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Induced Breeding Golden Black Molly Used Different Salinity

Induksi Pemijahan Ikan Golden Black Molly (*Poecilia* sp) Menggunakan Salinitas Berbeda

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ABSTRACT

Poecilia sp. is one type of ornamental fish that has distinctive characteristics because molly fish are freshwater ornamental fish that are able to live and breed in saline (brackish water) environments. Induction of molly fish spawning can be done with salinity treatment on the spawning media because the endocrine system in molly fish which plays a role in regulating body balance against changes in environmental conditions, especially changes in salinity will become more active so that it affects metabolism and reproduction (Taufik & Kusrini, 2006). The purpose of this study was to analyze differences in salinity as a spawning stimulant in molly fish. the method used in this study: P1. Salinity 10 ppt, P2. Salinity 15 ppt, P3. salinity 20 ppt, P4. Salinity 25 ppt, P5. 30 ppt with three replications. Parameters observed were Gonad Maturity Level (TKG), Gonad Maturity Index (IKG), survival rate (SR), and gestation period. The reared fish showed good gonad maturity so that spawning occurred. The results of this study, the highest gonadal maturity level was found at P1 salinity 10 ppt and P2 salinity 15 ppt the best, namely TKG V compared to P3, P4, and P5 namely TKG IV. The best gonadal maturity index was treatment P1 which was 14.28±2.0c followed by P2 11.71±2.0bc, P3 10.74±0.76abc P5 8.01±2.34ab and P4 7.27±2, 84a. The fastest gestation period was in P1 and P2, namely 44 days and 23 days. The highest survival rate occurred in P1 and P2, which was 100%. The highest absolute weight average was found in P1 which was 8.01±0.82c P2 6.33±0.5bc. The conclusion of this study, different salinity has a significant effect on the gonadal maturity index and absolute weight of golden black molly fish.

ABSTRAK

Ikan molly merupakan salah satu jenis ikan hias yang memiliki karakteristik yang khas karena ikan molly merupakan ikan hias air tawar yang mampu hidup dan berkembang biak pada lingkungan bersalinitas (air payau). Induksi pemijahan ikan molly dapat dilakukan dengan perlakuan salinitas pada media pemijahannya karena sistem endokrin pada ikan molly yang berperan dalam pengaturan keseimbangan tubuh terhadap perubahan kondisi lingkungan terutama perubahan salinitas akan menjadi lebih aktif sehingga mempengaruhi metabolisme maupun reproduksi (Taufik & Kusrini, 2006). Tujuan penelitian ini untuk menganalisis perbedaan salinitas sebagai perangsang pemijahan pada ikan molly. Metode yang digunakan pada penelitian ini : P1. Salinitas 10

ppt, P2. Salinitas 15 ppt, P3. salinitas 20 ppt, P4. Salinitas 25 ppt, P5. 30 ppt dengan tiga kali ulangan. Parameter yang diamati anatara lain, Tingkat Kematangan Gonad (TKG), Indeks Kematangan Gonad (IKG), Tingkat Kelulushidupan (SR), dan masa kehamilan. Ikan yang dipelihara menunjukkan kematangan gonad yang baik sehingga terjadi pemijahan. Hasil penelitian ini, tingkat kematangan gonad tertinggi terdapat pada P1 salinitas 10 ppt dan P2 salinitas 15 ppt paling baik yakni TKG V dibanding P3, P4, dan P5 yakni TKG IV. Indeks kematangan Gonad terbaik yaitu perlakuan P1 yaitu 14,28±2,0c diikuti oleh P2 11,71±2,0bc, P3 10,74±0,76abc P5 8,01±2,34ab dan P4 7,27±2,84a.masa kehamilan paling cepat terdapat pada P1 dan P2 yakni 44 hari dan 23 hari.tingkat kelulushidupan tertinggi terjadi pada P1 dan P2 yakni 100%. Rata-rata berat mutlak tertinggi terdapat pada P1 yakni 8,01±0,82c P2 6,33±0,5bc. Kesimpulan penelitian ini, salinitas yang berbeda memberikan pengaruh yang signifikan terhadap indeks kematangan gonad dan berat mutlak ikan golden black molly.

