# Cultivation Techniques of Pearl Catfish (clarias sp.) in The Parikesit Community Group of Sumurgung Village, Tuban District, East Java

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## Abstract

Cultivating PEARL catfish in the Parikesit Community Group, Sumurgung Village, Tuban District, Tuban Regency, East Java, goes through several stages, such as seeding, enlargement, and water quality management. Hatchery starts from parent maintenance, spawning, and seed maintenance. Enlargement is the stage of raising the seeds to consumption size. Feed with nutritional content can meet the needs of fish. Water quality management is also carried out so that pool water remains optimal and minimizes disease. The aim is to understand and know, as well as the business prospects contained in the cultivation of PEARL catfish (Clarias sp.). The field practice method uses descriptive methods, by observing and following all the activities of PEARL catfish (Clarias sp.) cultivation techniques. Parent maintenance in a concrete pond measuring 4.5 m x 4 m, 6 males and 11 females. Pool preparation by removing the water, cleaning the pool walls, and refilling the pond water. The success of the fertilized egg can reach an FR value of 85.84%. The enlargement technique was carried out in a round tarpaulin pond with a diameter of 3 m, media preparation by spreading krosok salt and probiotics, grading was carried out once a week, and growth monitoring. The feed given to Pearl catfish was natural food Tubifex sp. and artificial feed in the form of PF100, PF500, and PF1000. Water quality management was carried out to maintain water quality to remain stable with regular water changed and calcification of ponds.

## Keywords: Cultivation, Feed, Enlargement, Hatchery, and Water Quality

## Introduction

One of the freshwater fish commodities for consumption which is a superior aquaculture business prospect in Indonesia is catfish. According to the KKP (2021) the total production of catfish farming in 2021 could reach around 1,253,114 tons/year, an increase from 2019. The results of a new strain of African catfish which have passed the breeding assessment of the Sukamandi Fish Breeding Research Agency (BPPI) given the name PEARL "High Quality Without Match" (BPPI, 2014)..

PEARL catfish is the selection reslut from G (3) formed through a combination cross of four strains of African catfish in Indonesia, namely the Egyptian catfish, Paiton catfish, Sangkuriang catfish, and Dumbo catfish as the forming parents. One of the advantages of the Mutiara catfish is the relatively complete cultivation performance according to the expectations of the cultivating community such as growth, feed efficiency and uniformity in fish size (BPPI, 2014).

Pearl catfish culture, among others, stages of hatchery, enlargement, and management of water quality. Hatchery is an activity that starts from raising PEARL catfish broodstock, spawning, and seed maintenance. Enlargement is the stage of raising the seeds to reach consumption size. Feed is an important factor in supporting the growth of cultivated seeds, because nutrients inside which the catfish needed (Alwi et al., 2021). In addition to feed, water quality management is an important parameter in PEARL catfish farming. Water quality management includes water management in ponds so that it remains of optimal value and according to Indonesian National Standard levels.

The Parikesit Community Group in Sumurgung Village, Tuban District, Tuban Regency, East Java is one of the businesses in Tuban that develops seeding, growing and water quality management techniques. Based on this, it was necessary to carried out Field Work Practices in the Parikesit Community Group in Sumurgung Village to find out and observe PEARL catfish farming techniques which include hatchery, enlargement, and water quality management.

## Material and Methods Time and Place

This Field Work Practice was carried out at the Parikesit Community Group in Sumurgung Village, which was located at Jl. Al Falah Mosque, Bongkol 1, Sumurgung, Tuban District, Tuban Regency, East Java. The time for conducting Field Work Practices was July 11 2022 – August 31<sup>st</sup> 2022.

## **Research Method**

The method used was direct observation methods obtained from facts in the field and collects some data from primary data such as active participation, measurement, and insight, while secondary data is obtained from library materials, literature, and book.

## Result and Discussion Broodstock Rearing

Pearl catfish broodstock rearing in ponds where environmental conditions have been adapted to their natural habitat. Change of pool water can be done once a week and only a quarter of the pool water was replaced so that the sires didn't experience stress with sudden changes in water (temperature, pH and DO). Rearing of male and female broodstock was carried out separately so as to facilitate maintenance, control and prevent spawning out of control.

# **Broodstock Selection**

The age of the PEARL catfish broodstock which is ready to be spawned about 1 year old because the gamete cells had been fully formed. The characteristics of the mother catfish ready to spawn were the female broodstock's belly distended, the genitals swollen and reddish-purplish in color, while the male parent's genitals were spiky and reddish in shape and the abdomen when pressed towards the urogenital will release a milky white liquid (Ardyanti et al., 2017).

# Spawning

## A. Pond Preparation for Eggs

The pond used is a concrete pool with a length of 3 m, a width of 3 m, a water level of 70 cm, the bottom of pond was made slanted to the discharge section to a depth of 10 cm. Preparation of the egg rearing pond begins with removing the water, cleaning from the moss adhering to the pond walls and remaining unused waste and refilling the pond water.

