

The Characteristics of Fish Diversity and Age Structure in Pelus River Area Residency of Banyumas - Indonesia

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ABSTRACT

This research was purposed to reveal and discover fish community in Pelus River, Banyumas Residency. It includes: (1) water quality which include physical and chemical parameters and plankton species variation, (2) Fish diversity, (3) Fish age structure was based weight and total length. Research done by survey methods, with purposive random sampling method. The research was conducted in Pelus River Region of Banyumas Residency, which were location one (upstream of Pelus River), location two (middlestream of Pelus River), and location three (downstream of Pelus River). This Research applied survey method, with purposive random sampling technique. Research was done in eight months which replicated every month, since December 2016 until May 2017. Result indicated that research fishes caught were as many as 544 fishes divided to 18 Species, eight Family and five Ordo. Water quality factor including aquatic physical and chemical parameters, which were temperature, flowrate, clarity, dissolved oxygen and pH and biological parameter (plankton) variation in Pelus River Banyumas Residency were in good condition and suitable for fish life. Cyprinidae Family found as most varied species and most founded spesies in individual number at Pelus River Banyumas Residency. There were low species diversity, but there weren't found any dominancies. Fish species diversity in Pelus river low. Age structure shows the condition of fish in Pelus River of Banyumas regency is in a vulnerable condition, so it needs attention in order to conserve fish species.

Keywords: Fish diversity, age structure, Pelus river, Banyumas.

INTRODUCTION

The management of fishery resources in Pelus River is an integral part of water management that is suitable with its main objective that is optimum water utilization with maintaining environmental sustainability. The final purpose is the achievement of community welfare. Therefore, to maintain the potential of fishery biological resources in these waters need integrated handling from the fisheries sector and conservation.

The people of Banyumas Residency, especially those who are living in areas along the Pelus River, utilize the river resources, both biological and non-biological resources in order to meet the life necessary and increase welfare. In utilizing their biological resources to catch a fish, while the utilization of non-biological resources of the community to do sand and stone mining activities. In conducting of fishing and sand and rock mining activities, people are not know about fish species and their properties. They also do not understand whether the activities undertaken affect the existing fish stocks, growth and sustainability of the species.

Excessive fishing, sand and stone mining in Pelus River are alleged to be able to change the Pelus River ecosystem that flows in Banyumas Residency. The ecosystem changes in the Pelus River will affect the physical and chemical parameters of the waters and the fish communities living in the river. These changes will ultimately affect the diversity of fish species and their age structure.

Excessive fishing activities and sand and stone mining in the Pelus River Banyumas Residency can affect the fish communities living in them, especially the abundance and diversity of species. The abundance and diversity of these fish species will descent and ultimately threaten the fish sustainability. Based on the explanation, the research on fish community in Pelus River Region of Banyumas Regency needs to be done. The purpose of this research is to reveal and describe the water quality condition and the diversity and age structure of fish in Sungai Pelus Region of Banyumas Residency, which is:

1. Water quality including physical and chemical parameters, namely: temperature, flowrate, clarity, dissolved oxygen content and pH and variation of plankton species.
2. Fish diversity.
3. Fish age structure based on weight and total length of fish.

The results of this study are expected to increase the ecology comprehension, especially about fish communities in the lotik habitat. In addition, the results of this study also can be used as input for evaluation materials for decision makers in determining the policy of Pelus River management. Thus the results of this study are expected to be used as a reference for the management of Pelus River in the Region of Banyumas Residency particularly and other rivers in Indonesia.

The management of Pelus River in Banyumas Residency is not yet integrated and has not accommodate ecological considerations. Excessive exploitation of fish in Pelus River has the potential to threaten the existence and sustainability of various fish species in it. It is expected that fishing activities and sand and stone mining conducted by the community can be implemented wisely, which means fishing and mining by considering the conservation efforts of biological resources, especially fish.

