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Study of Culture of Ornamental Live Bearer Fishes in Small Cement Tanks As an Additional Source of Income

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Abstract:

The present study deals with the culture and breeding of live bearer ornamental fish Fancy Guppy and Black Molly in small space and an additional income generating source especially for women. The study was conducted for a period of 16 months from June, 2010 to September, 2011. Live bearer fish culture and breeding was done in cement tank of size 40" x 24" x 22" with a regular monitoring of water quality parameters. Water exchange was also done when needed. The various water parameters such as temperature, pH, CO_2 content, dissolved oxygen, and alkalinity was determined daily during breeding period. Temperature was maintained with the help of thermostat (water heater) and by aeration. Oxygen was also maintained with the help of aerators. Electric filter was used for removal of waste material. The breeding of above fishes were successfully done in cement tanks. The average no. of live bearer per female produced by fancy guppy and black molly was 31 and 35 respectively. Although the no. of live bearer produced was less. The reason for this is probably small size of brooder, small space for rearing of brooders, a short period of rearing of brooders in natural environment.

Keyword: Breeding & rearing, live bearer, *Poecilia reticulates, Poecilia sphenops*.

1.0 Introduction:

The live bearer fishes Fancy Guppy (*Poecilia reticulates*) and Black Molly (*Poecilia sphenops*) belongs to family Poeciliidae. The fancy guppy fish (*Poecilia reticulata* Peters, 1859) are the most popular among hobbyists because of their vibrant colours and the fact that they are easy to breed and keep. It is considered omnivorous and requires around 40% dietary protein (Dahlgren,1980). It is very hardy fish. Without doubt this live bearer is the most popular of all the tropical fish with beginners, as it is strong active and able to with stand temperature variations etc. The female is larger (6cm) than the male (3.5cm).It can be sexually mature at about two or three months. The black molly (*Poecilia sphenops*) is also one of the most common live bearing fish. This is short finned fish having length up to 7 cm in male and 10 cm in female. Generally, they do not eat their own young. At the time of maturity both sexes of live bearers are differentiated easily. The female is distinguished by its swollen belly with gravid spot, full triangular anal fin and dull colour. Whereas males are more colourful, long finned, aggressive and slime than female. The 3rd, 4th& 5th fin rays of anal fin are modified to straight, rod like projection called gonopodium. Live bearing fishes produce eggs and hold them within the body. After internal fertilization the development of the embryo takes place inside the female body to protect the young. The female live bearers give rise to birth of their young ones. They can give birth to 20 fry at a time. These fishes breed throughout the year in slightly hard water at temperature ranging from 25^0-30^{0}C in well illuminated conditions. Single fertilization is sufficient for fertilizing 4 to 5 batches of broods. The aim of this study was to popularization of aquarium keeping in local area and in turn will help to set profitable small scale ornamental fish farm in small space under the adverse climatic conditions (low and high temperature).

2.0 Material and Methods*:*

The present work was conducted at department of zoology Govt. Girls (P.G.) College, Sri Ganganagar (Rajasthan). The District Sri Ganganagar is located in the desert north-western part of the state of Rajasthan (Lat. 29^0-8' to 30^0-12', Long. 73^0-05' to 73^0-58'). The climatic condition of Sri Ganganagar varies widely with temperature reaching 0^{0}C in winter and those of summer touching 50^{0}C with almost nil to scanty rains. The study period

extended from June, 2010 to September, 2011. The criteria for selection of suitable species for culture are based on its ecological adaptability, adjusting to certain fluctuation in the culture medium, accepting supplementary food etc. Initially, Black Molly and Fancy Guppy were collected from different sources**.** Black Molly transported from College of fisheries, Udaipur and Fancy Guppy were transported from Delhi. After 20 hrs of journey fishes were acclimatized for 30 to 45 minutes and unpacked and released in cement tanks of size 40" x 24" x 22". Fishes were kept species wise in separate tank. According to age and size fishes were fed with farax, readymade food, live food (earthworms, Daphnia) and prepared food. A regular monitoring of water quality parameters were done in cement tanks and water exchange was also done when needed. In culture, chlorine free tap water was used. The various parameters of water such as temperature, pH, CO_2 content, DO and alkalinity were determined daily during breeding period by following the methods of Trivedi and Goel (1984) and APHA(1998). Guppies are cannibalistic. These fishes feed on their young ones, so there is need to protect babies from their parents. For this purpose, a thickly planted tank was used for breeding of guppies. This provides hiding places for babies. Selection of brooder was made with care, the healthy and good colored brooder selected .Brooders was fed with a good quality of prepared food containing egg, soybean flour and vitamins, farax and live food like earthworm, twice in a day at early morning and late evening. In the present investigation breeding was conducted in two separate season, first in month of August-September, 2010 and second in month of March, 2011. In first season (September, 2010), twenty one mature females and 7 male guppies and same quantities of black mollies were released in two separate well planted cement tanks each of size 40" x 24" x 22". In second season (March, 2011), fifteen mature female and five male guppies and same quantities of black mollies were released in two separate well planted cement tanks each of size 40" x 24" x 22".

