

Effective and Efficient Spawning Techniques of Koi Goldfish

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Abstract

This study aims to determine effective and efficient koi fish spawning techniques and to determine the reproductive stages and fish behavior during spawning, as well as to identify problems in the spawning process. The procedure of this research consists of several stages, namely: Spawning Container Preparation, Parent Selection, Parent Release, Spawning Process, Quality of Spawning Water, Egg Counting. The results showed that natural spawning techniques were more effective and efficient. The size and weight of the fish are very influential for the number of eggs to be produced. One of the factors that support the success of a spawning is the selection to get good quality broodstock resulting in a high number of seed production.

Keywords: koi; spawning; effectivity; efficiency.

I. Introduction

Indonesia, which is located in the tropics, has high biodiversity, including the diversity of freshwater ornamental fish. Freshwater ornamental fish commodity is a superior commodity that is most in demand. According to Ipteknet (2008), ornamental fish is one of the important cultivated organisms as a trading commodity, both inside and outside the country. Indonesia is ranked third in the world after Singapore and Malaysia as exporters of ornamental fish with a market of 7.5% (Kusrini, 2010). Koi (*Cyprinus carpio*) is one of the most popular ornamental fish.

Koi is a type of ornamental fish that has been cultivated for centuries by the Japanese, and has even been used as a symbol for the Japanese nation and was appointed as Japan's national fish. Koi colors are beautiful and diverse, encouraging the Japanese to produce dozens and dozens of types of koi which eventually favored by people in various countries including Indonesia (Susanto H. 2000).

According to Santoso (2000), koi are expensive fish and koi are always hunted by hobbyists looking for an exclusive type. The profit of ornamental fish business is much greater than that of consumption fish, because ornamental fish has an unlimited market abroad. Besides having relatively expensive

prices on the market, the rise of koi contests both domestically and abroad also contributed to enlivening the koi business. As a result, this business is sufficient to guarantee a more than adequate profit for koi cultivators.

The demand for koi to the needs of ornamental fish enthusiasts has increased from year to year. In line with this market demand, the availability of koi seeds, both in government-owned and household fish seed centers, is still unable to meet market needs. Until now, the availability of koi seeds is not continuous and only seasonal. The demand at the local market level for koi always goes through ups and downs, but seen from the number of sales results on average it always increases from year to year (Anonymous, 2005).

The above problems are strongly influenced by the aspects of koi cultivation which are carried out by fish cultivators on a household scale, UPR (People's Fisheries Business) and the government's own Fish Seed Center. The various aspects of cultivation in question, such as mastery of spawning techniques, growing of koi, which greatly determine the success of cultivation. Mastery of these techniques is essential in developing aquaculture, especially koi,

so that a basic knowledge, insight and skills are needed.

The production potential of farmers is actually very large, but due to various constraints both in technology and nature, this production potential has not been achieved. The availability of inexpensive and easy-to-apply spawning technology by fish farmers will encourage the production of quality seeds and ensure continuity of seed supply according to demand. In connection with this, the author raises the title of research on effective and efficient koi (*Cyprinus carpio*) spawning techniques.

II. Research Methods

The research was conducted in Bulotalangi Village, East Bolango District, Bone Bolango Regency, a pond for ornamental fish farmers (Istana Aquarium Gorontalo). The tools and materials used include concrete tubs, aeration machines, thermometers, litmus paper, *kakaban*, scoops, scales, and ready-to-spawn koi broodstock. Procedures carried out in the research process of are: spawning pond preparation. The pond used is a concrete pond measuring 200 x 150 x cm with a pond depth of 90 cm. The preparations included cleaning, drying for two days, filling the water to a water level of 60 cm, and spreading the substrate for egg-sticking in the form of *kakaban*. Before installing, the *kakaban* is cleaned, washed and rinsed so that it is free from dirt.

Selection of mature gonads based on the shape of the female parent and male parent. Females are bigger than males, their stomachs look bigger / distended than their backs. Males, on the other hand, are slimmer and have a flat stomach when viewed from the back.

A parent who is physically fit, complete fins, complete and not deformed, has a graceful and balanced movement and is not sluggish. After the male and female parent are dissected, the gonads are mature, separated between the female parent and the male parent in each parent rearing container / pond, then isolated for one day duration.

Spawning takes place at night, in the spawning process the male parent is first carried out, this is so that the male parent can adapt to the environment.

After 15 minutes, then the female parent is put in the spawning tub. The number of male sires entered is 4 with a ratio of 1: 3 (1 female parent, 3 male parent). After the spawning process is complete, immediately remove the parent from the spawning pond. If the broodstock is left in the pond, it is feared that it will eat the eggs. After the mains are moved the water in the spawning tub is reduced by 40%. The data collection method used in this research is descriptive method. Descriptive method is a method used to systematically describe the facts or characteristics of a particular population or a particular field, in this case the fisheries sector actually and accurately (Hasan, 2002).

