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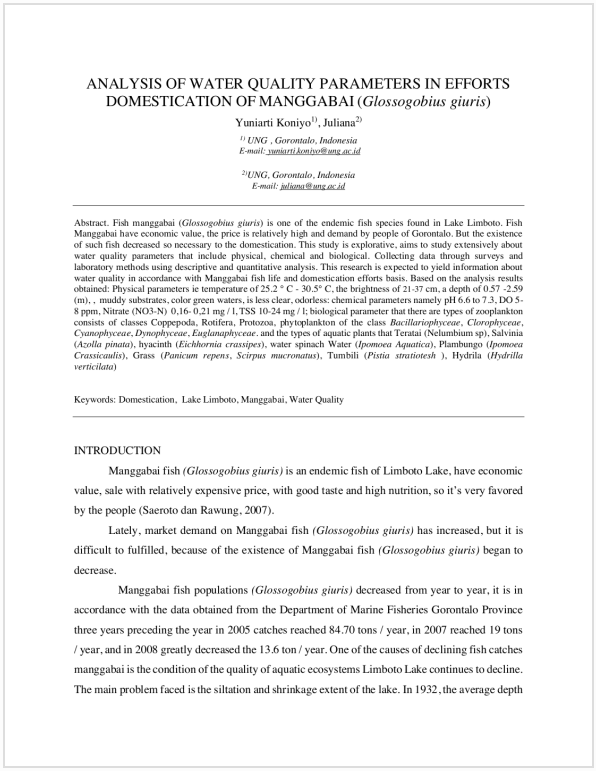

ANALYSIS OF WATER QUALITY PARAMETERS IN EFFORTS DOMESTICATION OF MANGGABAI (*Glossogobius giuris*)

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Abstract. Fish manggabai (*Glossogobius giuris*) is one of the endemic fish species found in Lake Limboto. Fish Manggabai have economic value, the price is relatively high and demand by people of Gorontalo. But the existence of such fish decreased so necessary to the domestication. This study is explorative, aims to study extensively about water quality parameters that include physical, chemical and biological. Collecting data through surveys and laboratory methods using descriptive and quantitative analysis. This research is expected to yield information about water quality in accordance with Manggabai fish life and domestication efforts basis. Based on the analysis results obtained: Physical parameters ie temperature of 25.2 ° C - 30.5° C, the brightness of 21-37 cm, a depth of 0.57 -2.59 (m), , muddy substrates, color green waters, is less clear, odorless: chemical parameters namely pH 6.6 to 7.3, DO 5 - 8 ppm, Nitrate (NO3-N) 0,16- 0,21 mg / l, TSS 10-24 mg / l; biological parameter that there are types of zooplankton consists of classes Coppepoda, Rotifera, Protozoa, phytoplankton of the class *Bacillariophyceae*, *Clorophyceae*, *Cyanophyceae*, *Dynophyceae*, *Euglanaphyceae*. and the types of aquatic plants that Teratai (Nelumbiaum sp), Salvinia (*Azolla pinata*), hyacinth (*Eichhornia crassipes*), water spinach Water (*Ipomoea Aquatica*), Plambungo (*Ipomoea Crassicaulis*), Grass (*Panicum repens*, *Scirpus mucronatus*), Tumbili (*Pistia stratiotesh*), Hydrila (*Hydrilla verticilata*)

Keywords: Domestication, Lake Limboto, Manggabai, Water Quality

INTRODUCTION

Manggabai fish *(Glossogobius giuris)* is an endemic fish of Limboto Lake, have economic value, sale with relatively expensive price, with good taste and high nutrition, so it's very favored by the people (Saeroto dan Rawung, 2007).

Lately, market demand on Manggabai fish *(Glossogobius giuris)* has increased, but it is difficult to fulfilled, because of the existence of Manggabai fish *(Glossogobius giuris)* began to decrease.

