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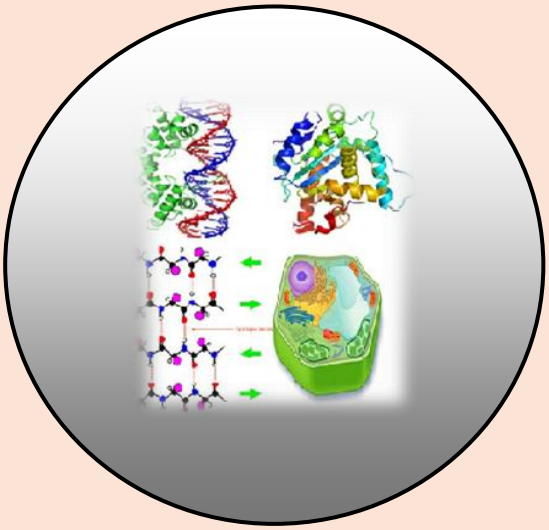

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Population Structure of Wader Fish in the Polluted Water

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ABSTRACT
Wader is a freshwater fish that included in the family of Cyprinidae. There are 56 species distributed in Indonesia and among them, three species are endemic in Indonesia. In the study of some river in Bali polluted by pesticide, industrial waste, and domestic waste, we found that one effect of this river or irrigation pollution is the population structure of fishes. Rasbora sp was a major freshwater fish that consume by people in Bali previously however the population of Rasbora sp now seem to very low. The aim of this study is to describe the population structure of Wader fish in the Sungi river which has been polluted with the pesticide, industrial, and domestical wastes. We used three site investigation based on topography included upstream, middle stream, and downstream of the river. In this study, we found two species, Rasbora. lateristriata and Puntius binotatus. We found 85 individuals species Rasbora lateristriata in the in the middle and downstream of the Sungi river respectively, however, only 14 individual species of Rasbora lateristriata found in the upstream of the river.Puntius binotatuswere found 60 individual species in the upstream of the Sungi river, while in the middle and downstream of the river we found only 13 species. The weight per individual of Rasbora lateristriata varied from 1 to 15 gram, and its length varied from 4 to 7,5 cm, while the weight for Puntius binotatusvaried from 1 to 25 gram, and its length varied from 5 to 11.9 cm. The population structure of Rasbora lateristriata and Puntius binotatus were influent by the quality of the water such as depth, brightness, Dissolved Oxygen (DO), Total Suspended Solids (TSS), Biological Oxygen Demand (BOD),and temperature.
Keywords: Population structure, Rasbora sp and River pollution.

INTRODUCTION
Genus Rasbora has classified Cyprinidaefamilia, 87 species distributed at Asia, especially in Southeast Asia and a part of Africa fairly widespread in the tropics (Eschemeyer, 2015) According to data from(Fish Base, 2012), there are 90 species of fish Rasbora scattered around the world where 56 species distributed in Indonesia and 3 species are endemic to Indonesia.The delicious taste and high nutritional content make this fish attracted many people (Budiharjo, 2002). Wader fish is also an economically important fish in the streams so that people make it a prime target of the catch. Rasbora found in the upstream and midstream areas but is extremely rare in the downstream areas and estuaries. These fish usually live at depths of less than 1 meter (Ahmad and nofrizal, 2011).

Rasbora is a fish that live clustered or schooling fish (Dina, et al, 2011). The upstream of the area had the ingredients of organic and inorganic derived from upland. The middle part of the river is a transport zone which distributes organic material on to downstream. While the downstream is central to deposit organic and inorganic materials that are stored in the bottom waters and site decomposition (Vannote, et, al, 1980). Sungi River is one of the ten rivers to contamination with chemical substance (BLH Prov, Bali, 2009). Pollutant parameters that have exceeded the quality standard that is BOD, COD, Total Phosphate, Total coliform and faecal coliform where these parameters are important because of the river Sungi for drinking water at Tabanan Regency (Krebs, 1978) Activities at Sungi River is dominated by agricultural activities, settlements farms and industrial in the downstream areas. Waste from these activities made disturbance of water quality can be shown as an increase in the content of BOD, COD, total coliform and faecal coliform. Increased content of this occurs in the middle of the river and decreases in the downstream.

The purpose of this study was to analyze the structure of the population based on body weight, standard length, total length and determine the relationship between physical-chemical waters with an abundance of Wader fish in river Sungi, Tabanan. This study provides information on ecological especially Rasbora fish populations that can be used as a reference in conservation efforts, especially in the use of fish by communities around the river Sungi.

