

Biology and Predatory Potential of *Chrysoperla carnea* (Stephens) on *Callaphis juglandis* Kaltenbach

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The walnut (*Juglans regia* Linn.) an important dry fruit in Himalayas is infested by several insects including *Callaphis juglandis* Kaltenbach, *Chromaphis juglandicola* Kaltenbach (Masoodi *et al.*, 1987) and *C.hirautibis* (Kumar and Lavigena, 1970). During the course of a routine faunistic survey in 1985-86 several predators were observed feeding on *C.juglandis* of which, a neuropteran *Chrysoperla carnea* (Stephens) was found to be predominant one. But no attempts seems to have been made to evaluate the predatory efficiency of *C.carnea* by providing dusky veined walnut aphid (*C.juglandis*) as prey. Keeping this in view, studies were initiated on the biology and predatory potential of *C.carnea* on *C.juglandis*.

To initiate the studies, field-collected gravid chrysopid adults were reared in glass tubes individually (15cm x 2.5 cm) by providing *C.juglandis* as their feed till egg laying was observed. To study the biology of *c.carnea*, the eggs of same age were delicately transferred individually in glass tubes (10cm x2.5cm). On hatching, the chrysopid larvae (n=10) were fed with the nymphs of *C.juglandis* from the culture raised on walnut saplings grown in earthen pots in laboratory. The petiole of the leaf was covered with wet cotton to prevent desiccation of leaves supporting nymphal population of the aphid placed in the rearing tube. The feed was doubled every alternate day during first instar of the chrysopid and changed daily during 2nd and 3rd instars. The incubation period, larval duration, pupal duration and adult longevity were recorded. The number of prey consumed by the larvae and adults wer recorded daily. The studies were conducted at 25-30⁰ C and 40-55 per cent relative humidity.

The incubation period of the pest ranged between 6-8 days with an average of 6.70 ± 0.82 days. The larvae passed through three larval instars each occupying on an average 6.30 ± 0.82 , 6.50 ± 0.89 and 5.30 ± 0.94 days, respectively. The larva took 18.10 ± 1.19 days to complete its larval life. The larval duration was found to vary with different prey (Pasqualini, 1975; Awadallah *et al.*, 1976; Varma and Shenhmar, 1983; Krishnaswamy and Yaseen, 1972; Sharma and Verma, 1991).

The adult chrysopids survived for 27.83 ± 3.27 days when reared on *C.juglandis*. On an average, a single chrysopid consumed 401.58 ± 15.20 aphids during its larval period of 18.10 ± 1.19 days. The mean aphid consumption of *C.carnea* larva when fed on *Aphis gossypig* over was 487 (Afzal and Khan, 1978) *Myzus persicae* 385 (Scopes, 1969) and *Brevicoryne brassicae* 181 (Sharma and Verma, 1991). The variations in prey consumption recorded by several workers may be due to the differences in aphid species, stage and situation of experimental site, laboratory conditions and environmental factors. The mean aphid consumption of adult recorded was 619.83 ± 46.70 during the life time of 27.83 ± 3.27 days and the average aphid consumption of both larval and adult stages of *C.carnea* was $1021.41 \pm 41 \pm 43.83$ nymphs of *C.juglandis*. As early as 1909, McDunnough recorded for the first time the predaceous habits of adult *Chrysopa perla* Linn. especially for aphids but sometimes also on other small insects and mites. *Chrysoperla lanata* (Banks) refused to prey on waxy cabbage aphid *B.brassicae* but accepted eggs of noctuid *Trichoplusia ni* (Hubner) (Ru *et al.*, 1975). Principii (1940) observed a female *Chrysopa septempunctata*

Wesmael eating more than 40 individuals of *Erisoma lanigerum* in less than 30 minutes. However, Hagen and Tassan (1972) concluded that about half of the 33 species of *chrysopa* are predators in their adult stage and remaining 15 species feed chiefly on honey dew and pollen. Tauber and Tauber (1973a, 1973b) noticed strain variation in *C. carnea* which included aphid eaters as in the mohave strain i.e. *C. carnea mohave* (Banks). Canard *et al.* (1984) noticed the presence of pollen grain, honey dew, spores of fungi, remains of aphids and other arthropods in the gut of *C. carnea*. It is just possible that this chrysopid may be *mohave* strain of *C. carnea* and needs further investigations.

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