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Feeding efficiency of larvae/ grubs of Syrphids and Coccinelid predators on mustard aphid, *Lipaphiserysimi* (Kalt.)

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Abstract:

Mustard aphid, *Lipaphiserysimi* (Kalt.) and its relation with the aphidophagous predators in terms of feeding efficiency was conducted under the laboratory condition during Rabi cropping season of 2018-19. Results revealed that the Syrphids consumed more number of aphids than the coccinellids & neuroptera. These predators could be used as bio-control agents to manage the mustard aphid.

Key words: *Lipaphiserysimi,* Syrphids, Coccinellids, Neuropterapredators, Oligophagous.

Introduction:

Aphids are small soft bodied tiny insect feeding on the sap of plants. They are commonly known as plant lice. They are economically important group of insects because of their ability to transmit viral diseases to plants by virtue of sap sucking habit and capable of feeding on a wide range of plants belonging to diverse families. Although, aphids prefer to colonize on tender leaves & shoot (Bhadauria*et al,*1995) still they can infest all parts of plant. Bakhetia& Chandra (1997) recorded 653 species of aphids in India, out of these, a dozen species has been considered as potential pest, of which mustard aphid, *Lipaphiserysimi*is one among them (Nayar*et al,* 1986). It is anoligophagous pest infesting only cruciferous plants like cabbage, cauliflower, mustard, rapeseed etc. The losses in yield caused by mustard aphid ranged from 30% to 70% (Phadke 1986, Prasad 1996). 24% to 96% (Pharke, 1985), upto 96% (Verma,2000) in different parts of India.

In view of its increasing concerns as an important pest, of late *L. erysimi* has been recognized as a "NATIONAL PEST" (Jayaraj, 1995). To control the pest infestation, synthetic insecticides are commonly used but it causes adverse side effect to non-target species, pollution hazard, toxic residue to man, animals & environmental hazard etc. These ill effects of insecticides can be overcome by the use of biocontrol agents (Predators and Parasitoids). Among the biocontrol agents, hoverflies (syrphids) and ladybird beetles

(coccinellids) have been reported to be effective for managing the population of *L. erysimi*(Chitra, 1999; Singh *et al*., 2012)

Keeping this in view, the present study were undertaken to assess the larval feeding efficiency of different species of syrphids and coccinellids on mustard aphid, *L. erysimi*.

Materials and methods:

To evaluate the predatory potential of different predators, eggs were collected from the field and kept in petridishes till it hatched. After hatching small 1st instar grub/ larvae were transferred to different petridishes (9 cm diameter) by keeping 10 replications in each species. The larvae/ grubs were provided with known number of adequate aphid daily. The consumption rate was noted down. Detailed observationon larval voracity, rate of consumption & developmental period wererecorded.

Result and Discussion:

Table 1 showed the larval voracity and developmental periodof the following predators:

(a) **Syrphids:**
- i. *Episyrphusbalteatus*(De G.)
- ii. *Ischiodonscutellaris*(Fabr.)
- iii. *Metasyrphusconfrater* (Weid.)
- iv *Betasyrphusserarius* (Weid.)
- v. *Paragusseratus*Fabr.

(b) **Coccinellids:**
- i. *Coccinellaseptempunctata* Linn
- ii. *Coccinellatransversalis*Fabr.

(c) **Neuroptera:**
- i. *Micromustimidus*Hagen

It revealed the variation in consumption rate of different species. The syrphid*B. serarius* consumed 774 aphids/ larva during the larval period of 13 days whereas the least number of aphids (67 aphids/ larva) was consumed by Neuroptera- *M. timidus.*

Table 1 – Feeding efficiency and duration of development of aphidophagous larvae

Name of Predatory Species	**No. of aphids consumed / larvae**	**Larval duration (days)**
Syrphids:		
E. balteatus	397±20.0	10.9±0.2
I. scutellaris	364±16.7	13.3±0.5

M. confrater	641±21.4	16.3±0.8
B. serrarius	**774±11.8**	**13.3±0.2**
P. serratus	163±3.5	16.1±0.3
Coccinellids:		
C. septempunctata	244±16.4	29.8±0.9
C. transversalis	233±9.7	28.2±0.5
Nruroptera:		
M. timidus	**67±2.8**	**17.7±0.9**
Each value (mean ±SE) given in the table is mean of 10 replications.		

Findings and Conclusion:

In case of coccinellids, there appeared a little difference in terms of voracity which was 233 aphids/ grub for *C. transversalies*& 244 aphids/ grub for *C. septempunctata*. In case of syrphids, *E. balteatus*, &*I. scutellaris*, no. of aphids consumed were 397 and 364 respectively which are more or less similar with the finding of Singh,Kuldeep (2013). While comparing the veracity of coccinellids as well as syrphids (Table 1) it was observed that the later consume more aphids than the former.

Thus the study revealed the possibility of keeping the aphid population below economic threshold level by syrphids&coccinellid predators in mustard ecosystem.

Based on the larval voracity and species composition of predators it could be concluded that the predators could be used as potential bio- control agent for controlling the mustard aphid.

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