Kata Kunci	*Indeks Kematangan Gonad, Molly, Pemijahan, Salinitas, Tingkat Kematangan Gonad*
Keywords	*Gonad Maturity Index, Gonad Maturity Level, Poecilia sp., Salinity, Spawning*
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INTRODUCTION

Molly fish is a type of ornamental fish that has unique characteristics because molly fish are freshwater ornamental fish that are able to live and reproduce in saline environments (brackish water). Market demand for ornamental fish including guppies and mollies is quite high, this is proven by the trend of increasing sales of ornamental fish in the poecilidae family including guppies and mollies among ornamental fish cultivator groups (Diamond Fish Club) in 2013, namely in one production they can sell 3,750 guppy and molly ornamental fish tails even more so (Anggina et al., 2013). In order to meet market needs for molly fish, it is necessary to increase molly fish stocks among cultivators. The increase in fish stocks is stimulated by producing molly fish seeds through spawning. However, as we know, not all fish can spawn as we wish because there is a certain period for fish to spawn. There are several ways that can be done to stimulate fish spawning, including ornamental fish, namely by using synthetic hormones such as ovaprim which can stimulate ovulation (Nur et al., 2017) and (Ningrum et al., 2019). Based on this research, the use of synthetic hormones has a significant influence on the fecundity of test fish, but currently the use of synthetic hormones has weaknesses, namely their price is less economical and their availability is limited, so other alternatives are needed to stimulate spawning, namely environmental manipulation. Research conducted by Vasagam et al. (2005) on molly fish (*Poecilia latipinna*) showed significant results on the spawning process and growth performance in salinity treatments of 25 ppt and 10 ppt. Molly fish that are in saline media (salt water) have a higher appetite and better color compared to molly fish that are in fresh water media. The spawning behavior of molly fish in saline media is more active, as evidenced by the swimming movements of male molly fish which actively chase females compared to the control treatment

(freshwater media) which tends to be passive and does not show such behavior because salinity affects the endocrine system of molly fish which is associated with osmoregulation mechanism, because saline water has a higher density (more viscous) so that fish swimming movements tend to be more active and faster to adapt to their environment (Taufik & Kusrini, 2006). This shows that salt water is suitable for stimulating reproduction because salinity treatment causes molly fish to become active in chasing males and females. This research aims to analyze differences in salinity as a spawning stimulant in molly fish.

METHODS

The golden black moly fish used in this research were fish obtained from ornamental fish farmers in Sigerongan village, Lingsar, West Lombok. The fish used were 120 fish with a length ranging from 2-4 cm and a weight ranging from 0.5-1 gram which were about two months old. density of 8 molly fish in one aquarium with a male to female ratio of 1:1, namely 4 males and 4 females. Before being treated, the newly acquired fish are acclimatized and adapted in a container for two weeks, then put into the aquarium for treatment. The maintenance container used in this research was an aquarium measuring 30x30x30cm filled with 13 liters of water. Each treatment had three repetitions. The treatment given is P1. Salinity 10 ppt, P2. Salinity 15 ppt, P3. salinity 20 ppt, P4. Salinity 25 ppt, P5. 30 ppt.

The molly fish that are kept are then given commercial feed ad station or as much as possible with a feeding frequency of three times a day, namely at 8.00, 12.00 and 16.00 WITA. To induce or stimulate spawning in this study, different salinity treatments were used, namely salinity of 10 ppt, 15 ppt, 20 ppt, 25 ppt, and 30 ppt. Before being spawned, to make the molly fish adapt to saline media, male and female molly fish are put in the same aquarium container but the female molly fish is put in a rearing basket in the aquarium to prevent spawning before being given salinity treatment. The method used to increase the salinity of fresh water is to make a salt solution with a weight of salt according to the ratio of the volume of water in the aquarium, then add the salt solution little by little until the solution made is used up. This is so that the molly fish can adapt slowly to the salinity provided. After the desired salinity is achieved and the molly fish have also adapted to the saline medium, then the male and female molly fish are put together to be able to spawn.