Manggabai fish populations *(Glossogobius giuris)* decreased from year to year, it is in accordance with the data obtained from the Department of Marine Fisheries Gorontalo Province three years preceding the year in 2005 catches reached 84.70 tons / year, in 2007 reached 19 tons / year, and in 2008 greatly decreased the 13.6 ton / year. One of the causes of declining fish catches manggabai is the condition of the quality of aquatic ecosystems Limboto Lake continues to decline. The main problem faced is the siltation and shrinkage extent of the lake. In 1932, the average depth

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of the Limboto Lake 30 meters with an area of 7,000 hectares, and in 1961 the average depth of the Limboto Lake reduced to 10 meters and wide into 4,250 Ha. While the year 1990 - 2004 the depths of Limboto Lake average stay of 2.5 meters with an area of 3,000 Ha. It is caused by the erosion and sedimentation caused by businesses are not environmentally friendly farming and illegal logging in the headwaters area (catchment) mainly on watershed (DAS) of Limboto. This condition is causing fish populations of endemic fish including Manggabai fish *(Glossogobius giuris)* continued to decline, and if allowed to continue could cause extinction.

The destruction of lake's habitat and the decline in population and the catches Manggabai *(Glossogobius giuris)* led to the domestication of the fish must be done to keep increasing production in order that the existence of these fish can be maintained and preserved. Domestication is made of wild species (wild species) into aquaculture species. Domestication fish or aquaculture as a whole has been instrumental in increasing fish production (Naylor et al., 2000).

Domestication is an effort for animals, including fish, which normally live wild (uncontrolled) be able to live and breed in a controlled environment. Domestication takes time and careful planning, both from the point of technical and socioeconomic assessment, so that at one moment a package of cultivation technology can be applied to the public (Dahuri, 2006). Technically, the domestication cultivation of a single species of fish should consider various aspects both internally and externally that is the state of the location of such aspects of the environment and water quality is right where domestication was planned, the technology used for the business of domestication, the necessary facilities, skilled personnel, sustainable fund, as well as the biological aspects such as eating habits, growth, and other aspects.

Selection of the proper location into one of the conditions of success manggabai fish farming. Therefore, it is necessary to study and research on aspects of the environment and water quality as a first step towards the domestication process manggabai fish.

EQUIPMENT, MATERIALS AND METHODS

Tools and materials used in the research are: GPS (Global Possitioning System), spektorofotometer, meter, secchidisk, pH digital meter, Dissolved Oxygen meter, COD meter, thermometer, board scale, tube sampling water at the bottom, sample bottles, boxes of ice to bring the sample to the laboratory. Materials used are distilled water, plankton samples, samples of aquatic plants, starch, KOH-KI, H_2SO_4, $MNSO_4$, Na_2SO_3, cotton, and tissue.

Research Location in the territorial waters of Lake Limboto. The type of study is explorative, collecting data through surveys and laboratory test method using descriptive analysis is to describe and explain the results of activities in accordance with scientific principles and analysis of quantitative data is displayed through the measurement and calculation. Determining the location and the sampling point as much as 12 points done in specified sampling stations. Water quality analysis conducted at the Laboratory of Fisheries Gorontalo province. Data used in this study are primary data and secondary data. Primary data is data results to measure physical parameters, water chemistry, aquatic biology include measurements of temperature, flow, Dissolved Oxygen, ammonia, depth, brightness, pH, and plankton performed insitu or exsitu.

RESULTS AND DISCUSSION

Water quality is a state and the physical, chemical, and biological properties of a waters compared to requirements for certain purposes, such as water quality for drinking water, agriculture and fisheries, hospitals, industry and so on, different according to designation (Ismoyo, 1994). According to Boyd (1982), the environmental quality of the waters is a feasibility of aquatic environment for support the life and growth of aquatic organisms whose value is expressed within a certain range. Meanwhile, ideal waters are waters that can support organism life in completing its life cycle. Water quality determines the success rate of aquaculture activities and domestication process. The high or low quality of water will be fatal for the growth of fish. Based on the results of water quality measurement during the study seen in the following table.

Table 1. Results of Water Quality Chemical Parameter Measurement

Nu.	Parameters Chemical Of Water Quality	Unit	The Range of Value
1.	pH	-	6,6 – 7,3
2.	DO	mg/l	5 - 8
3.	BOD	mg/l	3,5 - 7
4.	TSS	mg/l	10-24
5.	Nitrate (NO3-N)	mg/l	0,16- 0,21

2. Water Physic

Table Results of Quality Parameter Measurement

Nu.	Parameters Physic of Water Quality	Unit	The Range of Value
1.	Temperature	ºC	25,2 – 30,5
2.	Brightness	cm	21-37
3.	Depth	m	0,57 -2,59
4.	Substrates	-	Muddy
5.	Color	-	Green Waters
6.	Odor	-	Odorless

