



Oocyte Diameter Distribution and Fecundity of Javaen Barb (*Systemus orphoides*) at the Start of Rainy Season in Lenteng River, East Java, Indonesia insurance

Veryl Hasan*, Maheno Sri Widodo and Bambang Semedi

Fisheries and Marine Science Faculty, University of Brawijaya, Indonesia

*Corresponding author's e-mail: verylbp@gmail.com

ABSTRACT: The first stage of this research was sample collection from Lenteng River in East Java and the second was oocyte diameter distribution and fecundity analysis in Fish Reproduction Laboratory of Fisheries and Marine Sciences Faculty of Universitas Brawijaya, Malang in November 2014. The purpose of this research was to know oocyte diameter distribution and fecundity of Javaen Barb (*Systemus orphoides*) at the start of rainy season. Method of the research was descriptive method with graphic analysis model. The Javaen Barb researched for their oocyte diameter was the adult female fish which were in Stage V of Gonadal Maturation Stages while the ones researched for their fecundity were adult female fish based on their weight class interval differences. Results showed oocytes in diameter class interval B had the highest existing frequency reaching 45.33%, while the lowest was diameter class interval E with 1.66% existing frequency. The highest frequency of fecundity was achieved by weight class interval E with 61,619 oocytes while the lowest fecundity rate was on weight class interval A with 30,123 oocytes.

Key words: Oocyte Diameter, Fecundity, Javaen Barb

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INTRODUCTION

The Javaen Barb (*Systemus orphoides*) is one of fresh water species of Cyprinid fish which can be found in South Asia, from India [1] to Malay Peninsula, Malaysia [2]. In Indonesia, this fish spread out in Sumatra, Kalimantan, and Java. Lenteng River which is located in East Java is a natural habitat of Javaen Barb and its economic value as consumption fish makes it a catching commodity until now. So efforts to conserve the fish are needed by breeding it [3].

First stage in doing a breeding process is by knowing the reproduction aspect of the fish in its natural habitat especially at the start of season where its environmental factors like physical and chemical [4]. Reproduction aspect which can be studied is the potential reproduction based on its oocyte diameter distribution [5] and fecundity [6] or the average numbers of oocytes produced by the adult female fish.

The purpose of this research was to know oocyte diameter distribution and fecundity of the Javaen barb at the start of rainy season, and the result of the research was expected to be a reference for Javaen barb future studies especially about its breeding.

MATERIAL AND METHODS

Sample collection was conducted once randomly in the middle of November 2013 in the area at the start of rainy season where the Javaen Barb fish's gonad has matured enough so the reproduction aspect can be observed clearly [7]. Fish sample collection was done using environmental friendly fish net [8]. The method of the research was descriptive method with graphic model analysis [9].

Oocytes growth stages were related to the fish maturation [10]. The Javaen Barb which oocytes diameter was observed was the adult female fish which were in Stage V of Gonadal Maturation Stages and it was assumed that oocytes in that stage were matured [11]. Oocyte samples were taken about 100 oocytes in three retrieval process. Oocytes retrieval was conducted by incising the stomach and retrieving the ovary [12]. Oocyte samples were collected by using a pin set and then oocyte diameter class was divided into A= 0.21 - 0.22 mm, B= 0.23 - 0.24 mm, C= 0.25 - 0.26 mm, D= 0.27 - 0.28 mm and E= 0.29 - 0.30 mm, then oocyte diameter distribution was calculated based on its existing frequency so we can acquire the data in percentage (%).

The Javaen Barb studied for their fecundity was adult female fish which were in Stage V Gonadal Maturation Stages. Then the female fish were divided based on their weight class into A=50-59 gram, B=60-69 gram, C=70-79 gram, D=80-89 gram and E=90-99 gram. Fecundity calculation used graph metric method with a formula: $F/f = B/b$, where F = Total Fecundity, f = oocytes sample number, B = gonads weight, b = gonads sample weight [13].

