

FEEDING EFFICIENCY OF *CHRYSOPERLA CARNEA* AGAINST APHIDS (*L. ERYSIMI* AND *B. BRASSICAE*)

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ABSTRACT

Feeding efficiency of *Chrysoperla carnea* against aphids was studied in the laboratory. The larvae of *C. carnea* are fed individually in glass vial with different sps. of aphids. The known number of aphids were provided daily in the morning hours and their number increased accordingly. Predatory efficiency was calculated by counting the numbers of aphids consumed/day. The data indicated that mean percent feeding per day by first, second and third instars larvae was 6.5, 21 and 45 on mustard aphid and 4, 24 and 35.5 on cabbage aphid. Whereas total numbers of aphids consumed by 1st, 2nd and 3rd larval instar was 6, 72.5 and 100 in case of mustard aphids and 17.5, 37.5 and 71.5 in case of cabbage aphids. The 3rd instar larvae are more voracious eater of aphids in both the cases. Mean of total number of aphids consumed by respective larval instar was 178.5 and 126.5 for mustard and cabbage aphids. There was a significant difference between instars efficiency when offered different hosts.

INTRODUCTION

Chrysoperla larvae and adults are polyphagous and feed on several pests of economic importance. Aphid population increases in the fields and causes 70-80% yield loss. The use of too much of pesticides is hazardous for the environment so *Chrysoperla* larvae could be used to control aphids in the field (Ashfaq *et al.*, 2002; Chakraborty and Korat, 2010). The use of chrysopoids in biological control has been enabled by the development of efficient mass rearing facilities. Naturally, Green lacewings go after aphids on vegetables first, but also attack trips, spider mites, whiteflies, moth eggs, young caterpillars and other pests as aphids are cleaned up. The larvae are effective than adults in controlling the aphid population as they do not disperse in the field. The augmentation of natural enemies is an effective control method for many insect pest species (Tulisolo, 1984). (Khuram *et al.*, 2008) Investigated effectiveness of *C. carnea* on the population of *Bemisia tabaci* in different cotton genotypes and showed that use of *C. carnea* as bio-intensive IPM program reduced the insecticides and saved foreign exchange that spent on pesticide import. (Liu and Chen, 2001) studied effect of three aphid species on development, survival and predation of *C. carnea*. (Yadav and Pathak, 2010) assessed effect of temperature on the consumption capacity of *C. carnea* reared on four aphid species.

Keeping in view the importance of mustard crop, its yield losses and insect pest severity, it is necessary to develop an effective pest management program. The main objective of present study is to offer less expensive, environmental friendly,

preventive measure in terms of biological control of aphids.

MATERIALS AND METHODS

A laboratory study was carried out to know about the feeding efficiency of green lacewings. The individual grub was reared in glass vial from hatching of eggs till the cocoon formation. The grub was fed with the counted number of aphids. The aphids were provided daily in the morning hours with known numbers and their number increased according to the developmental stage. Feeding efficiency was calculated by counting the number of aphids consumed, similar method for counting the feeding percentage of aphids was adopted by Chakraborty and Korat, 2010. Table 1 shows the feeding potential of *Chrysoperla carnea* on two species of aphids.

RESULTS AND DISCUSSION

Observation in Table 1 shows that the predatory efficiency of *C. carnea* increased with the development of the larva. First, second and third instar larvae consumed mean 6.5, 21 and 45 of mustard aphids/day and 4, 24 and 35.5 of cabbage aphids/day. However, according to Chakraborty and Korat, (2010), consumption of aphids /day was 6.03 ± 2.19 , 25.43 ± 9.99 and 43.10 ± 6.89 for mustard aphid and 5.97 ± 1.73 , 21.80 ± 7.98 and 26.43 ± 5.25 for cabbage aphid by 1st, 2nd and 3rd instar larvae, which is almost similar to the present findings. The third instar larvae consumed more number of aphids in the species of aphids studied. Similar is the finding of Krishnamoorthy and Mani (1982); Megahed *et al.* (1984); Saminathan *et al.* (2003); Jagadish and Jayaramaiah

Table 1: Feeding efficiency of *C. carnea* on two sps. of aphids

Species	Instar	No. of aphids consumed / day			No. of aphids consumed during respective larval instar		
		Min	Max	Mean	Min	Max	Mean
1. Mustard aphid <i>L. erysimi</i>	I	5	8	6.5	6	12	6
	II	10	32	21	65	80	72.5
	III	30	60	45	90	110	100
Total					161	202	178.5
2. Cabbage aphid <i>B. brassicae</i>	I	2	6	4	10	25	17.5
	II	13	35	24	30	45	37.5
	III	26	45	35.5	65	78	71.5
Total					105	148	126.5

(2004), Chakraborty and Korat (2010).

