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The Production Evaluation of Lais Fish (*Kryptopterus* sp.) Culture in Wetlands

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Abstrak: *This study aimed to examine the technical and economic feasibility of lais aquaculture production. A cultivation activity was done in order to increase profits. Primary data was collected by interviewing fish cultivators and secondary data was obtained from related references. The bioecological characteristics of lais fish made this fish a candidate for aquaculture commodities paying attention to the management and technology used. Various technical aspects of production need evaluated continuously, including site selection, seed stocking, feeding, water quality management, fish health, harvesting, and marketing. Referring to the components of the evaluation results which were very lacking. Farmers need partners as mentors and access to several facilities to support production components that have not been maximized, one of which is the provision of best practices of fish handling certified superior lais fish fry.*
Keywords: *Evaluation of production; Lais fish; Freshwater commodities*

1. INTRODUCTION

Therefore, conservation efforts need to be done before extinction occurs. In general, currently the trend of capture fisheries is starting to decline in line with the increase in aquaculture activities and the limited carrying capacity of world fishery resources due to degradation in the last decade. The causative factors are degradation of environmental quality, pollution of both marine and fresh waters, destructive fishing, and illegal overfishing (Wahyuni *et al.*, 2013). Due to these conditions, Indonesia faces a challenging situation when it comes to returning to aquaculture as a major source of income.

The production of lais fish can be increased by cultivating. Cultivating lais fish is one way that can be done to overcome the problem of extinction or decreasing populations of lais fish as well as to increase the production of these fish. Efforts to produce seeds in large quantities, on time, and continuously are needed to support this fish farming business.

Aspects that need to be known in the cultivation of lais fish include habitat, food, and reproduction. Land suitability for fish farming

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should be analyzed so that it can be used as a basis for determining the most appropriate use of the land (Rachmansyah & Mustafa, 2011). To enable lais fish to complete their life cycle, they require a place for fish cultivation. In order to increase the production of lais fish, intensive cultivation must be conducted, not only by providing quality food, but also by ensuring good water quality. In lais fish farming, NH3 is an inhibitor of growth in addition to oxygen. At a concentration level of 0.18 mg L^{-1}, it can inhibit fish growth (Wedemeyer, 1996).

Cultivating lais fish (*Kryptopterus* sp.) in wetlands is an activity that has great potential to increase aquaculture production in Indonesia. Evaluation of lais aquaculture production in wetlands is very important to determine the effectiveness and efficiency of these aquaculture activities. Measuring production components such as site selection, seed stocking, feeding, water quality management, fish health, harvesting, post-harvest handling, and marketing can be performed as part of this activity (Effendi, 2019). The results of this evaluation can be used as a guideline for improving the quality of lais fish production in wetlands and helping fish farmers to increase profits from their cultivation activities. Therefore, evaluating the production of lais fish farming in wetlands is very important so that lais fish farming can develop and provide maximum benefits for fish farmers and the wider community (Yonarta *et al*., 2023).

2. RESEARCH METHOD

The data collection method used in compiling this journal was obtained from interviews with lais fish cultivators and various relevant literature. The topic of this scientific article discusses the evaluation of production in lais fish farming in wetlands. Literature study data analysis was carried out to collect data from various sources according to the topics discussed such as the potential for lais fish farming, cultivation locations, seed stocks, feed requirements, management of water quality and health, harvesting and post-harvesting. All of data were collected to evaluate the production potential of lais aquaculture in wetlands.

3. RESULTS AND DISCUSSION

Lais Fish Aquaculture Potential

Based on the bioecological characteristics of the lais fish, this fish can be cultivated in a controlled manner through domestication with due regard to the management and technology used (Yonarta *et al*., 2023). Domestication efforts are the initial stage before fish can be cultivated. The lais fish has the opportunity to develop aquaculture due to increasing production value, but the supply derived from nature still relies on natural products. This situation is feared to have an impact on the extinction of the lais fish (Sundari *et al*., 2021). Despite all the efforts required, lais fish farming activities still have wide potential.

High market demand for lais fish will be very profitable from an economic perspective. According to Dwitasari *et al.* (2017), the price of lais fish among fishermen is IDR 35,000 per kg. The potential of the lais fish can make lais fish a candidate for aquaculture commodities. One of the efforts to maintain this fish population is through cultivation, in addition to suppressing the intensity of catching in public waters, this cultivation business can also increase fish production with good quality.

