International Journal of Advanced Multidisciplinary Research (IJAMR)
ISSN: 2393-8870
www.ijarm.com
Volume 3, Issue 8 -2016

Research Article

SOI: http://s-o-i.org/1.15/ijarm-2016-3-8-5

Breeding technique of gold fish, molly, guppy and its impact on economy in the rural area of the Purba Midnapore district , West Bengal, India

MNS Mamun Siddiky[1*], Basudev Mondal[2]

[1]Scientific Officer, Bangladesh Fisheries Research Institute, Brackish Water Station, Paikgacha, Khulna-9280, Bangladesh.
[2]Assistant Professor, Dept. of Aquaculture Management and Technology, Vidyasagar University, Midnapore, West Bengal, India.
[*]Corresponding Author: *mamunsiddiky@gmail.com*

Keywords

Aquarium,
goldfish,
guppy,
molly,
feeding,
sex ratio.

Abstract

An experiment was conducted for 3 to 4 weeks in glass aquarium and tanks to studies on Breeding technique of gold fish (*Carasius auratus)*, molly (*Poecilia Sphenops)*, guppy (*Poecilia reticulata*) and its impact on economy in the rural area of the Purba Medinipur district,West Bengal,India. Four self-help groups has been identified and they are also involved in ornamental fish culture. They are guided by Aquaculture Wings of West Bengal comprehensive Area Development Corporation, Tamluk Project. The study was done in the farmer's field at Dasnagar Howrah. The result was shown that gold fish nature of the age of 1 year. At the age of 1st year they released 850-1200 number of eggs approximately and 2nd year they released 3000-3800 number of eggs approximately. But at the age of 3rd year they released 4800-5100 number of eggs approximately. The dry period is only 3 to 4 weeks. The hatching time is 84 to 95 hours and hatching eggs is 80 to 87 %. Guppy started breeding at the age of 4-5 months. At the1st time they released fry of 48 to 52 numbers and 2nd time they released fry of 45 to 62 numbers. At the 3rd time they released fry of 48 to 55 numbers. Dry period of these species is 3-4 weeks. As per observation it is clear that they released almost equal number of fry or babies in 1st,2nd and 3rd time of delivery. In this work no breeding trap was used. Just other delivery the mother removed from the system. Molly start breeding at the age of 5-6 months. Highest fecundity of molly was found in the sex ratio of 1 female: 2 male followed by the 1:1, under the conditions tested in this study. At the1st time they release fry of 45 to 65 number and 2nd time they released fry of 55 to 65 numbers. At the 3rd time they released fry of 58 to 60 numbesr. Dry period of those species is 3- 4 weeks. As our observation, it is clear that molly release almost equal number of babies in 1st, 2nd and 3rd time of delivery. The women of self-help groups are engaged in this industry. The members of self-help group can easily earn Rs.1540 -1800/- per months. Both state Govt. and Central Govt. are helping these self help groups through different schemes. Those schemes play an important role to improve the economic condition of the rural people.

Introduction

Aquarium keeping is an age old practice and has become one of the most popular hobbies. As on high demand, throughout the world, rearing and marketing of ornamental fishes for the aquarium can be taken up as a means of available livelihood. About 100 years ago Chines first began to domesticate gold fish (Witte and Schmidt, 1992). Glass aquarium was first used by the Romans (Courtenay and Stauffer, 1990). During 18th century gold fishes were transported to England. Ornamental fish trade began in Germany. 19th century about all the countries of the world started ornamental fish keeping. About 10 years back the Chinese scientist mutated gold fish and various types of gold fish have been produced. Most of the ornamental fishes are form Asian origin Ornamental fish species are popularly known as aquarium fish (Laha and Das, 2007). The culture of this species has become a source of employment generation for the rural people. Breeding and production technology of ornamental fishes differ from species to species according to the nature of their reproduction habitat and other psychological condition (Courtenay *et al.*, 1984). Although many techniques used for ornamental fish breeding but not much difficult, the breeding method for specific ornamental fish species are closing guarded secret (With Worth, 1996). Farmers have operated almost entirely on their own, developing their own method and really on many years of experimentation (Ogilvie,1969). Aquarium fishes are broadly divided into two categories: Egg layers and live bearers. The egg layers are lay eggs but the live bearer do not lay eggs but give birth to live young are known as live bearers. They make excellent subjects for the home aquarium because of their hardiness and their exceptional frameless. They also make interesting subjects, for breeding, requiring little special equipment or previous experience. Limias mosquito fish and half beaks are less common, but are still worth considering for some specialist hobbyist. They give birth fully developed young fishes. Most of them are prolific breeders. They are cannibalistic and even consume their young ones. That is why the breeders are kept in wire meshed breeding trap kept inside the breeding tank, through which young one can escape when born.