## B. Hormone Injections

The purpose of injecting hormones in the PEARL catfish broodstock was to stimulate, uniform the maturity of the eggs which were optimal initially not to become ripe simultaneously, and the volume of fluid from the sperm of the male broodfish (Sinial, 2014). The hormone used was the hormone ovaprim. Ovaprim was a combination of Salmon Gonadotrophin Releasing Hormone (sGnRH-a) LHRH analogue and domperidone. The stipulations for the dose of ovaprim injection for female catfish parents are 0.2 ml/kg of parent weight and 0.1 ml/kg male parent weight.

## C. Artificial Fertilization

The spawning of Pearl catfish in the Parikesit Community Group, Sumurgung Village, Tuban District, Tuban Regency, East Java, uses artificial spawning. In stripping process, the female broodstock's head was covered using a cloth or towel and then massages the stomach towards the genital papilla opening to release the eggs (Prama et al., 2014). The eggs obtained had a green-brown color, not lumpy, and not too dry. The sperm collection was carried out surgically from the anus to the direction of the pectoral fins (back of the gills) then separates the testicles from other organs. The testicles were cut with scissors and the sperm fluid was placed in the prepared basin. Artificial fertilization in Pearl catfish was done by mixing the sperm solution into a basin containing eggs, adding clean water and spreading it into the pond that had been prepared.

## D. Egg Hatching

In hatching ponds, pearl catfish eggs were given flowing water with a small discharge to provide sufficient dissolved oxygen supply for egg development. According to Tondang et al., (2019) live eggs appear to have a greenish color while dead eggs was white color and surrounded by fungus. The low egg hatchability value can be caused by the process of selecting pearl catfish broodstock whose physiological characteristics were immature gonads. The observation results of the fertilization rate (FR) were around 85.84%, it was said that the FR value in the Parikesit Community Group in Sumurgung Village was good.

## E. Larvae Rearing

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Pearl catfish eggs began to hatch into larvae about 18 hours after the artificial fertilization process. Maintenance and control of larvae must be maintained by water quality management so that it remained optimal. The haching rate obtained from the spawning process of the Parikesit Community Group in Sumurgung Village was around 80.84%, its value was good.

## F. Nursery

Nursery was a process that uniforms the size of fish so that they become even and the same size, aiming as a form of effort to avoid cannibalism and seed growth can run optimally. The size of the seeds in the nursery ponds were from 3-4 cm in length in healthy condition with a stocking density of around 500-5000 individuals/m<sup>2</sup>.

#### **Enlargement Pond Preparation**

Preparation of the Pearl catfish rearing pond consists of a round tarpaulin pond with a height of 70 cm and a diameter of 3 m. Adequate sunlight in rearing ponds can produce good water quality conditions and minimize disease attacks. Pond preparation began with cleaning a dirty and mossy pond using a brush, then drying the pond for 12 hours, and filling with water.

## **Media Preparation**

After preparing the pond, then spreading the krosok salt in as much as 8.4 kg/m<sup>3</sup> to kill and prevent fish, parasite and fungal diseases, then adding a molasses/sugar molasses solution of 20-50 ml/m<sup>3</sup> to increase fish weight, probiotics 0.8 grams to increase the immune system of fish for the better. After that, put 3.5 liters of water into the pond and fermented for 7 days. Fermentation aimed to produce an optimal growing environment for beneficial microbes, dominate and make the habitat more suitable for the growth of living things in that environment (Widarni et al., 2012).

## **Seed Spreaded**

Before the seeds were sown, it is better made climate adjustments first. The trick was to put the seeds into the pond with the container (bucket/jurigen) and leave it for 15 minutes so that the temperature of the place where the seeds are adjusted to the temperature of the pool as their new environment. Tilt the container and let the seeds come out on their own. This can prevent stress on the seeds. Furthermore, to determine the health of the seeds, physical observations were made on catfish seeds. PEARL catfish seeds have a uniform length of 5-7 cm, were not deformed and are active (Saputro, 2016).

#### Grading

Sorting was a separation activity to produce a uniform size of fish seeds. Sorting was usually done once a week by looking at the condition of the catfish, in the afternoon. Sorting was done by reducing the water in the pond and preparing the pond to be used for separating catfish. After the water was drained, the fish were netted using a seser and put in sorting tanks.

#### **Growth Monitoring**

Table 1. Growth Monitoring of Pearl Catfish(Clarias sp.)

No.	Date	Carrying	Length	Weight	Day
		Capacity			
1.	18/07/22	400	7	3	15
2.	28/07/22	400	9	8	25
3.	07/08/22	400	13	10	35
4.	17/08/22	400	14	15	45
5.	27/08/22	400	15	20	55

The growth of PEARL catfish can be seen from the increase in body weight and specific growth rate (SGR) for 5 weeks of treatment. In the first week to the fifth week it showed increasing growth results. On the last day, we got PEARL catfish with a weight of 20 grams and a length of 15 cm. Fish growth depends on the quality of the feed given so that it can be seen from the daily body weight gain. In addition to feed, water quality in catfish enlargement has an effect on fish growth and development (Rosmaiyadi et al., 2019).