RESULTS

Location of sample collection was 113°46'55.89"East Lon - 7° 2'32.25"South Lat. The location map can be observed in Figure 1. Data collected from oocyte diameter distribution was shown in Table 1 while data achieved for fecundity calculation can be observed in Table 2. In Table 1 shows Javaen Barb had various oocyte diameter distribution with different existing frequency 0 – 60%.

In Table 2 shows Javaen Barb fish fecundity ranged around 26,933 – 63,041. Then, histogram analysis was conducted to see oocyte diameter distribution based on the diameter class interval as shown in Figure 2. Histogram analysis was conducted to know fecundity value based on the weight class as shown in Figure 3.

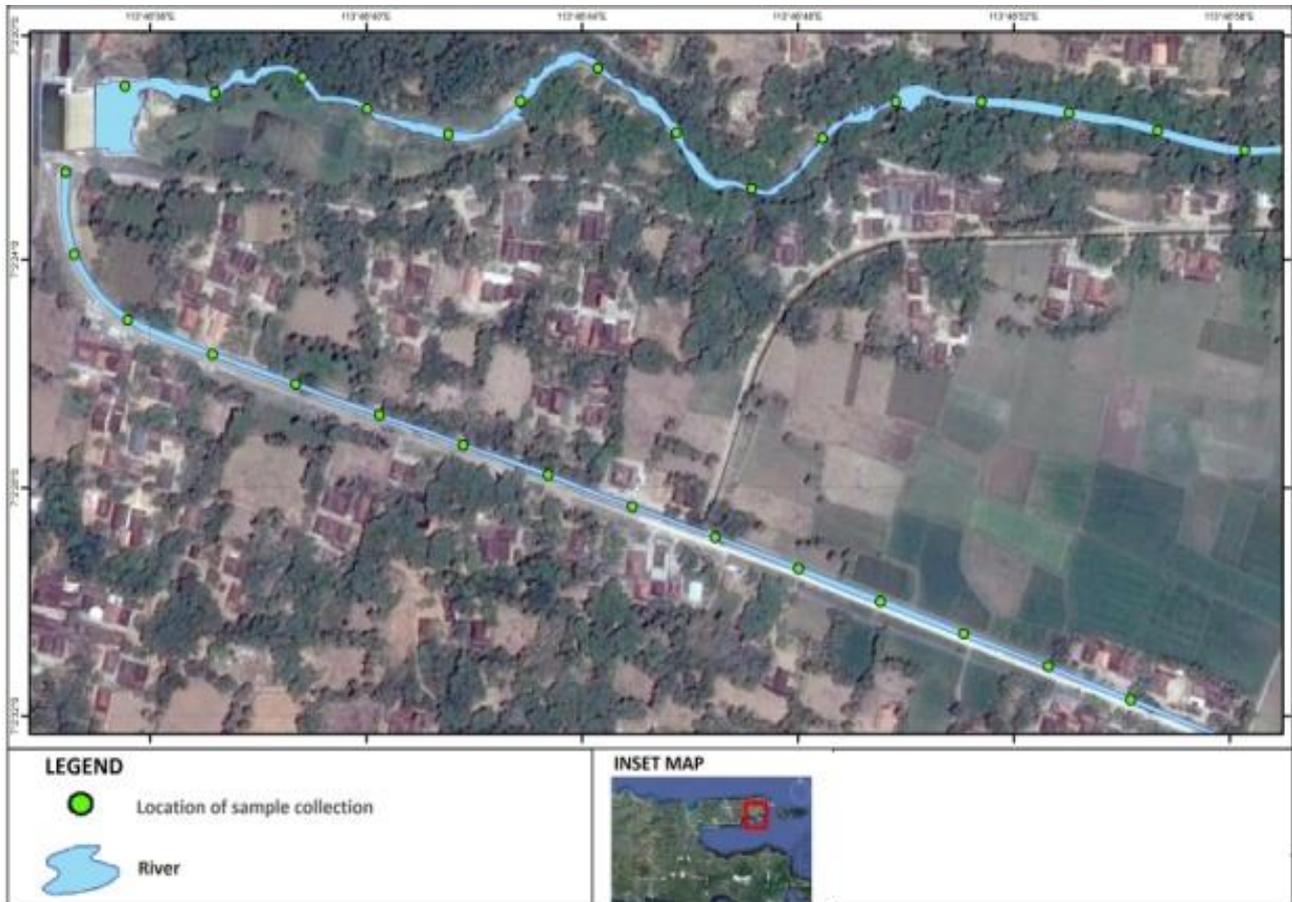


Figure 1. Sample collection location