If it can be confirmed that the molly fish have spawned and the molly fish are pregnant, then the male molly fish is removed from the spawning aquarium to prevent the pregnant female molly fish from experiencing stress due to being constantly chased by the male molly fish. Male molly fish will experience a period of pregnancy. The molly fish's gestation period usually lasts 28 days.

RESULT AND DISCUSSION

The results of the analysis of the gonad maturity level of golden black molly fish (*Poecilia* sp.) can be seen in Figure 1.

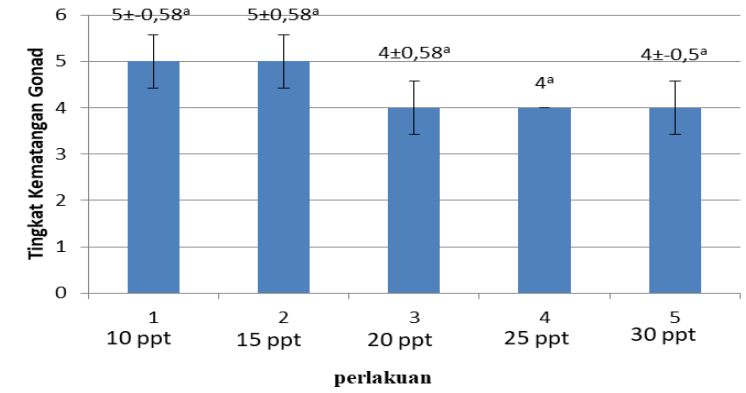

Figure 1. Results of Analysis of Average Gonad Maturity Levels

Based on Figure 1. The highest level of gonad maturity is found in (P1) and (P2), namely 5 ± 0.58a. shows that salinity has an effect on the gonad maturity of golden black molly fish, as evidenced by the average TKG in each treatment as shown in table 4. Even though all treatments were successful in spawning, there were differences in the development of treatment oocytes (P1) (P2) (P3) compared to (P4) and (P5) which are still in TKG III, it is proven that the oocytes are still not clearly visible. This is in accordance with the opinion of Nurhidayat (2016) who states that after spawning/ovulation the egg cells will grow again to be ready for the next spawning.

The spawning of molly fish is influenced by salinity because, the increasing salinity will affect the viscosity of the water, the higher the salinity, the higher the density so that the behavior of molly fish will be more active in swimming than usual which can influence the spawning process. This is in accordance with the statement of Nurhidayat (2016) which states that the process of gonad maturity is influenced by the work of vitologenin and the mechanism of action of vitologenin is influenced by environmental signals because environmental signals affect the nervous system of fish, namely by the presence of salinity which is supported by substrates such as aquatic plants so that the nerves will send signals to the hypothalamus gland then the hypothalamus will direct the vitologenin process to proceed and then be distributed through the blood circulation thereby stimulating the formation of egg cells until they reach maturity and ovulation.

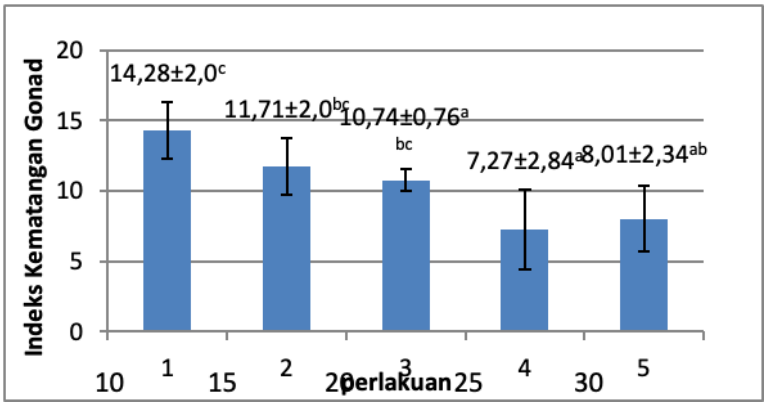

Figure 2. Gonad maturity index *Poecilia* sp.

