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Viability of Eggs of Green Lacewing Harvested by Am-tech and Other Methods

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Abstract: Experiments were conducted under laboratory conditions to find out the most efficient method for harvesting the eggs of *Chrysoperla carnea* from the different substrates provided on the top of the adult rearing cage for egg laying purpose. Highest egg viability (82.89%) was found in the eggs removed by a razor from the granulated Maraco paper sheet used by AM-Tech rearing methodology whereas egg viability was lowest (64.89%) in the case of egg removed from black organdy with potassium hypochlorite solution. Modest egg viability (75.56%) was observed in the eggs laid on black organdy and removed by a razor.

Key words: *Chrysoperla carnea*, AM-Tech, organdy, egg viability, potassium hypochlorite, maraco paper

INTRODUCTION

Chrysoperla carnea Stephen (Neuroptera: Chrysopidae) is an important generalist predator (aphid lion) of various sucking insect pests and eggs of lepidopteran pests. Several species of aphids, spider mites (especially red mite), thrips, whiteflies, eggs of leafhoppers, moths and leaf miners, small caterpillars, beetle larvae and the tobacco budworm are reported prey of *C. carnea*. Further it has been reported as an important predator of long tailed mealy bug in green houses and interior plant scrapes (Geetha and Swamiappan, 1998). Larvae of *C. carnea* eat 100 to 600 aphids in its life span. Mass releases of *C. carnea* in cotton field trials reduced bollworm infestation by 96%. Adults are active fliers particularly during the evening and night and mostly feed on honeydews. The larvae, which are very active, are grey or brownish and alligator like with well-developed legs and large pincers to suck the body fluids of prey (Pedigo, 1986).

Mass rearing techniques have been in study from 1950s. Eggs of Mediterranean flour moth (*Anagasta kuehniella*) and the Angoumois grain moth (*Sitotroga cerealella*) are the most frequently used in the United States for mass rearing of *Chrysoperla* species (Nordlund and Morrison, 1992). Black organdy was used as egg- laying substrate by Finney (1948 and 1950) and Gautam (1994), whereas granulated paper was used by Nasreen *et al.* (2002). Finney (1950) used a diluted sodium hypochlorite for dissolving stalks of eggs to remove from the substrate. Hot wire method was also used in egg collection from egg laying substrate. Morrison (1977) developed a hot wire-vacuum removal device that reduced destruction of the eggs and removed a significant number of the stalks. Gautam (1994) and Nasreen *et al.* (2002) used razor for removing eggs in the improved rearing techniques.

The objective of the present studies is to evaluate the different methods, which has been adopted for collection of eggs of *C. carnea* from different substrates.

MATERIALS AND METHODS

Counted number of adults (150) of *C. carnea* was reared in the IPM Laboratory of University College of Agriculture, Bahauddin Zakariya University, Multan. Experiments were conducted in completely randomized design in three replicates. Nine transparent plastic jars of 21 cm deep and 8 cm diameter were taken. Adults were kept in these jars as their effective oviposition period was started. Small holes (two mm diameter) were drilled in the walls of jars for proper ventilation. A side hole (one cm) was made in a side of each jar and water soaked cotton was placed there. Five pairs of *C. carnea* adults were placed in each jar. Six jars were provided with black organdy and three were provided with black granulated paper on the top for egg laying.

The adults were fed on a mixture of honey, yeast and water in 1:1:1 ratio. Food was provided in the form of small droplets on paper strips having 23 cm length and two cm width. Jars were kept at 27±2°C and 65±5% relative humidity. Eggs were collected from each jar daily. Eggs were removed from granulated paper and from three jars with black organdy by razor. Eggs from the other three jars with black organdy were removed by potassium hypochlorite (3%). Organdy with eggs was dipped into the solution for 30 seconds. The eggs detached from organdy were washed with distilled water and collected

on paper. Eggs removed by all the three methods were kept separately. Thirty eggs from each treatment were taken (10 from each replication) and filled in medium size gelatin capsules. One egg was kept in one capsule. Gelatin capsules with *C. carnea* eggs for each replication were kept in separate Petri plates. Capsules were opened after 72 h. Number of eggs hatched in each treatment was noted for 15 days. Data was analyzed statistically and means were compared by least significant difference (LSD) where appropriate (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

The highest egg viability (82.89%) was found in eggs removed from granulated paper by razor (AM-Tech) (Table 1). Modest egg viability (75.56%) was observed in eggs removed with the help of razor from black organdy. Eggs removed with Potassium hypochlorite treatment showed lowest viability that was 64.89 %.

The statistical analysis showed that chemical treatment had significant impact on egg viability. Morrison (1977) reported that if such procedure is not carefully performed, it might result in the incomplete removal of eggs or in dissolving the egg chorion to the point that eggs are destroyed. So the concentration of potassium hypochlorite and time of dipping the substrate into the chemical are important to get the highest level of viable eggs. Carvalho *et al.* (1998) observed the similar results. They used commercial concentrated domestic cleaning fluid (javel water) with 12.5% active chlorine and analytical grade product with 3.5%. The effect of former was generally stronger as could be expected from its higher hypochlorite concentration. On large scale rearing programme, it required sufficient time and labour in the field application. Nasreen *et al.* (2002) used granulated paper in the new improved rearing technique (AM-Tech). Razor work quite easily and quickly on paper to remove the eggs as compared to organdy. Granulated surface of paper also gave an advantage that is difficult in the case of cloth. Moreover, eggs removed from cloth by razor contain fuss and in tangled, so cannot be separated easily.

The results of the experiments concluded suitability of AM-Tech. a technique for mass rearing of the potent insect predator *C. carnea*, in term of viability of eggs of the predator harvested by this technique. A dark colored granulated paper was offered to female as substrate for egg laying. The paper proved many advantages over the previous techniques, where a black organdy was used for the purpose. The eggs of *C. carnea* on the paper can be destalked with the help of simple razor. The same in case of black organdy, caused them entangled as mass of fuss as well as more eggs damaged and the loss of viability of the eggs was observed. A chemical potassium hypochlorite, recommended in previous rearing techniques to dissolve stalk of the eggs, for detaching them from the organdy, affected there viability and very less number of larvae were hatched from these eggs. Thus, the granulated paper (substrate for egg laying) used by AM-Tech is more suitable that produced more number of viable eggs as compared to the substrate practiced by previous rearing techniques.

Table 1: Viability of eggs of green lacewing harvested by AM-Tech and other methods

Egg harvesting method	Egg viability	St. Dev.
From paper by razor	82.89c	2.77
From cloth by razor	75.56b	3.42
From cloth by chemical	64.89a	4.02

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