Table 1. Data on Oocyte Diameter Distribution Calculation

Code	Weight Class (Gram)	Frequency Reaching			Average
		Retrieval			
A	0,21-0,22	14	25	29	22,66
B	0,23-0,24	45	60	31	45,33
C	0,25-0,26	17	15	19	17
D	0,27-0,28	10	0	21	10,33
E	0,29-0,30	5	0	0	1,66

Table 2. Data on the Fecundity Calculation

Code	Oocyte Diameter Class (mm)	Oocytes Produced			Average
		Retrieval			
A	50-59	36108	27330	26933	30123,467
B	60-69	40473	46773	51187	46144,333
C	70-79	43697	49005	57784	50161,933
D	80-89	53716	55850	58032	55865,867
E	90-99	63041	58974	62843	61619,533

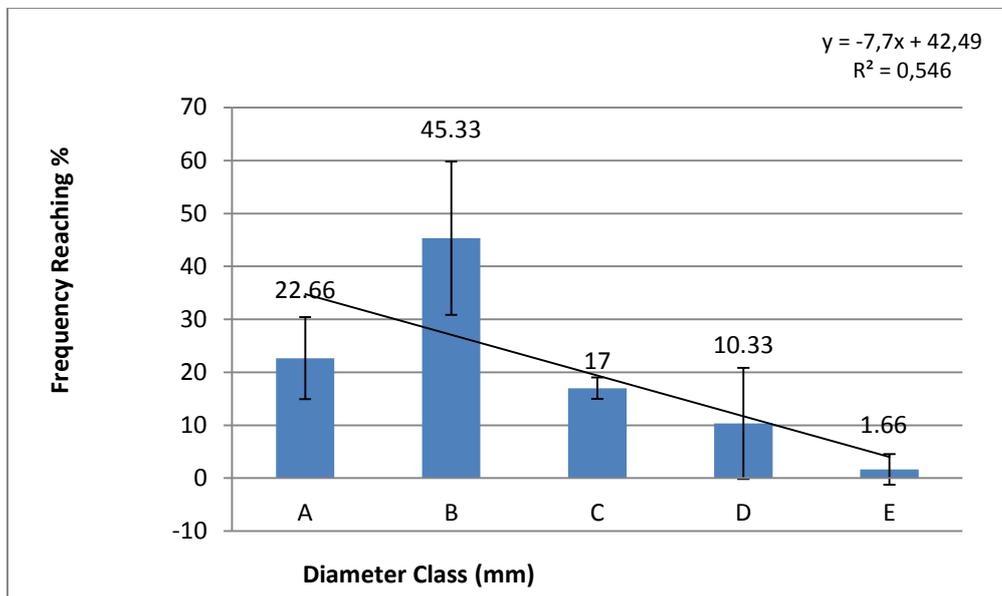


Figure 2. Oocyte diameter distribution based on the diameter class

Based on the histogram analysis it was shown that the highest existing frequency was 45.33% on diameter class B, while the lowest existing frequency was 1.66% on diameter class E.

