

The Embryonic Development and Hatching Rate of Cantang Grouper (*Epinephelus fuscoguttatus*, Forskall 1775 x *Epinephelus lanceolatus*, Bloch 1790)

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Abstract

Cantang grouper is a grouper species produced from the hybridization of Kertang grouper and Tiger grouper. The hybridization, besides increasing species diversification, also has the prospect of cultivation that has the opportunity to increase fishery production in the future. The technique of maintaining grouper larvae needs to be known to be able to increase the production value of the grouper larvae and create technological opportunities in the production process. The embryonic development phase of cantang grouper egg consists of multicellular phase, blastula, gastrula, separation of the tail from the egg sac, the movement of embryo, internal organ formation and the hatching eggs. During the two months maintenance period, the Hatching Rate (HR) larvae were found to be 80%.

Keywords : Embryonic Development; Cantang Grouper; Hatching Rate. *Epinephelus*

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Introduction

One species of grouper which is being developed in Indonesia because of the quite high price in market is the cantang grouper. Cantang grouper is a hybrid grouper fish as the result of male kertang grouper and the female tiger grouper (National Standardization Agency, 2014). The morphology is similar to tiger grouper and kertang grouper, but has a better growth speed makes the grouper fish has a higher economic value than both the broodstock and has great potential in national and international markets (Prayogo and Isfanji, 2014).

Hybridization is one of the technology in aquaculture with purpose to increase the genetic diversity of groupers where the characters from their broodstock will produce strains with rapid growth, resistant to disease, survive in extreme environmental changes and sometimes the hybridization can be used to produce sterile fish (Ismi *et al.*, 2013). It seems that the hybridization can increase

species diversification, also have cultivation prospects that have the opportunity to increase fisheries production going forward (Ismi *et al.*, 2013).

The newly hatched grouper is called a larvae, its body is not yet perfect in both the inner and outer organs. Larvae maintenance is carried out to increase the production of seed and larvae. The technique for maintenance of cantang grouper can be done in a concrete pond with several aspect based on Prayogo and Isfanji (2014) which stated that fish density, water sources, biosecurity systems, feed composition and feed enrichment with multivitamins should be maintained in rearing grouper fish larvae.

Embryonic study support phylogenetic development and necessary to undertake proper study to characterize various stages of embryonic and larval development to understand the biological clock and cultural techniques of some species (Aral *at al.*, 2016). This research was undertaken with the

goal to describe the embryonic development of cantang grouper and also the value of hatching rate as success indicator of spawning activity.

Methods

This research was conducted at Brackish Aquaculture Fisheries Center, Situbondo, East Java, Indonesia on December 2018 - January 2019.

The method used in this study is the integration of various information and research results to be obtained, in this case the development of the grouper larvae. This means that the main activity is the systematic collection of information about egg development and calculation of the hatching rate and drawing logical conclusions from that information. Data was collected by active participation, interviews and direct observation.

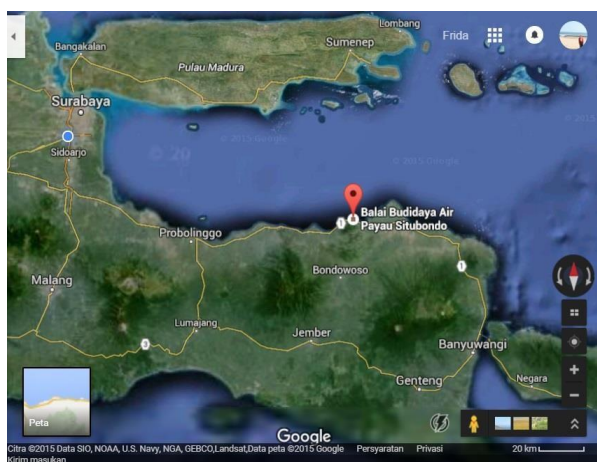


Figure 1. Brackish Aquaculture Fisheries Center, Situbondo

Hatching Rate (HR) was calculated using the formula from Effendi (2002) :

$$HR (\%) = \frac{\text{Number of hatched eggs}}{\text{Total number of eggs}} \times 100\%$$

Result and Discussion

Maintenance of cantang grouper larvae

The first stage in cantang grouper larval rearing is pond preparation. The pond

preparation is aimed at preventing the presence of harmful microorganisms in the larval rearing process and to remove dirt attached to the walls and floors of the pond. After the tank is ready for use, then the pond is loaded with sea water with salinity of ± 30 -32 ppt as much as 10,000 L through an inlet that has been installed with a filter bag to avoid macro dirt. This is consistent with the statements of Prakosa *et al.* (2013), that seawater which is loaded at the beginning of maintenance is filtered using a filter bag so as to avoid the presence of dirt and microorganism.

