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Study of The Application of Spawnprim Hormone On Kawan Fish (*Poropuntius Tawarensis*)

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Abstract
Finding out how the spawnprim hormone affects the gonad maturity of the kawan fish Poropuntius tawarensis is the aim of this research. The Technical Implementation Unit of the Fish Seed Agency (UPTD BBI) Lukup Badak of the Fisheries Service of Central Aceh Regency conducted this research in November 2020. In this research, four treatment groups were included in a fully randomized design (CRD) that was duplicated three times. Fish in groups B, C, and D received injections of the spawnprim hormone at doses of 0.5 ml/kg feed, 1.0 ml/kg feed, and 1.5 ml/kg feed, respectively. Fish in group A, which served as the control, received no treatment at all. The metrics that were noted were fecundity, a rise in brood weight, an increase in egg diameter, and the proportion of late gonadal mature broodstock. The study used Analysis of Variance (ANOVA) with a 95% confidence interval to examine the impact of various treatments on the data. The findings demonstrated that feeding fish buddies spawnprim hormone in feed had a substantial (P 0.05) effect on the development of egg diameter, gonadosomatic indices, and fecundity. The treatment group B in this study, which received 1.5 ml/kg of feed, had the most increases in terms of fecundity, gonadosomatic index, and egg diameter, with average values of 650.66, 62.26 mm, and 0.92 mm, respectively. At 0.33 mm, Treatment A (Control) had the highest hepatosomatic index value.

Keywords: Kawan Fish, Gonad Maturity, Spawnprim

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Introduction

Fish farming is the practice of growing fish for financial gain (Putra, 2022). Individuals in the Acehnese province have historically engaged in fish farming undertakings. The following are some of the commodities that are frequently found in the waters around Aceh and are also commonly farmed by the local community: brackish and sea commodities like milkfish (Evendi et al., 2017); ornamental fish like the green swordtail Xyphophorus helleri (Dedi F. Putra et al., 2020); crabs and shellfish like the mangrove crab Scylla serata (Putra et al., 2021); and blood clam Anadara granosa (Putra, Ramadina, et al., 2021). Regarding the shrimp commodity, the province of Aceh is a part of a province that has a wide variety of marine shrimp resources (Putra, Muhammadar, et al., 2018; Putra, Ulfa, et al., 2020; Muhammadar et al., 2019). In the meantime, shrimp commodities that are farmed include giant prawns (Dachi et al., 2019), vannamei shrimp (Arisa et al., 2021; Putra, Trisyahdar, et al., 2018), and tiger Penaeus monodon (Muhammadar et al., 2021; Muhammadar et al., 2018; Putra et al., 2019). Research related to comrade fish is still very minimally carried out, Several studies have reported, among others, the relationship between length, weight and condition factors

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eating habits, DNA barcoding. The conservation and spawning program for trout has been initiated by the Central Aceh District Government, but this effort is still constrained because the gonadal maturation of trout occurs during the rainy season. So spawning can not be done all the time. Therefore, one effort that can be done to deal with this problem is to apply the method cryopreservation of both sperm and embryos (Muhammadar et al., 2021; Muhammadar et al., 2018; Putra et al., 2019). Through this method it is hoped that the supply of sperm or embryos can be available all the time so that spawning can be done throughout the year. The cryopreservation process requires a cryoprotectant to protect sperm or embryos during the freezing process. Commonly used cryoprotectants in fish sperm cryopreservation process are Dimethyl sulfoxide (DMSO) and egg yolk. DMSO is a cryoprotectant that works inside the cell (permeating cryoprotectant), while egg yolk works outside the cell (non-permeating cryoprotectant). Studies on the cryopreservation of sperm of comrades have never been carried out, so it is necessary to do research considering the importance of this fish both from an economic and conservation perspective. Therefore, this study aims to determine the optimum concentration of DMSO and analyze DNA damage that occurs in post-freezing sperm of broodfish (Poropontius Tawarensis) (Muhammadar et al., 2021; Muhammadar et al., 2018; Putra et al., 2019).

One of the freshwater fisheries resources found in Acehnese river waters is Kawan fish (Poropuntius Tawarensis). The Lukup Badak Fish Seed Center (UPTD-BBI) in Central Aceh is still engaged in friendly fish farming; however, due to persistent challenges and issues, the fish's gonad maturation still only happens during the rainy season. Due to their ecological and economic significance, companion fish should be domesticated for farming. The maturation season for fish gonads now limits the broodfish (Poropuntius Tawarensis) production carried out at BBI Lukup Badak. In fish that are still in the brood stage, gonadal maturation may be accelerated with the use of hormones. Fish gonad development may be accelerated by some hormones, such as spawnprim.