Water Quality Chemical Parameters

Potential of Hydrogen (pH) is a measure of the acidity or wetness of an object and becomes an important factor for the metabolism and physiological processes of an organism. The pH value is defined as the negative logarithm of the concentration of Hodrogen ions indicating the acidic or alkaline atmosphere of a water. The degree of acidity of a waters is influenced by the concentration of CO2 and acidic compounds (Lesmana, 2002). The acid value is indicated by the values of 1 to 7 and the base 7 to 14. Based on the measurement of pH in the waters of mangabai fishing location ranged from 6.6 to 7.3. Pescod (1973) states that the tolerance limit of aquatic organisms to pH varies and is affected, among others, temperature, dissolved oxygen, alkalinity, cation and anion content as well as the type and place of living of the organism. The ideal waters for fishing activities are 6.8 s / d 8.5 and waters with pH <6 cause micro organisms can not live well. Dissolved oxygen in the waters is an important factor for respiration of aquatic organisms, maintaining beneficial chemical factors and creating a hygienic environment of water bodies. Oxygen in the waters comes from the diffusion or result of the photosynthetic process of the producer organism. Pescod (1973) states that the dissolved oxygen content of 2 mg / L in the waters is sufficient to support the aquatic life of the aquatic.). The dissolved oxygen content in Limboto

Lake where mangabai fish catch ranges from 5.1 ppm - 5.7 ppm. Solubility of oxygen in water is observed by several factors including temperature, salinity (salinity) of water, water movement on the surface of water, the open surface area of the water, atmospheric pressure and the percentage of oxygen around it. If at the same temperature the dissolved oxygen concentration is equal to the amount of oxygen solubility present in the water, then the water may be said to be saturated with dissolved oxygen. When water contains more dissolved oxygen than it should at a certain temperature, it means that the oxygen i in the water is over saturated (Roeslani, 2008). Oxygen fragility will decrease if temperature and temperature rise (Boyd, 1990). BOD (Biochemical Oxygen Demand) is the amount of dissolved oxygen required by living organisms to break down or oxidize waste materials in water. If high oxygen consumption is indicated by the smaller dissolved oxygen content, then the content of high oxygen-containing waste materials is required. Oxygen consumption can be determined by oxidizing water at 20 ° C for 5 days, and the BOD value indicating the amount of oxygen consumed can be determined by calculating the dissolved oxygen concentration difference before and after incubation (Hardjojo and Djokosetiyanto, 2005). The BOD indicates the amount of oxygen consumed by the aerobic microbial respiratory process present in the BOD bottle incubated at a temperature of about 20 0C for 5 days in a lightless state (Boyd, 1982). The total solid (residue) is the material remaining after the sample water undergoes evaporation and drying at a certain temperature (APHA, 1985). The solids present in the waters are classified by the size of the particle diameter. The total suspended solid (TSS) is a suspended material (> 1µm diameter) retained on a milipore filter with a pore diameter of 0.45µm.

TSS consists of mud and fine sand and microorganisms, which is mainly caused by soil erosion carried by water. Dissolved and suspended material in natural waters is not toxic, but if excessive, especially TSS can increase the turbidity value, which will further inhibit the penetration of sunlight into the water column and ultimately affect the process of photosynthesis (Effendi, 2003). TSS in the study sites ranged from 10 to 24 mg / l.

Physical Parameters of Water Quality Temperature is an important environmental variable for aquatic organisms or aquatic organisms. The tolerance range as well as the optimal temperature for each culture are different for each species of fish species to different growth stages. Temperature or temperature is one of the determinants of fish life. The result of temperature measurement at the research location is 25,2 °C - 30,5 °C. Temperature may affect fish feeding

activities, such as: increased fish metabolism, decreased dissolved gas, fish reproduction effect, appetite enhancement, and fish growth. According to Sayuti (2003) that in general, the criteria of good water for the maintenance of fish is temperature 22-32^{0}C or ideally 27-30 ^{o}C. Amri (2004) states that the temperature range is good for fish life between 25 - 30 ^{o}C meanwhile, if water temperature is below 14^{o}C fish will experience death. If the water temperature drops below 25 ^{o}C, the fish digestibility of the food consumed is reduced. Conversely, if temperatures rise up to 30 ^{o}C fish will be stressed due to the higher oxygen demand. This is confirmed also by Suyanto and Mudjiman (2003), that the normal water temperature for fish farming ranges from 25 - 30 ^{o}C.
Water temperature is strongly influenced by the amount of sunlight that falls onto the surface of the water that is partially reflected back into the atmosphere and partly absorbed in the form of heat energy (Welch 1952). Temperature measurement is necessary to know the characteristics of the waters. According to Schwoerbel (1987) water temperature is an abiotic factor that plays an important role for the life and life of aquatic organisms. Based on the results of research Goldman (1983) showed that there was a decrease in biomass and diversity of fish when water temperature increased more than 28 ^{o}C.

