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IMPACT OF THE AVAILABILITY OF HOST PLANTS AND PREY APHIDS ON THE OCCURRENCE OF LADY BEETLES IN WESTERN U.P.

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The lady beetle and its developmental stages are dependent on the availability of the aphid food, which may only grow, when the specific food crop is available in the field. Thus, in nature a very regular and specific change and their interrelationship among host plants, aphid pests and the predator *Coccinella septempunctata* Linn. exist during mid July to April due to prevailing suitable condition in Saharanpur (the specific area of the work). Simultaneous, occurrence of the host plants in the field is a bio-indicator of the seasonal prevalence of the notorious aphid pests and predatory lady beetle population, depending on the suitability of the climatic condition. Thus, the growth of the host plant in the field indicate appearance of aphids which act as prey for the predator *C. septempunctata.*

Key words : *Coccinella septempunctata* Linn., Aphids.

INTRODUCTION

Coccinella septempunctata Linn. aphidophagous in nature predates upon aphids and shifts from one host plant to the other depending on climatic conditions. Studies on the availability of host plant and aphids have been studied by different workers (Kundu & Pant, 1968; Agarwala *et.al.*, 1983; Santos *et.al.*, 1990; Kaniuczak, 2000; Indu, 2004; Indu & Chatterjee, 2006; Chatterjee & Indu, 2008; Sirvi & Singh, 2014).

MATERIALS AND METHODS

Infestation of the aphids on specific, food crop (host plant) depends on the rate of consumption of aphids by the lady beetle. Observation is carried out in the natural conditions regarding rearing or study of predator and prey interrelationship. Individual studies of the consumption of aphids, are also carried out in Petri dishes (rounded Petri dishes measuring 7 x 7cm) covered on the top with thin muslin cloth in microclimate. Copulation is followed by oviposition in other Petri dishes otherwise, eggs are eaten up.

The field study includes counting of the number of the aphids and beetle populations on different host plants throughout the year. The number of aphids per plant recorded is compared with the number of beetles available accordingly on the same host plant or any such area nearby where the adults may rest after feeding or copulation. The distribution of the beetle in a locality to other plants not bearing aphids are also recorded, which occasionally visit the aphid infested host plant for their food (Table I). Observations are to be taken for two consecutive years throughout the Saharanpur Distt. in different localities. The climatic observations are recorded at the place of rearing as well as from local meteorological observatory at Horticultural Research Institute. Interrelationship between the predator and prey is a definite criteria and is acceptable in principle during the survey. Interrelationship between predator and prey numbers has been undertaken linked to the rise and fall of predator and prey populations.

Table 1 : List of aphid preys for predation by *C. septempunctata* Linn. on their host plants.

S.No.	Scientific Name	Host Plants
1.	*Lipaphis erysimi* Kaltenback	Mustard, Radish, Turnip, Indian Rape
2.	*Brevicoryne brassicae* Linn.	Cabbage
3.	*Acythosiphon pisum* Harris	Berseme
4.	*Schizaphis graminum* Rondani	Wheat
5.	*Hyadaphis coriandari* Das.	Carinder
6.	*Aphis gossypii* Glover	Bottle gourd, Brinjal
7.	*Melanaphis sacchari* Zehntner	Sorghum
8.	*Rhopalosiphum maidis* Fitch	Maize

RESULTS AND DISCUSSION

Coccinella septempunctata Linn. is aphidophagous beetle. Hence, during rearing in the laboratory the aphid (Homoptera : Aphididae) food is to be provided to all the larval stages and the adults. Significantly, aphids are specific to their host plants. So the availability of different aphids during the year is dependent upon the growth of the specific host plant of the crop in the field during the months and the seasons, when the crop is available and so the growth of aphids occur to different extents and the under prevailing climatic conditions and where lack of control measures exists. However, the biotic control agent present in the nature *i.e. C. septempunctata* limit the prey - aphid