The results of the Gonad Maturity Index analysis of golden black molly fish (*Poecilia* sp.) can be seen in Figure 2 above. The results of the analysis carried out on the Gonad Maturity Index (IKG) of molly fish show that salinity influences the gonad maturity index value of golden black molly fish, as evidenced by the average IKG in each treatment as shown in table 5. That different salinity treatments show a different effect. significant

effect on the Gonad Maturity Index of molly fish. This shows that salinity is one of the factors that influences IKG which shows gonad development and embryo development related to molly fish spawning. Based on this research, the highest Gonad Maturity Index was at (P1), namely a salinity of 10 ppt at 14.28% and the lowest average was at (P4) a salinity of 25 ppt and (P5) a salinity of 30 ppt, respectively 7.2% and 8%. The significant difference in gonad maturity index is due to the level of energy absorption for spawning. The salinity treatment of 10 ppt produced the highest IKG which indicates the best gonad development. This is because a salinity of 10 ppt is the best salinity and the osmotic pressure of the molly fish's body fluids is the same as the osmotic pressure of the medium. (Taufik & Kusrini, 2006).

Table 1. Molly fish pregnancy period *(Poecilia* sp.*)*

Parameter	Treatment					Day range	References
	P1	P2	P3	P4	P5		
Pregnancy Period	44 days	23 days	>44 days	>44 days	>44 days	26-63	(Vasagam, *et al.* 2005)

The results of the gestation period for golden black molly fish (Poecilia sp.) can be seen in Table 1. Based on this research, the average gestation period for molly fish ranges from 23 – 44 days. The results of research (Vasagam et al., 2005) on the gestation period of molly fish in fresh water media ranged from 26 - 63 days. This shows that the salinity provided affects the gestation period of molly fish. The shortest gestation period occurred in treatments (P1) with a salinity of 10 ppt and (P2) with a salinity of 15 ppt, namely 44 days and 23 days respectively. This is because to this salinity molly fish can adapt well so that embryo development is optimal. This is in accordance with the opinion of Darwisoto et al. (2015) on the reproductive performance of tilapia treated with 10 ppt salinity showed a significant effect on the fecundity of tilapia.

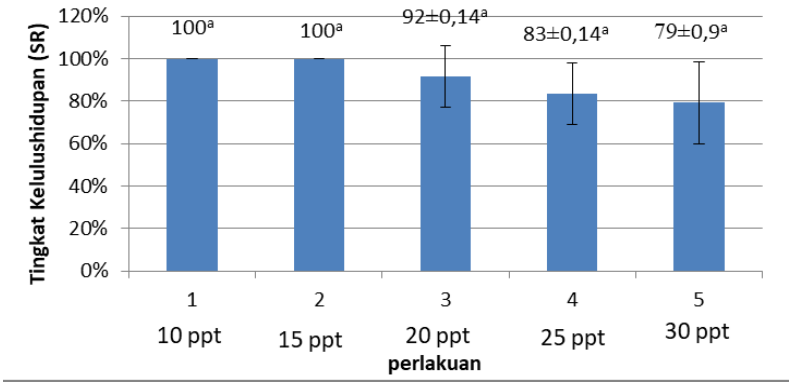

Figure 3. Survival rate (SR) of molly fish (*Poecilia* sp.)

