Proceedings of the International Conference on Agricultural Strategy for Sustainability (ICASS)
October 15–16, 2024 – Pekanbaru, Indonesia
Volume 1, Number 1 (2025): 99-102

Combination of Ovaprim and Oxytocin Hormones for Growth and Survival of Betok Fish (*Anabas testudineus*)

Hisra Melati*, Jarod Setiaji, Muhammad Hasby, Rosyadi, Agusnimar

Fakultas Pertanian, Universitas Islam Riau, 28284, Kota Pekanbaru Riau, Indonesia

Email: hisramelati@agr.uir.ac.id (Corresponding author)

Abstract, Analyzing the administration of a combined dose of the hormone ovaprim and oxytocin on ovulation and spawning of betok fish (*A. testudineus*) and analyzing the concentration of the hormone estradiol-17β in the blood before injection of the hormone ovaprim and oxytocin and after spawning. The method in this study used a completely randomized design consisting of five treatments and three replications consisting of 100% ovaprim + 0% oxytocin, 75% ovaprim + 25% oxytocin, 50% ovaprim + 50% oxytocin, 25% ovaprim + 75% oxytocin and 0% ovaprim + 100% oxytocin with a hormone injection dose of 0.5 mL/kg weight of broodstock betok fish. The results of this research are. The results of the research are that giving the hormone 50% ovaprim + 50% oxytocin is a treatment that can accelerate the growth of betok fish larvae, namely 3.84 cm and then the hormone 50% ovaprim + 50% oxytocin is a treatment that can increase the survival rate of betook fish by 97.45%.

1. Introduction

The betok fish is a threatened species and its population in nature continues to decline as a result of overcatching, pollution (environmental degradation) and cultivation methods that have not developed rapidly at this time. So that fishing activities carried out by the community continuously can reduce the natural population in the future. The main obstacle to the development of betok fish cultivation is the limited number of seeds, both in quality and quantity (Marlida, 2008). Efforts to manage betok fish so that they are available throughout the year, namely by studying and observing reproductive aspects (Effendie, 1997). One way to overcome the limitations of betok fish seeds can be to produce seeds by implementing artificial spawning or injection mating (Agustinus and Minggawati, 2018). One effort that can be made is by adding or injecting hormones into the bodies of fish that have matured gonads to speed up the spawning process so that good betok fish seeds can be produced where the quantity, quality and time of supply can be regulated as desired (Djarijah, 2001).

Then, to improve the performance of the ovaprim hormone, a hormone is needed that can complement the work of ovaprim to be combined during injection, namely the hormone oxytocin (Rolla, 2019). This oxytocin hormone is thought to help ovulation occur in betok fish because it can stimulate uterine smooth muscle contractions for the process of releasing eggs. Therefore, research on providing hormonal stimulation to types of fish with high economic value is very necessary. It is hoped that the combination use of ovaprim and oxytocin will have a good influence on ovulation and semi-artificial spawning in betok fish. Therefore, this research was conducted to Determine the combination dose of the hormone ovaprim and oxytocin that is effective on the growth and survival of betok fish (*Anabas testudineus*).

2. Research Methods

2.1. Research Tools and Materials

The research was conducted at the Experimental Balai Benih Ikan of the Faculty of Agriculture, Universitas Islam Riau, Jalan Kaharuddin Nasution Km 113, Perhentian Marpoyan District, Pekanbaru City. This research was conducted for firts months starting from Oktober 2024. The tool used as a

container for this research is an aquarium. Meanwhile, the material used during the research was broodstock fish with mature gonads measuring approximately 100 grams/fish and an average length of 10 cm/fish. The number of male broodstock used was 15 and 15 female broodstock.

The method used was a Completely Randomized Design (CRD) with 5 treatments and 3 replications.

P1 = Dosing 100% Ovaprim + 0% Oxytocin.
P2 = Dosing 75% Ovaprim + 25% Oxytocin.
P3 = Dosage of 50% Ovaprim + 50% Oxytocin.
P4 = Dosage of 25% Ovaprim + 75% Oxytocin.
P5 = Dosing 0% Ovaprim + 100% Oxytocin.

Data on growth and survival of 3 day old larvae were analyzed using the ANOVA test (Sudjana, 1991). The analysis process uses SPSS version 16.0 software. If there is a significant difference (95%), that is, if $P < 0.05$. To determine the difference between treatments for each parameter analyzed, the Newman-Keuls range test is carried out. Meanwhile, water quality data and analysis of the hormone estradiol-17β before injection and after spawning were analyzed descriptively.

3. Results And Discussion

3.1. Growth of Betok Fish (A. testudineus)

Observations were made on body growth after being given a combination of feed. The absolute length growth of baung fish in this study can be seen in Figure 1.

