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A Preliminary Note on Assessment of a Few Indigenous Ornamental Fishes of Northeast India as Potential Predators of Mosquito Larvae

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INTRODUCTION

Biological control, particularly using larvivorous fish, is important to malaria control programmes in the 20th century, particularly in urban and periurban areas for immediate use in developed and developing countries (Gratz and Pal 1988).

Mosquitoes are found all over the world and it is considered as pests. Many countries have adopted several measures to control the population of mosquitoes in order to reduce the incidence of malaria and other mosquitoes borne diseases. Mosquitoes are prolific breeders and have adapted to almost all types of climatic conditions.

Fish consumes varieties of food in live, moist, dry or in frozen condition. Among the live food, mosquito larvae is one of the most favourite feeds for the larvivorous fish such as *Gambusia affinis* (Baird & Girard) and Guppy, *Poecilia reticulate* (Peters). Both belong to Order Cyprinodontiformes and family Poecilidae. Many types of mosquito-eating fish have been used in control programs across the world (Walton 2007). Currently, the use of fish is tempered by two concerns. First, introducing non-native fish can have dramatic consequences on the aquatic environment. *Gambusia* is a voracious and highly aggressive fish that compete with the native fish very successfully for viable food and space. *Gambusia* essentially depletes all large zooplankton while rotifers and phytoplankton densities increase (Hurlbert and Mulla 1981; Bence 1988).

Both Gambusia and Guppy being invasive in nature (Rehage et al. 2005; Manna et al. 2008) may compete with the indigenous fish species as well as other aquatic organisms that use mosquito larvae as food. Further, their existence in the natural waters may have adverse effect on the abundance of indigenous aquatic organisms.

In different regions of the world, indigenous fishes have been used for mosquito control (Morton et al. 1988; Neng et al. 1987; Kim et al. 1994). Most of these indigenous larviviorous fishes provide dual benefits by reducing the mosquito populations and indirectly augmenting the aquacultural economics (Menon1991; Sharma and Ghose1994; Walton 2007; Chandra et al.2008). The suitability of indigenous air-breathing fishes as predators of mosquito larvae were assessed by Bhattacharjee et al.(2009).

In view of growing importance on biological control of mosquitoes; a few indigenous fishes were evaluated to assess their predation potential in a laboratory experiment.

Five indigenousornamental fish species of the northeast India, viz. *Mystus bleekeri,Channa stewartii, Rasbora daniconius, Colisa fasciatus*and *Danio aequipinnatus* were selected for the experiment. These species of size ranging between 6-10 cm in total length were collected from the local wet lands and marshy areas and brought to the laboratory. They were separately reared in glass aquaria for 5 days and fed with commercial aquarium fishfood and plankton. Individual fishes were starved for a period of 18 hours prior to the actual experiment. The experiment was conducted during the monsoon period in the month of July in order to obtain adequate numbers of mosquito larvae. Initially a few mosquito larvae were collected from the local stagnant water bodies by a

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net of small mesh size. Later they were introduced in a separate fibre glass tank of 30 litre capacity for culturing mosquito larvae. The tank was filled with fresh water. One medium sized potato was cut into pieces and placed in the tank along with a small quantity of cow dung (about 250 gm). The tank was then placed in a corner of the laboratory undisturbed. The media attracted the mosquitoes to lay eggs and within 5-7 days, large number of mosquitoes was seen in the media. These larvae metamorphose in to pupae that ultimately molts into mosquito. Using a scoop net of small mesh size these larvae were harvested to feed the experimental fishes.

