International Journal of Scientific Engineering and Research (IJSER)
www.ijser.in
ISSN (Online): 2347-3878
Volume 2 Issue 4, April 2014

# Grant of Feed Containing Vitamin E in Home Fish Kelabau (Osteochilus Kelabau) to Improve Quality Eggs and Larvae

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**Absract:** ***This study was conducted as long as six months from May – October 2013, located at the soil ponds owned by the Hatchery Laboratory and fish breeding, University of Riau. The purpose of this study was to evaluate the best dose of Vit E added to fish pellets on egg quality of kelabau fish (Osteochilus kelabau) which includes: time for gonadal maturity achievement, ovisomatic index, laten time, number of ovulating eggs, maximum egg dimeter at the end of experiment, percentage of fertilized eggs, hatching rate and survival rate of larva. Applied doses of Vit E were 0, 100, 150, 200 mg/kg pellets. The results show that the best dose of VIT E to reach gonad maturity was 200 mg/kg pellets with three months cultivation period. Laten time was 13.5 hours and the average number of ovulated eggs were 4, 807. The ovisomati index was 0.82 % and the average diameter of eggs after treatments was o.14 mm. Fertilization rate was 0.61 %, with hatching rate was 16.68 %. Unfortunately, survival rate of larve was 0 % after 3 days old.***

**Keywords:** Vitamin E, Eggs and larva quality, *Osteochilus kelabau.*

## 1. Introduction

Kelabau adult fish populations have declined and worrying and vulnerable to extinction. These concerns are not excessive considering kelabau fish are very rarely found in the market. This is thought to be caused by the declining quality of the habitat, such as siltation of water, an increase in turbidity, both organic and inorganic contamination of the Watershed (DAS), especially the Kampar river flows into the main habitat of this fish. In addition to these factors, factors that are not less important is the result of the capture of less heed the rules of exploitation of natural resources, like catching up with an electric current, the use of toxins, as well as catching the peak spawning season.

Although the research is still very limited, some preliminary research concerning fish life kelabau, Osteochilus kelabau, has been done. Among other aspects of the ecology and feeding habits of fish kelabau ( Nasution and Nuraini, 2003), the reproductive cycle (Nasution, Nuraini, and Yurisman , 2005), and artificial spawning Experiment (Nasution and Nuraini, 2006). Experiments using artificial spawning of the fish ovaprim kelabau, O. kelabau have done Nasution and Nuraini (2006), but has not made it to the level of hatching and larval survival. The low degree of hatching eggs is suspected because of the low quality of the mains feed, so the quality of the eggs produced is also low. In order for quality of eggs obtained is good enough then it needs to be done is the feeding quality with the addition of vitamin E into the mains feed. This study aims to determine the best dose of Vit E on fish kelabau gonad maturation, speed achievement of mature gonads, Ovi Somatic Index, latent period, the number of eggs ovulated, the percentage of fertilization rate, percentage hatching rate and percentage of larval survival. While the benefits of this research are best known dose of vitamin E in fish spawning kelabau. It is expected that by knowing the appropriate dose that will be able to produce enough seed both quantity and quality, as a result kelabau fish farming can be started by the people, especially the fish farmers in the area Kampar, Riau. Which in turn can prevent the scarcity of kelabau fish populations and ultimately may increase in the future income of kelabau fish farmers in public waters Riau.

## 2. Methods

Research kelabau parent fish gonadal maturation was conducted in the month of May 20 to October 20, 2013 in the cages were placed on rain-fed ponds, whereas nurseries are conducted at the Laboratory of Fish Hatchery and Breeding Faculty of Fisheries and Marine Sciences University of Riau. The fish samples used measuring weight 600-900 g (Figure 7a). Maintenance of aircraft used container floating net measuring 1.5 x 1.20 x 1 m were mounted on the pond, with a stocking density 2 tail / container. Fiber bath tub used spawning and hatching eggs used tank containers. Vit E is used is in the form of d - alpha tokeferyl acetate, manufactured by Ameri - cal USA, where 1 capsule contains 400 IU. Kelabau spawning aphrodisiac used sGnRH + Domperidone output PT Syndel, Canada, with a dose of 0.7 ml / kg parent, feed test used was a commercial pellet output PT Pokhphan. Examination of fish gonad maturation performed 1 time in 1 month. The treatments tested include P0: Feeding without containing vitamin E, P100: Feeding containing vitamin E 100 mg / kg of feed, P150: Feeding containing vitamin E 150 mg/kg of feed, P200: Feeding containing vitamin E 200 mg/kg of feed. The parameters measured include: Speed attainment of maturity of gonads, Indesk Ovisomatik (IOS), Latent time (hours), number of eggs ovulated, the egg diameter, fertilization rate (%), hatching rate (%), and larval survival (%). Measurement data are tabulated into tables and histograms and graphs, descriptive subsequently analyzed the data and compared with the literature and previous research.

