

Influence of larval diet on pupal period and size of cocoon of *Chrysoperla zastrowi sillemi* (Esben-Peterson)

Abstract

A study was conducted in the Biocontrol Laboratory, Department of Entomology, College of Agriculture, OUAT, Bhubaneswar, Odisha during 2020-21 to record the influence of larval diets on pupal period and size of cocoon of *Chrysoperla zastrowi sillemi* (Esben-Peterson). Six larval diets *i.e.* T₁ (Purple aphid, *Aphis craccivora* Koch.), T₂ (Green aphid, *Myzus persicae* (Sulzer)), T₃ (Mustard aphid, *Lipaphis erysimi* (Kalt.)), T₄ (Papaya mealy bug, *Paracoccus marginatus* Williams and Granara de Willink), T₅ (Pink mealy bug, *Maconellicoccus hirsutus* (Green)) and T₆ (*Corcyra cephalonica* Stainton 1st instar larva) were tested along with one control (T₇= *Corcyra cephalonica* egg). T₁ was detected as the best larval diet which produced maximum pupal period of 8.90 days with 16.80% increased over control. Maximum cocoon diameter was also recorded in T₁ *i.e.* 3.28 mm with 11.95% increased over control. T₁ was closely followed by T₃ with respect to pupal period (8.74 days with 14.70% increase over control) and diameter of cocoon (3.20 mm with 9.22% increase over control) of *C. zastrowi sillemi*.

Key words: Larval diets, *Chrysoperla zastrowi sillemi*, pupal period, diameter of cocoon

Introduction

Chrysoperla zastrowi sillemi (Neuroptera: Chrysopidae) is a generalist predator of soft bodied sucking insects like aphids, mealy bugs, immature scales, whiteflies, thrips, spider mites and other sucking insect pests (Saminathan and Baskaran, 1999). The larvae of *Chrysoperla* is a voracious predator of soft bodies insects and their adults are free living in nature feeding upon the pollen and nectar (Villenave *et al.*, 2005). It is quite obvious that rearing of natural enemies in the laboratory with preferred food will positively influence the duration and vigour of different life stages which in turn will increase the feeding potentiality in the field after release. Keeping this objective in view, six larval diets comprising three species of aphid (Purple aphid, *Aphis craccivora*; Green aphid, *Myzus persicae* and Mustard aphid, *Lipaphis erysimi*), two species of mealybug (Papaya mealy bug, *Paracoccus marginatus* and Pink mealy bug, *Maconellicoccus hirsutus*) and first instar larva of *Corcyra cephalonica* were tested in the present investigation along with one control (egg of *Corcyra cephalonica*) to determine their effects on pupal period and size of cocoon.

Materials and Methods

The experiment was conducted during 2020-21 in the Biocontrol Laboratory of Department of Entomology, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha. The experiment was laid out in CRD with three replications and seven treatments. In each replication of a treatment, five neonate larvae of *Chrysoperla zastrowi sillemi* (just after their hatching out of eggs) were placed in glass petri dishes individually to avoid cannibalism. Thus, fifteen petri dishes were maintained for each treatment. A total of hundred and five such petri dishes were maintained for seven treatments and three replications at 28 ± 2 °C with $65 \pm 5\%$ relative humidity throughout the experiment. Foods (preys) were provided (ad libitum) along with the infested twigs or portions of leaf in the petri dishes everyday at fixed time till the larvae pupate. All the pupae (cocoons) of a replication of a particular treatment were transferred to a petri dish immediately after pupation. The dates of pupation of the larvae and the emergence of adults from pupae were recorded and the pupal periods were determined. The diameter of cocoons was measured using a stereo zoom trinocular microscope. The data so obtained were subjected to statistical analysis using OPSTAT software for logistical interpretations.

Result

Data on pupal period have been presented in Table 1. Maximum pupal period of 8.90 days was recorded in T₁ (Purple aphid, *Aphis craccivora*) followed by T₃ (Mustard aphid, *Lipaphis erysimi*) i.e. 8.74 days with 16.80% and 14.70% increase in pupal period over control (T₇= *Corcyra cephalonica* egg). These two treatments were statistically at par and significantly superior to all other treatments. Lowest pupal period of 7.39 days was recorded in T₆ (*Corcyra cephalonica* 1st instar larva).

Data on diameter of cocoon have been presented in Table 2 and Figure 1. Highest diameter of cocoon of 3.28 mm was recorded in T₁ (Purple aphid, *Aphis craccivora*) with 11.95% increase over control (T₇= *Corcyra cephalonica* egg) followed by 3.20 mm and 3.12 mm in T₃ (Mustard aphid, *Lipaphis erysimi*) and T₂ (Green aphid, *Myzus persicae*) with 9.22% and 6.48% increase in cocoon diameter over control, respectively. These three treatments were statistically at par and significantly superior to all other treatments. Lowest cocoon diameter of 2.93 mm was observed in control along with T₅ (Pink mealy bug, *Maconellicoccus hirsutus*) and T₆ (*Corcyra cephalonica* 1st instar larva).