Brightness is a measure of water transparency, which is determined visually by using a secchi disk. The brightness value is strongly influenced by the intensity of sunlight, water turbidity and plankton density of a waters, the brightness value that supports the life of organism in a waters is> 45cm (Barus, 2004).

Water brightness in the study area is 21-37 cm, included in the brightness level that supports the life of the organism. The lake has a very significant difference in depth compared to other stagnant ground water types. The depth of the lake waters can reach more than 500 m, the center is usually the deepest. The depth of the waters of the lake allows the stratification of the water column due to sunlight penetration and changes (decrease) of water temperature (Kemen-LH, 2008). The depth of Lake Limboto in 1932 reached 30 meters. In 2008 the depth only reached 2.5 meters (Balihristi, 2009). The results showed that the study sites had a depth of 0.57 - 2.59 m. Odor is very influential in the determination of a water as a place of recreation and beauty (aesthetics). Odor may be affected by the presence of inorganic and organic materials of water from domestic waste, agricultural waste, and aquaculture (Jayanti, 2009). Research sites tend to be odorless. Water colors are usually grouped into true colors (true color) and apparent color (Emelia, 2009). The real color is the color only caused by dissolved chemicals. The visible color

is a color not only caused by the solute, but also the suspended material (Effendi 2003). The color of the waters is one of the parameters that affect the aesthetic value of the waters. The fifth averages The locations have clear, crystal clear waters.

Biological Water Quality Parameters

In aquatic ecosystems there are three organism components that live in them when classified according to their movement capability, ie, planktonic organisms, nektonic organisms and benthic organisms. Planktonic organisms include organisms that have weak movements and are unable to maintain their position from the movement of water currents. These include both vegetable and phytoplankton planktons animal (zooplankton).

Plankton is defined as animals and plants that float gliding in the waters, the movement passively follows the flow. The name plankton comes from the Greek root "planet" meaning wanderer. The term plankton was first applied to marine organisms by Victor Hensen the director of the German Expedition in 1889, known as the specially-funded "Plankton Expedition" to determine and fabricate the cytology of marine organisms (Charton and Tietjin, 1989). Plankton consists of two major groups of different aquatic organisms, photosynthetic or phytoplankton organisms and non-photosynthetic organisms or zooplankton.

Phytoplankton are microscopic plants (single-celled, filament-shaped or chain-shaped) that occupy the upper part of the water (the photon zone). The phytoplankton name is derived from the Greek term, phyton or "plant" and "planktos" meaning "nomad" or drifter ". Although unicellular / single-celled forms cover most of the phytoplankton, some green algae and blue-green algae are in the form of filaments (ie, thread-expanding cells.

Zooplankton is an animal plankton swept passively because of the limited moving females. In contrast to phytoplankton, zooplankton almost covers all animal phyla ranging from protozoa (single-celled animals) to Chordata (vertebrate) phyla. Based on observation and direct identification of plankton species in Limboto Lake, the result of plankton species that live in Lake Limboto can be seen in the table below.

Table 3. Identification of Plankton species in Lake Limboto

No.	Type Plankton	Group	Category
1	*Fragillaria crokonensis*	Diatom	Fitoplankton (Dominan)
2	*Fragillaria sp.*	Diatom	Fitoplankton (Dominan

