



Research Article

Multiplication of green lacewing, *Mallada astur* (Banks) on frozen grubs of *Tribolium castaneum* Herbst

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ABSTRACT: The green lacewing, *Mallada astur* (Banks) was reared on frozen grubs of red flour beetle, *Tribolium castaneum* Herbst. The incubation period, larval period and pupal period were 3.0–3.3 days, 8.70–9.30 days and 9.10–10.40 days, respectively and total life cycle was completed in 20.8–22.7 days and continuous rearing for 5 generations did not alter any biological parameter significantly. The total immature mortality was 21 per cent and larval survival 76.66 per cent, when fed on a-week-old frozen prey. On prey stored at -4 to -6°C for a period of four weeks, survival was 46.5 per cent and it declined to 38.8 per cent after 42 days as against 85.5 per cent in control. A slight increase in developmental period was noticed with increase in cold storage of the prey beyond four weeks. These studies suggest that frozen grubs of *T. castaneum* are suitable for the multiplication of *M. astur*. The production of red flour beetle is cheaper than producing equivalent quantity of rice meal moth eggs, which are presently used for large scale production of the green lacewings.

KEY WORDS: *Mallada astur*, multiplication, *Tribolium castaneum*

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INTRODUCTION

The chrysopid, *Mallada astur* (Banks) (Neuroptera: Chrysopidae), was recorded in Karnataka region on guava in India (Singh and Narasimham, 1992). Subsequently, it has been reported as an important predator on many horticultural crops (Sujatha and Singh, 2003; Mani and Krishnamoorthy, 1999). Generally, green lacewing predators are reared on traditional factitious host, viz., frozen or sterilized eggs of *Corcyra cephalonica* (Stainton) (Gautam, 1994) or on semi-synthetic diet (Venkatesan *et al.*, 2000), which is expensive. Besides, the moth scales of *C. cephalonica* are known to cause respiratory hazards to sensitive workers on prolonged inhalation. To avoid such problems, earlier studies revealed that frozen grubs of *Tribolium castaneum* Herbst were suitable, and rather better in terms of cost reduction and safety aspects in *Chrysoperla zastrowi sillemi* (Viji and Gautam, 2005a) and *M. desjardinsi* (Okamoto) (Elsiddig *et al.*, 2006). Cost of production of *C. z. sillemi* and *M. desjardinsi* on *T. castaneum* as against the eggs of *C. cephalonica* was reported to be less by three-fold besides safety to human health (Viji and Gautam, 2005b, Elsiddig, 2006). Hence, an attempt was made to rear *M. astur* on frozen grubs of *T. castaneum* to find out its suitability.

MATERIALS AND METHODS

Tribolium castaneum culture was maintained in plastic jars (15 x 20cm) containing wheat flour as suggested by Viji and Gautam (2005a, b) and Elsiddig *et al.* (2006). The jars were covered with cloth secured by rubber bands and the culture was kept at $30\pm 1^{\circ}\text{C}$ and $60\pm 5\%$ RH in a BOD. Adult beetles were released in wheat flour and left to lay eggs for two days. Then the flour was sieved to remove adults and they were transferred to a new jar with fresh wheat flour to lay eggs and continue the same cycle so as to get different stages of development at any point of time. This process was done for easy separation of larvae of equal age and size at the time of harvest. Stock culture of *M. astur* was maintained by using standard procedure set by Gautam (2008) for green lacewing predators in the Biological Control Laboratory, Division of Entomology, Indian Agricultural Research Institute (IARI), New Delhi, India. Adults were transferred to jars (21x18cm) containing a cotton swab dipped in 20% honey solution and Power Packed Green lacewing Feed (Gautam *et al.*, 2010) as supplementary food.

Generation wise suitability of frozen prey to the predator

Suitability of frozen grubs of *T. castaneum* as prey for the grubs of *M. astur* with regard to continuous rearing was