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PREDATING EFFICIENCY OF *CHEILOMENES SEXMACULATA* F. ON BEAN APHID *APHIS CRACCIVORA* KOCH

Rakhshan

Aphid Systematics and Biocontrol Laboratory, University Department of Zoology
T M Bhagalpur University, Bhagalpur 812007, Bihar, India
Email: rakhshankalim@gmail.com

ABSTRACT

***Cheilomenes sexmaculata* F. (Coleoptera: Coccinellidae) is an effective biological control agent against aphids. This study observed its feeding efficiency in the grub stages, and adult male and female during March and April on aphid *Aphis craccivora* Koch in broad bean *Vicia faba*. The first to fourth instar grubs were observed in April to predate on aphids to an extent of 13.2± 0.18, 42.2± 1.98, 61.8± 1.31 and 164.2± 4.94 aphids, respectively). Male and female adults fed on 1011.4± 0.25 and 1201.2± 0.88 aphids, respectively.**

Key words: *Cheilomenes sexmaculata, Aphis craccivora, Vicia faba*, grubs, instars, male, female adults, feeding efficiency, seasonal occurrence

The bean aphid *Aphis craccivora* Koch (Hemiptera: Aphididae) is one of the destructive pests of broad bean *Vicia faba.* Ahmad et al. (2012) observed six species of aphidophagous coccinellids from northeast Bihar. Among these, *Cheilomenes sexmaculata* F. was found abundantly, and is effective as predator of *A. craccivora*. Temperature influences the development, survival, reproduction and predatory efficiency of predators (Asrar et al., 2013). The quality of prey species and host plants influence the predatory efficiency (Shah and Khan, 2014). The present study evaluates the feeding efficiency of the grubs and adults of *C. sexmaculata* on *A. craccivora*.

MATERIALS AND METHODS

The culture of *C. sexmaculata* was established on *A. craccivora* infested host plants in the laboratory, and *A. craccivora* were collected daily with leaves of host plants from field and provided as food. Mating pairs were collected from the stock culture and reared on aphids in a separate beaker (25x 10cm) at room temperature during March and April (24.55± 3.64°C, 28.13± 2.84°C, respectively). Ten such replications were maintained, with blotting paper placed at bottom of beaker and top covered with muslin cloth (Rakhshan and Ahmad, 2015). Predatory efficiency of larval instars and adult beetles were expressed by Mean± SE.

RESULTS AND DISCUSSION

The results revealed significant differences in the feeding efficiency of grubs and adults of *C. sexmaculata;* maximum feeding efficiency of first, second, third and fourth instar grubs were 13.2± 0.58, 42.2± 1.98, 67.8± 1.31 and 164.2± 4.94 aphids, respectively, during April (28.13± 2.84ºC); these values were less (11.8± 0.48, 39.6± 1.91, 62.8± 1.82, and 132.8±3.82 during March (24.55± 3.64ºC). The fourth instar grub was observed to be highly voracious, Asrar et al. (2013) reported significant effect of temperatures on feeding efficiency of *C. sexmaculata* on *Schizaphis graminum*. Chakrabarti et al. (1988) observed such variations in the predatory potential of *Harmonia dimidiata* F., feeding on woolly apple aphid *Eriosoma lanigerum*. Easwaramoorthy et al. (1998) evaluated the feeding potential of *C. sexmaculata* grubs on aphids in sugarcane. Rakhshan and Ahmad (2015) observed feeding by *C. sexmaculata* on *A. craccivora* on *Phaseolus sinensis* at different temperatures and found variations. Newly emerged adults consumed less number of *A. craccivora*, but reached 1011.4± 0.25 and 1201.2± 0.88 aphids later (during April-(28.13± 2.84ºC, with female and male, respectively; it was 1091.9± 0.30 and 812.4± 0.25 during March- 24.55± 3.64ºC). Gillani et al. (2007) observed such variations with *H. dimidiata;* also, Yu et al. (2013) on *Aphis gossypii,* observed variations with male and female.

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REFERENCES

Ahmad M E, Kumar S, Parween N, Rakhshan. 2012. Screening of aphidophagous coccinellids (Coleoptera: Coccinellidae) from northeast Bihar. Journal of Advanced Zoology 33(2): 103-112.

Asrar A, Haq E, Khan J, Gillani W A, Rehman A, Mahmood T, Javed H I, Rasool A. 2013. Effect of three constant temperatures on the biology and predatory potential of *Menochilus sexmaculatus* (Fab.) (Coleoptera: Coccinellidae) feeding on *Schizaphis graminum* aphid. Pakistan Entomologist 35(2): 95-98.

Babu A. 2001. Predatory potential and life parameters of *Cheilomenes sexmaculata* in relation to energetics of *Aphis gossypii* Glover. Entomon 26(1): 29-36.

Chakraborti S, Ghosh D, Debnath N. 1988. Developmental rate and larval velocity in *Harmonia* (Leis) *dimidiata* (Coleoptera: Coccinellidae), a predator of *Eriosoma lanigerum* (Homoptera: Aphididae) in western Himalaya. Acta Entomologica Bohemoslovaca 854(5): 335-339.

Dixon A F G. 2000 Insect predator-prey dynamics, ladybird beetles and biological control. Cambridge University Press, Cambridge. 257 pp.

Easwaramoorthy S, Kurup N K, Santhalakshmi G. 1998. Biology and predatory potential of the ladybird beetle, *Cheilomenes sexmaculata* (Fabricius) (Coleoptera: Coccinellidae) on sugarcane aphids. Journal of Biocontrol 12(I): 47-50.

Gillani W A, Matin, Raffi M A. 2007. Bionomics of tropical Coccinellid beetle *Harmonia dimidiata*: (Coleoptera: Coccinellidae) under laboratory conditions, Pakistan Journal of Agricultural Research 20: 79-83.

Hodek I. 1996. Food relationships. Hodek I, Honck A (eds.). Ecology of Coccinellidae. Kluwer Academic Publishers, Dordrecht, Boston, London. pp. 143-238.

Kumar S. 2013. Taxonomical and ecological study of aphids and their predators in Northeast Bihar. Doctoral dissertation, Tilka Manjhi Bhagalpur University, Bhagalpur.

Rakhshan, Ahmad M E. 2015. Predatory efficiency of *Cheilomenes sexmaculata* (Fabricius) (Coleoptera: Coccinellidae) against *Aphis craccivora* Koch on various host plants of family Fabaceae. European Scientific Journal 11(18): 154-161.

Rakhshan, Ahmad M E. 2018. Effect of host plants on the reproductive aspects of *Cheilomenes sexmaculata* (Fabricius) (Coleoptera: Coccinellidae). Current Investigations in Agriculture Current Research 3(5) 1-4.

Shah M A, Khan A A. 2014. Qualitative and quantitative prey requirements of two aphidophagous coccinellids, *Adalia tetraspilota* and *Hippodamia variegata*. Journal of Insect Science 14 (72).

Yu J Z, Chi H, Chen B H. 2013. Comparison of the life tables and predation rates of *Harmonia dimidiate* (F.) (Coleoptera: Coccinellidae) fed on *Aphis gossypii* Glover (Hemiptera: Aphididae) at different temperatures. Biological Control 64: 1-9.

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