

The Effects Of Different Worm Feeding To Estradiol 17 β At The Gonad Maturity Level Of Domesticated Uceng (*Nemacheilus Fasciatus*)

Lik Anatus Sholikah, Agoes Soeprijanto, Yuni Kilawati

Abstract: Uceng is a freshwater fish that has huge potential in Wlingi area, Blitar. Until now uceng fish can not be cultivated and still rely on catches from nature to meet consumer needs, it is necessary to do domestication. Domestication activities related to fish reproduction, especially gonad maturity. The selection of natural food such as red worms, silk worms and blood worms to help accelerate the maturation of uceng fish gonads. The purpose of this study was to obtain levels of the hormone estradiol-17 β and gonad development of uceng fish. The research method used is an experimental method and a completely randomized design that is treatment A (red worms feed), treatment B (silk worms feed), treatment C (blood worms feed). Each treatment with 3 replications. The highest levels of the hormone estradiol 17 β A were 141,92 ng/L. Gonad Maturity Level is highest in treatment A, namely Gonad Maturity Level IV. The effect of giving natural food types in the form of red worms can influence the highest levels of the hormone estradiol 17 β in treatment A and the best gonadal histological conditions in treatment A is Gonad Maturity Level IV.

Index Terms: Uceng, Domestication, Estradiol 17 β , Reproduction, Gonad Maturity Level

1. INTRODUCTION

Uceng fish (*Nemacheilus fasciatus*) has the potential to consume fish in the Wlingi area, Blitar. Uceng fish contains DHA-EPA (Decosa Hexaenoat Acid - Eicosa Pentaenoat Acid) which is very good for human health [1]. Until now, they still rely on natural catches to get the fish. As a result, there is an excessive use of fish resources without regard to aspects of sustainability [2]. Domestic activities are needed to help meet the needs of consumers. Domestication activities related to fish reproduction, especially gonad maturity. Gonadal fish development is influenced by several factors, one of which is feed [3]. The quality of main feed must contain protein which refers to the content of essential amino acids [4]. Essential amino acids are used to maintain life, maintain the body, growth, development and maturation of the gonads, embryonic development and endocrine functions such as estrogen which can enhance the process of vitelogenin in the liver [5,6]. The female reproductive system in it is controlled by the hypothalamus-pituitary-gonad shaft [7]. The influence of gonadotropin, then ovary follicles produce androgens, namely testosterone which will then be converted into estradiol 17 β with the help of the aromatase enzyme. The 17 β hormone then stimulates the process of vitelogenesis. The process of vitelogenesis will affect the process of the next gonad maturity level. Information about the gonad maturity of the prospective uceng broodstock through worm feeding is something that is needed to reach the level of uceng fish production. This research was conducted to obtain information about the type of worm feed that affects the level of the hormone estradiol 17 β at the level of gonad maturity of the prospective uceng broodstock..

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1. MATERIAL AND METHOD

Selection Candidate broodstock of Uceng Fish

This research used candidate broodstock female of uceng fish. Selected of prospective uceng broodstock was done morphologically. The characteristics include, an average length of 5,5 cm, healthy, active and not deformed movements, a darker body color, a distended abdomen and a reddish urogenital opening.

Histological Analysis of Early Gonad

Gonad histology observations were made at the Faculty of Medicine, Brawijaya University, Malang. Following is the gonad histological analysis process:

- Limb Harvesting Process
- Fixation Process
- Embedding Process
- Sectioning Process
- Staining Process
- Mounting and Labeling Process

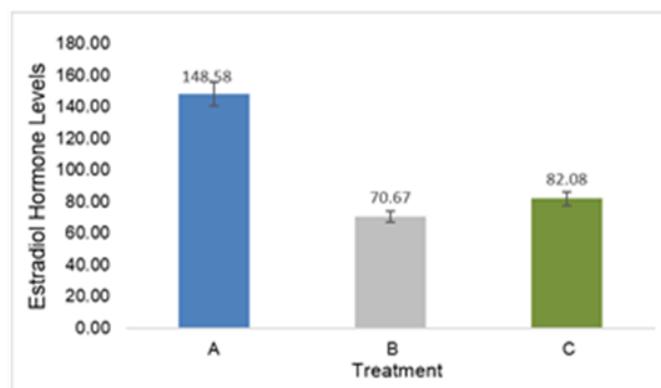


Figure 1. Graph of Estradiol 17 β Hormone Levels in Uceng Fish (A: Treatment with Red Worms, B: Treatment with Silk Worms, C: Treatment with Blood Worms).

