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Study of Aspect of Reproductive Biology of Manggabai Fish (Glossogobius Giuris) in Lake Limboto

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Abstract:- The purpose of this study was to determine the study of aspects of reproductive biology of manggabai fish (Glossogobius giuris). The method used is the observation method, where all fish are observed directly in the field for some characteristics of gonad maturity, while other observations are carried out in the laboratory. The parameters measured and observed are gonadal maturity level, gonadal maturity index, egg diameter, and fecundity of manggabai fish. Manggabai fish used during the study amounted to 50 heads consisting of 25 males and 25 females with a body length range 16.3 - 25.1 cm and body weight 26.66 - 48.24 grams. The results showed that the largest manggabai fish TKG was obtained at TKG I which was 32% (male) and females at TKG III were 36%. TKG greatly affects the IKG value, both in male and female fish. The highest IKG value of manggabai fish for female fish is in TKG IV with IKG values of 6.272% and for male fish 0.574%. Manggabai fish egg diameter reaches a length of 0.30 - 0.68 mm, width 0.07 - 0.10 mm with a weight of 0.08 mm. the fecundity of manggabai fish with gonad 4.09gr weight reached 3,172 eggs while gonad weight was 0.35gr with a range of 1,196 eggs.

Keywords:- *reproductive biology, manggabai fish (Glossogobius giuris).*

I. INTRODUCTION

The type of fish found in Limboto Lake is not an endemic lake of Limboto Lake, a type of manggabai fish (Glossogobius giuris). Ikanini is one of the prima donna fish that is much favored by the people of Gorontalo and is sold at relatively expensive prices. The population of manggabai fish used to be very abundant, but the decline was marked by a decrease in the response of fishermen. This gives a strong indication that this species has experienced overfishing or over exploitation. In addition, the occurrence of silting and shrinkage in Lake Limboto can cause habitat dependence and it is feared that the manggabai fish population will experience extinction (Astri & Krismono, 2011).

According to Nikijuluw and Wiadyana (2006), the manggabai fish marketed so far shows a relatively different size over time. On the other hand, consumer demand for manggabai fish which has increased has implications for its development guidance. Therefore, so that the utilization of manggabai fish resources can continue and its sustainability can be maintained, efforts are made to conserve the fish by regulating fishing and mass production, among others through restocking (adding fish stocks) and intensive fish farming.

II. METHOD

This research was conducted on March 20 2018 and September 11 2018 at the Fish Quarantine Station of Gorontalo City Fisheries Quality Control and in Gorontalo Gotong Royong Vocational School. Objects in this study are knowing Gonad Maturity Rate (TKG), Gonad Maturity Index (IKG), egg diameter and fecundity of manggabai fish (Glossogobius giuris). The method used is the observation method, where all fish are observed directly in the field for some characteristics of gonad maturity, while other observations are carried out in the laboratory. The parameters measured and observed are gonadal maturity level, gonadal maturity index, egg diameter, and fecundity of manggabai fish. Manggabai fish used during the study amounted to 50 heads consisting of 25 males and 25 females with a body length range 16.3 - 25.1 cm and body weight 26.66 - 48.24 grams.

III. RESULTS AND DISCUSSION

Knowledge of manggabai fish, among others, through eating habits, the nature of growth, natural habitat, domestication and in terms of aspects of reproductive biology.

TKG	Male		Female	
	n (tail)	Percentage (%)	n (tail)	Percentage (%)
I	8	32	-	-
II	7	28	8	32
III	5	20	9	36
IV	5	20	8	32
Jml	25	100%	25	100%

Gonad Maturity Level (TKG)

Description: n = Number of fish samples

The largest percentage of TKG for male fish was obtained at TKG I by 32% (8 tails) and the smallest in TKG III and IV by 20% (each of 5 tails). Percentage of male gonads mature (TKG III and IV) reached 40% (10).

