A Study of Breeding and Rearing of Koi Carp and Zebra Danio

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ABSTRACT

The present study deals with the breeding and rearing of Zebra danio and Koi carp. The fishes were reared in cement tank of size 48" x 36" x 36." The breeding of Zebra danio was done in glass aquarium of size 48" x 12" x 15" in the month of September. The total number of eggs laid was 580. Hatching was completed in 42-46 hours and hatching percentage was 58%.Whereas the breeding of Koi carp was done in cement tank of size 48" x 36" x 36." One pair of brooders was released in cement tank of size 48" x 36" x 36" in the month of September. The total number of eggs laid was 36000. Hatching was completed in 74-88 hours and hatching percentage was 34%.

Key word:- Breeding and rearing, Koi carp, Zebra danio

Introduction

The art of rearing and keeping fish in aquarium is an age old practice. At the dawn of the 21st century fish keeping is reflected in ubiquitous aquaria that feature as an integral part of modern interior decoration (Katia Oliver, 2001). The brilliant, flamboyant colour and exotic appearance of the fish appeal to one and all children and aged alike. The keeping of ornamental fishes in aquaria is a growing hobby among urban people with formation of several new aquarium societies. Now a days, aquarium shows and competition are arranged frequently at many places. These shows are attended by thousands of fish lovers. In the field of interior decoration also, aquaria are increasingly finding respectable position and they has become a status symbol. Many people also believe that from Vastu point of view, aquarium keeping at home brings prosperity. These different facets of rearing and breeding ornamental fishes and allied activities need appropriate motivation and promotion by the Government and private sector in wider interest of the society.

Material and Methods

The present study was conducted at department of Zoology Govt. Girls (P.G.) College, Sri Ganganagar (Rajasthan). The criteria for selection of suitable species for culture is based on its ecological adaptability, adjusting to certain fluctuation in the culture medium, accepting supplementary food etc.

Initially, Koi carp were transported from College of fisheries, Udaipur and Zebra danio were transported from Delhi. About 20-30 fishes were packed in polythene bag and placed in cartoons and transported to Sri Ganganagar by bus. After 20 hrs of journey fishes were acclimatized for 30 to 45 minute and unpacked and released in cement tanks. On receipt mortality was about 30 percent. Fishes were kept species wise in separate tank. Fishes collected from different sources were reared in cement tanks of size 48" x 36" x 36." 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 all cement tank and water exchange was also done when needed. In culture the storage, chlorine free tap water was used. The various parameters of water such as temperature, pH, CO_2content, DO and alkalinity were determined daily during breeding period.

Breeding in Zebra danio (Brachydanio rerio)

The danio is a very popular group presenting no problem to the aquarists. The most favorite among danios is Zebra danio from Bengal. It has several blue-black horizontal stripes on silver colour body and tail fin. It is very active fish moving in shoals. They prefer to take live feed and are very sensitive to change of water. Life span in captivity is around 2-3 years.

Zebra danio is a prolific breeder and eggs are non-adhesive. Parental care is absent in this fish. One year old zebra is ready for breeding. Female and male can be distinguished by bulging body and long fins. Adult female exhibit a small genital papilla in front of the anal fin origin. For the breeding set up of this fish, the bottom of aquarium was completely covered with round pebbles of about 6-8cm. diameter. Active, healthy and fully matured male and female were put together for breeding. Before putting into the breeding tank, brooders were fed with live and artificial feed for a month. After conditioning four female and four males were released into the breeding aquarium in September. The water temperature was maintained about 27-28^0c. Spawning took place after four days. Female spawn at interval of about 24 hours laying about 30-40 eggs in each clutch. Males released milt on eggs and fertilization took place. Fertilized eggs were transparent. After fertilization brooder were removed from the aquarium. About 42-44 hours after hatching took place and about 30-36hours after hatching larvae starts swimming and feeding in the aquarium. Free swimming larvae were fed with boiled egg and farex. After seventh day fry were fed with farex and crushed earthworm and prepared food. About one month of rearing the young ones were transferred to cement tank.

Breeding in Koi carp

Breeding was conducted in cement tank of size 48" x 24" x 30" which was disinfected with 1ppm. Solution of potassium permanganate and washed thoroughly with fresh water and then filled with declorinated fresh water. In the pond, spread out a fry mat. The koi use this flat, sticky pad as a place to lay their eggs. Koi breeders, both male, and female, typically have similar appearances. The males' pectoral fin margins and checks, however, develop tiny white growths known as breeding stars or tubercles during mating season. In the late spring or early summer, breed koi. When the weather is warm and the water temperature has increased, koi frequently reproduce.