Materials and Methods

Breeding technique of goldfish

There are a few easy stapes to prepare the tank for breeding. We have needed at least 20 gallons of water to breed two goldfish properly. We have needed plants in the goldfish tank as well. Then we need 1 male and 1 female goldfish of at least 3 years old, anything younger and they may not breed and might cause the female become egg bound. We have needed another tank at least 3 to 5 gallons of water. There were also need gold fish baby foods, but we have get into that later. We have to make all the preparation and want to breed goldfish. The first sings goldfish were ready to mate; the male goldfish will get white pimples on the gill covering and the female goldfish will become very round looking. The male goldfish will chase the female goldfish around the tank endlessly (sometimes even tearing hurting her fins). The female goldfish will become very tired and will release her eggs, sometimes by the hundreds or thousands, all over the tank. Most of them will stick to the plants. The male goldfish will spray his milt over the eggs and the tank will get cloudy appearance (don't change the water!). After about three to four hours the courtship should be stop. Now that the eggs are fertilized and we have needed to remove them from the tank. We have needed to place them in the 3 – 5 gallon tank. This tank may be not more than about 6 inches of water to avoid the goldfish being crushed by the weight of the water. Too much water also makes it harder for them to swim to the surface. We have needed a weak filter system to avoid drawing fry into the filter. We have needed to aerate the water surface and a heater. The temperature of the tank will determine the incubation period generally 5 days at 23-28^{0}C. We have needed to keep a good eye on the eggs because some of them could wind up with fungus and infect of the rest of the eggs. Healthy eggs will look transparent in color and the non-fertilized eggs will be white and most lightly will get fungus. We have needed to remove the fungused eggs. After four days we should see growth inside the goldfish egg, a small black dot in the middle. After or around the 7th day, they will start to come out of the egg and stick to the plants. We will be able to see the yolk sack and they will feed off for the next 3 days. If the yolk sack was gone then they will be searched for a lot of food. Many goldfish will be died because of lack of food. We have needed very small particles of food such as frozen brine shrimp, micro warm crushed hard-boiled egg yolk, dried flack food and even liquid food if you can find them. We have needed to feed them 3 times a day (morning, noon and night), making sure that we only feed the goldfish fry enough food that they are able to it all. For best results keep males and females separated before breeding. Feed them well with a variety of foods – goods quality dry food supplemented with live food. The ratio we recommended 3 males to 2 females.

We can either let this happen naturally as weather patterns change, or spawning can be induced by simple raising the temperature a little. Goldfish will breed at temperature between 23-28^{0}C. It is important to remember that it is the change in temperature not the actual temperature, which triggers spawning activities. Since goldfish scatter sticky eggs haphazardly over the aquarium, it should be stocked with aquarium plants. Try to arrange the aquarium with floating rooted plants, along with some bottom plants or artificial spawning grass. We can also use soft willow or pong fronds. The fertilized eggs are about 1.5 mm in diameter and are amber-colored when first laid. Spawning is usually large, from about 500 to 2000 eggs, depending upon the size and condition of the female. The parents should be removed immediately after spawning, which usually lasts about 3 hours. Ten drops of 1 % Methylene Blue should be added to each 10 liters of well-aerated aquarium water. Although the eggs will hatch after 5 days, the embryo needs 3 days or so to absorb all the yolk. It is important not to feed the fry until after the 3rd day and they have consumed the yolk sac. Once the fry have digested the yolk sac they require copious amount of live food. Feed them on a diet of infusorians, newly hatched brine shrimp, and sifted daphnia. Liquefy, boiled egg yolk fed through a stocking and after a week finely powdered dry food may also be fed. Care must be taken not to over feed fry as excess food will quickly pollute the water and kill all the young fry. Make sure you give the fry plenty of good quality food, good water quality, along with plenty of space to swim in and watch how quickly they will grow.

