Broodstock rearing techniques brown-marbled grouper (Epinephelus fuscoguttatus) at Balai Perikanan Budidaya Air Payau (BPBAP) Situbondo, East Java

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Abstract. Grouper fish has a fast growing nature so it can be mass produced to serve market demand. The purpose of implementing field work practices is to determine the technique of raising brown-marbled grouper broodstock at the Balai Perikanan Budidaya Air Payau (BPBAP) Situbondo, East Java and to find out the problems that are often faced in the maintenance techniques of brown-marbled grouper broodstock. This research was carried out on 23 December 2019-25 January 2020. The method used is the descriptive method with data collection including primary data and secondary data. The maintenance technique for brown-marbled grouper broodstock includes several stages of activities, namely preparation of containers, procurement of broodstock and parent selection, water quality management, feeding, pest and disease control. The obstacles that exist in the maintenance technique for brown-marbled grouper broodstock are erratic weather and power outages.
1. Introduction

Grouper is a commodity that has very high economic value either in the tropical and subtropical areas [1]. The brown-marbled grouper is one of the important fisheries commodities in Asian countries. It is a very popular food and is cultured intensive [2]. Ideal broodstock management envisages mimicking the conditions that the fish faces in its natural environment. Because the selected specimens of the fish were produced in the hatchery, they are already accustomed to culture conditions and therefore easier to develop into broodstock compared to their wild counterparts or parents of this cohort sourced from the wild populations[3]. Parent rearing is an initial priority in the hatchery business, the quality of the broodstock is very influential on the quality of the seeds produced. However, the availability of broodstock in the wild is low, this is due to overexploitation and high fishing [4]. With these facts in mind, there is a need for research on Broodstock Rearing Techniques Brown-marbled grouper \( (Epinephelus fuscoguttatus) \), especially at Balai Perikanan Budidaya Air Payau (BPBAP) Situbondo, East java

2. Materials and Methods

The study was conducted on December 23, 2019 to January 25, 2020, in Balai Perikanan Budidaya Air Payau (BPBAP) Situbondo, Jawa Timur. The working method used is the active participation method with data collection including primary data in the form of observation, interviews and active participation and secondary data in the form of literature study to complete the data collected. The data analyzed this research used is the descriptive method.

3. Result and Discussion

3.1 Broodstock Source

The broodstock source in BPBAP Situbondo comes from the waters of the Madura strait, the Bali strait, and the result of self-cultivation. Prospective female brown-marbled grouper fish must meet physical requirements such as complete body parts, no deformities, be healthy, free from disease, and have normal movements. This is by the criteria for female tiger grouper fish in [5], namely, weight 5-7 kg, not morphologically defective, free from disease, and having a positive response to the feed given.

Feed

The feed can affect the development of gonads and the success of the fish spawning process. The main diet of grouper broodstock is skipjack, selar fish, and kite fish with a size of 14-18 cm. The fish content can be seen in (Table 1). The dose of feeding on brown-marbled grouper broodstock is 3-5% of the total weight of the fish. The quality and quantity of broodstock feed greatly influence egg production, degree of fertilization, degree of hatching, and frequency of spawning [6].

The broodstock brown-marbled grouper was fed with fresh fish, namely kite \( (Decapterus \) sp.). Feeding was done at satiation in the morning. At satiation is feeding the fish to the maximum but the feed provided is not available around the environment. Fresh fish is stored in the refrigerator at a temperature of -4°C to -11°C. Before feeding, the fish are soaked first [6].
Table 1. Comparison of the nutritional content of some crumbled fish with the nutritional needs of groupers

| Nutritional Needs of Grouper | Mackerell [8] | Scad fish [9] | Rastrelliger spp. [10] | Yellow strip [11] |
|-----------------------------|---------------|---------------|------------------------|-------------------|
| Protein 45–50 %             | 54.2 – 68.4 % | 74.86%        | 18.5 %                 | 18.8 %            |
| fat 19-21 %                 | 1.8 – 5.6 %   | 5.74 %        | 2.1 %                  | 2.9 %             |
| carbohydrate 7-28%         | 0.03 %        | 1 - 3 %       | 0 – 1 %                | 0 %               |
| Vitamin 60-120 mg/kg       | 1 %           | 0.8 - 2 %     | 3.0 – 4.5 %            | 0.4 mg/kg         |
| Mineral 2 %                 | 1 %           | 0.3 %         | 2.0 – 2.5 %            | 179 mg/kg         |

3.2 Vitamin
Giving vitamins to the feed can accelerate the maturation of fish gonads and the quality of fish eggs, giving vitamins to the feed is done every two days. The type of vitamin given is in the form of a multivitamin containing vitamin B complex, vitamin C, and vitamin E. The dose of vitamin E is 100 IU / brood fish, while the dose of multivitamin B and C is 50-100 mg/broodstock. The administration of vitamins is done by inserting a multivitamin into an empty capsule then the capsule is inserted into the stomach of a fresh fish given to the mother of tiger grouper. The dose of a multivitamin mix as enrichment is 20-50 mg/kg broodstock [12].

Vitamins B and C can stimulate good reproductive development for brown-marbled grouper broodstock for gonad maturation and maintain fish appetite, Vitamin C can increase body resistance to stress, play a role in collagen formation, and prevent abnormal metabolism, while vitamin E plays a role in protects the fish body from bacteria and also stimulates gonadal maturity. Vitamin E can also be used to improve cell membrane function [13].

BPBAP Situbondo has 2 brood tanks of brown-marbled grouper, in one tank there are 65 fish with a total number of 30 females and 35 males. The number of eggs produced in January 2020 was 14,200,000.00 with the number of broodstock spawning 47 fish, the spawning percentage was 78.3%.

3.3 Water Quality

Table 2. Water Quality

| Parameter     | Value          |
|---------------|----------------|
| Temperature (°C)| 30-31          |
| Salinity (ppt)  | 30-35          |
| pH            | 8.07-8.21      |
| Nitrite (mg/L) | 0.008-0.028    |
| Ammonia (mg/L) | 0.004-0.029    |
| DO (mg/L)     | 5.19           |

Almost all parameters still have a normal range of values [11]. This is because the change of water for 24 hours continuously keeps the water conditions in the pond or tub stable. Seawater is directly pumped and channeled into the main rearing tank and water continues to flow out through the outlet with a water change.
of ±400%. Water circulation in broodstock rearing which is carried out continuously (flow-through system) aims to maintain water quality in broodstock tanks and make the grouper rearing environment similar to its natural habitat [13].

3.4 Disease Prevention
BPBAP Situbondo prevents disease in brown-marbled grouper broodstock by treating water in temporary reservoirs by immersing fresh water. In addition, soaking is also carried out using H$_2$O$_2$ solution at a dose of 200-300 ppm for 30 minutes. Hydrogen peroxide is a disinfectant that is often used in the world of health because it does not leave harmful residues. Hydrogen peroxide is an effective and nontoxic antiseptic [14].

In addition, prevention is also carried out by implementing Biosecurity which functions to prevent the entry of diseases from outside the parent rearing environment, such as the application of KMnO$_4$ solution in footbaths and environmental sanitation. Tool washing serves to prevent bacteria or parasites from spreading from one tub to another.

4. Conclusion
The technique of rearing brown-marbled grouper broodstock at BPBAP Situbondo uses an intensive system, including broodstock procurement, container preparation, feeding and vitamins, water quality management, pest, and disease prevention.

5. References

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