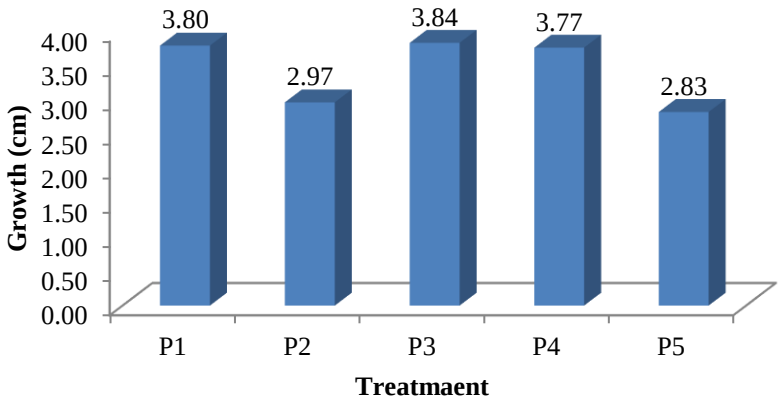

Figure 1. Growth of Betok Fish (*A. testudineus*)

Based on Figure 1, the results of observations of the length growth of betok fish (*A. testudineus*) during maintenance show that the increase in length of betok fish (*A. testudineus*) with treatment (P3) of feeding 50% ovaprim and 50% oxytocin (3.84 cm) is better than with growth of betok fish with treatment (P1 P2, P4 and P5) feeding 100% ovaprim, 75% ovaprim and 25% oxytocin, 25% ovaprim and 75% oxytocin and 100% oxytocin. Giving the hormones ovaprim and oxytocin can increase the gonad somatic index in betok fish, due to hormonal stimulation given from outside the body to control gonad maturation of betok fish. According to Moncaut et al. (2005), gonadotropin releasing hormone (GnRH) is synthesized by the preoptic-hypothalamic system and acts on the pituitary glands as a stimulant for gonadotropin release in all vertebrates.

Providing the hormone oxytocin in ovaprim at a dose of 50% ovaprim and 50% oxytocin can speed up the start of spawning with very fast growth time, because the fish are in normal condition so they can regulate reproductive hormones in the body (steroid hormones) as the formation of gonad maturation promoting factors (gonad maturation promoting factors). MPF), while giving a high oxytocin dose of 100% the opposite occurred. According to Rodriguez et al. (2003), gonadotropins are known as reproductive hormones which act as stimulants for the production of gonadal steroids.

3.2. Survival of Betok Fish (A. testudineus)

As for the survival of the betook fish, more details can be seen in Figure 2.

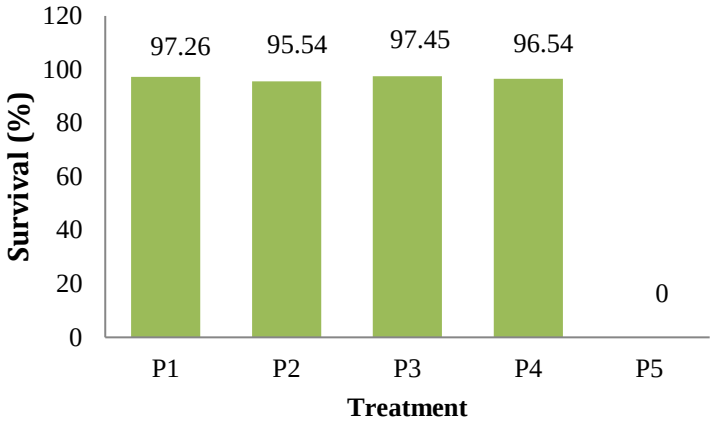

Figure 2. Average Survival of Betok Fish (*A. testudineus*) Larvae During the Research.

The survival of betok fish above shows that the use of ovaprim and oxytocin in this study obtained the highest values for betok fish survival of 97.45% and 97.26%. This survival value is included in the high category from research with a combination treatment of the hormones ovaprim and oxytocin (Harahap, 2015) on the herring fish (Mystus nigriceps) which obtained a survival value of 66.65%. Manantung et al., (2013) in Siamese catfish (Pangasianodon hiphopthalmus) obtained a survival value of 98.33%. Hadid et al., (2014) obtained a two-day survival value of 80.00% for baung fish. Nainggolan et al., (2019) on Jelawat fish (Leptobarbus hoevenii Blkr) obtained a 5-day survival value of 75.55%.

The survival of larvae in the post-larval period is greatly influenced by the egg yolk content they contain and the quality of the water in the rearing media (Kelabora et al., 2010). This is related to the protein that comes from the parent feed, namely in the form of pellet 781-2 which has a protein content of around 31-33% so that it can influence the vitellogenin process in the formation of egg yolk during oocyte maturation. The egg yolk is used by the larvae as a food reserve to maintain high survival. The survival of betok fish is closely related to the number of hatching eggs which require an energy source for larval development. Sinjal et al., (2014) when the eggs hatch, the energy source for the development of fish larvae is very dependent on the egg-borne material that has been prepared by the mother and this phase is the most critical phase.

