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Embryo Development of Ospheronemus Gouramy Lac With Young Coconut Cocos Nucifera L Water Immersion

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Abstract – The interaction between genetic and environmental factors influences the development process of the embryo and also determines various individual characteristics. Using coconut water as a diluent for goldfish spermatozoa, because coconut water can be used as an energy source for spermatozoa. This study aimed to analyze the effect of immersing gouramy eggs with young head water on embryo development. This research was conducted at the Freshwater Hatchery of Marine and Fishery Polytechnic, Pariaman from November 2022 to December 2022. This study used an experimental method with a completely randomized design with 4 treatments and 3 replications. The treatment used as the research subject was the concentration of immersing young coconut water : without immersing young coconut water (P0); 15 ml/L (P1); 25 ml/L (P2); 35 ml/L (P3). Observational data on embryo development were analyzed descriptively based on the results of research observations. The data is presented in pictures and the results of the description are referred to using relevant references. The results of this study concluded that the addition of young coconut water to the process of hatching gouramy eggs gave more significant results in the P3 treatment with a dose of 35 ml/l of young coconut water, namely the embryonic cell division process was faster than other treatments.

Keywords – Coconut Water; Gouramy Eggs; Embryonic.

I. INTRODUCTION

Gouramy fish (*Osphronemus goramy* Lac.) is a type of freshwater fish that has high economic value because of its good price and relatively stability in the market. Gouramy is a delicious fish, contains high nutrition, the texture of the meat is not mushy, it has few spines and bones, so it is in great demand by the public. The processes involved in the early life development of fish are closely related to the stability of the fish population in a waters. Early life development of fish has a big contribution in determining the variation in production each year. The interaction between genetic and environmental factors influences the development process of the embryo and also determines various individual characteristics[1].

Feces that occur in the early development of fish life greatly affect the stability of the fish population in their habitat. The development of fish life in determining the variation in production each year is a big contribution at the beginning of rearing. The interaction between genetic and environmental factors influences the development process of the embryo and also determines various individual characteristics. Sustainable gouramy hatchery efforts with the aim of producing quality gourami seeds starting from high egg hatchability and survival rate. In this phase special handling is required because the larvae are still vulnerable and sensitive to environmental changes. Embryos and larvae are the phases of fish development and growth that are most sensitive to environmental conditions and the most influential are changes in temperature[2].

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Another determining factor in the process of hatching gouramy eggs is water, because water is a vital medium for fish life. Using coconut water as a diluent for goldfish spermatozoa, because coconut water can be used as an energy source for spermatozoa. Sperm fluid consists of glucose and fructose which are also contained in coconut water so that it can be used as an energy source for the survival of spermatozoa[3]. The use of young coconut water is expected to replace physiological NaCL as a diluent. The use of young coconut water for a long time can lower the pH so that a buffer is needed to maintain the pH under normal conditions (pH 7). Young coconut water has almost the same composition as isotonic fluids needed by the human body are minerals, including potassium. Potassium functions to balance sodium levels, so blood pressure is maintained. This study aims to analyze the effect of immersing gouramy eggs with young head water on embryo development[4].

II. Literature Survey

Process changes that occur during the early development of fish life starting from eggs are very influential in stabilizing fish populations in their waters of origin. The early development of fish life has a big contribution in determining the variation in production each year. The interaction between genetic and environmental factors influences the development process of the embryo and also determines various individual characteristics. The energy used for metabolism and embryo development in eggs comes from the yolk sac, as well as dissolved particles in water which are thought to also be absorbed by the egg[1].

Eggs generally undergo a process of embryogenesis is the process of developing eggs to become definitive larvae. Embryogenesis will take place at the time of incubation starting from the process of cell division, morula, blastula, gastrula and continued with organogenesis which then hatches. Cell division (cleavage) is the process of cell division during embryonic development, the size of the cell gets smaller over time or becomes a small unit called a blastomer. At the beginning of the gourami life development, both the size of the eggs, larvae, and growth are still relatively the same. The character differences between the gourami subspecies may be clearly seen at a more advanced level of life, or by looking at the differences down to the DNA level. Nevertheless, the results of the study showed that there was a tendency for differences in the characters of hybrid, bluesapphire, and Caucasian gourami at the embryo and larval levels[2].