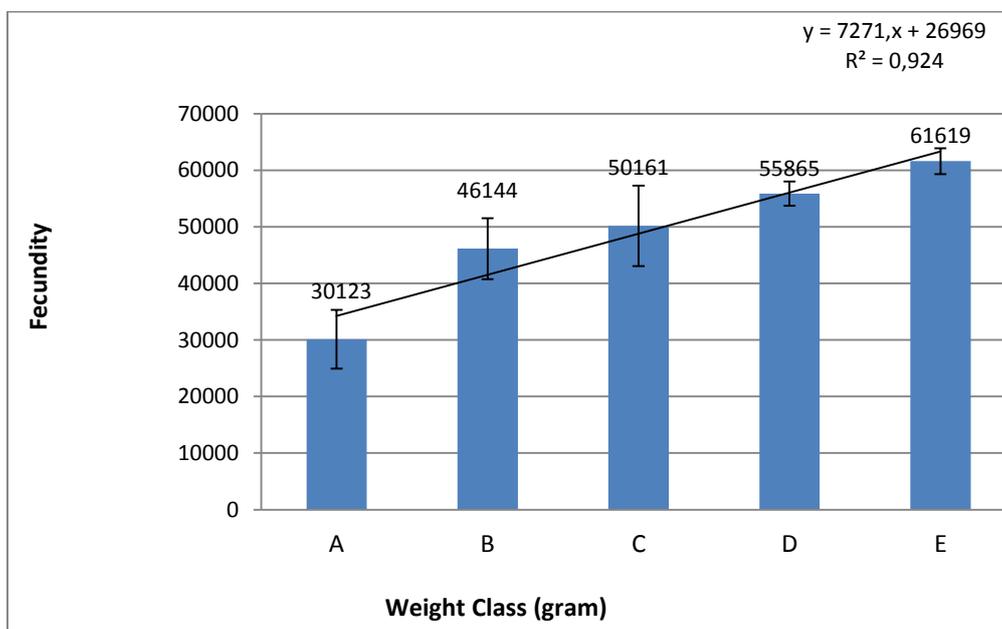


Figure 3. Javaen Barb Fecundity based on the weight class

Based on the histogram analysis, it was shown that the highest data was on weight class E with total fecundity value about 61.619 while the lowest data was achieved on the weight class A with total fecundity value about 30.123.

DISCUSSION

Observation result on oocyte diameter distribution showed that Javaen Barb with matured gonads had various oocyte diameters more than two modes it means that the fish had spawned partially throughout the year [14]. Oocyte diameter of Javaen Barb ranged about 0.29 – 0.30 mm, for comparison common carp fish (*Cyprinus carpio*) in the same genus has oocyte diameter range about 0.40 – 1.50 mm [15].

Partial fish spawning generally happens to tropical fish where there are only two seasons [16], rainy season and dry season so the fish metabolism especially on the gonads maturation process happens faster. It is different from fish which live in subtropical water where the spawning only happens once a year because of low temperature during the winter. It causes the fish metabolism to work slower [17].

Observation results on the Javaen Barb females' fecundity with different weight class showed that the heavier the female fish then the more oocytes produced [18]. It is because the fish weight is positively correlated

with the gonad weight in the fish stomach [19]. For that reason, other than environmental factors, food factors are also important to estimate fish fecundity [20].

CONCLUSION

Javaen Barb oocyte showed various diameter classes and diameter class 0.23 – 0.24 mm was the highest on the existing frequency about 45.33%, while diameter class 0.29 – 0.30 was the lowest on the existing frequency, only about 1.66%. Javaen Barb fecundity value is positively correlated with the fish weight. The highest fecundity found on weight class 90 – 99 gram with fecundity value 61619.533 while the lowest was on weight class 50 – 59 gram with.

Recommendation

For future researches, we suggest Javaen Barb to be researched with its other biological aspects considered such as its testical and ovaries histology, habitat suitability and the food supply for young and matured fish.

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