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www.ijser.in
ISSN (Online): 2347-3878
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## 3. Results and Discussion

Achieving Maturity Time gonads. The timing of the achievement of the maturity of the gonads can be seen from the gonads Maturity Level (TKG) at 1 month intervals during the study can be seen in Figure 1. From Figure 1 it is understood that the number of mature gonads parent with long maintenance 3 (three) months are at P200 treatment (Figure 7b). A large number of mature gonads parent P200 due to the treatment given feed containing the highest vitamin E, thus making the parent a lot of mature gonads.

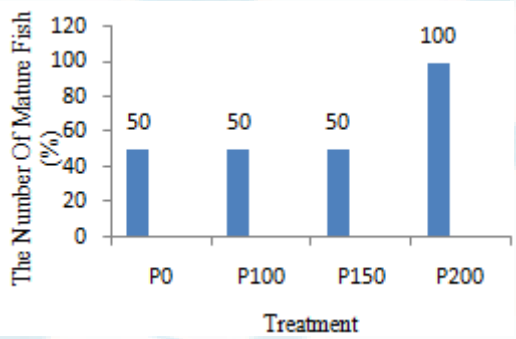


**Figure 1:** Histogram of the number of parent fish gonads mature kelabau each month.

As per the opinion of Vitamin E has an important role in reproduction of fish (Halver, 1989). The main function of vitamin E is as an antioxidant compound, which can prevent the oxidation of unsaturated fatty acids in cells, especially in unsaturated fatty acids that play a role for vitamin E to increase in egg maturation process. Parent needs vitamin E varies depending on its type. Watanabe et al, (1991) stated that vitamin E affects the quality of the eggs produced as vitamin E act as antioxidants in the body's fatty acids. Vitamin E and essential fatty acids needed simultaneously to gonadal maturation of fish at a dose of vitamin E in the feed will depend on the content of essential fatty acids that exist in the feed ( Yulfiperius, 2001).

**Ovisomatic Index (IOS).** Ovisomatik index value on the test fish can be seen in Figure 2. Ovisomatic index value was highest at P0 treatment, it is because the parent has a high level of maturity of gonads. This is supported by the average iOS P0 (2.8 %) and IOS at P200 (0.28 %).

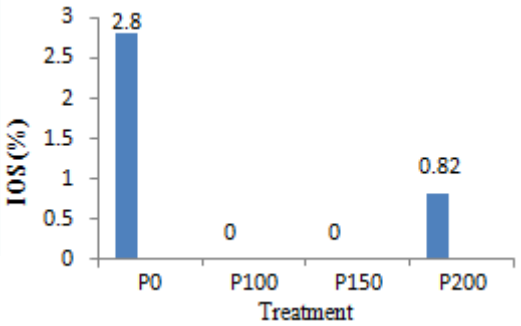


**Figure 2:** Histogram ovisomatik index value of each test fish treatmen

The small diameter of the eggs in the P0 treatment due to the content of vitamin E levels are the lowest, so that fatty acids are oxidized more, consequently take longer to reach the mature gonads. According to Watanabe et al (1984) that feed the parent essential fatty acid deficiency resulted in a low rate of embankment gonads . However, in this study a high level of maturity gonadnya. It is likely being formed by the gonadnya vitellogenesis phase process. As per the opinion Yaron, (1995) that the main phase is the phase in the formation of gonadal vitellogenesis. Vitellogenesis activity will lead to increased value of GSI . Furthermore, According to Effendi (1979) the greater the degree of gonad maturity, the greater the percentage of gonad maturity index (GSI).