Luteinizing hormone releasing hormone analogue (LHRHa) components, antidopamine chemicals (AD), oxytocin, aromatase inhibitors (AI), and prostaglandins (PGF2α) are the components that make up spawnprim hormone (Fitri, 2017). The Fish Genetics and Reproduction Laboratory at Bogor Agricultural University is the source of this hormone. Prior research has shown that the hormone spawnprim is useful for the main lemeduk fish (B. schwanenfeldii) gonad development (Baihaqi, 2019). There haven't been any reports of using SpawnPrim on companion fish up to this point. As a result, the goal of this research was to examine how applying spawnprim hormone at various dosages affected the gonadal maturation of broodfish, namely the percentage increase in fecundity, gonadosomatic index, and hepatosomatic index.

Materials and Methods

The design used in this study was a completely randomized design (CRD) consisting of 4 treatments and 3 replications. This design refers to research conducted by Arismunanda (2019), on the main Biawan fish (Helostoma temminckii). A total of 120 female broodfish were divided into 4 treatment groups (30 broodstock each per treatment) and injected with the hormone spawnprim as follows:

1. Treatment A 0 ml/kg feed
2. Treatment B 0.5 ml/kg feed
3. Treatment C 1.0 ml/kg feed
4. Treatment D 1.5 ml/kg feed

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This research was conducted in floating net cages at BBI Lukup Badak. The containers used were 12 units of waring measuring 1 m x 1 m x 1 m. Before the waring is used as a research vessel, cleaning and drying of the waring is carried out so that the mains are protected from pathogens. The female broodfish used were 10 fish per container with a total of 12 containers. The brood fish are then weighed to determine the weight as a reference for the treatment feed coating. The test feed that will be used in this study is a commercial feed with a protein content of 26%. The addition of Spawnprim hormone to the feed was carried out according to the treatment dose, namely 0.5 ml/kg of feed, 1.0 ml/kg of feed, and 1.5 ml/kg of feed and added 10% egg white as an adhesive. Furthermore, the feed is dried for 30 minutes at room temperature before being given to the fish. Parameters of gonad maturity and fish growth were measured on days 0, 7, 14, 21 and 28. Day 0 was to determine the initial weight of the broodstock broodstock and to determine the initial egg samples. The data obtained in the study were analyzed using analysis of variance (ANOVA) at a 95% confidence interval to test whether there was an effect between treatments. If the results of the study have a significant effect, then the KK value (coefficient of variance) is sought, the KK value is above 10%, then a further Duncan test is carried out.

Results and Discussion

Results

Table 1 displays the findings of studies conducted on the gonadosomatic indices, hepatosomatic index, fecundity, and egg diameter of brood fish after their infusion with spawnprim hormone feed. Different outcomes on egg diameter were seen when the spawnprim hormone was used at doses of 0 ml/kg, 0.5 ml/kg, 1.0 ml/kg, and 1.5 ml/kg of feed.

Table 1. Egg diameter, gonadosomatic index, hepatosomatic index and fecundity of brood fish (Poropuntius Tawarensis) using feed after being added with the hormone spawnprim at different doses.

Treatment	Parameter			
	Egg Diameter Fecundity (grain) (mm)	Fekunditas (butir)	GSI (%)	HIS (%)
A (Controls)	0,43±0,01^{b}	198,66±70,54^{b}	98,09±0,90^{b}	0,33±0,07^{a}
B (0.5 ml spawnprim/kg feed)	0,92±0,01^{a}	650,66±96,34^{a}	62,26±7,24^{a}	0,20±0,03^{a}
C (1.0 ml spawnprim/kg feed)	0,91±0,01^{b}	314,33±20,03^{b}	96,64±1,61^{b}	0,26±0,05^{a}
D (1.5 ml spawnprim/kg feed)	0,90±0,01^{b}	272,00±25,23^{b}	98,26±0,34^{b}	0,21±0,09^{a}

$^{a, b, c, d}$ different superscripts in the same column show significant differences (P<0.05).