Coconut is a tree that thrives in the tropics and subtropics, coconut fruit is the part of the coconut tree that is widely used apart from its stems and leaves and sticks. Coconut fruit consists of two parts, namely the outer (endocarp) and the inner (endosperm). The endosperm also consists of two parts, namely the white kernel and the coconut water. The volume of coconut water reaches its maximum at the age of 6 months, as the coconuts get older the volume of coconut water decreases because it is replaced by kernels that grow harder and thicker[3]. The nutritional composition of coconut water can vary based on variety, degree of maturity (age) and environment (temperature and climate). The volume of coconut water in each coconut is usually around 300 ml with a pH ranging from 3.5 – 6.1 and coconut water produces a distinctive aroma due to the presence of aromatic and volatile components. The benefits of coconut water in the field of fisheries science can be seen from several studies used for dilution of spermatozoa, namely the addition of coconut water and glycerol has an effect on the fertility of carp (*Cyprinus carpio*) spermatozoa and spermatozoa still survive for four days of storage, with the best test treatment with a dose 50% coconut water and 50% glycerol[4].

III. Methodology

This research was conducted at the Freshwater Hatchery of Marine and Fishery Polytechnic, Pariaman from November 2022 to December 2022. This study used an experimental method with a completely randomized design with 4 treatments and 3 replications. The treatment used as the research subject was the concentration of immersing young coconut water : without immersing young coconut water (P0); 15 ml/L (P1); 25 ml/L (P2); 35 ml/L (P3).

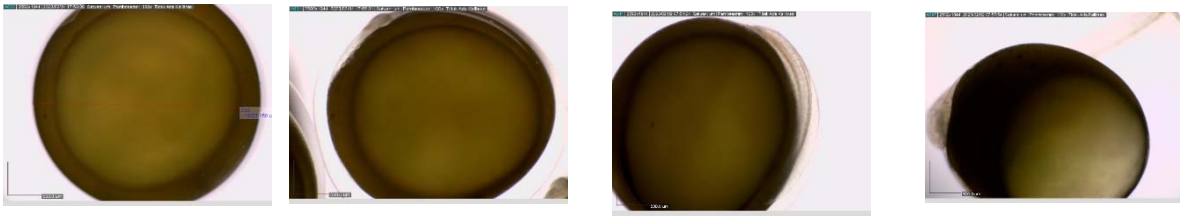
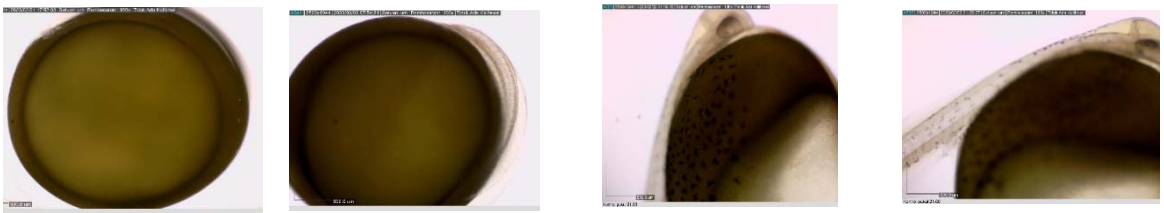
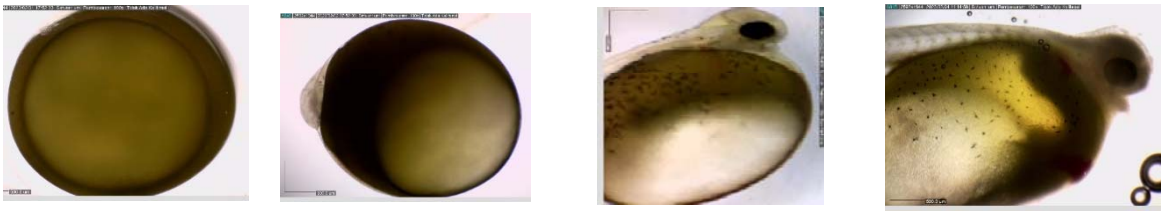
Observation of embryo development during hatching with a binocular microscope. The time interval for observing the embryos was 4 hours after starting the study with each treatment. Observations were made at 06.00 P.M when the eggs were put into the hatching container, then at 10.00 P.M, 06.00 A.M and 12.00 A.M. Observation of embryo growth was carried out by taking one egg for each treatment and repeating it using a small plastic spoon and then placing it on a microscope slide.

Observational data on embryo development were analyzed descriptively based on the results of research observations. The data is presented in pictures and the results of the description are referred to using relevant references.

IV. Result And Discussion

The development of each process of fish life is related to the stability of the fish population in a waters. Early life development of fish contributes greatly in determining the variation in production each season. The interaction between genetic and environmental factors can affect the process of embryo development and can also produce a variety of individual characteristics. Research on soaking gourami eggs with the addition of young coconut water with various different concentrations was observed under a microscope at predetermined hours as shown in Table 1.