In the treatment of P200, P100 and P150 have a low index of gonad maturation, it is alleged that at the time of sampling vitellogenesis process is over, so as to have a low index of gonad maturity. According to Utomo et al., (2006) that the pattern up and down the value of GSI previtellogenesis due process, vitellogenesis and final previtellogenesis. As stated Nayak and Singh (1992) in Utomo et al., (2006) that the hormone 17β - estradiol concentrations during the female reproductive cycle of catfish low on previtellogenesis phase and increased rapidly at vitellogenesis phase and peak at the end of vitellogenesis phase. GSI alleged impairment because vitellogenesis process has been completed.

Vitamin E plays an important role in the process of gonad development because it accelerates vitamin biosynthesis in the liver vitelogenin. Vitelogenin itself be glycoposphoprotein containing approximately 20 % fat, especially phospholopid, triglyceride and cholesterol (Tang and Affandi, 2001). Accretion will result in increasing the number vitelogenin GSI values for body weight in fish gonads will be growing. At the time vitelogenesis process progresses, the yolk granules increase in number and size, so that the volume of enlarged oocytes (Yaron, 1995).

**The number of ovulated eggs (oviposition).** Oviposition the female parent is the number of eggs released during sequencing (stripping) after ovulation (Figure 7b). Oviposition showed potential mature egg (produced) to do fertilization. For more details, longer maintenance time, the number of eggs ovulated and the latent period can be seen in Figure 3. From Figure 3 shows that the difference in the number of eggs ovulated between P0 treatment with P200 treatment so far. This is because the different length of time maintenance. Darwisito et al., (2008) stated that the size of fecundity is affected by the quality of food, fish size and environmental conditions. In this study, when associated with a diameter of eggs obtained, then the size of the diameter of the eggs at P100 and P150 treatment is smaller than the diameter of the eggs on the P200 treatment, this difference is caused by differences in the levels of Vit E is given. Meanwhile, if the terms of the levels of each protein in the feed protein and fat levels in the P200 treatment is lower when compared with other treatments, while the ash content has the range is not too different. According Gunasekere, et al., (1996), Al Hafedh, et al., (1999) in Susanti and Mayudin , (2012) stated that low levels of a protein that affects the protein composition of the parent

International Journal of Scientific Engineering and Research (IJSER)
www.ijser.in
ISSN (Online): 2347-3878
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which is then used by the body as a backup for the establishment and gonadal maturation. While Minissery et al., (2001) in Susanti and Mayudin (2012) reported that rates of protein will affect the size of the diameter of the eggs in the common carp. So in this study suggested that the low protein content contained in the feed containing vitamin E can increase the diameter of the egg is greater when compared with P100 and P150 treatment.

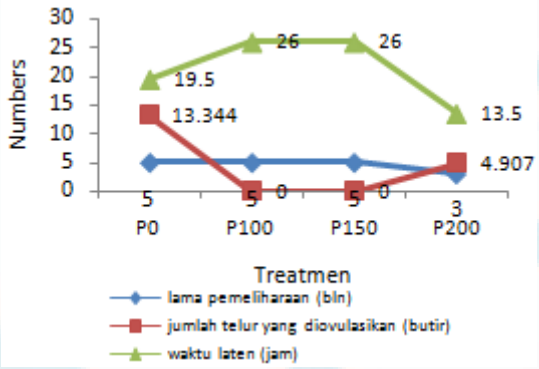


**Figure 3:** Graphs latent period, the number of eggs ovulated and pisciculture long kelabau of each treatment.

The lack of uniformity of the diameter of the eggs obtained in each treatment is thought to be related to the optimal development of the gonads. This is because the energy of feed consumed were allocated to reproductive activity can not be absorbed optimally. Besides holding collateral that is used not so suspected genetic factors also affect the absorption of feed for gonad development. According Badruzzaman (1995 ) states that the environmental factors that affect the absorption of energy from food that is consumed feed and water environmental factors.

In this study, factors other than protein levels and genetic factors likely the difference in the number of eggs ovulated caused by environmental factors, which influence the energy absorption of the feed consumed by the parent fish kelabau include ammonia levels. The results of measurements on an experimental ammonia levels ranged from 0.18 to 0.30 ppm. According to Sari (2009) in Susanti and Mayudin (2012) that the ammonia levels that exceed levels that can be tolerated by the parent Siamese catfish will cause a decrease in appetite parent Siamese catfish. While the levels of ammonia in water which can be tolerated by catfish is 0.02 mg / l. Based on the observations in this study were given food that is often consumed by the parent kelabau thus would have a decrease in appetite the parent. Decreased appetite in fish kelabau stem affect the amount of feed consumed. When the amount of feed consumed is reduced, then the allocation of energy to reproduction fish activity is also reduced. Further reduction in energy allocation to reproductive activities have an impact on fish gonad development kelabau.