Following treatment, the egg diameter of the broiler fish revealed that treatments A, C, and D differed considerably from treatment B (0.5 ml/kg of feed) in terms of both fecundity and egg diameter. Based on Table 1, it can be inferred that treatment B had the maximum fecundity with 650.66 items, while treatment A had the lowest with 198.66 items. The biggest egg diameter was measured at 0.92 mm in treatment B, and the smallest at 0.43 mm in treatment A. Treatment D had the highest gonadosomatic index values, with a score of 98.26 (P<0.05).

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Treatment A had the highest Hepatosomatic Index values, measuring 0.33 mm, and it differed considerably from treatments B, C, and D.

Discussion

The reproductive health of other fish may be impacted by the addition of the hormone spawnprim to food in a number of ways. Egg diameter, fertility, and the gonadosomatic and hepatosomatic indices provide the basis for this. A rise in the measured parameter values set off the vitellogenensis process. comparable to luteinizing hormone (LH) and follicle stimulating hormone (FSH), spawnprim hormone has comparable biological characteristics. Fish eggs are formed with the assistance of FSH, while the development of gonads—which prepares them for divittelogenesis—is facilitated by LH (Farastuti, 2014). The hormone spawnprin added to the meal had favorable effects on the egg diameter size. This indicates that hormones administered to cattle have an impact on the vitellogenesis process. These findings support the theory put out by Effendie (2002) that the gonads' development level is directly correlated with the size of the eggs inside the ovary.

During the study, the size of the diameter of the fish eggs observed showed development. According to Glasser et al. (2004), vitellogenesis occurs when the vitellogenin protein is combined by oocytes and processed into egg yolk protein. This causes the female gonads to become larger when they mature. The oocyte undergoes a growth phase, which is highly dependent on the presence of gonadotropin hormones and the egg is the final product of the process of gametogenesis. Many egg yolks usually cause the egg diameter of telesotei oocytes to increase (Farastuti, 2014). Understanding of the mechanism of oocyte growth and development processes is very important to understand the components that affect egg quality and fertilization (Ismail et al., 2011). The addition of the hormone spawnprim not only has an impact on the diameter of broiler fish eggs but also on the gonadosomatic index (GSI). GSI is a parameter used to determine the level of gonadal maturity (TKG). In addition, GSI can be used to estimate fish spawning time (Wootton and Smith, 2014).

The mechanisms of action of ovaprim and sproutprim are identical. Gonadotropin hormone (GtH) release in the brain may be triggered by the gonadotropin releasing hormone (sGnRH-a) analog component of salmon and domperidone in ovaprim, which is induced via the circulation and replaces missing environmental cues. In contrast, maturation is brought about by the pituitary gland's secretion of GtH, which is triggered by sGnRH-a (Nandeesha et al., 1990). According to Joy et al. (2000), the gonads matured and secreted LH when the oocytes reached their maximal size, which led to the buildup of testosterone in theca cells. In contrast, testosterone granulosa cells exhibit a reduction in aromatase activity, which results in the production of estradiol-17β (Basuki, 2007). LH will cause the follicle to create 17α,20β-Dihydroxy-4pregnen-3-one (17α,20β-DHP), which is the steroid hormone that will cause the oocyte to fully mature. The hormone in question serves as a modulator of oocyte development up until the moment at which germinal vesicle breakdown, or GVBD, takes place.

Scientifically, the hormone spawnprim can help ovulation and accelerate fish spawning. Due to external and internal factors in the fish, this research on friendly fish can lead to gonadal maturation. According to Sitiady (2008), two external and internal components affect the maturity of the gonads of fish. Type of fish and hormones are internal factors that influence the maturity of fish gonads. Other external factors include currents, temperature, food, stocking density, and light intensity. Feed and environment are two external factors that are often of particular concern because they affect the maturity of the gonads of the parent fish. The results of this study indicated that of the 4 doses of spawnprim used, a dose of 0.5 ml/kg of feed was the optimal dose used to increase egg diameter and fecundity of brood fish. From previous

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studies it was also known that the use of the hormone spawnprim at a dose of 0.6 ml/kg broodstock was effectively used for gonad maturation of the main lemeduk (B. schwanenfeldii) which was observed in the study (Baihaqi, 2019).

Conclusion

The conclusion that can be drawn from this study is that the use of spawnprim hormone through feed has a significant effect on egg diameter, gonadosomatic index, and fecundity ($P<0.05$). Scientifically, the content contained in the hormone spawnprim functions to ovulate or accelerate fish spawning. feed and environmental factors. Spawnprim hormone at a dose of 0.5 ml/kg of feed in this study was the most effective for fellow fish.

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