C. septempunctata	-	-0.141	0.372	0.483	0.379	0.178

****, ** Significant at 5 per cent and 1 per cent levels of significance, respectively.***

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