MATERIAL AND METHODS

In this study using fish Rasbora sp as objects and water samples from the river Sungi. The fish in the catch with fishnet. Samples collected in the upstream, midstream and downstream using 3 pieces nets with mesh size 1.25 x 1.25 cm; 1 x 1 cm; and 0.5 x 0.5 cm. Equipment used to measure the physical and chemical parameters is DO meter, pH meter, thermometer, GPS, scales and calipers. The study was conducted by survey method and random purposive sampling technique Sungi river divided into 3 stations based on topography and environmental setting. Sampling fish at Sungi river will be divided into three regions are upstream, midstream, and downstream. On the upstream at 8 ° 21,45'S 115 ° 10,49'E, midstream at 8 ° 33,695'S 115 ° 09,538'E and downstream at 8 ° 38,053'S 115 ° 06,068'E measured by GPS. Physical variables were observed by depth parameters and temperature. Chemical variable to measure pH, DO, BOD and TSS. Population structure was analyzed by total weight, standard length, and total length. The abundance genus Rasbora counted the number of species per station from SungiRiver. Species abundances calculated the number of individuals of each species per station. The relative abundance is an abundance ratio of each species on the abundance of individuals of all species in a community[8]. Relative abundance is calculated with the formula:

$$Relativesabundance = \frac{ni}{N} \times 100\%$$

Information:

ni = number of individuals of species

N = the total number of individuals of all species

Overview of the population structure can be obtained by grouping data based on the body weight, standard length and the total length of the fish. Observation of the relationship between chemical physical factors with an abundance performed using Excel software.

RESULTS AND DISCUSSION

A total of 145 individuals Rasbora caught in this study, consisting of *Rasbora lateristriata* and *Puntius binotatus*, found 60 individuals of *Puntius binotatus* and 85 individuals *Rasbora lateristriata*. Species abundances variant in the upstream, midstream and downstream Sungi River (table 1).

Table 1. The abundance of Wader Fish at Sungi River.

Species	Stations			Total (Indv)
	1	2	3	
Puntius binotatus	34	12	14	60
Rasbora lateristriata	14	34	37	85
number of Species	2	2	2	2
number of Individuals	48	46	51	145

The abundance of *Puntius binotatus* decreases from upstream to midstream and increase downstream. The abundance of *Rasbora lateristriata* increased from upstream to downstream. The absolute relative abundance of Rasbora is shown in Figure 3. The relative abundance *Puntius binotatus* showed 41.37% and *Rasbora lateristriata* is 58.63%. Population structure based on body weight at present in figure 4.

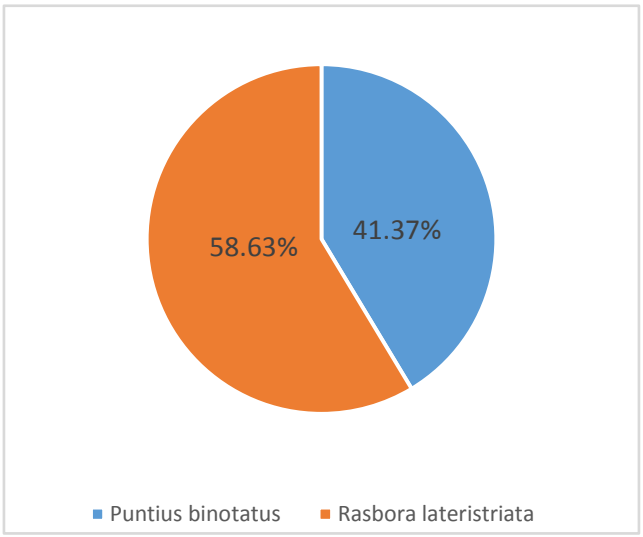


Figure 3. The relative abundance of Wader Fish.

Population structure *Puntius binotatus* and *R. lateristriata* based on body weight are presented in Figure 4. In the downstream found at the mostly *Rlatertistriata* that weight 1to5 gr are 29 individuals and *Puntius binotatus* mostly found are 6 to10 gr of upstream as much as nine species. *R. lateristriata* have the highest weight in the midstream with a total of 7 species and the weight of 11 to 15 gr is also present in the midstream. *P. binotatus* have more weight variation, the highest in the upstream 1 to 5 are 4 individuals, the weight 6 to 10gr have 9 individuals, 11 to 15 gr is 8 individuals, the weight of 16 to 20 gr is 6 individuals and 21 to 25 gr is 7 individuals. *Puntius binotatus* in the midstream and upstream have the highest weight is 1 to 5 g of each is 7 and 5 individuals.