Discussion

It was evident from the results that the pupal period and diameter of *Chrysoperla zastrowi sillemi* were higher when the larvae were fed with aphid species than the mealybugs and first instar larva and egg of rice moth. Hence, it may be assumed that the aphids are the preferred hosts over mealybugs and rice moth (larva and egg). This may be the reason that the green lacewings are otherwise named as aphid lions. The data on pupal period recorded in the present investigation are almost similar to the data reported by Cohen and Smith (1998), Alghamdi and Sayed (2017) and Naruka *et al.* (2017). The cocoon diameter recorded in the present

investigation are almost similar to the values reported by El-Dakroury *et al.* (1979), Patel and Vyas (1985), Jalali *et al.* (2003) and Chakraborty and Korat (2010).

Table 1. Influence of larval diet on pupal period of *C. zastrowi sillemi*

Tr. no.	Treatments	Pupal period (days)	
		Mean	Increase (%) over control
T ₁	Purple aphid, <i>Aphis craccivora</i>	8.90	16.80
T ₂	Green aphid, <i>Myzus persicae</i>	8.61	12.99
T ₃	Mustard aphid, <i>Lipaphis erysimi</i>	8.74	14.70
T ₄	Papaya mealy bug, <i>Paracoccus marginatus</i>	8.21	7.79
T ₅	Pink mealy bug, <i>Maconellicoccus hirsutus</i>	8.07	5.95
T ₆	<i>Corcyra cephalonica</i> 1 st instar larva	7.39	-2.98
T ₇	<i>Corcyra cephalonica</i> egg (Control)	7.62	-
	SE(m)±	0.062	-
	CD (P=0.05)	0.19	-

Table 2. Influence of larval diet on diameter of cocoon of *C. zastrowi sillemi*

Tr. no.	Treatments	Diameter of cocoon (mm)	Increase (%) over control
T ₁	Purple aphid, <i>Aphis craccivora</i>	3.28	11.95
T ₂	Green aphid, <i>Myzus persicae</i>	3.12	6.48
T ₃	Mustard aphid, <i>Lipaphis erysimi</i>	3.20	9.22
T ₄	Papaya mealy bug, <i>Paracoccus marginatus</i>	3.04	3.64
T ₅	Pink mealy bug, <i>Maconellicoccus hirsutus</i>	2.93	0.00
T ₆	<i>Corcyra cephalonica</i> 1 st instar larva	2.93	0.00
T ₇	<i>Corcyra cephalonica</i> egg (Control)	2.93	-
	SE(m)±	0.055	-
	CD (P=0.05)	0.17	-

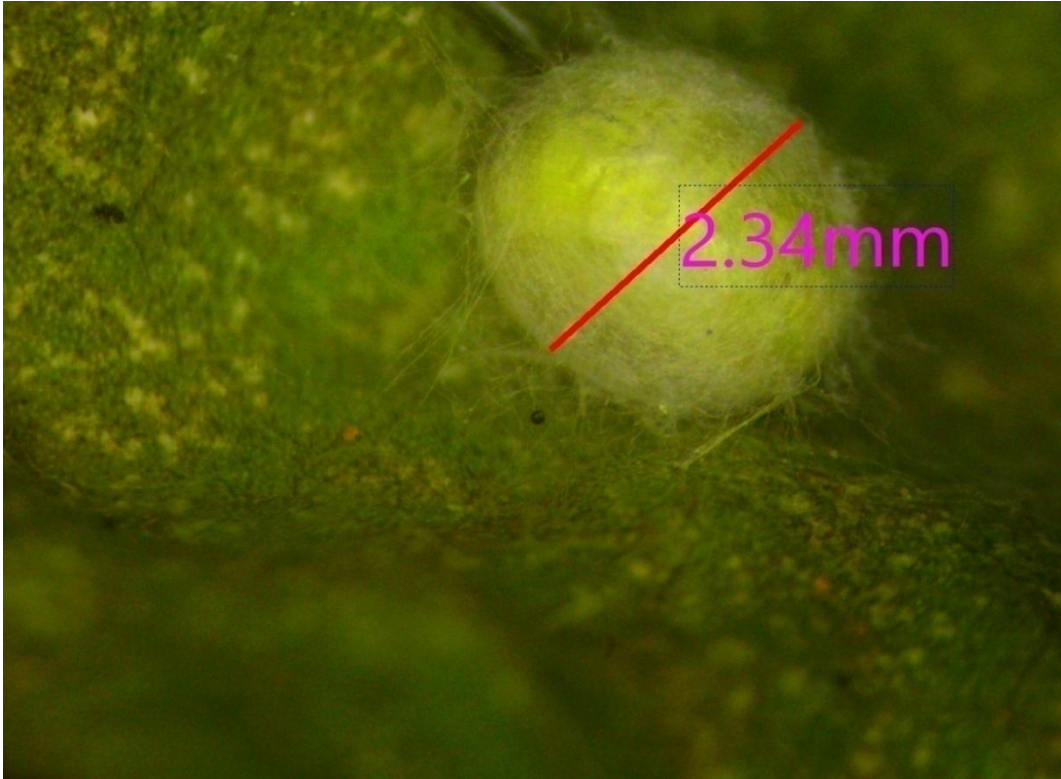


Figure 1. Diameter of cocoon of *C. zastrowi sillemi*

Conclusion

The purple aphid, *Aphis craccivora* was evaluated as the best larval diet which recorded highest increase in pupal period and cocoon diameter of *C. zastrowi sillemi* followed by mustard aphid, *Lipaphis erysimi*.

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