



MOSQUITO LARVAE CONSUMPTION RATE OF A CYPRINUS CARPIO L. UNDER LABORATORY CONDITIONS FOR BIOLOGICAL PEST CONTROL

KEYWORDS

Mosquito larvae consumption, Cyprinus carpio, Biological pest control

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ABSTRACT Mosquitoes are vectors of dreaded diseases such as Malaria, Filariasis, Dengue, Chikungunya and JE. Control of mosquitoes is control of mosquito born diseases. Pesticides lead serious problems like pollution, health hazards, pest resistance, pest resurgence etc. Hence, in the present paper attempts have been made to assess a fish *Cyprinus carpio* L. with respect to mosquito larvae consumption rate for adopting biocontrol technique. On an average 127 larvae have been consumed by the fish at its age, 120 days.

INTRODUCTION

Mosquitoes are responsible for cause of many vector borne diseases like Malaria, Filariasis, JE etc. Despite considerable success of control of these diseases, they still continue as a major public health problem in many countries.

Vector control is an essential part for reducing disease transmission. Mosquito control through use of insecticides causes many inherent problems including high cost, environmental concern (Chandra & Ghosh 2008; Rajnikant et al. 2013). Chemicals can affect non target population and mosquitoes develops resistance against pesticides (Kumar & Hwang, 2006). Use of pesticide leads to hazardous effect on human health. Biological control of mosquitoes by using larvivorous fish is most popular method for eliminating or reducing mosquito larvae population. (Ghosh et al. 2005; Sathe & Bhoje, 2005; Tabibzadeh et al. 1977; Fletcher et al. 1993; Sathe & Bhoje, 2005; Sathe, 2014).

Cyprinus carpio is an indigenous and common omnivorous fish (Flajshans & Hulata, 2006). Many fishes have high tendency towards the consumption of mosquito larvae (Layla Kamareddine, 2012).

MATERIALS AND METHODS

Collection and maintenance of fishes and mosquito larvae.

Cyprinus carpio fishes were collected from Government fish farm, Dhom, Satara, Maharashtra. The fishes with (2.4 - 2.7 cm) in length and (0.6 - 1 cm) in breadth were kept in laboratory in aquarium of size (90cm x 60cm x 30cm) containing 50L of tap water at temperature 25° to 35°C for 10 days. Fishes were fed with groundnut oil cake in powder form for a period of 10 days before using them in experiment. Experimental fishes were kept without food for a period of 24 hrs before introduction into experimental aquarium.

Mosquito larvae were collected from the field with the help of zooplankton net. They were reared in laboratory till they reach to 3rd instar stage. 3rd instar larvae were used for the experiment.

Experiment –

Experiments were carried out at different age of fishes i.e. 50 days, 80 days and 120 days. 24 hrs starved fish introduced into a aquarium of size (38cm x 22cm x 23cm).

Mixed population of 3rd instar larvae of Anopheles and Culex mosquito were introduced in a aquarium with fixed number. The readings were taken after each 24 hrs.

RESULT AND DISCUSSION

Results are recorded in tables 1-3 and Figures 1- 5

Table 1- Mosquito larvae consumption rate by *C. carpio* at age 50 days (Size 2.6cm x 0.6cm)

Sr.No.	Mosquito larvae used	Mosquito larvae consumed
1	10	10
2	20	15
3	20	13
4	20	16
5	20	15
6	20	14
7	20	15
8	20	18
9	20	17
10	20	15
		Average 15

Table 2 - Mosquito larvae consumption rate by *C. carpio* at age 80 days (Size 2.8 cm x 1 cm)

Sr.No.	Mosquito larvae used	Mosquito larvae consumed
1	20	20
2	40	40
3	80	80
4	100	90
5	100	95
6	100	98
7	100	92
8	100	85
9	100	91
10	100	95
		Average 79

Table 3 -Mosquito larvae consumption rate by *C. carpio* at age 120 days (Size 3.1 cm x 1.2 cm)

Sr.No.	Mosquito larvae used	Mosquito larvae consumed
1	100	100
2	120	120
3	140	125
4	140	132
5	140	130
6	140	135
7	140	131
8	140	138
9	140	130
10	140	126
		Average 127



Fig.4. Mosquito larvae



Fig. 1. *C.carpio* (50 days old)



Fig. 2. *C.carpio* (80 days old)



Fig. 3. *C.carpio* (120 days old)



Fig.5. *C.carpio* feeding on mosquito larvae

The laboratory trials showed that *C.carpio* significantly fed on the larvae of *Anopheles* and *Culex* mosquitoes in mixed form. Average consumption rate of *C.carpio* at the age of 50 days were 15, at the age of 80 days 79 and at the age of 120 days were 127. The larval consumption of mosquito was increased from lower size group to higher size group in 24 hr under laboratory experiments. In previous studies *C.carpio* were used in composite fish culture in rice field resulted in 81% reduction in population of anopheline and 83.5% reduction in culicines (T John victor *et.al.*, 1994). Present finding confirms the biocontrol potential of *C.carpio*. However, it would be interesting to release the fish *C.carpio* in open breeding environment of mosquito for their control by this fish.

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