3.3. Water Quality

The results of the quality check can be seen in the attachment. The following are the results of water quality observations in Table 1.

Table 1. Results of Observation of Betok Fish Water Quality Parameters During Research.

Perlakuan	Parameter			
	Amonia (mg/L)	DO (mg/L)	Suhu (°C)	pH
P1	0,28-0,44	3,14-3,81		
P2	0,28-0,42	3,14-4,27		
P3	0,28-0,46	3,14-3,38	29-33	6,5
P4	0,28-0,56	3,14-3,11		
P5	0,28-0,97	3,14-2,97		

The highest ammonia in the P5 treatment (0% ovaprim + 100% oxytocin) was 0.97 mg/l, so apart from the relatively high dose, the water quality in P5 (0% ovaprim + 100% oxytocin) had a relatively low quality value among the treatments. other. Even though it is still in the tolerant stage for

the environment, the betok fish larvae live. This statement is supported by Mahyudin in Srimulyani (2019) that ammonia of less than 1 mg/l is the optimal level for fish's living environment.

DO in this study is still the tolerance limit for the life of betok fish. Temperature and pH parameters are one of the most important factors in influencing the hatching process and survival. Temperature and pH are used as controlling factors. The pH and temperature values in this study were 290C to 330C and had a pH of 6.5. Temperature and pH are within the optimal limits for the betok fish rearing process. Generally betok fish like a temperature range of 25-330C (Anggra et al., 2013). This shows that the water temperature in this study was still quite normal and good for the growth and survival of betok fish larvae.

4. Conclusions

The conclusions from this research are, Providing the hormone 50% ovaprim + 50% oxytocin is a treatment that can accelerate the growth of betok fish larvae, namely 3.84 cm and then the hormone 50% ovaprim + 50% oxytocin is a treatment that can increase the survival rate of betook fish by 97.45%.

References

Journal

[1] Hadid, R., M. Syaifudin., M. Amin. 2014. Pengaruh Salinitas Terhadap Daya Tetas Telur Ikan Baung (*Hemibagrus Nemurus* Blkr.). *Jurnal Akuakultur Rawa Indonesia*. 2 (1)78-92 hlm.

[2] Kelabora, D. M dan Sabariah. 2010. Tingkat Pertumbuhan dan Kelangsungan Hidup Larva Ikan Bawal Air Tawar(*Collosoma* sp) dengan Laju Debit Air Berbeda Pada Sistem Resirkulasi. *Jurnal Akuakultur Indonesia*. 9 (1) : 56-60 hlm.

[3] Manantung VO., H. Sinjal dan R. Monijung. 2013. Evaluasi Kualitas, Kuantitas Telur dan Larva Ikan Patin Siam (*Pangasius hiphopthlalamus*) dengan Penambahan Ovaprim Dosis Berbeda. Jurnal Budidaya Perairan. 1(3)14-23 hlm.

Paper presentation

[4] Harahap, N. 2015. *Pengaruh Pemberian Pakan yang Berbeda Terhadap Ovulasi, Penetasan dan Kelulushidupan Larva Ikan Ingir-ingir (Mystus nigriceps)*. Skripsi. Fakultas Perikanan dan Ilmu Kelautan Universitas Riau. Pekanbaru. 9 hlm.

[5] Nainggolan, M. F. 2019. *Pengaruh Kombinasi Penyuntikan Ovaprim dengan Oksitosin Terhadap Daya Rangsang Ovulasi dan Kualitas Telur Ikan Jelawat (Leptobarbus Hoevenii Blkr.)*. Skripsi. Fakultas Perikanan dan Kelautan Universitas Riau. 1-14 hlm.

[6] Rolla, B. S. 2019. Induksi Ovulasi dan Pemijahan Buatan Induk Patin Siam (*Pangasianodon Hypophthlmmus,* Sauvage, 1878) dengan Kombinasi Hormon Ovaprim dan Oksitosin. Skripsi. Program Studi Budidaya Perairan Jurusan Perikanan dan Kelautan Fakultas Pertanian Universitas Lampung. 47 hlm.

[7] Sinjal, H., F. Ibo., H. Pangkey. 2014. Evaluasi Kombinasi Pakan dan Estradiol-17β Terhadap Pematangan Gonad dan Kualitas Telur Ikan Lele Dumbo (*Clarias Gariepinus*). *Jurnal LPPM Bidang Sains dan Teknologi*. 1 (1) : 1-16 hlm.

Thesis

[8] Marlida, R. 2008. Efek Cekaman Suhu terhadap Penetasan Telur dan Keragaman Larva Ikan Betok (*Anabas testudineus*). Makasar: Sekolah Pasca Sarjana Universitas Hasanuddin.

Book

[9] Sudjana, N. 1991. Dasar-dasar Proses Belajar Mengajar. Bndung : Sinar Baru.

Acknowledgement

This research produces values that are in accordance with the research procedures that the researcher has carried out.