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Feeding Potential of Cyprinus Carpio L. and Labeo Rohita Ham. on Culex Larvae (Diptera: Culicidae)

KEYWORDS: Feeding potential, C. carpio, L. rohita, culex larvae, Biological control.

Londhe Sheetal D.
Department of zoology, Shivaji University, Kolhapur, India-416004

Prof. Dr. T. V. Sathe
Department of zoology, Shivaji University, Kolhapur, India-416004

ABSTRACT *In search of potential of mosquitovorous fish and its preference to larvae as a feed and traditional fish feed, the present study was designed to compare feeding capacity of Cyprinus carpio L. and Labeo rohita Ham. on culex larvae. Experiments were conducted in Laboratory conditions (27±1 oC , 70-75% RH and 12 hr photoperiod). 25, 50, 75 and 100 prey densities have been tried against above fishes. Results indicated that, C. carpio was superior than L. rohita for Culex larvae consumption.*

INTRODUCTION

Mosquito borne diseases is a major problem in almost all tropical and subtropical countries, (Chandra et al., 2008). Mosquitoes are primary vector for prevalent mosquito borne diseases such as malaria, dengue, chikunguniya and yellow fever. Culex mosquitoes have special importance since they transmit filaria, JE, West Nile Virus and other illnesses that can cause serious health problems to human beings and animals (Sathe *et al.*, 2010). Chemical, biological and preventive methods have been applied for mosquito control in different parts of the world. Pesticides are widely used even in recent years for mosquito control. However, the use of chemical insecticides in mosquito control pose some hazards such as contamination of water and food sources, poisoning of non-target fauna and flora, concentration in the food chain, pest resistance, pest resurgence, secondary pest outbreak etc. Fishes are natural enemies of mosquitoes. They feed on eggs and larvae of mosquitoes hence, used as means of biological control. Sharma *et al.*, (1987); Joshi *et al.,* (1989); Singh and Patel, (2013); Sathe and Bhoje (2005), etc. have reported that predatory fishes may be used in mosquito control.

The use of larvivorous fishes is presently the most popular method for reducing mosquito larvae population (Raghavendra and Subbarao, 2002; Mohmed, 2003; Ghosh *et al.*, 2005; Yilldiram and Karacuha, 2007; Sathe, 2015). More than 253 fish species have been considered for mosquito biocontrol throughout the world (Gerberich and Laird, 1985). In India, mosquitofish Guppy have been successfully and most widely used for mosquito control (Sharma, 1994; Rajanikant *et al.*, 1996; Singarvelu *et al.*, 1997; Sathe and Bhoje, 2005; Sathe, 2014). The use of mosquitovorous fishes in mosquito control will avoid all effects of pesticides in various ecosystems. Therefore in the present work, *L. rohita* and *C.carpio* have been used for control of mosquitoes.

MATERIALS AND METHODS

Collection and acclimatization of fishes

Fingerlings of *C.carpio* and *L. rohita* were collected from government fish farm at Dhom, Maharashtra. The fish fingerlings were kept in laboratory in 50 liter glass tanks at a density of 30 fish/ tank .The fishes were acclimatized to laboratory conditions for 10 days and supplied with traditional fish feed, groundnut oil cake in powdered form. The fishes used for experiment were separated according to their age.

Collection of mosquito larvae

The larvae of Culex species were collected from the field on daily basis with the help of mesh aquatic net. Collected sample were separated to obtain IV instar larvae. The different stages were then kept separately in the glass containers and supplied with proper amount of Wheat flour, reared up to IV instar stage.

Experimental set up

All experiments were carried out in 5 litre glass tanks. Fishes *L. rohita* and *C. carpio* of age group 120 days were selected and kept in separate tank. The experiments were conducted in 4 replicates by using one fish in one tank. The exposure experimental time was 24 hours without food to standardize hunger level. The selected fishes were exposed to Culex larvae at four larval densities (25, 50, 75, 100) for a separate 12 hour light and 12 hour dark period. In addition to mosquito larvae traditional fish feed was also provided to study food preference. Readings were noted for 12h light and 12h dark period. The experiments were conducted using the method reported earlier by Anyaele and Obambe, (2010) with a slight modification. All the data were statistically analyzed using student 't'test.