3.0 Result and Discussion:

Table no.1 gives the water quality of the rearing water. It would be seen from this table that the water temperature ranged between 25 to 29 (average 27 0C), dissolved oxygen 6.7to 8.1 (average7.4 mg L-1),pH 7.6-8.2 (average7.9), carbon di oxide3.3-3.6 (average 3.45 mg L-1) and alkalinity 6.1-8.6 (average 7.35 mg L-1) the water quality remained more or less the same throughout the culture period. Regarding the dynamics of water quality parameters didn't observed major modification or peaks during the day or after feeding. All the parameters were within the range acceptable for fish.

Table 1: Water parameters at the time of culture and breeding of Guppy and Molly

Sr.No.	Parameters	Live bearer Fish			
		Guppy		Molly	
		Culture	Breeding	Culture	Breeding
1	Water Temperature(0c)	25-29	25-28	25-29	25-28
2	Alkalinity (mg/l)	6.1-8.6	6.1-8.3	6.3-7.9	6.2-8.1
3	DO (mg/l)	7.4-7.6	6.8-7.8	7.1-8.1	6.7-7.6
4	CO2 (mg/l)	3.5	3.3	3.6	3.3
5	pH	7.6-7.9	7.7-8.2	7.6-8.0	7.6-8.2

Table 2: Breeding details of live bearer fishes (Guppy and Molly)

Sr.No.	Particulars	Live bearer Fish			
		Guppy		Molly	
		Sept. 2010	March. 2011	Sept. 2010	March. 2011
1	Age of brooder fish	3-4 months	6-7 months	3-4 months	7-8 months
2	Male : Female ratio	1:3	1:3	1:3	1:3
3	No. of brooders selected for breeding	7:21	5:15	7:21	5:15
4	Average number of fry survived after thirty days of rearing	680	440	770	500

Table3: Economics of live bearer fishes (Guppy and Molly) for 2000 fishes

Sr.No.	Particulars	Rate(Rs.)	Total Value
	Capital Cost		
1	4 Cement Tanks	1000/-pc	4000/-
2	4 Air Pumps	200/-pc	800/-
3	4 Water Heater	200/-pc	800/-
	Culture Cost		
4	Cost of brooders (100 nos.)	3/-pc	300/-
5	Cost of feed for 60 days	20/-per day	1200/-
6	Miscellaneous expenditure		1000/-
	Sale		
7	Sale of 2000 Fish	3/-pc	6000/-
8	Income in two months		6000/-
9	Annual Income (4 crops in a year)		24000/-
10	Annual net profit (after deducting capital cost)		15900/-

The quality and amount of the daily feed and timing of the feedings are the key factors influencing the growth and reproduction in fishes (Degani and Yehuda, 1996, James and Sampath, 2002). The short reproductive cycle of aquarium fishes might result in continuous oogenesis in adult female, and hence availability of right type of diet is very important. In the present investigation foods offered were mixed food which contains natural planktons, earthworms, farax and prepared food (soybean flour + Wheat flour + mustered oil + egg + germinated gram + salt + calcium and mineral powder). Nandeesh et al (1994) reported that mixed feeding schedules were superior to the high protein of a single diet because nitrogen retention was high in fish fed with mixed schedules. Earthworm is one of live feed with high level of protein (45-70%) and suitable fatty acids that provide aquatic nutritional needs. The potential value of earthworm as a protein source had been established by several authors (Edward and Niederer, 1988, Ortega *et. al*., 1996). Three of the top 10 ornamental imported into U.S. are poecillids, and these species account for approximately 50% of the ornamental market in India (Mahaptra *et al* 2000, Ramchanderan, 2002). Many studies have investigated the reproductive behaviors of fresh water poeciliidae and successfully cultured for the aquarium industry. In mollies and guppies sex can be determined when individual reach a length of about 2-3 cm. and age of 3-4 months. Studies show that females prefer larger males when presented with several mates simultaneously (Mac Laren and Rowland, 2006). Female have the ability to store sperms and brood several times (4-5 times) throughout the year. In the present study in live bearer fishes a ratio of three females to one male was preferred because the females are harassed by males to the point of exhaustion, and having more female's gives the others rest. The breeding details of live bearer fishes (Fancy Guppy and Black Molly) shown in table no.2. In first season (September, 2010), twenty one mature females and 7 male guppies and same quantities of black mollies were released in two separate well planted cement tanks of size 40″ x 24″ x 22″. Plants serve as a refuge for newly born live bearing fishes, protecting from the vora city of their own parents. After a period of one month the population was increased up to 680 for Guppies and 770 for black mollies. In second season (March, 2011), fifteen mature female and five male guppies and same quantities of black mollies were released in two separate well planted cement tanks of size 40″ x 24″ x 22″. After a period of one month the population was increased up to 440 for Guppies and 500 for black mollies.