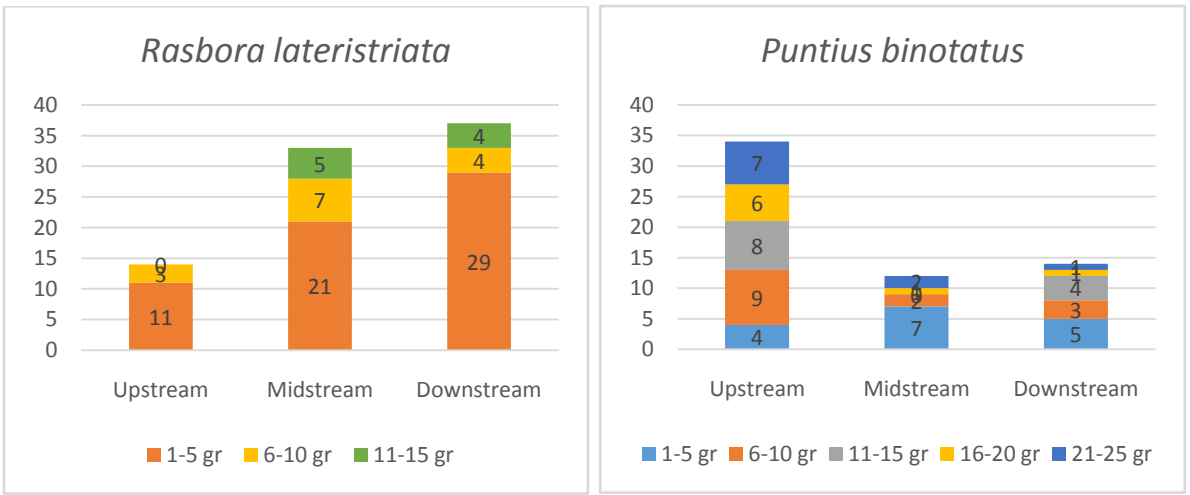


Figure 4. Populationstructure *R. lateristriata* and *Puntius binotatus* based on body weight.

Population *R. lateristriata* with standard length (figure 5) 5 to 7.9 mostly in the downstream is 21 individual, while *Puntius binotatus* with a length of 5 to 7.9 cm on the upstream highest standard that is 17 and the middle and lower reaches 4 to 5.9 standard length is the highest number. pada 9 individual.

Length central part of the total which at the downstream *R. lateristriata* has a length of 5 to 7. 9 mostly in the downstream is 21 individuals and *Puntius binotatus* has the highest total length 8 to 9.9 upstream.

Based on the standard length and the total length of known structure *R lateristriata* population is dominant in size from 5 to 7.9 on the river Sungi and *Puntius binotatus* dominant at the same size that is 5 to 7.9 in the Sungi river.