III. Results and Discussions

The pond used for spawning is a concrete pond located in the house yard measuring 200 cm x 150 cm with a pond depth of 90 cm. The preparations made are:

1. This spawning pond washing without any disinfection. The spawning pond is brushed and rinsed thoroughly.
2. The pond is dried for 2 days under the hot sun. This is intended to kill germs in the pond.
3. Furthermore, the pond is filled with water until it reaches a height of 60 cm. This water comes from a well that has been installed a water pump machine. This well is located around the spawning pond. The water is relatively clean and clear water.
4. Spread the *kakaban* in the form of a substrate for attaching the eggs to the spawning pond. *Kakaban* is made of long and flat fibers, 120 cm long and 40 cm wide that are clamped with bamboo slats and tied into 4 pieces. The position of the *kakaban* in the pond is submerged to a depth of about 30 cm from the water surface. In order to float, the *kakaban* is arranged on top of a piece of bamboo that is still intact. Above the *kakaban* is given bamboo and tied so that the group of *kakaban* is not scattered when the parent pair spawns. Before installing, the *kakaban* is cleaned, washed and rinsed so that it is free from dirt.

The broodstock used in the spawning process are brood that is ripe for gonads and the fish are in a healthy condition, without physical defects. The number of broodstock used for this study were 4, each with a weight of 2 kg, and the male weighing 1.5-1.7 kg. The size of the female parent is larger than the male parent. Likewise, the age of each parent that was collected ranged from 1.5-2 years.

The selected parent is then put into the spawning pond at 6 in the afternoon, when the sun has set with a temperature that is not hot. The parent that is first put in the pond is the male parent for about 15 minutes of environmental adjustment, then the male is inserted into the pond. Comparison of 1: 3 parent koi (1 female parent and 3 male parents), this is intended so that all the eggs released by the female parent can be fertilized by male sperm and anticipate the presence of immature male gonads.

The water quality meters that are measured in this spawning are temperature, pH, and DO can be seen in Table 1.

Table 1. Water quality parameters for spawning

No	Parameters	Figure
1	Temp.	28 ^o C
2	pH	7
3	DO	6,5 ppm

Parent koi that have been released in the spawning pond at 2 o'clock in the morning begin to carry out the initial stages of spawning, marked by the boisterous sound of water due to spawning couples chasing each other. The female parent will swim around the pond followed by the male swimming behind her. The male pursues, trying to attach his body to the female mother.

The movement is faster with the peak, namely the female will issue eggs into the pond. Occasionally the female parent jumps up. The male is no less exciting, he often follows the female mother and jumps into the air. While removing sperm. The pond water will rippling slightly and accelerate the fertilization of eggs by sperm cells.

The eggs that are removed will stick to the *kakaban*. The chase will last until dawn (around 5

am) is over. The brood that has finished spawning stops chasing and swims to the edge of the pond. The fishy-smelling pond resulted from spawning and the mother's stomach was also seen deflating. When spawning has finished, the parent is lifted and returned to the parent's rearing pond, this is so that the parent does not eat its own eggs.

The problems faced in this research are:

1. There are limited broodstock of koi carp that are ripe for gonad, this is because the cultivators, especially the koi carp in Gorontalo, are still less than in other regions.
2. Inaccurate selection of sires, namely the ratio between male and female parents is not balanced or the sires are not yet 1 year old so the eggs are not yet mature.
3. Broodstock is disabled or unhealthy.
4. Lack of handling of spawning water quality.

Koi carp eggs count using the TF formula (Total Fecundity): $(TF) = n \cdot (Wt / Ws)$, where n is the number of eggs taken (1000 count) times (Wt) the total weight of gonads weighed (g), and divided (Ws) the weight of 1000 eggs weighed (g).

In this study, the total gonad weight was 400 grams, while the weight for 1000 eggs was 2 grams. So to get total fecundity (FT), which is 1000 eggs multiplied (400 grams of total gonad weight divided by 1000 egg weight or 2 grams) results in a total fecundity of 200,000 eggs.

IV. Conclusion and Suggestion

Koi spawning conducted in this study is a natural spawning technique because it is considered more efficient and effective.

The female parent who has a good response, when spawning, will swim towards the substrate while releasing eggs, then followed by the male parent behind her while releasing sperm until the spawning is complete.

One of the factors that support the success of a spawning is the parent selection necessary to get a good broodstock to take the advantage of high quantity seed production.

Judging from the spawning process, it is hoped that further researchers can use semi-artificial spawning methods to compare the quality koi seeds.

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