Evaluation of Lais Fish Production

Site Selection

Site selection is an important factor in the field of cultivation because it will affect the quality of the water source used. The natural habitat of the lais fish is flooded swamp waters, which have the characteristics of limited dissolved oxygen content, acidic pH, high turbidity and low brightness (Jusmaldi *et al*., 2019); (Jubaedah *et al*., 2015). Lais fish in Indonesia can be found in the Nagara River, South Kalimantan (Fajriati *et al*., 2022), Lais fish in Indonesia can be found in the Nagara River, South Kalimantan (Sukmono *et al*., 2010), the Mahakam River, East Kalimantan (Jusmaldi *et al*., 2019), the river flood swamps Rungan, Central Kalimantan (Minggawati & Lukas, 2015), Kampar River, Riau (Elvyra *et al*., 2007), Pakil River, Bangka Belitung (Lestari *et al*., 2021), and Musi River, South Sumatra (Prianto & Suryanti, 2010).

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The average water quality in the lais fish habitat includes a temperature of 25-32ºC; pH 4.7-7.9; dissolved oxygen 2.6-8.0 mg L^{-1}; and ammonia 0.01-2.00 mg L^{-1}. Although the lais fish is able to live in low water quality, according to several studies it can grow optimally in a certain range. According to Gunawan *et al*. (2019), treatment with a temperature of 29ºC gave the best results with an absolute weight growth of 34.22 g, an absolute length of 5.75 cm and a survival rate of 92.50%.

Furthermore, germs and parasites must not be present in the water used for cultivation, whether it be for preparation or rearing. Pool sanitation needs to be done to keep the pool and water used clean. In general, ponds that have poor environmental conditions or are poorly maintained will more easily grow algae or other types of parasites, which can reduce the quality of cultivated products. In order to avoid spreading diseases or parasites, ponds are always kept clean, especially the water quality (Putrawan *et al*., 2019).

Seed Stocking

Lais fish seeds are still difficult to obtain, due to low-quality seeds so their availability is limited. The survival rate of lais fish larvae only reaches an average of 38.27%, which is still relatively low (Agusnimar *et al*., 2015). Therefore, it is necessary to pay attention to several aspects in detail when sowing the seeds. Good seeds are seeds that come from superior breeders that have been selected or certified (Ramadhan *et al*., 2018). So that you can be sure that the health quality of the seeds is guaranteed.

The number and weight of seeds can be determined before stocking as a way to calculate survival rates or growth parameters. At the time of stocking, it is advisable to perform acclimatization. Acclimatization is a physiological adjustment or adaptation of fish to their new environment. Acclimatization is a process of adjusting to two different environmental conditions so that these conditions do not cause stress for fish. Seeds stocked must be checked periodically to see if the stocking caused fish stress, as indicated by abnormal fish behavior (Arianto *et al*., 2018; Jayadi *et al*., 2021).

Feeding

Food serves as a source of energy used for body maintenance, replacement of damaged body tissues, growth, and activity, and excess food is used for reproduction (Somawati & Adnyana, 2020). For this reason, the right type, amount, and frequency of feed must be given. The type of feed given is based on the habits of fish-eating in nature or their natural habitat. The results of a stomach study conducted by Lestari *et al*., (2021), showed that the main food of lais fish is insects with an Index of Preponderance (IP) value of 59.67%, and classifies lais fish as carnivorous fish. Natural foods that can be given to lais fish are insects, small shrimp, and silk worms. According to Fatah & Asyari, (2011), fish that have intestines that are shorter than their body length are classified as carnivores. Therefore, the rate of digestion that occurs is faster than that of herbivorous fish. So that the frequency of administration will also be more frequent because it is related to the rate of gastric emptying that occurs, which will also take place faster.

In order to determine fish feed requirements, it is necessary to know the population data and biomass of the fish in cultivation. The larger the size of the fish, the smaller the percentage of feed given, but the amount of daily feed is greater. The frequency of feeding fish is also important to note because in some types of fish, increasing the frequency of feeding can increase growth.

Water Quality Management

During lais fish farming, water quality must be monitored and recorded regularly so that the quality of the water quality can be continuously controlled (Sutarjo & Sudibyo, 2019). Water quality in fish farming activities is very important because it is the habitat for fish to live. Good water quality is not only free from pollution and clear in color. However, the physical and chemical quality of water must still be considered (Koniyo, 2020). Not only the feed factor, but water quality can also support the growth of the fish produced. Conversely, poor water quality can cause the growth of fish to be stunted (Yanuar, 2017).