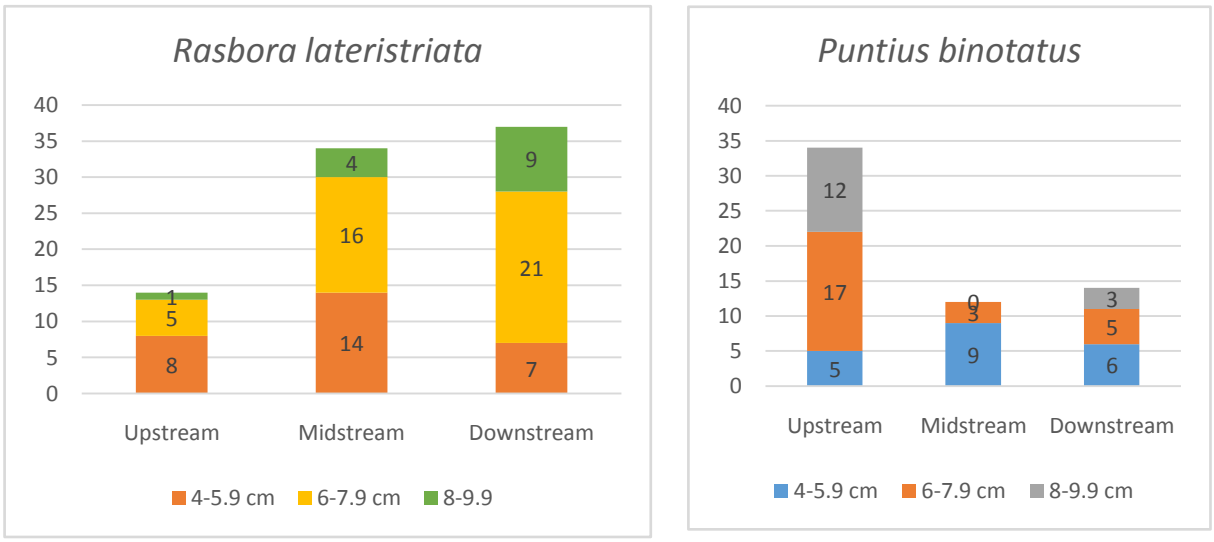
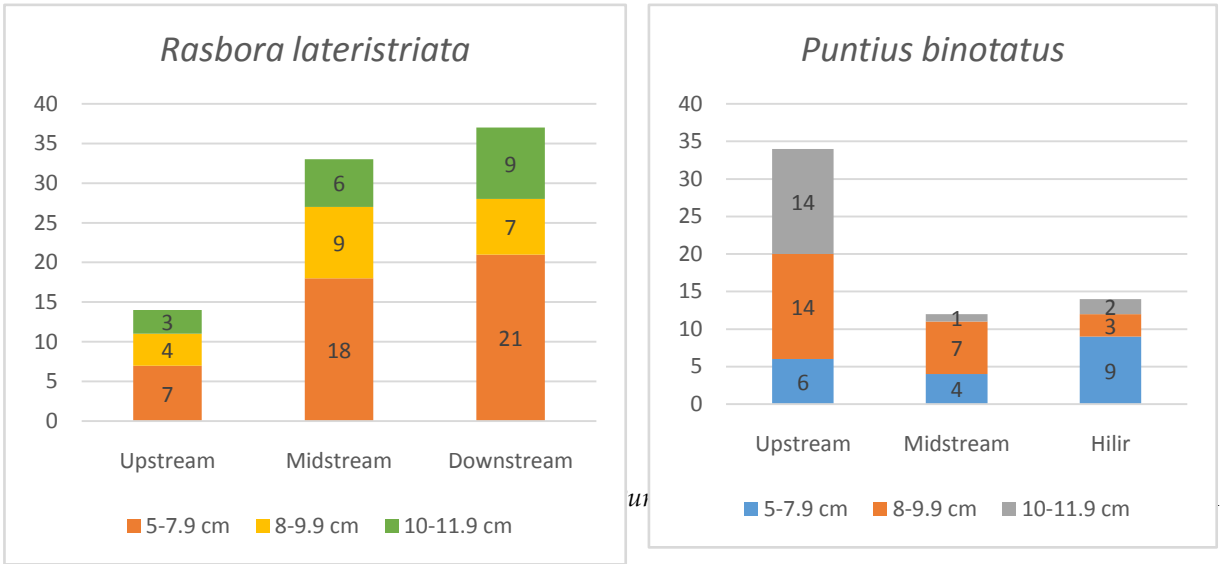


Figure 5. Population structure *R. lateristriata* and *Puntius binotatus* based standard lengths between the station.



The measurement of water quality in Sungi River showed in Table 2. Physical parameters are the depth and brightness is between 25 to 40 cm. The temperature of water ranges from 23 to 28^{0}C. Dissolved oxygen parameter is from 6.16 to 9.79 ppm, pH parameter is from 6.50 to 7.44 and BOD concentration is 1.2 to 3.12 ppm. Plankton populations lowest in the downstream is 1083 ind / l. Some water quality parameters have changed from upstream to downstream. This condition will be effective the Sungi River flows has received a wide range of organic materials as shown varying pH values and tends to sour on the upstream and downstream bases. But this pH value can still be tolerated by the fish life is 4 to 11.

R lateristriata found in the middle of its oxygen content ranges 6.10 to 7.08ppm while *Puntius binotatus* are found in the upper reaches of which have an oxygen content 9.40 to 9.79 ppm. The content of oxygen affects the presence *of Puntius binotatus* in the Sungi River.

Table 2. Results of the physical-chemical parameter in River Sungi River.

The range of the physical parameter value chemical research station							
Station	Depth	Brightness	DO	Ph	Temperature	TSS	BOD
	(Cm)	(Cm)	ppm		° C	Ppm	ppm
1	25-35	25-35	9.40-9.79	6.50- 7:22	24.35-26.80	70	1.2
2	25-35	30-35	6:10 to 7:08	7:32 to 7:55	27.05-28.20	82	3:12
3	30-50	30-40	6.16-6-57	7.32 to 7.44	23.08-26.03	90	2.4
The range	25-50	25-40	6.16-9.79	6:50 to 7:44	23.08-28.20	70-90	1.2-3.12

CONCLUSION

Abundance Rasbora at the Sungi River has two species are *R. Lateristriata* less than *Puntius binotatus*. *R. lateristriata* is dominant in the midstream and downstream of the river with a size of 5 to 11.9 cm. *Puntius binotatus* dominated by the individual size of 8 to 11.9 cm. Abundance*R. Lateristriata* and *Puntius binotatus* more influenced by chemical factors, such as pH, DO, BOD and TSS.

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