Total consumption of aphids by 1st, 2nd and 3rd instar larvae in case of *L. erysimi* is 161 to 202 with an average of 178.5 and in case of *B. brassicae* total consumption is 105 to 148 with an average of 126.5. According to Singh and Hamid (1998), a single larva consumed about 259.22 cabbage aphids during its total larval period. Rana and Srivastava (1998) showed a single larva consumed about 349.80 mustard aphids during its total larval period. These two reports show higher predation as compared to the present findings. Result shows that *L. erysimi* is more preferred prey for *C. carnea* in comparison to *B. brassicae*. This finding is in agreement with the report of Rana and Srivastava (1998); Bansod *et al.* (2001) and Liu and Chen (2001), who reported the feeding potential decreases from *A. gossypii* > *U. compositae* > *L. erysimi* > *A. craccivora* > *A. nerii* > *B. brassicae*.

Thus *C. carnea* can be used as a spot treatment to reduce localized outbreaks of aphids as a part of an integrated pest management programme in the form of biocontrol agent.

REFERENCES

- Ashfaq, M., Nasreen, A. and Cheema, G. M. 2002. A new technique for mass rearing of green lacewing on commercial scale. *Pakistan J. Apple. Sci.* **2(9)**: 925-926.
- Bansod, R. S., Sarode, S. V., Indira, B. and Anade, S. K. 2001. Feeding potential of *C. carnea* on different prey sps. *J. Soils Crops.* **11(2)**: 269-270.
- Chakraborty, D. and Korat, D. M. 2010. Feeding efficiency of green lacewing, *C. carnea* (Stephen) on different sps of aphids. *Karnataka J. Agri. Sci.* **23(5)**: 793-794.
- Jagadish, K. S. and Jayaramaiah, M. 2004. Biology and predatory potentiality of *C. carnea* on tobacco aphids. *J. Ecobiol.* **16(3)**: 161-167.
- Krishnamoorthy, A. and Mani, M. 1982. Feeding potential and development of *C. scelestes* on *H. armigera* under laboratory condition. *Entomol.* **7(4)**: 385-388.
- Khuram, Z., Faisal, H. and Rashid, R. Khan 2008. Effectiveness of *Chrysoperla carnea* on the population of *B. tabaci* in different cotton genotypes. *J. Agri. Social Sci.* 112-116.
- Liu, T. X. and Chen, T. Y. 2001. Effect of three aphids sps. on development, survival and predation of *C. carnea*. *Appl. Entomol. Zool.* **36(3)**: 361-366.
- Megahed, M. M., Abou-Zeid, N. A., Farghaly, H. T., Marei, S. S. and Zeid, N. A. 1984. Predating efficiency of *C. carnea* on certain host. *Agri. Res. Rev.* **60(1)**: 201-208.
- Rana, B. S. and Srivastava, R. C. 1998. Feeding potential and growth rate index of aphid lion *C. carnea* on different sps of aphids. National Sem. Entomol. 21st Century Maharana Pratap University of Agri. and Technology, Udaipur Rajasthan. April 30 - May 2, 1998.
- Saminathan, V. R., Mahadevan, N. R. and Muthukrishnan, N. 2003. Influence of prey density on the predatory potential and development of *C. carnea*. *Indian J. Ent.* **65(1)**: 1-6.
- Singh, N. N. and Hamid, L. 1998. Development of different stages of *C. carnea* on *C. cephalo-nica* and mustard aphid. National Sem. Entomology. 21st century. Maharana Pratap University of Agriculture and Technology Udaipur. April 30 - May 2, 1998.
- Tulisalo, U. 1984. Biology of Chrysopidae in Canard, M., Semeria, Y. and New, T. R. (Eds). Junk, Botson. Mass rearing techniques. pp. 213-220.
- Yadav, R. and Pathak, P. H. 2010. Effect of temperature on the consumption capacity of *C. carnea* reared on four aphid sps. *Development.* **5(2)**: 271-274.