Koi don't sexually mature until they are about 3 years old. Koi are about 10 inches (25 cm) long when they are 3 years old. Koi romance takes a few hours, and experienced breeders place the male with the female in the late afternoon. Spawning happens just before sunrise. The female releases her first batch of eggs, and the male spews sperm. The parents then eat some eggs; this natural culling is very nourishing. The whole process repeats until the female has no more eggs to release. Remove the male at this point. Koi can generate up to 1 million eggs, so it's crucial to be ready. After fertilization, the eggs begin to hatch 3 to 6 days later.

Water chemistry and temperature must stay optimal. Give special attention to ammonia levels. A reading of

zero is ideal replace 20 to 30 percent over an hour.

RESULT AND DISCUSSION

The rearing and breeding detail of the cultured Zebra danio, and Koi carp are presented in table 1. These are the most popular fresh water fish species in aquarium trade industry. Due to their body colouration, shape, easy to breed and economical value these fishes are most important.

All the water parameters were within the range acceptable for fish. The water temperature in the present study ranged between 20^0 to 29^0 c. Higher temperature reduces the amount of oxygen content in the water, reducing tanks stocking density (Cooper, 2006). Although the recommended pH range for fresh water fish falls between 6.8 and 7.2 (Cooper, 2004). In present study Zebra danio, and Koi carp were successfully reared in pH ranges between 6.6 to 8.3. The change in pH was very low. Higher pH can enhance the formation of ammonia in the water while low pH can adversely affect the function of the fish's gills (Cooper, 2006). The CO_2 was ranged between 2.4 to 3.6 mg/ lit. The DO was ranged between 6.7 to 8.1. Studies have shown that individuals can become acclimated to hypoxic conditions, with DO concentration as low as 1 mg/lit. (Timmermann and Chapman, 2004). There is general agreement on lower limit i.e. 4 ppm for warm water fishes and 5 ppm for salmonids (Wedemeyer et. al., 1999).

The quality and quantity of feed are important factors affecting growth and reproduction in fishes (Wooton, 1982, Lochmann and Phillips, 1994, 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). The natural plankton was grown in stone-slab pond by manuring through cow dung, groundnut oil cake etc. 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 (Stafford and Tacon, 1988, Edward and Niederer, 1988, Ortega et. al., 1996). Farex was given as it is known to be the best food for the aquarium fishes because of its high digestibility and the resultant low metabolic wastes.

The breeding of Koi carp and Zebra danio(Brachydanio rerio) were successfully done. Although the no. of eggs were less. The reason for this is probably small size of brooder, small space, a short period of rearing of brooders in natural environment and immaturity of brooders. The small size of brooder was used due to the availability of small space. A large, active fish cannot be expected to spawn in a small space. (Mercy Anna, T.V.2009).As the larger fish (lenth&weight) has drastically more fecundity then the smaller size. (S. Solomon et al 2011). In egg laying fishes a general ratio of one male to one female (1:1) was maintained. The breeding detail of Zebra danio and Koi carp during study period is shown in the table no.1.

Table No.1

S. No.	Particulars	Koi carp	Zebra danio
1	Age of fish at spawning	3 years	11-12 months
2	Water temperature	28-29^{0}c	27-28^{0}c
3	Water pH	6.5-6.9	6.8-7.2
4	Male : Female ratio	1 : 1	1 : 1
5	No. of pairs of brooder selected	1 pair	4 pairs
6	No. of eggs laid	36000	580
7	Fertilization percent	80-85%	80-85%
8	Hatching period	74-88 hrs	42-44 hrs
9	Hatching percentage	34%	50%
10	Average no. of fry survived after one month of rearing	2060	210

Four pairs of Zebra danio (Brachydanio rerio) brooders were released in glass aquarium of size 48" x 12" x 15" in the month of September. The total number of eggs laid was 580(with an average 145 eggs per female). The eggs were laid in 3-4 clutches (about 40-50 eggs in each clutch). Hatching was completed in 42-46 hours and hatching percentage was 58%. Average number of fry survived after 30 days of rearing was 210.

The breeding of koi carp was successfully done and The breeding detail of koi carp is shown in table no.1. One pair of brooders was released in cement tank of size 48" x 36" x 36" in the month of September. The total number of eggs laid was 36000. Hatching was completed in 74-88 hours and hatching percentage was 34%. Average number of fry survived after 30 days of rearing was 2060.

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