

Biology of A Dragonfly *Crocothemis Servilia Servilia* Drury (Odonata: Libellulidae), A Predator of Paddy Pests in Kolhapur.

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Abstract: *Crocothemis servilia servilia* (Drury) (Odonata: Libellulidae) is biocontrol agent of paddy pests in Kolhapur region of Maharashtra. It predate on paddy jassid *Nilaparvata* sp., Paddy borer *Chilo suppressalis* (Walker) and Jowar stem borer *Chilo partellus* (Swin). Therefore, biology of *C. servilia servilia* has been studied under laboratory conditions ($24 \pm 0^{\circ}\text{C}$, 70 - 75% RH and 12 hr Photo period). It completes its life cycle within 3 months, egg stage lasts for 18 days and nymphal period is 72 days. There are 12 instars, each has about 7 - 10 days duration. During nymphal period they feed on paramoecium, daphnia, redworms and mosquito larvae. Adult survives for 4 days without food. Mated female can lay about 140 - 150 eggs in water body/water trough. A single mated female, an average can produce 142 adults under laboratory conditions.

Key Words: Biology, Dragonfly, *Crocothemis servilia servilia*, Biocontrol agent, Paddy Pests.

I. Introduction

Crocothemis servilia servilia (Drury) (Odonata: Libellulidae) is biocontrol agent of paddy pests in Kolhapur region of Maharashtra. It predate on paddy Jassid *Nilaparvata* sp, paddy borer *Chilo suppressalis* (Walker) and Jowar stem borer *Chilo partellus* (Swin). Therefore, biology of *C. servilia servilia* has been studied under laboratory condition ($24 \pm 0^{\circ}\text{C}$, 70 - 75% RH and 24 hr photo period). Biology provides basic information for mass rearing of individual species. Dragonflies as biocontrol agents are to be mass reared for their utility in biocontrol programme of pests. Review of literature indicates that biology of Dragonflies has been rarely attempted except the work of Corbet (1980, 1999), Kumar (1972, 1973, 1978, 1979, 1980), Kulkarni (1999), Kakkassery (2004), Sahayaraj (2004) and Sathe & Shinde (2008) etc. Keeping in view all above facts the present work was carried out.

II. Materials And Methods

Nymphs of *C. servilia servilia* have been collected from the water bodies of Shivaji University, campus and reared in laboratory condition ($24 \pm 0^{\circ}\text{C}$, 65-70% RH and 2hr photo period) for adult formation on red worms and mosquito larvae. On emergence, adult males and females were separated and kept in rearing cage and identified consulting Fraser (1934 and 1936). Later, exposed for mating in laboratory (20 feet x 10 feet 14 feet in length, width and height respectively.) After mating females were allowed to lay their eggs in the water tank. After hatching the eggs first instar nymphs and second instar nymphs were reared in the plastic tub by providing paramoecium, *Daphnia* etc. as food. Later, the nymphs (naiads) have been reared in aquarium (3 feet length x 2 feet width x 1 feet height) by providing red worms and mosquito larvae and observations were taken on the nymphal (naiad) duration and later, adult longevity in the laboratory. Sufficient number of individuals were reared for conformation of life cycle studies. In control no food was provided to adults.

III. Results

The life history of this species is amphibiotic and has 3 stages viz. egg (Fig.-3), naiad (nymph) (Fig-4-5) and adult (Fig-1+2). Egg is rounded and bluish in colour, about 1.5 mm long and hatched within 15 to 18 days. Naiad is flat bodied, measuring about 2 cm in body length. Naiad shows labial mask for catching preys. It also shows rectal gills in abdomen. There are 12 instars; each has about 7-10 days duration. During nymphal period they feed on paramoecium red-worm, *daphnia* and mosquito larvae. Adults survived for 4 days without food. Single mated female laid 140-150 eggs in water body and produced on an average 142 adults under laboratory conditions.

According to Sathe & Shinde (2008) the aquatic life of larvae varies greatly in length. The dragonflies belonging to the genus *Lestes* have shortest duration of about three months while, the larger dragonflies showed longer period, about one year to 3 years. According to them, "The life history of dragonfly is amphibiotic and has 3 stages, viz. egg, nymph (naiad) and adult." The larval stage is passed in watery environment and adults are terrestrial. In the present form *C. s. servilia* same situation is recorded regarding life stages and habitat i.e. life cycle contains egg, nymph (naiad) and adult and the individual is amphibiotic. According to Kakkassery (2004)

robust naiads shows labial mask for catching prey, rectal gills are within abdomen. Similar modifications are noticed in *C.s. servilaria*.

Kumar and Prasad (1977) counted 830 eggs in *N. chinensis* in 55cm² leaf area of fern plant. According to Kumar and Prasad (1977) incubation period of egg varies from 5-40 to 80-230 days in tropical and temperature regions. *Anax immaculifrons* lay eggs endophytically in submerged leaves while *Ictinogomplus rapax* lays on tightly coiled filament at the pole and prevents the eggs sweeping down stream (Corbet, 1980). Similarly, *Burmogomphus sivalinkensis* deposit eggs on the substance covered with gelatinous material (Kumar, 1978).

According to Kakkassery (2004) the naiad of dragonfly pass through 10-20 stages. The naiad feed on small insects, fishes, tadpoles and redworms etc. Pre-reproductive adult stage lasted for few days to 2-3 months in some dragonflies and colour change to body has taken place within same sex or between sex and males became more colourful. In the present form also colour change taken place within the unmaturred and maturated sex and between sexes. Males were uniformly pink coloured and females with spots and light yellowish colorations. It can easily complete in life cycle in domestic water storage and consume mosquito larvae. Hence, this is good biocontrol agent of mosquitoes, *Aedes egypti*.

IV. Conclusion

- i) *C.s. servilia* is rearable in domestic water.
- ii) It has good potential to control *Aedes egypti* mosquitoes.
- iii) Need its utilization in Biological control of insect pests of economic importance.

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Fig. *C. servilia servilia* (Female)



Fig. - 2: *C. servilia servilia* (Female)



Fig.- 3:Eggs – *C.s servilia servilia*



Fig.- 4: *C. S. Servilia*
First instar Naiad



Fig.- 5: *C. S. Servilia*
Last instar Naiad