The breeding of fancy guppy fish and black molly were successfully done. Although the no. of live bearer produced was less.There are several factors, such as environmental conditions,genetic factors, nutrition and content of feed that influence reproduction in fish (Izquierdo *et al* 2001, Mehrad and Sadagur 2010). In the present study small size of brooders were used due to availability of small space. The economics of ornamental live bearer fishes are presented in table 3.The total stock were reared up to 60 days and sold when they attained size of 4-5 cm. Thus by low investment and high benefit ratio the ornamental fish can be bred and reared in small space as an additional income generating source. But due to hard climatic conditions of local area and lack of knowledge no anyone farmer is engaged in this trade. Therefore this study will

help in popularization of culture of aquarium fishes in local area.

4.0 Conclusion:

This study will help the fish farmers (beginners) of local area in rearing and breeding of ornamental fishes in small space and in turn will help to set profitable small scale ornamental fish farm as a component of integrated rural development. In rural areas and small towns a small open space of house may be converted into a small ornamental indoor fish culture unit and can generate additional income source from this trade especially by women.

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References:

1) APHA, 1998. Standard methods for the examination of water and waste water, 20th ed. APHA. Washington.
2) Degani, G. and Yehuda, Y. (1996). Effects of diets on reproduction of Angel fish Pterophyllum scalare (Cichidae). Indian J. Fish. 43: 121-126.
3) Dahlgren B. T., 1980 The effects of three different dietary protein levels on fecundity in the guppy, *Poecilia reticulata* (Peters). Journal of Fish Biology **16**:83-97.
4) Edwards, C.A., Niederer, A. 1988. The production of earthworm protein. In Edwards, C.A., E.F. Niederer, (Eds.), Earthworm in Waste and Environmental Management. The Hague, the Netherlands Academic Publishing, pp: 169-180.
5) Izquierdo M. S., Fernandez-Palacios H., Tacon A. G. J., 2001 Effect of broodstock nutrition on reproductive performance of fish. Aquaculture **197**(1-4):25-42
6) James R. and Sampath, K. (2002). Effect of different feeds on growth and fecundity in ornamental fish, Betta splendens (Regan). Indian J. Fish, 49(3): 279-285.
7) Mac Laren, R.D. and Rowland, W.J. (2006). Differences in female preference for male body size in Poecilia latipinna using simultaneous versus sequential stimulus presentation design Behav. 143: 273-292.
8) Mahapatra, B.K., Ghosh, A. and Dutta, N.C. (2000). Breeding and rearing of ornamental fishes, Guppy, Poecilia reticulata (Peter) and Gold fish, Carassius auratus (Linnaeus) for prospective entrepreneurship development. Green Tech. 3 : 26-33.
9) Mehrad B., Sudagar M., 2010 The effect of vitamin C on growth factors, survival, reproduction and sex ratio in guppy (*Poecilia reticulata*). AACL Bioflux **3**(3):163-170
10) Nandeesha, M.C., De Silva, S.S., Krishnamurthy, D. and Dathatri, K. (1994). Use of Mixed feeding schedules in fish culture: Field trials on Catla catla (Hamilton-Buchanan), rohu, Labeo rohita (Hamilton) and common carp, Cyprinus carpio. Aquacult. Fish Manag. 25: 659-670.
11) Ortega, C.M.F., Reyes O.A.L., Mandoza M.G., 1996. Chemical composition of earthworm (Eisenia fetida and Lumbricus rubellus) silages. Arch. Latinoam. Nutr. 46(4): 325-328.
12) Ramchandran, A., 2002. Manual on breeding, farming and management of ornamental fishes. School of Industrial Fisheries, Cochin, India.
13) Trivedi, R.K. and Goel, P.K. (1984). Chemical and biochemical methods for water pollution studies. Environmental Publications, Karad, India.