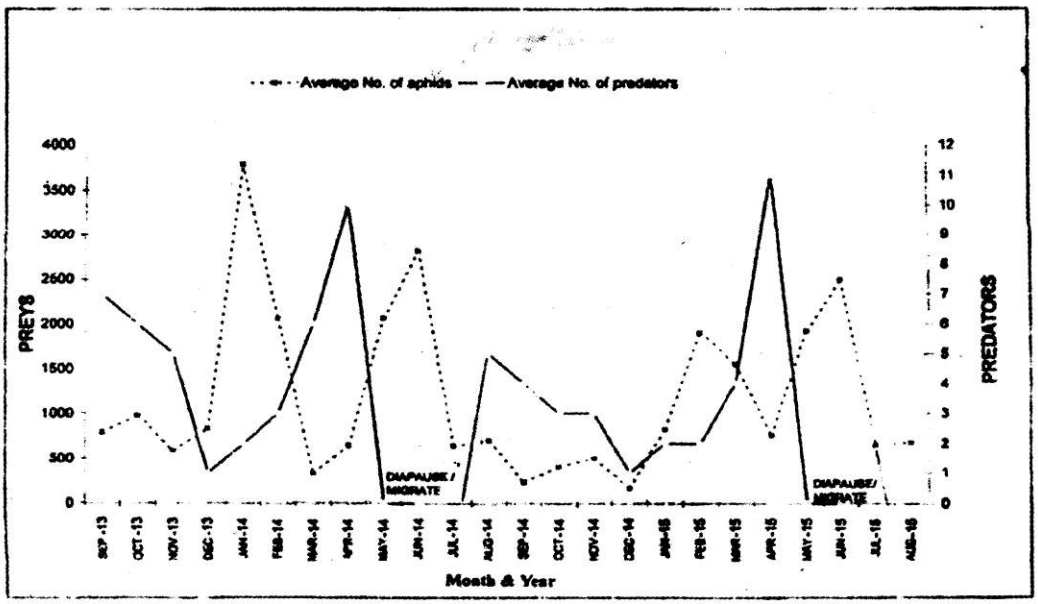

Fig. 1 : To show relationship between the population of preys and predators.

population. Crops in the field have been taken up to study the aphid (prey) nymph (N) and adult populations and simultaneously its control by lady beetle population.

Valuable crop plants provide suitable food and microclimate for the increase in number of the aphid (Homoptera : Aphididae) population but desapping by the aphids cause sometimes wilting of the twig due to loss of excessive fluid contents but the mother nature has its on cycle so delimit the aphids. Aphidophagous *C. septempunctata* prey upon these aphids in which all its larval forms as well as adults participate. Primarily to the increase in the predator number which bears economic value as it limit the harmful aphid populations. The occurrence of the host plant in the field is a bio-indicator of the seasonal prevalence of the notorious aphid population, depending on the suitability of the climatic condition (Fig. 1; Table II).

Table II : Field study of the average number of Prey and Predator population.

S.No.	Month and Year	Average number of Prey	Average number of Predator
1.	Sep. 13	792	7
2.	Oct. 13	978	6
3.	Nov. 13	591	5
4.	Dec. 13	835	1
5.	Jan. 14	3785	2
6.	Feb.14	2058	3
7.	Mar.14	327	6
8.	Api.14	650	10
9.	May.14	2063	=/+
10.	June 14	2809	=/+
11.	July 14	638	4
12.	Aug. 14	696	5
13.	Sep. 14	233	4
14.	Oct. 14	404	3
15.	Nov. 14	498	3
16.	Dec. 14	160	1
17.	Jan. 15	824	2
18.	Feb. 15	1897	2
19.	Mar. 15	1546	4
20.	Api. 15	761	11
21.	May 15	1917	=/+
22.	June 15	2488	=/+
23.	July 15	647	2
24.	Aug. 15	673	3

* Adult *Coccinella septempunctata* Linn. Show no reproduction and undergo diapause/ migrate and aphids only on bottle gourd; =/ + Diapause/ Migrae

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