Fish Treatment

Broodstock candidate of uceng are used 20 fish/aquarium and then given food according to the treatment namely, treatment A (red worms), treatment B (silk worms), treatment C (blood worms). Feeding of 7% of the body weight of fish with a

frequency of 2 times a day at 07.00 WIB and 16.00 WIB. The amount of feed given is shown in (Table 1).

Table 1. Amount of Treatment Feeds

Week-1		Week-2		Week-3		Week-4	
Treatment	Amount	Treatment	Amount	Treatment	Amount	Treatment	Amount
A1	1,39 g	A1	1,42 g	A1	1,54 g	A1	1,65 g
A2	0,86 g	A2	0,96 g	A2	1,97 g	A2	1,06 g
A3	1,42 g	A3	1,45 g	A3	1,46 g	A3	1,48 g
B1	1,40 g	B1	1,4 g	B1	1,36 g	B1	1,47 g
B2	1,3 g	B2	1,28 g	B2	2,57 g	B2	1,25 g
B3	1,46 g	B3	1,5 g	B3	1,56 g	B3	1,62 g
C1	1,51 g	C1	1,2 g	C1	1,27 g	C1	1,23 g
C2	1,18 g	C2	1,1 g	C2	1,20 g	C2	1,20 g
C3	1,46 g	C3	1,46 g	C3	1,52 g	C3	1,45 g

Remarks: A: Treatment with Red Worms, B: Treatment with Silk Worms, C: Treatment with Blood Worms; (1,2,3): Replicate at Treatment

Analysis of Levels Estradiol 17 β Hormone

Analysis of the 17 β -estradiol hormone used the Fish Estradiol ELISA kit (Cat. No. E0050FI) tissue sandwich kit (tissue homogenates) can be done in the followed ways:

- Making PBS
- Making Gonad Sample Prep
- Making Gonad Sample Preparations
- Preparation of Reagents
- Preparation of Wash Buffer Reagent 1x
- ELISA method.

Final Gonad Histological Analysis

The analysis was carried out after 30 days of treatment. The following is the final gonad analysis process:

- The process of organ harvesting
- Fixation Process
- Embedding Process
- Sectioning Process
- Staining Process
- Mounting Process
- Labeling Process.

3. RESULT AND DISCUSSION

Estradiol 17 β Hormone Levels

The levels of the hormone estradiol 17 β were observed, that is, by knowing the difference from the initial levels before being treated and after the treatment giving different types of feed. The result of the difference will be used as a parameter for observing 17 β estradiol hormone levels will increase or decrease after being given different types of feed treatment. Based on the results of the test levels of the hormone estradiol 17 β using the ELISA method obtained results in (Figure. 1). The results of the hormone estradiol 17 β showed that the hormone estradiol 17 β increased after being given a different type of feed treatment. The highest levels of the hormone estradiol 17 β are found in treatment A (red worms) with an average of 141,92 ng/L. Red worms contain very good nutrition so that it can affect the increased levels of the hormone estradiol 17 β in the liver of uceng fish. So the hormone estradiol 17 β will stimulate the process of vitelogenin synthesis. The presence of estradiol 17 β is very important because it is an estrogenic control of vitelogenin there is an estrogen receptor [8]. Increasing the hormone estrogen (estradiol 17 β), will encourage the phase of previtelogenesis towards the phase of vitelogenesis [9].

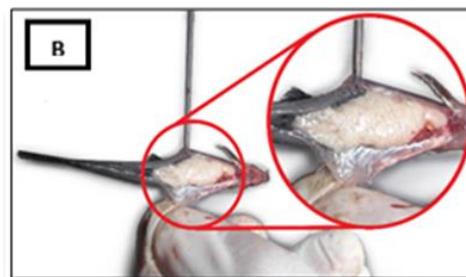
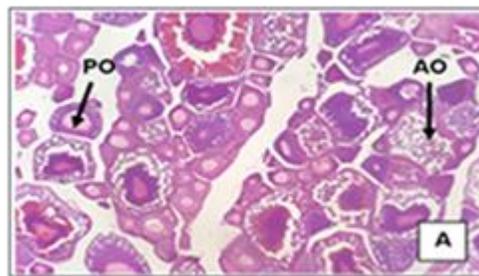
Gonad Maturity Level of Uceng Fish

Candidates of uceng broodstock given different types of feed treatment can reach Gonad Maturity Level IV level, which is characterized by the gonads getting bigger and filling most of the abdominal cavity.