#### **Feed Management**

The Parikesit Community Group in Sumurgung Village uses two types of feed, namely natural feed and artificial feed. One of the natural feeds used is silk worms (*Tubifex* sp.) because they had a high protein content. Feeding natural silk worms with seeds aged 1-10 days with a length of less than 1 cm and weighing less than 3 grams. Artificial feed was made in a certain shape so that it can form an attraction or can stimulate fish ate it easily and voraciously. The artificial feed used by the Parikesit Community Group in Sumurgung Village includes PF100, PF500, and PF1000.

#### Water Quality Management

According to Rachmawati et al., (2015) Water quality management can be done by changing pool water regularly and calcifying the pool. Changing the pool water improved the water quality, whereas if the pool water changes were not regular, then the harmful substances in the pool water hadn't been removed, so the water quality wasn't optimal. During pool water changes, water quality parameters were also measured, such as temperature, DO, pH, ammonia and nitrite. Temperature, DO, and pH measurements were carried out 3 times a day, namely morning, afternoon and evening. Meanwhile, measurements of ammonia and nitrite at once a week.

## **Pest and Disease Control**

There were 2 types of diseases found in Pearl catfish, namely white spot disease and *Aeromonas hydrophila* bacteria. White spot disease was characterized by the appearance of white spots on the surface of the skin and gills. The cause of this disease was due to high stocking densities and poor water quality management. *Aeromonas hydrophila* bacterial disease had general symptoms of the disease, namely the fish swimming movement was abnormal, slow, there were damaged parts of the fins, and there were injuries to the skin and muscles. Treatment of the disease was carried out by routinely controlling water quality management and providing 2-4 kg/m<sup>3</sup> of krosok salt for 2-3 consecutive days.

In addition, pests found during PEARL catfish cultivation were tadpoles and birds. Prevention that can be done against tadpole pests is siphoning every 3 days and installing nets to prevent bird pests from entering (Jasmanindar et al., 2020).

## Harvest and Post Harvest

Harvesting was the final stage in PEARL catfish cultivation which can be done in the morning or evening when the temperature wasn't too hot. Usually the seeds can be harvested every 2.5 - 3.5 months with a length starting at 3 cm. Before being harvested, the catfish are not fed with the aim of not regurgitating the feed or disposing of feces during delivery. The pond water was drained and the fish were taken using a seser and then put into the jury.

## **Business Analysis**

In a business there were several things that need to be considered in order to find out if the business was worth continuing or not. The following was a table of analysis of the pearl catfish hatchery and rearing business in the Parikesit Community Group, Sumurgung Village:

November 2022 TR (Total Receipt) = Rp10.500.000 (month), Rp126.000.000 (year) C (Operational Cost + Depreciation Cost) = Rp11.511.000 + Rp17.608.800= Rp29.119.800 FC (Depreciation Cost) = Rp17.608.800 (year) TVC (Operational Cost) = Rp3.832.000 (month), Rp 11.511.000 (year) NC (Total Receipt + TC) = 126.000.000 +29.119.800 = 155.119.800 TR/TC RC value = Rp126.000.000/Rp155.119.800 = 1,09 (worth developing) BEP value (cost) = (FC)/(1-(TVC/TR))= Rp17.608.800/1 (Rp11.511.000 / Rp126.000.000) = Rp17.608.800 / 1 - 0.09 =Rp17.608.800/0.91 = Rp19.350 PP (Payback Period) = (investment cost/Nc) x 1 year = (Rp225.394.000/ Rp155.119.800) x 1 year = 1,45 x 1 year = 1,45 year

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Based on business analysis, PEARL catfish farming business can continue to be developed in order to meet the needs as a consumption fish. There were times when business constraints arise, such as fish that were exposed to disease so that their appetite decreases and results in death. An increase in feed prices can occur erratically and also an obstacle to PEARL catfish farming business.

## Conclusion

Pearl Catfish hatchery techniques include brood rearing, brood selection, spawning (pool injection, preparation, hormone artificial fertilization, and hatching of eggs), larval rearing, and nursery. Enlargement techniques include pond preparation, media preparation, seed stocking, grading, and growth monitoring. Feed management by giving natural feed and artificial feed. Water quality management was carried out by managing water quality and measuring water quality parameters, namely pH, temperature, DO, Ammonia and Nitrite. Pest and disease control was carried out by siphoning. Harvesting was done every 2.5 - 3.5 months with sizes from 3 cm. Pearl catfish business was profitable and feasible to develop.

There needs to be a solution to overcome the problems in the Parikesit Community Group in Sumurgung Village, namely by improving facilities and infrastructure in Pearl catfish farming activities and increasing supervision of pest and disease control in order to speed up prevention if fish were attacked by disease.

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