3	*Hexalaspis holiodiscus*		Fitoplankton
4	*Gyrosigma*	Diatoms	Fitoplankton
5	*Homeokhrix*	Cyanobacteria	Fitoplankton
6	*Scenodesmus obliquus*		Fitoplankton
7	*Anabaenopsis elenkinii*		Fitoplankton
8	*Anabaenopsis sp*		Fitoplankton
9	*Pediastrum simplex*		Fitoplankton
10	*Pediastrum duplex*		Fitoplankton
11	*Merismopedia sp*		Fitoplankton
12	*Crococcus limnetica*		Fitoplankton
13	*Dichtyocha sp*		Fitoplankton
14	*Aphanizomenon flos aquae*		Fitoplankton
15	*Aphanizomenon sp*		Fitoplankton
16	*Gymnodinium*	Dinoflagellata	Fitoplankton
17	*Parafavella ventricose*		Fitoplankton
18	*Gonatozygon aculeatum*		Fitoplankton
19	*Navicula sp.*	Diatom	Fitoplankton
20	*Nitzschia apectabilis*	Diatom	Fitoplankton
21	*Nitzschia sigma*	Diatom	Fitoplankton
22	*Nitzschia vitrea*	Diatom	Fitoplankton
23	*Stichochryisis immobilis*		Fitoplankton
24	*Triplastrum indicum*		Fitoplankton
25	*Euchitonia ecinata*	Family : Porodiscida	Fitoplankton
26	*Coelodendrum furcatissimum*		Fitoplankton
27	*Synedra tabulate*	Diatom	Fitoplankton
28	*Aspelta angusta*	Dicranophoridae	Zooplankton
29	*Asplancha sp.*	Aspanchnidae	Zooplankton
30	*Cyclops sp.*	Copepoda : Cyclopoida	Zooplankton
31	*Keratella sp*	Keratella	Zooplankton
32	*Keratella cochlearis*	Keratella	Zooplankton
33	*Trichocerca stylata*	Trichocerca	Zooplankton
34	Nauplius Copepoda	Copepoda : Calanoida	Zooplankton
35	Nauplius *Euphausia brevis*	Crustacea (Udang-udangan air tawar)	Zooplankton (Dominan)

In the lake ecosystem the main organisms that are able to utilize light energy are green plants especially phytoplankton. Phytoplankton is an autotropic organism that is an organism capable of producing organic material from inorganic materials through photosynthesis process with the help of light. As organism autotrope phytoplankton acts as a primary producer capable of transferring light energy into chemical energy form.

Organic matter in the cell that other organisms can harness at the tropical level above. Phytoplankton is the largest producer of marine ecosystems. In aquatic ecosystems most primary productivity is done by phytoplankton.

Organic matter from photosynthesis process can be utilized by zooplankton which occupy second level tropic in food pyramid. At this tropical level, zooplankton acts as a herbivorous or primary consumer organism. Most zooplankton eat phytoplankton or detritus and have an important role in the food chain in aquatic ecosystems. Some species obtain food through direct uptake of dissolved organic matter. Zooplankton basically collect food through the feelter feeding mechanism or raptorial feeding. Zooplankton filter feeder filters all foods that pass through 'mouth' whereas in the feeder part of the raptorial feeder is removed again. The process of mutual prey between one and the other is called the food chain (food chain) while the chain of food is called the food web (food web). On the food chain as well as on the food web. Phytoplankton occupies the lowest place as the primary producer. The grazing food chain in the waters starts from phytoplankton as a producer and zooplankton as a consumer (grazer).

In addition to plankton identification, researchers also conducted identification of water plants that live in Lake Limboto. Based on the results of the identification of various water plants that live in Lake Limboto: water plants types namely Lotus (Nelumbium sp), Kiambang (Azolla pinata), Enceng hyacinth (Eichhornia crassipes), Water Kangkung (Ipomoea Aquatica), Plambungo (Ipomoea Crassicaulis), Grass Panicum repens, Scirpus mucronatus), Tumbili (Pistia stratiotesh), Hydrila (Hydrilla ververticalata).

Conclusion

Based on the results of this study can be concluded: physical parameters ie temperature 25.2 ° C - 30.5 ° C, brightness 21-37 Cm, depth 0.57 -2.59 (m), substrate muddy, color green water, less clear, no smell : Chemical parameters ie pH 6.6-7.3, DO 5-8 ppm, Nitrate 1.77-5.6 mg / l, TSS 10-24 mg / l; the biological parameters of the type of zooplankton consist of class Coppepoda, Rotifera, Protozoa phytoplankton from Bacillariophyceae class, Clorophyceae, Cyanophyceae, Dynophyceae, Euglanaphyceae. and species of water plants ie Lotus (Nelumbium sp), Kiambang (Azolla pinata), Water Hyacinth (Eichhornia crassipes), Water Kangkung (Ipomoea Aquatica),

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