RESULTS AND DISCUSSION

The results are recorded in figures 1 to 3. The total percentage predation of the four different densities of Culex larvae by *C.carpio* and *L. rohita* in the 12h light and 12h dark period is summarized in figures 1 and 2. The comparison between larval consumption rate of *C.carpio* and *L. rohita* is showed in figure 3.

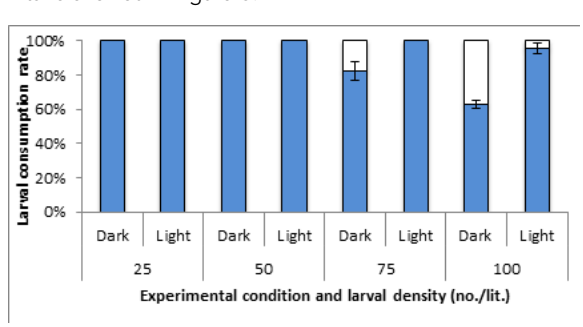

Fig. 1. Larval consumption rate of *C. carpio* L. at various densities and 12 hrs of dark and light periods.

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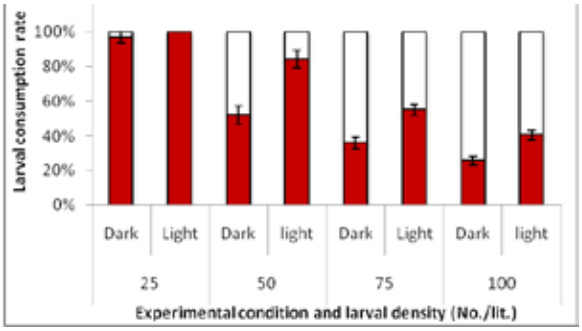

Fig. 2. Larval consumption rate of *L. rohita* Ham. at various density and 12 hrs of dark and light period

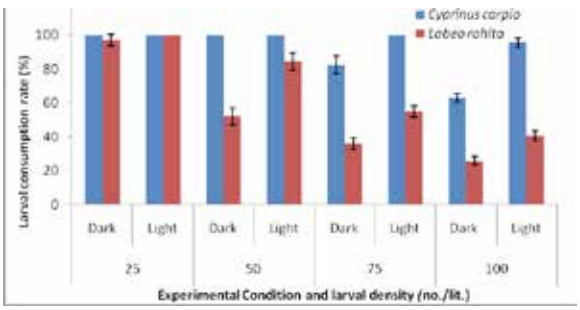

Fig. 3. Comparison of larval consumption rate of *C.carpio* and *L. rohita*

At the larval density of 25 and 50, 100% larval consumption was observed for *C. carpio* in 12h light and 12h dark period. 100% and 82.33±5.26% consumption was observed in light and dark period respectively at the density 75. At the larval density of 100, consumption by *C. carpio* was 95.5± 2.88% and 63±2.44% in light and dark period (fig.1). The total percentage of larvae consumed by *L. rohita* was 100% and 97±3.3% in 12h light and 12h dark period respectively at the larval density of 25. The consumption of larvae at the density of 50 was 84.5±4.97% in light period and 52±5.09% in dark period. The larvae consumed at 75 density were 55±3.44% in light and 36±3.39% in dark period. At the larval density of 100, 40.5±2.95% larval consumption was observed in light period and 25.75±2.48 in dark period (fig.2). Statistically, at all larval densities except 25 (in light period) the difference between the no. of larvae consumed by *C. carpio* and *L. rohita* at different conditions and different densities were found to be significant , $p<0.0072$. The results indicates that the no. of Culex larvae consumed by *C.carpio* were higher as compared to *L. rohita* in both 12h light and 12h dark period (fig.3).

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