Feeding schedule for goldfish fry

After 48 hrs, crushed yolk of hardboiled egg and oatmeal paste should be used as fry feed . After 2 weeks fry will be feed with brine shrimp and infusoria. After 3 weeks powdered foods can be used. First 4 weeks feed 3 times each day up to 4 months. After 4 months once daily (Feedings should be as much as they can eat in 20minutes).We should always siphon uneaten food. Once a month a table's spoon of salt should be added to the tank and artificial aeration should be provided. We can feed them with the usual rich foods like earthworm, bloodworm, tubifex and some flake food.

Breeding technique of guppy and molly

The guppy and molly are live bearer species .The sex ratio should one pair or a ratio of 2males 1 female or 1male 1 female. They do not lay eggs like most fish but instead give birth to young free swimming fry. As the male matures the anal fin develops into a structure for reproduction called the Gonadopodium. The Gonadopodium can be moved in almost any direction and stores the sperm in packs called sperm metamorphosis. Once the sperm is inserted into the female it fertilizers her eggs and the rest is stored in the oviduct walls for later use. The eggs are very rich in yolk and the young develop by consuming their yolk stores. In light colored females pregnancy can be recognized by the growing dark body marking in front of the anal fin. Young Live-bearers are fairly large at birth and their development is very advanced. They can swim right away, which is needed to avoid their enemies including their parents who give on natal care whats ever. The fry grow very rapidly and will eagerly accept fine flake food. The number of fry is variable due to the size differences in the species, but in larger female can give birth large number well over one hundred . When you get most female livebearers they are pregnant and should give birth to babies every 3or 4 weeks. Feed your livebearers plenty of floating flakes and some live food as well to supplement their diet and give them larger and healthier fry. As always remove any uneaten food after 5 minutes. Be sure to keep your aquarium clean and change about 25 % of the water in your aquarium at least once a week.

Take care and feeding of the fry

A net breeder is a must if you wish to save large numbers of fry. Simply place it in a corner of the tank when one of the females has already spawned or place the female in it just before she spawns. Either way ensures the fry are the only fish inside the net. As a rough guide, a young female guppy and molly usually releases 12 to 30 babies in her first batch of young. In comparison a large molly may be able to release up to 100 babies. Change 25% of the water in the aquarium each day replacing it with de-chlorinated water which is as close to the temperature already in the water as possible; remember any differences will result in stress to the fish and more chance of your livebearer aborting her pregnancy. Fry should be fed with cucumber, flake but the adult one can be fed with blood worms or adult brine shrimp. The fry leave them in the net breeder or their own aquarium, feed them 3 times a day for maximum growth with finely crushed flake food (as fine as you can crush it) use your fingers and rub them together really grinding it up very finely because any large bits will remain uneaten and will polluting your tank. Growth will vary on quality of food.

Results

Breeding of goldfish

The study was done in the farmer's field at Dasnagar Howrah. The result of Table-1 was shown that gold fish nature of the age of 1 year. At the age of 1st year they released 850-1200 number of eggs approximately and 2nd year they released 3000-3800 number of eggs approximately. But at the age of 3rd year they released 4800-5100 numbers of eggs approximately. The dry period is only 3 to 4 weeks. The hatching time is 84 to 95 hours and hatching eggs is 80 to 87 %.

Table-1: Breeding of goldfish

No. of sets	No. of species	Age/eggs laying	Hatching time	Hatched eggs (%)	Dry period	Eggs laying	Hatching time	Hatched Eggs (%)
Set-1	2 males and 1 female	1 year 850 no. (approx.)	85 hours	80 %	30days	1200 no. (approx)	84 hours	82 %
Set-2	2 males and 1 female	3 years 5100 no. (approx.)	95 hours	85 %	25days	4800 no. (approx)	86 hours	87 %
Set-3	2 males and 1 female	2 years 3000 no. (approx.)	88 hours	85 %	28days	3800 no. (approx)	90 hours	80 %

Breeding of guppy

These results were shown in Table-2. Guppy starts breeding at the age of 4-5 months. At the time of 1st time they released fry of 48 to 52 numbers and 2nd time they released fry of 45 to 62 numbers. At the time of 3rd time they released fry of 48 to 55 numbers. Dry period of these species is 3 - 4 weeks. As our observation it is clear that they released almost equal number of fry or babies in 1st, 2nd and 3rd time of delivery.