RESULTS AND DISCUSSION

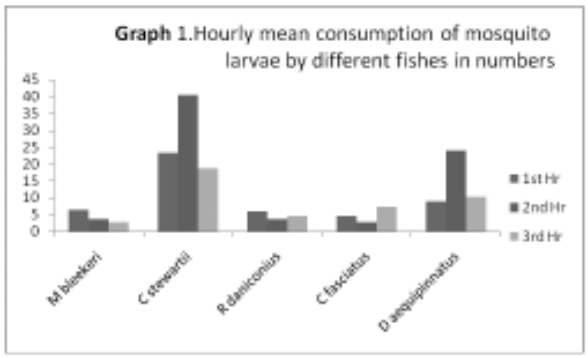
The rate of predations by selected fishes was determined in a glass beaker of 2 litre capacity. A total of 100 nos. of mosquito larvae were first introduced into the beaker prior to the release of individual fish. Each fish was allowed to predate upon the mosquito larvae for three hours at a stretch in the glass beaker with three replicates. The number of mosquito larvae consumed by each fish was recorded at one hour interval (Graph 1).

The preliminary experiment conducted on predation of mosquito larvae by a few indigenous

Table 1: Consumption rate of mosquito larvae by five different indigenous fish species of ornamental value under laboratory condition

Fish Species	Size(Mean +SD) cm.	Time taken(Hr)	Beaker-I	Beaker-II	Beaker-III	Pooled data (Mean consumption + SD)
Mystus bleekeri	8.03+ 0.47	1st Hour	10	04	05	6.33+3.21
		2nd Hour	02	06	03	3.66+2.08
		3rd Hour	02	05	01	2.66+2.08
		Total consumption in 3 hours	14	15	09	12.66+3.21
		Mean consumption /Hr+ SD	04.66+4.62	05+1.0	03+2.0	4.22+1.07
Channa stewartii	8.83+1.04	1st Hour	22	05	43	23.33+19.03
		2nd Hour	76	28	17	40.33+31.37
		3rd Hour	16	25	15	18.66+5.50
		Total consumption in 3 hours	114	58	75	82.33+28.71
		Mean consumption /Hr+ SD	38+33.04	19.33+12.50	25+15.62	27.44+ 9.57
Rasbora daniconius	6.60+ 0.53	1st Hour	04	06	08	6.0+2.0
		2nd Hour	02	04	05	3.66+1.53
		3rd Hour	04	06	04	4.66+1.15
		Total consumption in 3 hours	10	16	17	14.33+3.78
		Mean consumption /Hr+ SD	3.33+1.15	5.33+ 1.15	5.66+2.08	4.77+1.26
Colisa fasciatus	7.53+0.64	1st Hour	04	04	06	4.66+1.15
		2nd Hour	03	02	03	2.66+0.57
		3rd Hour	04	08	10	7.33+3.05
		Total consumption in 3 hours	11	14	19	14.66+4.04
		Mean consumption /Hr+ SD	3.66+0.57	4.66+3.05	6.33+3.51	4.88+1.35
Danio aequipinnatus	7.43+0.60	1st Hour	05	12	10	9.0+ 3.60
		2nd Hour	17	20	35	24.00+9.64
		3rd Hour	10	09	12	10.33+1.53
		Total consumption in 3 hours	32	41	57	43.33 + 12.66
		Mean consumption /Hr+ SD	10.66+6.02	13.66+5.68	19.00+13.89	14.44 +4.22

fish species revealed interesting information. Both *Channa stewartii* (Murrels) and *Danio aequipinnatus* were found to be the most efficient consumer of mosquito larvae in comparison to other three fish species tested under the study. They are followed by *Colisa, Rasbora* and *Mystus* species under the captive condition.



All these five fish species are also known as the potential ornamental fishes of northeast India (Das2005). Of these *Channastewartii* (Murrels) and *Danioaequipinnatus* are in great demand in the international ornamental fish markets. At present,only the wild caught varieties are sent to the global market. Therefore, there is an urgent need to create awarenesson conservation of these native fish species through aquaculture where mosquito larvae can be utilized as one of the important low-cost feed. Efficient utilization of mosquito larvae by these fishes shall not only aid in control of mosquito but also encourage culture of these important varieties of indigenous fishes of ornamental value.

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