High levels of ammonia in the experimental ponds caused by sludge and fish feces accumulate earlier maintained, so that the high ammonia allegedly caused by sludge, waste feed and feces are never discarded. Value fecundity of a fish species is affected by several factors, among others, the availability of food (Wootton, 1979), and the size of the diameter of the eggs (Woynarovich & Horvath, 1980). Vitamin E is a vitamin that is important for gonad development is to hamper the process of fertilization and fecundity (Izquierdo et al., 2001) Vitamin E can be added to the feed to accelerate the formation of follicular phase (Tang and Affandi , 2001). Thus increasing the value of fecundity can also be caused by nutrient content such as fat and protein and carbohydrates contained in food enough to support the development of the gonads.

**Egg diameter**. The results of measurements of the diameter of the eggs end of the maintenance can be seen in Figure 4. From Figure 4 shows that the size of the average diameter of the largest egg found in P200 treatment , ie 1.4 mm , then P0 (feeding without vitamin E) is 1.25 mm , while the P100 and P150 (feeding with vitamin E 100 mg/kg of feed and feeding 150 mg/kg of feed) the size of the average diameter of the eggs was 1.0 -1.05 mm , while the diameter of the initial kelabau fish eggs before feeding vitamin E on average ranged from 0.5 to 0.6 mm.

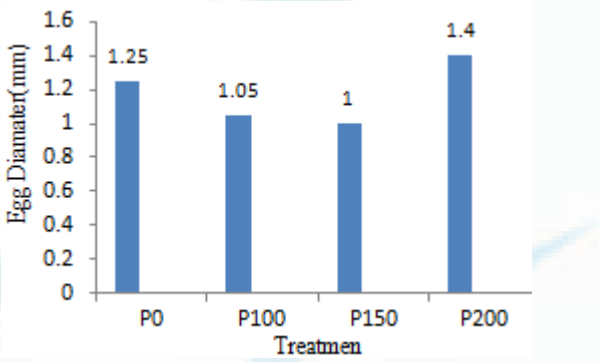


Figure 4. Histogram diameter eggs fish after feeding with vitamin E from each treatment.

The difference is the size of the diameter of the eggs obtained after feeding with vitamin E in the parent fish kelabau caused by the size of the parent absorption of feed given to the maturation of the gonads, in addition to the external factors that influence the development of the egg diameter is the height of water in pool maintenance. Where at the time of the maintenance performed on the month from May to October, 2013, which in the months is the peak of summer, so the water that is in an especially reduced maintenance water source comes from rain-fed. The results of measurements of the existing high water holding pond maintenance is 32-37 cm. According to Wise (2006) that changes in water levels also affect the size of the diameter of the eggs so that in general act as a trigger for the development of gonad maturity levels in fish cork.

Sukendi (2005) stated that egg size is indicated by the diameter of the egg. The use of vitamin E may affect the size of the resulting value fecundity nothing to do with the diameter of the egg. Experiments on previous catfish produce eggs 1:12 to 1:19 mm diameter while the diameter of research sp Barbodes fish eggs reach the optimal value of 0.70 mm and the research results MOTAN fish fed vitamin E 1.07 mm (Junaidi, 2010). The size of the diameter of the

International Journal of Scientific Engineering and Research (IJSER)
www.ijser.in
ISSN (Online): 2347-3878
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eggs is closely related to the accumulation of nutrients in the egg itself.

**Figures Fertilization (%).** The results of measurements of the average percentage of egg fertilization kelabau parent fish can be seen in Figure 5. From Figure 5 shows that the higher average percentage of egg fertilization in the treatment of P200, while the lowest was in the P0 treatment. This can be caused by the quality of the eggs produced less well on good quality treatment at P0 and P200 treatment (Figure 4 and 5, and 7c, d), then fertilization occurs externally so that success is determined by substances released by the egg can stimulate sperm to swim to the egg.