Figure 2. Gonad Reaches Gonad Maturity Level I (A), Gonad Reaches Gonad Maturity Level IV (B).

Pregnancy in fish is characterized by a flabby stomach area and a red, swollen urogenital opening. Candidates of uceng broodstock that have not been given different feed treatments show Gonad Maturity Level I criteria, which means the gonads are not yet ripe [10]. Characteristics of immature gonad fish are characterized by an empty stomach, genital holes that have not been flushed and there are no eggs when decomposed. A picture of the gonad can be seen in (Figure. 2). Based on the results of Gonad Maturity Level uceng fish, graph are made to show the results of observations of the effect of giving different types of feed to the Gonad Maturity Level (Gonad Maturity Level) of the prospective uceng brooders. The graph is available in (Figure. 3).



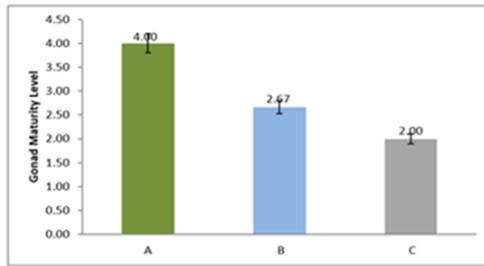


Figure 3. Graph of Gonad Maturity Level Candidate broodstock of Uceng (A: Treatment With Red Worms, B: Treatment With Silk Worms, C: Treatment With Blood Worms).

The highest average percentage occurred in treatment A (red worms feed) in the amount of $4\% \pm 0,000$ and the lowest percentage in treatment C (blood worms feed) was $2\% \pm 0,000$. The main factor that can determine the speed of maturation of fish gonads is the feed given during the ripening process in these fish [11]. This is because the basic ingredients in the feed in the formation of egg cells derived from the metabolism of the feed given primarily to female fish, this maturation process is known as the process of vitellogenesis. The basic ingredients in the gonad maturation process consist of carbohydrates, fats and proteins.

Gonad Histology of Uceng Fish

Gonadal histology observations showed the results before the treatment were Gonad Maturity Level I characterized by the ovary still visible transparent and small in size. Gonadal histology after treatment showed the results of gonad maturity levels that differed in each treatment. Treatment A (red worms feed) showed that the gonad's maturity level reached Gonad Maturity Level IV. The treatment of red worms feeding showed faster results of gonad maturation, because the red worms (*Lumbricus rubellus*) had a high fat and protein content compared to the treatment of silk wormss and blood wormss. The type of uceng fish oocyte development is asynchronous type [12]. The structure of the ovaries, which have five phases of follicular development, both when the ovaries are mature or immature, although the composition of the follicles is different. Ovaries that have matured will have a greater percentage of vitellogenic phase and mature oocyte phase compared to other follicular growth phases. The explanation shows that uceng fish have the potential to spawn throughout the year but the peak spawning period does not occur in the dry season, but will occur in the rainy season. Gonadal histology section can be seen in (Figure. 4).

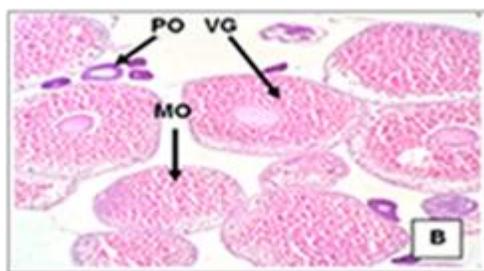


Figure 4. Histological Structure of Gonad Uceng Fish (*Nemacheilus fasciatus*) when the gonad is immature (A) and gonads in Gonad Maturity Level IV (B). PO: Primary Oosit, AO: Oocyte

Atresia, MO: Mature Oosit, VG: Vitellogenesis

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4. CONCLUSION

Based on the research results obtained include, the best levels of the hormone estradiol 17β in treatment A (red worms feed) with an average of 145,33 mg/L and red worms feed gives the best level of gonad maturation at Gonad Maturity Level IV rather than silkworm treatment (*Tubifex sp.*) and blood wormss (*Chironomus sp.*).

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