Table-2: Breeding of guppy

No. of sets	1st time		2nd time		3rd time
	Age/No.of fry or babies released	Dry Period	No.of fry or babies released	Dry Period	No. of fry or babies released
Set-1	125days/ 48fry	28 days	45 fry	25 days	55 fry
Set-2	185days/ 55fry	25 days	62 fry	22 days	52 fry
Set-3	140days/ 52fry	22 days	58 fry	24 days	48 fry
Average	150days/ 52fry	25 days	55 fry	24 days	52 fry

Breeding of molly

The result was presented in Table-3. Molly starts breeding at the age of 5-6 months. At the time of 1st time they released fry of 45 to 65 numbers and 2nd time they released fry of 55 to 65 numbers. At 3rd time they released fry of 58 to 60 numbers. Dry period of these species is 3 - 4 weeks. As per observation it is clear that they released almost equal number of babies in 1st, 2nd and 3rd time of delivery. Since most live bearing species give bill to their young with little or no direct involvement by the hobbies or the farmers, the real skill lies in ensuring that the babies are not taken by other fish especially the mother breeding trap can be used. In this work no breeding trap was used. Just other delivery the mother removed from the system.

Table-3: Breeding of Molly

No. of sets	1st time		2nd time		3rd time		4th time
	Age/No. of fry/ Babies released	Dry Period	No. of fry/ Babies released	Dry Period	No. of fry/ Babies released	Dry Period	No. of fry/ Babies released
Set-1	185days/ 65fry	28 days	75 fry	28 days	65 fry	25 days	58 fry
Set-1	155days/ 53fry	26 days	55 fry	25 days	54 fry	24 days	60 fry
Set-1	175days/ 45fry	25 days	56 fry	28 days	62 fry	22 days	58 fry
Average	172days/ 54fry	26 days	62 fry	27 days	60 fry	24 days	59 fry

Impact of ornamental fish in rural economy

In this aspect, the survey has been done in the rural area of the Purba Medinipur district, West Bengal, India. Four self-help groups has been identified. These groups are involved in ornamental fish culture. They are guided by Aquaculture Wings of west Bengal comprehensive area Development Corporation, Tamluk Project. They culture gold fish in low cost culture system. A low cost culture system means a – an earl Lear system 15ft x 10ft land covered with a polythene pit is completely encircled with a nylon net and the roof is covered with polythene. The pits were filled up with water up to 2.5 ft. Water and soil treated with 150 gm. of quick lime per pit. Rest for three days, there are released fry / spawn 550-580 numbers per pit. Regular feeding were supplied with planktons twice per day. 25 % water exchange was done per week. Culture period was 30 days. The members of self-help group can easily earn Rs.1540 -1800/- per month. Net income is more in the second crop; this is due to low cost of production. Both State Govt. and Central Govt. were helping these self-help groups through different schemes.

Table-4: Economic of four groups for two crops

Name of the Items	Group 1 (1st crop/2nd crop)	Group 2 (1st crop/2nd crop)	Group 3 (1st crop/2nd crop)	Group 4 (1st crop/2nd crop)
Survivality	90 %/91 %	98 %/93%	94%/85%	87%/82%
Production	500 nos/505 nos	549 nos/522 nos	532nos/585 nos	521nos/527nos
Capital cost	4500.00	4500.00	4500.00	4500.00
Cost of production	550.00/280.00	450.00/240.00	550.00/280.00	450.00/240.00
Gross income	2150.00/1840.00	2070.00/2020.00	2160.00/2080.00	1990.00/2030.00
Net income	1600.00/1560.00	1620.00/1780.00	1610.00/1800.00	1540.00/1790.00

Water quality plays an important role in the survival of the fish and during the present work (Table-5). All the parameters will be monitored on weekly interval with in optimum range. The range of the water quality parameters will be recorded during the present work with earlier studies on gold fish, guppy and molly (Kestomont 1995, Krejszeff 2008).