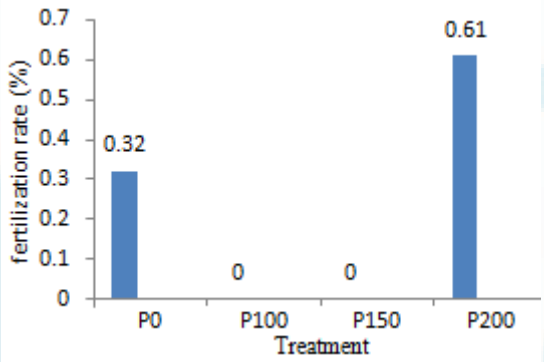


**Figure 5:** Histogram fertilization rate (%) during the study kelabau fish

According to Hoar in Effendie (1979) substances secreted by the egg and sperm are Gamone. Gamone issued by egg called Gynamone I and II while Gamone issued by the spermatozoa is called Androgamone I and II. The basic ingredients of gamone is a protein that is synthesized from the feed. So in this case the protein more important role than the fatty acid fatty acids ditelur although quite well as maintained by vitamin E from oxidation. Besides the degree of success of fertilization of eggs is also influenced by the size of the sperm quality, chemical composition, and endurance of sperm motility (Affandi and Tang 2001).

In this study, the low percentage of hatchery fish due kelabau used sperm from sperm derived carp (Cyprinus carpio L). Why use sperm from stem carp because the fish kelabau mature male gonads were not obtained despite maximal cultivated. Thus, in this study there has been hybridization between kelabau female fish with male goldfish. Between kelabau fish with male goldfish by Kottellat taxonomy (2007) including one family that is Cyprinidae. So the cause of low conception rate is the percentage of fish kelabau marriage and kinship relations carp away (Hybridization Intergenetik). So it can be said that the eggs are not necessarily produce good quality hatching a high degree of value. Kurniasih and Gustiarno (2007) states that the failure rate in many combinations intergenetik hybridization due to the smaller size of the micropyle on the egg diameter than the sperm of male fish species used. According Woynarovich and Horvath (1980) that the degree of fertilization in fish is largely determined by the quality of eggs, sperm, media and human handling.

**Hatching numbers (%).** Figures hatching determined 8-10 hours after the eggs hatch, it is expressed by the number of eggs that hatched divided by the number of fertilized eggs multiplied by one hundred percent. For more details, percentage figures kelabau hatchery fish can be seen in Figure 6. From Figure 6 shows that the percentage hatching rate tertnggi found on P200 treatment , ie 16.68%, then P0 treatment, ie 1.29% . The length of time of incubation of fish eggs kelabau 24-28 hours at a temperature of 27-29 $^0$C. The high percentage hatching rate at P200 treatment caused that the feed contains vitamin E , vitamin E which plays an important role during embryogenesis as a source of energy that is required for the development and growth of the embryo.

Kamler (1992) stated that fat deposited in the egg acts as a source of energy and buoyancy control eggs. Furthermore Mokoginta et al. (2000) stated that fat serves as an energy source in embryonic development also plays an important role as a constituent of cell membranes and precursors of prostaglandins. contained in the feed will keep fats from oxidation. The content of vitamin E contained in the feed will keep fats from oxidation. Fat content in the eggs will be directly proportional to the amount of vir E is given. Furthermore Mokoginta stated (1992) that the essential fatty acids contained in eggs affects the stadia early embryogenesis and will determine subsequent development of the embryo that will determine the hatchability of eggs.

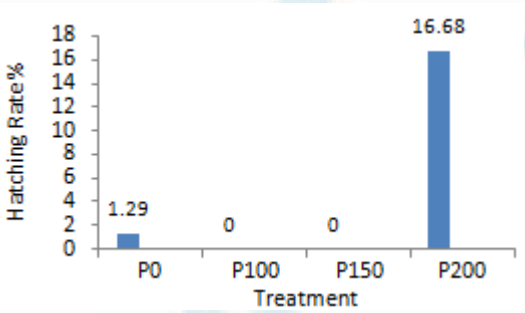


**Figure 6:** Histogram average hatching rate (%) of fish eggs.

Larval survival is determined by the number of larvae that live on the third day divided by the number of larvae that hatch multiplied by one hundred percent (Figure 7.e). The observation of larval survival rate was zero for three days, where the larvae gradually angsung die from the first day until the last day of the third. For more details, larvae that hatch can be seen in Figure 7.