The second stage is fertilization and egg selection. The egg produced by the tiger grouper broodstock is mixed with sperm from the sperm of the kertang grouper. The egg that have been mixed by sperm are left for 5 minutes to give time for the fertilization occur. Then the fertilized eggs are spread out in the incubation tanks that have been given aeration. Egg incubation aims to make the development of the embryo take place perfectly. Egg incubation is done so the eggs can develop properly. According to Sunyoto and Mustahal (2000), incubation aims to create conditions so that the development of the embryo takes place properly so that quality larvae are obtained. Grouper eggs which fertilized will float on the water and transparent round shape with a size of 0.7-0.8 mm, while unfertilized eggs will settle to the bottom of the pond and become turbid white.

The fertilized eggs then acclimatized for 15 minutes in a maintenance tank that has been filled with water in order to adjust the temperature between the early environment with the temperature in the maintenance tank. After the acclimation process is complete, then the eggs are spread in two larval rearing tanks slowly and carefully with each tank containing $\pm 200,000$ eggs of groupers. Then the tank is covered with a tarpaulin so that the temperature in the larval rearing tank stable

and to reduce the intensity of the light entering the rearing tank. Fertilized eggs will begin the development phase of multicellular, blastula, gastrula, morula, until the eggs hatch into larvae after 18-20 hours of fertilization. These phases are in accordance with Chu (2016) statement, that fertilized eggs will start the development phase from multicellular, blastula, gastrula, morula until the eggs hatch into larvae. The development phase of the egg can be seen at Figure 2 below :

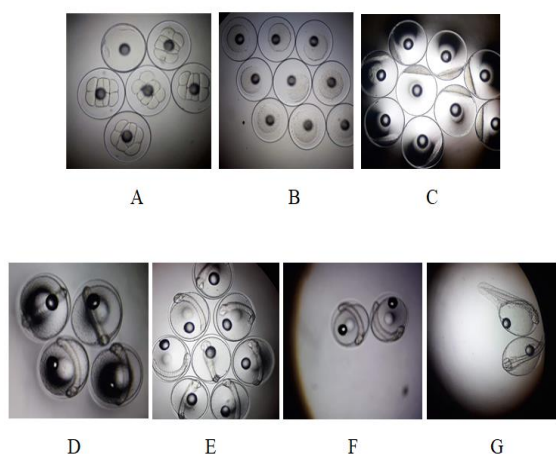


Figure 2. Development phase of Cantang Grouper Egg . A. Multicellular. B. Blastula. C. Gastrula. D. Tail separation from the egg sac. E. Movement of Embryo. F. Internal Organ Formation. G. Hatched Larvae.

Hatching Rate

HR (Hatching Rate) is the hatchability of eggs or the number of eggs that hatch. HR calculation is done directly to determine the success of fertilization and stocking of eggs. During the two months maintenance period, the Hatching Rate (HR) larvae was found to be 80% based on the formulation below :

$$\begin{aligned} \text{HR (\%)} &= \frac{320.000}{400.000} \times 100\% \\ &= 80\% \end{aligned}$$

According to Sugama (2013), a good fertilization rate and hatching rate for groupers must be > 50%. Fertilization and hatching rates are also used as indicators of egg quality. Fish larvae from the egg group with poor fertilization and hatching rates (<30%) are considered to be as poor quality larvae, and generally show low survival, high abnormal ratios and other health problems. The quality of the egg can be defined of the egg to be fertilized and subsequently into a normal embryo. Under aquaculture conditions, poor egg quality can lead to several types of problems, such as lack of fertilization, development arrest, embryonic mortalities and embryonic deformities (Bobe, 2015).

Water Quality

The results of water quality observations indicate the optimum value for cantang grouper larval rearing media, as follows : 29.33°C in temperature; 7.7 in pH; 33 ppt in salinity and 0.02 mg/l in ammonia.

Conclusion

Development phase of cantang grouper egg consists of multicellular phase, blastula, gastrula, separation of the tail from the egg sac, the movement of embryo, internal organ formation and the hatching eggs. The Hatching Rate (HR) of cantang grouper reached 80%, respectively.

Acknowledgement

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