

## **RETIPENNA JUBINGENSIS (NEUROPTERA : CHRYSOPIDAE) A POTENTIAL PREDATOR OF APHID PEST**

**D.K. BHATTACHARYA AND S.R. DEY**

*Department of Zoology, University of Kalyani  
Kalyani-741235, Nadia, West Bengal, India*

### **ABSTRACT**

Biology of *Retipenna jubingensis* (Hölzel) an aphidophagous chrysopidae, was studied from Western Himalaya, India. The egg, larval, pupal description, their development, oviposition, fecundity and longevity of the adult were noted along with their predatory efficiency. At relatively low temperature ( $22 \pm 2.1^{\circ}\text{C}$ ), *R. jubingensis* (Hölzel) was found to be better predator than some other chrysopidae.

**Key Words :** *Retipenna jubingensis*, predator, aphid pest, Western Himalaya.

Predators, especially the Chrysopids, are studied for their obligate relationship with the aphids. The elimination or addition of the predator have rapid visual effect on the population dynamics of aphids. For controlling aphid species attack in several economically important plants, use of Chrysopids is being increasingly recognized throughout the world.

Genus *Retipenna* Brooks has eight species of which *R. jubingensis* (Hölzel) is the only species found from India. Chakrabarti *et al.*, (1991) studied the development rate, larval voracity and oviposition but this study was to some extent incomplete to establish the life history of this species. Considering this an attempt has been made to study the egg, larval and pupal structure; developmental period; oviposition; egg, larval and pupal survival and larval voracity of *R. jubingensis* by rearing it on *Brevicoryne brassicae* Linnacus attacking the mustard crop.

### **MATERIALS AND METHODS**

Pupae of *R. jubingensis* were collected from the field and reared in the temporary station in Harsil-Dharali valley (2620 msl), Uttranchal, India. After the emergence of adults, several pairs of *R. jubingensis* were placed for mating in open mouth transparent plastic vials (7.2 x 7 cm), mouth covered with nylon net. Gravid females were provided with aphid infested plant parts, these aphids were the food source and stimulus for oviposition. A thin

aluminium sheet was placed inside each container which was taken out after each day of oviposition to prevent cannibalism by the adult and then counted. Freshly hatched larvae (10 in number) were placed in separate containers and counted number of aphids *Brevicoryne brassicae* L. (last instar and adults) were given to them as food. Observations were made to record the duration of each life stage. Surviving aphids were counted removed and fresh aphids of the same stage were offered to the predator daily. Mortality of respective development stages was observed.

### RESULTS AND DISCUSSION

#### Biology:

**Egg:** The females laid 71-113 eggs singly which were elongated oval in shape, with a definite stalk, 0.82-0.86 mm in length and 0.39-0.45 mm in width. At the time of oviposition a sticky substance comes out first, which hardens to form the filament, then the eggs are laid with the miosophlar and coming out first.

**Larva:** After hatching out from eggs the larva come down through the stalk. First instar larva tapering caudate, 1.10-1.89 mm in length and 0.30-0.48 mm maximum width at the third thoracic segment body hairy, head relative by larger as compared to the body, without any marking, jassprominentm, no cervical segment, presence of trumpet shaped empodium in legs, well developed basally dilated claws. The length and maximum width of second and third instar were 2.10-2.98 mm abd 0.45-0.69 mm and 7.10-8.85 mm and 1.45-2.51 mm, respectively.

**Pupa:** The matured larva more to a dark dry place and spin an oval. This parchment like very tough cocoon having a number of loose supporting strands on the outer side and a circular hinged lid at the anterior and for ..... of adult. The pupa is brownish in colour; globular in shape, 2.66-2.87 mm in length and 1.68-1.96 mm in breadth.

**Development:** *Retipenna jubingensis* passes through three larval stages. The duration of first, second and third instar was 3-5, 2-3 and 6-8 days, respectively. Thus the larvae take 20-28 days to develop. Total development from egg to adult was completed in 24-34 days.

**Larval Voracity (Table-I):** Prey consumption was different in different developmental stages. The first instar larvae consumed 27-42 ( $35.91 \pm 6.32$ ) aphids, the second instar consumed 54-78 ( $66.12 \pm 10.87$ ) aphids but huge uptake of aphids was by the third instar where 122-142 ( $134.21 \pm 9.84$ ) aphids are consumed. The average daily larval consumption was  $16.15 \pm 3.2$  aphids.



**Survival:** Survival of the egg, larvae and pupae was 97%, 85% and 83% respectively. Larval mortality was high in the first instar probably due to poor adaptability to the environment.

**Longevity:** The adult lived on honey up to 17 days. The efficiency of Chrysopidae as predator of aphids was studied in different species. Bruke and Martin (1956) made critical studies on feeding efficiencies of *Chrysopa oculata* Say, *Chrysoperla plorabunda* (fitch) and *Chrysoperla rufilabris* (Burmeister) on *Aphis gossypii*. Abid et al (1978) observed *Chrysopa septempunctata* Wesmael feeding on *Myzus persicae* and *Chrysoperla mutata* on *Hyalopterous pruni*. Chakrabarti et al (1991) studied the developmental rate, larval voracity and oviposition of *Cunctochrysa jubingensis*. In the present study while studying the antagonistic role of *Retipenna* (= *Cunctochrysa*) *jubingensis*, without going to the fragmentary work, a comprehensive account of the predating efficiency of this neuropteran species has been made. It has been found that the aphid consumption of *Retipenna jubingensis* (203-262 aphid larva) was quite similar to that of *Chrysopa oculata* (243-299) but slightly at low temperature.

Thus, *R. jubingensis* with good reproductive potentiality, high rate of larval consumption and high rate of survival of the larvae can be effectively used as a bio-control agent to suppress the aphid pest population.

Table 1. Duration in days and larval consumption (Mean  $\pm$  SD) of the different stages of *Retipenna jubingensis* (Hölzel) reared on *Brevicoryne brassicae* Linnaeus (at  $22 \pm 2.1^\circ\text{C}$ )

	Duration in days	No. of aphids consumed/larva	Average no. aphids consumed/larva
Egg	4-6	-	-
1st instar larva	3-5	27-42	35.91 $\pm$ 6.32
2nd instar larva	2-3	54-78	66.12 $\pm$ 10.87
3rd instar larva	6-8	122-142	134.21 $\pm$ 9.84
Pupa	9-12	-	-
Total	24-34	203-262	238.38 $\pm$ 25.77

REFERENCES

- Abid, M.K., Tawfik, M.F.S. and Al-Rubeae, J.K. 1978. The life history of *Chrysopa septempunctata* (Wesm.) (Neuroptera: Chrysopidae) in Iraq. *Bull. Biol. Res. Cenr* (Baghdad), 10 : 89-104.
- Furke, H.B. and Martin, D.F. 1956. The biology of three Chrysopid predator of cotton aphid. *J. Econ. Ent.*, 49 : 698-700.
- Chakrabarti, S. Debnath, N. and Ghosh, D. 1991. Developmental rate and larval voracity and Oviposition of *Cunctochrysa jubingensis*. Holzel (Neuroptera : Chrysopidae), An aphidophagous Predator of Western Himalaya. In: *Behaviour and Impact of Aphidophaga* (Eds. Polger, L.; Chambers, R.J.; Ixson, A.f.G. and Hodek, I) Academic Publishing. The Hague, 107-13 pp.