**Figure 7:** The quality of eggs and larvae on artificial spawning fish kelabau (*O* kelabau)

a) Kelabau mature gonads
b) Eggs divulasi
c) Conception

d) Incubation of eggs, and
e) larvae

Based on the observation that experienced morthalitas total larvae found on the P0 treatment on day 2, while the last (third day) occurred morthalitas total P200 treatment. Survival of larvae alive until day 3 due to vitamin E contained in the feed is more synergy relation to unsaturated fatty acids, whereas the energy used more larvae using saturated fatty acids (Perwitasari, 2005) while. According to NCR, (1983), states that have occurred during the larval rearing total mortality, this is caused by nutrients required for growth are macronutrients , such as carbohydrates, fats and proteins. While micronutrients including vitamin E is not one of them contribute directly to growth. Devisiensi vitamin E will cause muscular disorders, vascular, neural skeletal and adipose. Furthermore, it is stated that vitamin E deficiency will also cause low blood cell hemoglobin, volume and red blood cell count increased and part of immature red blood cells. Also causes muscular dystrophy, fatty degeneration of the liver, bleeding and lack of fertilization.

**Water Quality**. Results of water quality measurements carried out every day in the pool for temperature measurement during the study, while the pH and dissolved oxygen (DO) was measured three times, namely baseline, mid- study and at the end of the study. To find out the results of water quality measurements during aircraft maintenance kelabau can be seen in Table 1.

**Table 1:**.Hasil water quality measurements during aircraft maintenance on all treatments during the study.

| *No* | *Parameter* | *Result* | *Tools* |
|---|---|---|---|
| 1 | Tempereture | 26 – 37$^0$C | Termometer |
| 2 | pH | 5 – 6 | pH indicator |
| 3 | Dissolved Oxygen | 1,42 – 2,20 ppm | DO Meter |
| 4 | Pond water level | 32 – 37 cm | Meteran |
| 5 | Ammonia | 0,18 – 0,30 ppm | Spektronic |

Waynorovich and Horvath (1980) states rise and sudden drop in water temperature is not more than 5$^0$C during maintenance does not affect the maintenance, otherwise if penerunan rise and sudden water temperature of more than 50C during the maintenance will result in the death of the parent who is being maintained. However morthalitas parent dies only one tail. Syafriadiman et al (2005) which states that the pH is good for fish is 5.0 to 9.0, while for the type of fish that live in the waters of the swamp has a very low pH < 4. Furthermore, it is stated that the minimum dissolved oxygen tolerance limit of 2 ppm. According to Ward (2004) normal water are eligible for a life having a pH ranging between 6,5 - 7,5.

The results of ammonia measurements during the study ranged from 0.18 to 0.30 ppm. This result is the highest. According to Sari in Susanti and Mayudin (2012) ammonia levels that exceed levels that can be tolerated by the parent catfish will cause a decrease in appetite parent catfish. Decreased appetite in Siamese catfish affect the amount of feed consumed. When the amount of feed consumed is reduced, the energy allocation to reproductive activity of fish is reduced. Further reduction in energy allocation to reproductive activities impact on gonadal development Siamese catfish. Ammonia levels that can be tolerated by the Siamese catfish was 0.02 mg / l.

## 4. Conclusions and Recommendations

From the research that has been conducted for 5 (five) months on rain-fed ponds can be concluded that the dose of vitamin E for gonadal maturation kelabau fish is 200 mg / kg of feed; Long time achievement ripe gonads are the fastest on the P200 treatment, ie 3 (three) months. P0 (control), 5 (five) months; Ovisomatic index was highest in the control treatment, ie 2.80% and 0.82% P200; Average shortest latent period contained in the P200 , which is 13.5 hours and P0 19, 5 hours; Diameter eggs are the largest at the end of the maintenance on the P200, and P0 is 1.4 mm by 1.25 mm, number of eggs ovulated highest average found in P0, that is 13 344 grains and P200 at 4,907 points. The percentage was highest in the treatment fertilization P200, which is 0.61% and the lowest at P0, ie 0.32%; hatching percentage was highest at P200, which is 16.68% and the lowest at P0, ie 1.20%; survival of larvae 0% on day 3.

For fish farmers are advised if you want to conceive kelabau fish , broodstock should be obtained from the results of the maintenance of seed to become a parent. Further research needs to be continued on the hatching of fish eggs using sperm kelabau male parent, as well as larval rearing.

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