Table-5:Physicochemical parameters of the glass aquarium and tanks water during the breeding experiments

Parameters	Range
Temp.(^{0}C)	23-28
Dissolved oxygen (DO)(mg/l)	6.0-6.8
pH	7.4-7.8
Alkalinity (mg/l)	227-245
Total hardness (mg/l)	189-195
Free CO_2 (ppm)	1-1.5

Discussion

The result of goldfish breeding was presented in Table-1. At first year they released approximately 850-1200 number of eggs. It was the similar with the observation of Azad (2005). In second year they released approximately 3000-3800 numbers of eggs. In third years they released 4800-5100 numbers of eggs approximately. These results were agreed with the findings of Mahapatra and Sardar (2007). Guppy starts breeding at the age of 4-5 months (Table-2). At first time they released fry of 48 to 52 numbers and second times they released fry of 45 to 62 numbers. These results were closely related with the observations of Ako *et al*, (2000). In third times they released fry of 48 to 55 numbers. It was the similar with the observation of Sinha and Das (2004). Since most live bearing species give bill to their young with little or no direct involvement by the hobbies or the farmers, the real skill lies in ensuring that the babies are not taken by other fish especially the mother breeding trap can be used. In this work no breeding trap was used. Just other delivery the mother removed from the system. Molly starts breeding at the age of 5-6 months (Table-3). There were released fry of 45 to 65 numbers and second time released fry of 55 to 65 numbers. These findings were revealed with the observations of Patra and Bandyopadhyay (2006).

Conclusion

Ornamental fish culture now becomes a popular industry in different parts of India. To populization the culture system, one should know the breeding technique. The breeding technique of live bearers are easy as they release really directly, we will have to rear the baby in separate system to avoid the cannibalism from their parents. In the case of egg layer a grower must here to maintain and separate unit for production of seed. They grower can maintain two units – one is egg production unit other is seed production unit. For ornamental fish breeding we need low investment, return will be quickly. The members of self-help group can easily earn Rs.1540 -1800/- per months. Ornamental fish breeding can easily adoptation to our rural people.

References

Ako, H., Tamaru, C.S., Asamo, L., Yuen, B. and Yamato, M. 2000. Achieving natural coloration in fish under culture UJNR Technical Report No. 28.p.55-60.

Azad, L.2005. Enjoy your Aquarium fish published by Azad Aquarium and Fortune fish.p.20-22.

Courtenay, W. R., Hensley, D.A., Taylor, J. N. and McCann J. A. 1984. Distribution of exotic fishes in the continental United States. Pages 41-77.

Courtenay, W. R. and Stauffer, J. R. 1990. The introduced fish problem and the aquarium fish industry. Journal of the World Aquaculture Society 21 (3):145-159.

Kestomont, P.1995. Influence of feed supply, temperature and body size on the growth of goldfish, *Carassiusauratus* larvae. Aquaculture.Volume 136. Issue 3. 341-349.

Krejszeff, S., Stepnaik ,P., Kucharczyk, D., Kujawa, R. and Targonska, K. 2008. Mass rearing of goldfish larvae and juveniles under controlled conditions. Electronic Journal of Polish Agricultural Universities.Volume 11.Issue 12, pp. 345-348.

Laha, U.K. and Das, R.N. 2007. National Workshop or Sustainability of Indian Aquaculture Industry. p.51-60.

Mahapatra, B. K. and Sardar, P. 2007. National Workshop or Sustainability of Indian Aquaculture Industry. p.51-60.

Ogilvie, V. E. 1969. Illustrate checklist of fishes collected from the L – 15 canal (Lake worth Drainage District) in palm Beach county. Florida (collection data November 8, 1969) unpublished Report for the Florida Game and Fresh water fish commission. 10pp.

Patra, B.C. and Bandyopadhyay, P. 2006. Ornamental Fishes, published by Vidyasagar University. p.301-305.

Sinha, A. and Das, R.C. 2004. National Seminar on prospect of ornamental fish breeding and culture in Eastern and North Eastern India .p.120-125.

With Worth W. R. 1996. Fresh water fisheries of Connecticut. State Geological and Natural History Survey of Connecticut, Bulletin 114.

Witte, K. E. and J. Schmidt. 1992. Betta brownorum, a new species of and bantoid (Telesofei : Belontiidae) from North Western Borneo. With a key to the genus. I chtyological Exploration of fresh 2(4) : 305-330.

Access this Article in Online	
Quick Response Code	Website: www.ijarm.com
	Subject: Fishery Science

How to cite this article:

MNS Mamun Siddiky, Basudev Mondal. (2016). Breeding technique of gold fish, molly, guppy and its impact on economy in the rural area of the Purba Midnapore district ,West Bengal, India. Int. J. Adv. Multidiscip. Res. 3(8): 34-40.