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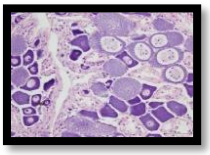
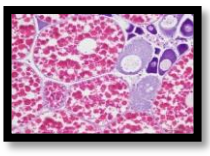
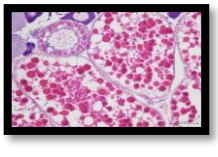
Female fish has the largest percentage, namely at TKG III for 36% with the number of fish 9 fish, while the smallest percentage is at TKG I by 0%. The maturity level of the manggabai fish gonad in the TKG I and II was declared to be gonad immature while the TKG III and IV were mature gonads. The types of manggabai fish used in the study have various TKG, including TKG I, II, III and IV. In accordance with the TKG obtained shows that this fish has been partially spawned but the spawning peak has not been determined. This is because the fish observed have different TKG.

Morphologically, classification of the maturity level of gonads in manggabai fish is divided into four stages: TKG I (no gonads), TKG II (early gonadal development), TKG III (mature gonads), TKG IV (late gonad development). According to Eragradhini's research (2014), microscopically female manggabai fish are characterized by the process of egg development that occurs in ovaruim and called oogenesis. In principle, the process is not far apart from the process of spermatogenesis. The first stage of oogonia spreads in the ovaries, the second stage of oogonia undergoes mitotic division into oocytes and undergoes the first meiotic division to form ootids and the last stage of meiotic division then becomes ovum.

Tingkat Kematangan Gonad (TKG)	
I	II
	
	
III	IV
	
	

Information : I (no gonad)
II (early gonad development)
III (mature gonads)
IV (late gonadal development)

During the process of oogenesis, the surrounding epithelial cells provide a number of reserves of food in the form of moldy yellow (protein) and fat formed by oil drops. Furthermore, the eggs that have been formed will soon be released into the ovarian cavity or peristonel cavity known as the ovulation process (Rahadjo et al., 2011).

According to Eragradhini's research (2014), microscopically the gonads of manggabai fish are marked by the formation of spermatozoa from primordial spermatogonia male sex cells through stages called spermatogenasis. In the first stage the gonads are dominated by spermatoginia and connective tissue. In the second stage, spermatogonia then undergoes repeated mitotic division (the formation of spermatogonia) which will form primary spermatocytes. The next stage (stage three) occurs miosis (reduction) in primary spermatocytes forming secondary spermatocytes. In the fourth stage, secondary spermatocytes undergo a second meiotic division to become spermatids and the last stage of spermatids then differentiate into spermatozoa or gametes. Spermatozoa or gametes produced will be secreted from the sperm duct and released during spawning. From the morphological observations on gonads of female fish at the maturity level of gonads (TKG) II the egg yolk was not clearly seen, whereas in TKG III and IV morphologically, it could be seen that the ovary was yellow and egg yolk was found, while the morphology of fish gonads males at gonad maturity level (TKG) I testes have not been too visible and TKG II testes are white as TKG III and IV testes are larger compared to the size of testes in TKG I and II. According to Nur (2015), ovary development and Fish testes generally consist of two main stages of development, namely the stage of gonadal growth and the maturation stage of sexual products (gametes).

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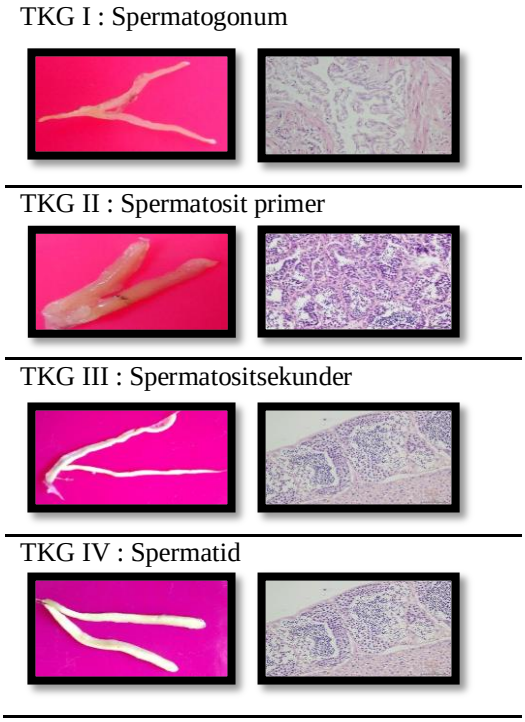

Figure 4. Gonad and gonadal tissue

A. Gonad Maturity Index (IKG)

Manggabai fish (Glossogobius giuris) has a range of IKG based on TKG. TKG greatly influences the value of IKG both for male fish and for female fish. The higher the IKG of the manggabai fish obtained, the higher the IKG value. This shows that there is a relationship between IKG and TKG. The highest value of the IKG of manggabai fish was obtained in female fish, namely at TKG IV with a value of 6.272%, while for male fish it gained a value of 0.574%.