Based on Figure 3. The highest survival rate (SR) is found in (P1) and (P2), namely 100%. The best survival rate (SR) in this study was in treatment (P1) with a salinity of 10 ppt and (P2) with a salinity of 15 ppt. SR is related to the level of adaptation of molly fish to the salinity treatment given. At a salinity of 10 ppt and 15 ppt, molly fish can adapt quickly so that it does not affect their survival rate. This is in accordance with research by Darwisoto et al. (2015) on the reproductive performance of tilapia fish treated with 10 ppt salinity showed the best survival of tilapia larvae.

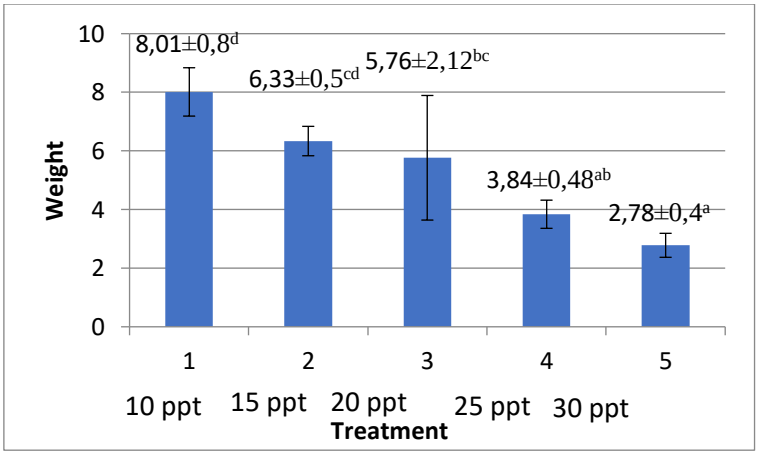

Figure 4. Absolute weight of golden black molly fish (*Poecilia* sp.)

Based on this research, salinity has a significant effect on the absolute weight growth of molly fish. This is evident from the results of the analysis carried out, it was found that the highest average absolute weight value was found in treatment (P1) with a salinity of 10 ppt, namely 8.01 grams and the lowest average absolute weight was found in the treatment (P5) with a salinity of 30 ppt, namely 2.78 ±0.4a. This shows that a salinity of 10 ppt has the best growth among other treatments, which means that a salinity of 10 ppt is isoosmotic to the osmotic pressure of the molly fish's body so that the molly fish can adapt well and the feed given can be absorbed well, resulting in the best body weight.

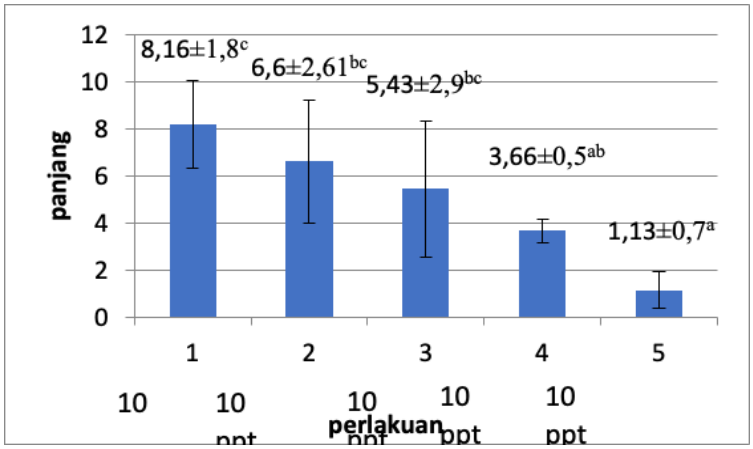

Figure 5. The absolute length of the golden black molly fish (*Poecilia* sp.)