In the event of extreme fluctuations in water quality, such as a sudden decrease in pH or low dissolved oxygen, aquaculture water must be

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handled immediately. A waterwheel or aerator hose can be added if the dissolved oxygen in the water is low, and lime can be added to raise the pH standard range. In addition, parameters such as temperature, free ammonia, and phytoplankton must also be considered in managing water quality. If these parameters are not managed properly, there will be a risk of disease spread which will eventually lead to decreased production and crop failure. Especially for the temperature parameter, according to Wangni *et al.* (2019), low temperatures can increase mortality in fish due to decreased appetite which will affect their body resistance and makes them more susceptible to disease. Furthermore, according to Lestari & Dewantoro (2018) high temperatures do not directly cause death in fish, but will have an impact on the emergence of stress, and abnormal behavior, the body weakens and becomes thin in fish. Whereas at an optimal temperature according to Arifin *et al*. (2021), digestive enzyme activity will be more stimulated so that metabolic processes will take place more quickly.

Management of fish health

The disease is a physical condition, morphology, or function that changes from normal conditions due to several causes, namely from within (internal) and outside (external), such as environmental factors, malnutrition, genetics, and pathogens such as fungi, parasites, bacteria, and viruses (Nugroho *et al*., 2012). The environment and maintaining the immunity of cultivated fish can be used to prevent disease. Several factors cause environmental changes and will disrupt the health of fish, namely pollution, excessive interaction, use of hazardous materials or antibiotics in cultivated fish, and the spread of external pathogens.

Drugs, especially antibiotics, that are not used according to the recommended dosage and type can also make pathogenic organisms resistant, resulting in new types. Generally, cultivators will use it without understanding the proper information about the use of drugs and chemicals. Precisely it will not cure and will cause new diseases in the cultivation area so it will affect the health of other fish. The application of best practices of fish handling is an alternative that can be done to help farmers carry out their experiments in dealing with ongoing fish disease attacks (Akbar & Fran, 2013).

Aquaculture activities can improve the production quality of several freshwater fish, including lais, by using hormonal engineering techniques. Some hormones that have been known to play a positive role in increasing fish growth include thyroxine hormone (T4) and growth hormone (growth hormone). Several studies have stated that the hormone thyroxine can increase the growth rate of fish by increasing metabolic rate, feed efficiency and protein retention. Several studies used thyroxine and rGH hormones in lais fish, namely in Agusnimar *et al.* (2015) the use of thyroxine hormone at a dose of 0.08 mg per kg of feed was the best treatment which resulted in an absolute weight growth of 14.80 g, length absolute by 1.10 cm, and survival by 100%. Furthermore, the research by Sawitri *et al*. (2018) the use of the hormone rGH (recombinant growth hormone) at a dose of 12 mg per kg of feed is the best treatment which results in an absolute weight growth of 3.85 g, an absolute length of 3.60 cm, a ratio of feed efficiency of 1.10, and survival of 100%.

Harvesting and Post-Harvest Handling

The lais fish that have reached the size of consumption can be harvested immediately. Fish weight at harvest varies depending on the length of maintenance. The length of rearing to reach consumption size depends on the size of the fish being stocked, the target size of fish to be marketed, and the desired size. Before harvesting, the seeds were fasted (no feed) for 24 hours. Harvesting fish must be done quickly and carefully, and try to keep the fish healthy and fresh. Equipment used for harvesting must be practical and safe for fish. After the fish had been harvested, they were housed in a water-flowing area. Fasting must be done before fish were distributed alive. Before transporting fish, it must be packaged according to the requirements of the transport system. The system for transporting fish can be carried out in an open system equipped with an aeration system and a closed system using plastic filled with oxygen. The process of transporting fish in cool conditions, this condition is generally in the morning or at night. The process of transporting fish must consider the

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length of time the journey will take. In addition to density, transportation time also affects water quality. The longer the fish are transported, the dissolved oxygen will decrease and increase the waste of fish metabolites such as CO2 and ammonia (Akbar, 2016).

Marketing

Marketing management is a crucial activity for increasing value and welfare in lais fish farming. Marketing fish requires consideration of several factors, including the target market, it is important to determine the market to be addressed before doing marketing, for example, the local, regional, national, or even international market; Maintaining the quality of fish, the quality of fish must be maintained properly starting from the process of harvesting, storage, to distribution. This is important to maintain consumer confidence and increase the selling value of fish; Determining the right price, and determining the right price is very important in fish marketing. Prices must be adjusted according to fish quality, target market, and production costs; Increase promotion, good promotion can help increase fish sales. Promotion can be done through social media, advertising, or exhibition events; Establishing partnerships with others, such as collectors and wholesalers to gain better access to the market and reduce distribution costs.

With good marketing management, it is hoped that fishery business actors increase the value of their fish products and contribute positively to the local and national economies.

4. CONCLUSION

The conclusion of the study found that lais fish has the potential to be cultivated considering the high consumer demand accompanied by a fairly high price. However, this potential must still be accompanied by an increase in cultivation, especially the provision of seeds that still rely on products from nature. So it is necessary to develop the hatchery sector.

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