Table 1. Embryo development at the time of observation

Perlakuan	Immersion time (hours)			
	00.00	06.00	12.00	18.00
P0 (control)				
P1 (15 ml/L)				
P2 (25ml/L)				
P3 (35ml/L)				

The results of the research that has been carried out show that the effect of young coconut water added to the process of hatching gouramy eggs gives more significant results in the P3 treatment, the process of embryonic cell division seen using a microscope, changes occur within 4 hours, namely at 10.00 P.M, it can be seen body grows like a tail then at 02.00 A.M the head has appeared and then for observation at 06.00 A.M it can be seen that the embryo has formed a head with rather large black spots which will turn into eyes, then the body and tail which are already clearly visible. In the P2 treatment, at 10.00 P.M, the embryos showed

growth of the tail and body still attached to the yolk, then at 02.00 A.M the embryos grew tails and heads but were not clearly visible and at 06.00 A.M the embryos showed a head and a black spot in the middle which is an organ and gouramy larvae eyes. For treatment P1, a dose of 15 ml of young coconut water, embryo development was seen by visible cell membranes separated from the yolk resembling a tail. This was seen at 02.00 A.M and growth of head tissue was seen at 06.00 A.M. P0 treatment without the addition of coconut water, it was easy for tissue growth to separate from the egg yolk which resembled a tail seen at 06.00 A.M.

The results of the research that has been done show that the effect of young coconut water added to the process of hatching gouramy eggs gives more significant results in the P3 treatment with a dose of 35 ml/l of young coconut water, namely the process of embryo cell division seen using a microscope there is a change of 6 hours of soaking the results of observations with a microscope, namely the development of the embryo is already visible on the outer layer of the egg, you can see the tail membrane and the future gase head this is called the organogenesis phase then the observations are made after 12 hours of immersion the head and eyes are visible, the yolk sac with black spots which is the pigment of the embryo has turned into a larva.

Observation at 18 hours of immersion, the development of the embryo is clearly visible in the head, eyes, mouth, arrangement of bones on the back and tail, the yolk has begun to elongate, the pigment is clearly visible, this change has entered the larvae. For observation in treatment P2 with a dose of 25 ml/l coconut water, hatching gourami eggs soaked in young coconut water after 6 hours it can be seen that the tail membrane has separated from the egg yolk and the tail has been seen moving. This process has entered the hatching phase, then observations were made at 12 hours of immersion, the growth of the head, eye and tail organs which have separated from the yolk, after hatching and the 18 hour observation of embryo development in the form of organs from head to tail, visible spots and arrangement of bones but still covered with membranes. In the P1 treatment, with a dose of 15 ml/l of young coconut water, embryo development at 6 hours of immersion showed that the cell membranes were separated from the yolk, visible protrusions of the membranes at the morula stage. Then the results of 12 hours of observation of the tail membrane which is still attached to the egg yolk, this pase holding is called a gastrula.

results of observations on 18-hour immersion of the head and tail organs which have separated from the yolk but the head and eyes have not clearly seen this process in the organogenesis phase. The results of embryogenesis will take place at the time of incubation starting from the process of cell division, morula, blastula, gastrula and continued with organogenesis which then hatches. Cell division (cleavage) is the process of cell division during embryonic development, the size of the cell gets smaller over time or becomes a small unit called a blastomer[5].

Various ways and methods of accelerating growth and survival in the treatment of immersing gouramy eggs by adding young coconut water for the egg hatching process which is equipped with aeration in each treatment and replicates give the best results in treatments P0, P1, P2 or P3 where it is expected that the process of embryo development so that hatching with a hatching rate of 100%, showing changes in the embryo at different times[6]. The nutritional content in young coconut water depends on the variety, degree of maturity (age) and climatic factors. Coconut water contains 4.11% KH, 0.12% L and 0.13% P, an energy content of 17.4% per 100 grams or about 44 kal.L. besides that, micronutrients (vitamins and minerals) such as B vitamins (B1, B2, B3, B5, B6, B7, B9) and vitamin C content will decrease during maturity.

Embryo development was observed using a binocular microscope which was seen visually, recorded and documented both photos and videos[7]. The change in the fastest embryo development phase was in the P3 treatment with a dose of 35 ml/L of young coconut water, namely at 12 to 16 hours, namely gastula and the development of prospective limbs, the embryo was seen perfectly with clearly rounded egg yolks, an elongated tail and head. moving away from the yolk, the prospective eye organ is clearly visible black. Observations were made in each treatment and repetition. To accelerate the development of the second embryo is P2 with a dose of 25 ml/L of young coconut water, then the P1 treatment is 15 ml/L.

V. Conclusion

The results of this study concluded that the addition of young coconut water to the process of hatching gouramy eggs gave more significant results in the P3 treatment with a dose of 35 ml/l of young coconut water, namely the embryonic cell division process was faster than other treatments.

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