Based on the results of the analysis of the absolute length of molly fish, the highest average value was obtained in treatment (P1) 8.16 ± 1.8c and the lowest in (P5) 1.13 ± 0.7a. The salinity provided has a significant effect on the absolute length growth of molly fish. This shows that absolute length is directly proportional to absolute weight. This cannot be separated from the role of the hormone prolactin as a hormone that functions to adapt and regulate water and salt balance, reduce membrane permeability, and has the characteristics of retaining sodium in surface osmoregulation. Furthermore, if the growth hormone secreted by the adenohypophysis (somatothropin) and the adaptation hormone (adenohypophysis prolactin) there is an interaction between these two hormones, it can increase the secretion of growth hormone and inhibit the work of prolactin (Taufik & Kusrini 2006) so that molly fish can still grow even though they are in salinity media.

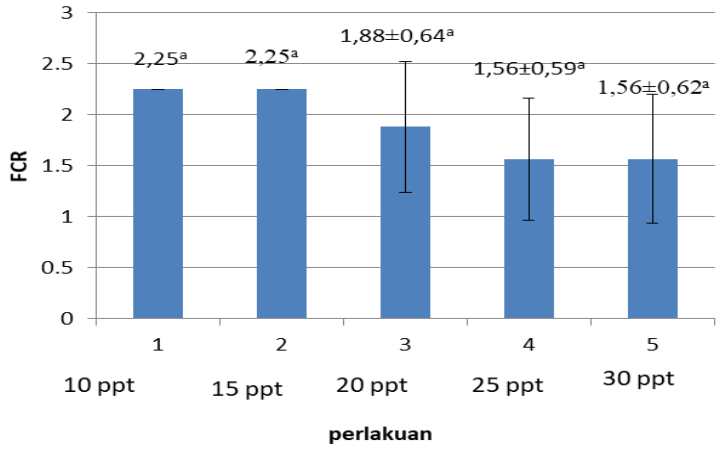

Figure 6. Feed Conversion Ratio (FCR) of golden black molly fish (*Poecilia* sp.)

The results of the analysis of the feed conversion ratio (FCR) of golden black molly fish can be seen in Figure 7. Based on the analysis and results of calculations carried out, it shows that the lowest FCR value for molly fish is (P1) 10 ppt, namely 1.67 (P3) 1.75 (P5) 1.74 and the highest at (P2) 2.11 and (P4) 2.09. There is a difference between (P1) (P3) (P5) and (P2), (P4) because at salinities of 15 ppt and 25 ppt the feed given is focused on molly fish gonad development so only a little is allocated for weight gain.

Table 2. Water quality of golden black molly fish (*Poecilia* sp.)

Parameter	Treatment					range	References
	P1	P2	P3	P4	P5		
Temperature (^{0}c)	29	29	29,2	29	29,1	27,5-29,3^{-0}c	(Chairunnisa, *et al.* 2020)
DO (mg/l)	4,6	4,9	4,7	4,6	5,0	>4 mg/l	(Nurhidayat, *et al*. 2016)
pH	8,5	8,6	8,6	8,4	8,5	6-9	(Nurhidayat, *et al*. 2016)
Ammonia	0,4	0,2	0,15	0,63	0,71	≤0,02 mg/l	(Ardi, *et al*. 2016)

Based on the results of water quality measurements during this research, it shows that the value corresponds to the water quality value required by molly fish. The water quality measured includes temperature, DO, pH, ammonia. The temperature range during the research was 28.6-300C, the DO range during the research was 3-6.7 mg/L. The pH range during the research was 7.9-8.7. The ammonia range during the research was 0.15-1 mg/L. The ideal temperature range for keeping fish is 27.5-29.3 0c (Chairunnisa, et al. 2020). The ideal pH range to support aquatic biota is around 6 – 9 (Nurhidayat, et al. 2016). Water quality in this study was measured 3 times, namely at the beginning of the study, during the study, and at the end of the study.

CONCLUSSION

The conclusion of this research is that different salinities have a significant influence on the gonad maturity index and absolute weight of golden black molly fish, salinity also influences the spawning period and gestation period of molly fish, which ranges from 23-44 days.

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