According to Johnson (1971) in Sipetu (2011), suggested that IKG would increase until it reached the maximum limit at the time of spawning. Factors that support the development of fish gonads can be caused by environmental factors such as temperature, food, periods of light, seasons and hormonal processes.

B. Egg Diameter

Manggabai fish egg diameter was measured at TKG IV, with the size of the diameter of the eggterus increasing with gonadal development. The higher the TKG, the larger the diameter of the egg in the ovary. Measurements were made on two sides, namely egg length and diameter on the egg width. Manggabai eggs are oval shaped with a length of 0.30 to 0.68 mm, while the diameter of fish eggs ranges from 0.07 to 0.10 mm with an average length of 0.45 mm and an average weight of 0.08 mm. In the process of reproduction before spawning occurs, the gonads are larger and heavier, as well as the size of the diameter of the eggs in them. According to Tamsil (2000), the length of manggabai fish eggs reached 0.28 to 0.65 mm, while the diameter of the smallest and largest eggs ranged from 0.08 to 0.14 mm and 0.13 to 0.17 mm.

C. Fecundity

The fecundity of manggabai fish with gonad weight 4.09gr (highest) with a length of 17.2cm and body weight 40.10gr reached 3,172 eggs, while the weight of gonad 0.35 gr (lowest) with a length of 13.4cm and body weight of 18.00 reached 1,196 eggs. The fecundity of manggabai fish in limboto lake is relatively larger than some of the results of previous studies.

According to Islam (2004), the fecundity of manggabai fish is influenced by various factors such as size, age, species and habitat conditions such as food availability, resulting from a decrease in population abundance caused by high catches.

The fecundity of manggabai fish ranged from 18,578-335,034 with an average of 192,032 items in a total length range of 125-240 mm. The results of Suwarni's (1998) study showed that the fish fecundity at Lake Tempe ranged from 3,440-15,360 grains with an average of 9,400 grains in the total length ranging from 85-187 mm. The availability of food sources for manggabai fish in Limboto Lake allegedly supported the formation of gonads and manggabai fish fecundity.

The magnitude of the fish fecundity value in Lake Limbot is a form of selection pattern on environmental pressure. This is in line with the opinion of Nikolsky (1969) in Effendie (2002), who said that certain species at different ages show varying fecundity with respect to annual food supplies. This effect also occurs for individuals of the same size and can also for populations overall. If one population in a few years decreases due to arrest, for example, this means that it will improve the supply of food for the remaining population. The next phenomenon of the remaining population has increased fecundity, while when the population is complete or large in number, the fecundity is small. It can be seen from the value of its fecundity, manggabai fish in Lake Limboto including fish that have large fecundity and fish with large fecundity tend to adapt quickly to environmental changes.

IV. CONCLUSION

Berdasarkan hasil penelitian, maka dapat disimpulkan : Presentase tingkat kematangan gonad (TKG) ikan manggabai jantan dan betina yaitu mencapai TKG I, II III, dan IV.Nilai kisaran IKG yang tertinggi terdapat pada TKG IV yaitu untuk ikan jantan dengan kisaran 0.574% dan untuk ikan betina 6.272%.Fekunditas ikan manggabai betina terbesar yaitu pada TKG IV dengan bobot gonad 4.09 gr (tertinggi) pada ukuran panjang 17.2 cm dan bobot tubuh 40.10 g mencapai 3.172 butir sedangkan bobot gonad 0.35 g (terendah) pada ukuran panjang 13.4 cm dan bobot tubuh 18.00 mencapai 1.196 butir telur..Telur ikan manggabai berbentuk lonjong dengan panjang antara 0.30 sampai 0.68 mm, sedangkan diameter pada lebar telur ikan berkisar antara 0.07 sampai 0.10 mm dengan rata-rata panjang mencapai 0.45 mm dan rata-rata berat mencapai 0.08 mm.

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