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Larvivorous Behaviour of *Channa Gachua* on Filaria Vector – A Biological Control Measure

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Abstract

Mosquitoes are known to transit many diseases like malaria, filarial, Japanese encephalitis, yellow fever and dengue. In India alone approximately 40 million people suffer from mosquito borne diseases annually. Insecticides play a major role in vector control programmes and continue to be a major component for integrated vector management. But due to the health hazards associated with the use of chemical insecticides new biological control measures are being tried in the last few years. Use of predatory fishes is one of the major components of biological vector control so as to minimize vector borne diseases.

The present paper is an attempt to present the findings of a study on predatory behaviour of locally available edible fish *Channa gachua* on *Culex quinquefasciatus* a known vector for *Wouchereria bancrofti*. Maximum predation was found to 190 larvae per day. It was observed that fish prefer second instar larvae.

Introduction

With the introduction of *Gambusia affinis* biological control of mosquitoes has been recently practiced in fresh water bodies. Besides predatory fishes water bugs of family Napidae, Bellostomatedae and Notonectidae have also been tried in the past few years (as reported by Ravishankar 1985, Singh *et al.* 1989, Venkatesan 1985 and Saxena *et al* 1995). Jayshree and Panickar 1992 have reported the use of predatory fishes against mosquito vectors. Similarly, Prasad and Sharma 1994 have reported the control of rural malaria through bioenvironmental control measures.

Looking to the present need of searching an indigenous biological control measure to control the vectors, present study has been made to test the predaceous efficacy of a major carp *Channa gachua* an indigenous fish locally available in fresh water pond of Betul District of Madhya Pradesh (India).

Materials and Methods

Fish fauna survey of locally available fishes was done before starting the study. During the survey 34 species of indigenous fishes were identified from different habitats. For the present study, fish *Channa gachua* was selected on the basis of individuals' potential and its edible nature. Gill net method was used to catch the fishes and an aquarium of size 54x30x30 cm was used to acclimatise the fishes. The fishes were acclimatized for one-month period in laboratory under controlled conditions. Mosquito

larvae were cultured in a ware kept reared in the laboratory so as to get the desired age larvae for experimental purpose. First to fourth instar larvae of *Culex quinquefasciatus* were used for the present study from the laboratory cultured stock.

Three sets of experiments for the predatory study of *Channa gachua* were setup in the laboratory as per the following details.

1. First set consists 5 to 10 adult specimens of *Channa gachua* in 20 litres of pond water with standard fish food.
2. Second set consists same number of fishes as set-1 without fish food.
3. The third set was control having same number of fishes with pond water

The experiments were performed in three replicates with 50 larvae of each instar separately. Observations were recorded on 24 hourly basis.

Results and Discussion

The results of all experiments are shown in Table 1 and 2. Predatory performance of fishes with artificial food is shown in Fig.1. It is quite apparent from the results that the rate of predation is high when fishes were kept in an aquarium without fish food as shown in Table 2. Maximum predation was found to 190/ day/ individual for second star larvae. This is perhaps a considerable behaviour of an indigenous fish reported so far. Saxena *et al.* 1995 notified *Mystus cavacious* as maximum predator of mosquito larvae followed by *Rasbora daniconius* but the author has reported there premium predatory performance, which could not be compared with 24 hours predatory behaviour, noticed in the present study. Results showed that predatory performance of fish decreases with the increase of age of prey. It indicates that predatory performance of *Channa gachua* has a negative co-relationship with the age of prey. It was also found that with the increase of predator number in an ecosystem, the predatory performance decreases. Results also showed that without fish food predatory performance is better than with fish food as without fish food predation was found to be 190/day/ individual against with fish food of 100/day/individual.

The results of predatory performance test on *Culex quinqefasciatus* are found quite interesting and further needs to be performed under field conditions. Jayshree and Panicker 1992 investigated 34 indigenous fishes for larvaevorous potential and found that *Mystus cupanus* has highest potential. Therefore, indigenous fishes could be used as better tool for biological control of mosquitoes, as also stressed by Prasad and Sharma 1994.

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Table 1. Predatory Efficiency of Fishes with artificial food

Fish Name	Number of Fishes	Predation of instar larvae	Larvae fed/ day
Channa gachua	1	II III IV	100 90 75
Channa gachua	2	II III IV	180 160 140
Channa gachua	3	II III IV	245 225 195
Channa gachua	4	II III IV	300 280 248

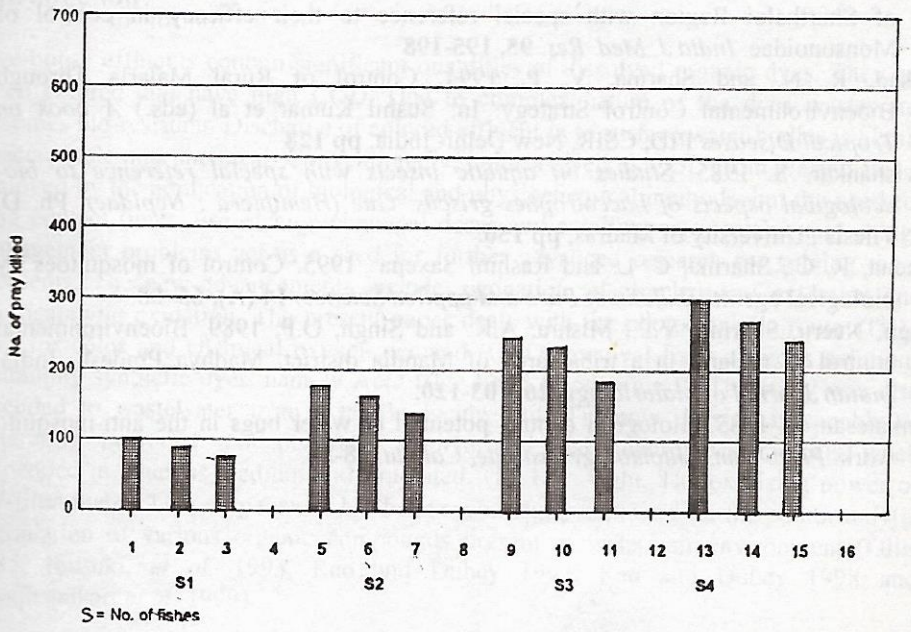

Fig. 1: Predatory performance of fishes *Channa gachua* with artificial food

Table 2. Predatory Efficiency of Fishes without artificial food

Fish Name	Number of Fishes	Predation of instar larvae	Larvae fed/ day
Channa gachua	1	II III IV	190 160 150
Channa gachua	2	II III IV	350 300 250
Channa gachua	3	II III IV	500 425 360
Channa gachua	4	II III IV	620 540 460

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