For people who living or domiciled in Pelus River area, the existence of various types of fish in the river is a source of nutrition and additional income. If the existence of various types of fish in the Pelus River continues to decrease, the source of nutrition and additional income will also be reduced. Therefore, the existence of various species of fish in the Pelus River is important to sustain its preservation.

RESEARCH METHOD

1. Description of research location

This Research applied survey method, with purposive random sampling technique. Each research location divided into three stations, before tributary, after tributary, and before tributary on branch river. Each station divided into three sampling sites comprising right, middle, and left side. Research was done in eight months which replicated every month, since December 2016 until May 2017. The research was conducted in Pelus River Region of Banyumas Residency (Fig. 1) at three locations: location one is upstream of Pelus River (Fig. 2.), has rocky river base and the most swift river flow compared to other location. Location two is the middle part of the Pelus River channel (Fig. 3a), the river base at this location is sandy and the river stream is slower than the location one. Location three is the estuary of Pelus River (Fig. 3b), sandy mud river base and river currents slower than location one.

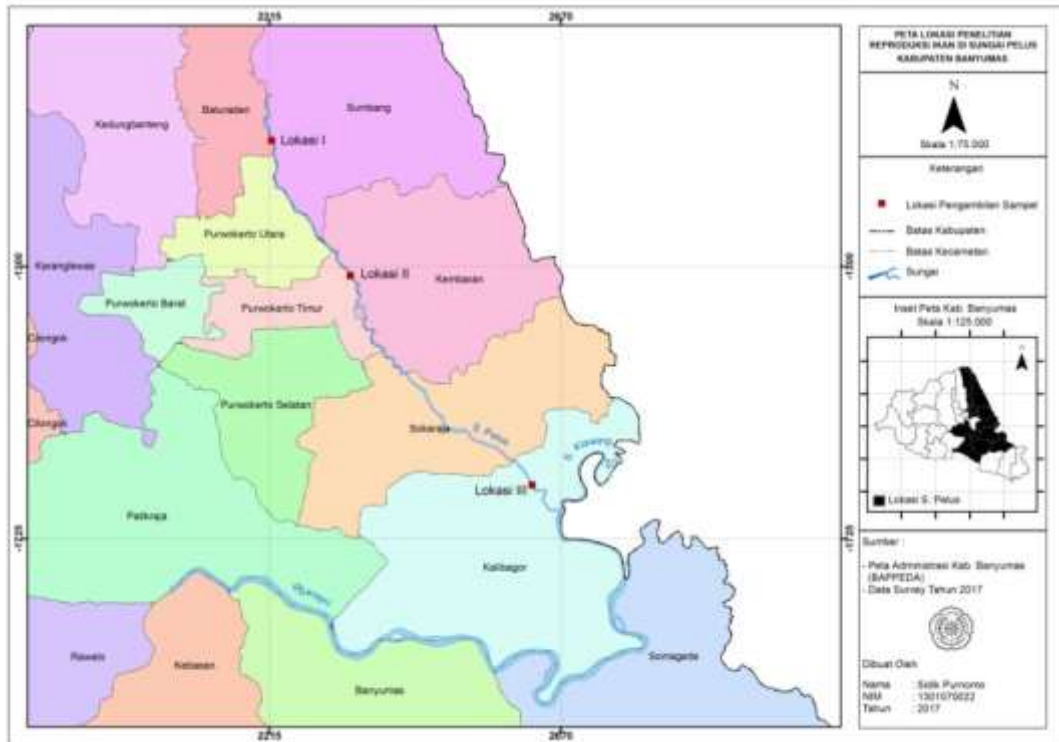


Fig. 1 Overall research location

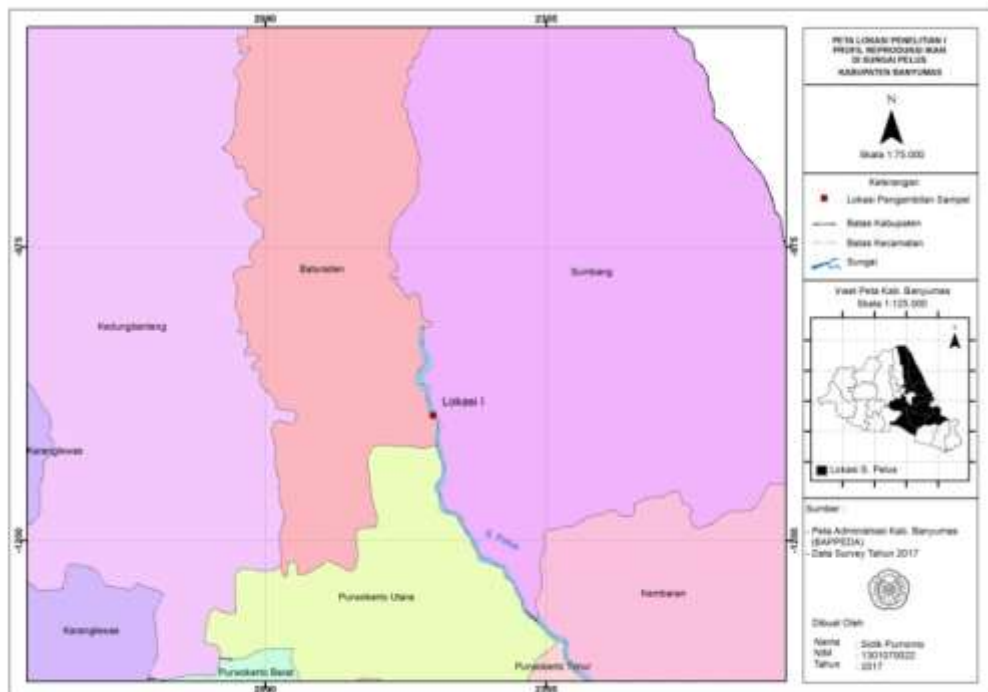
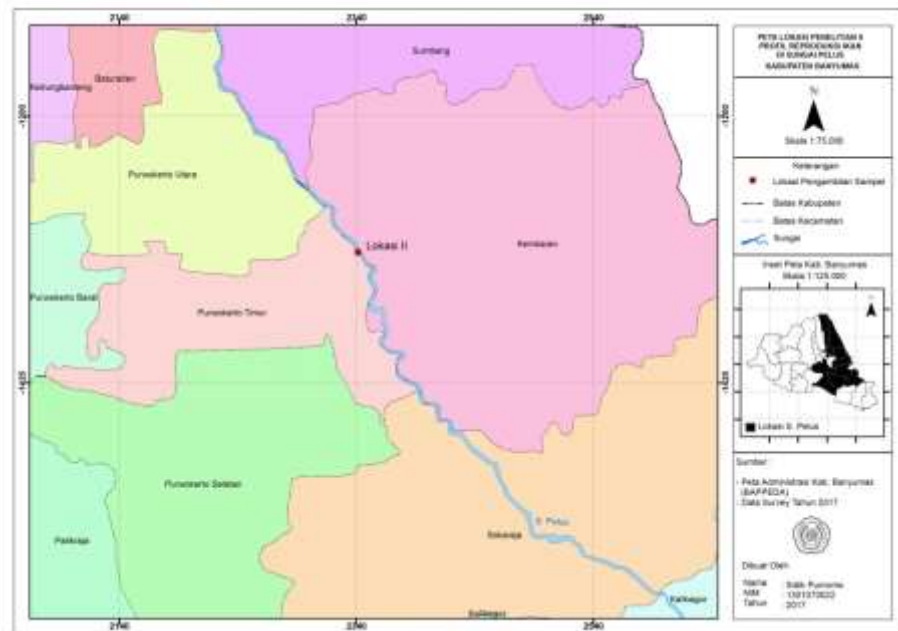
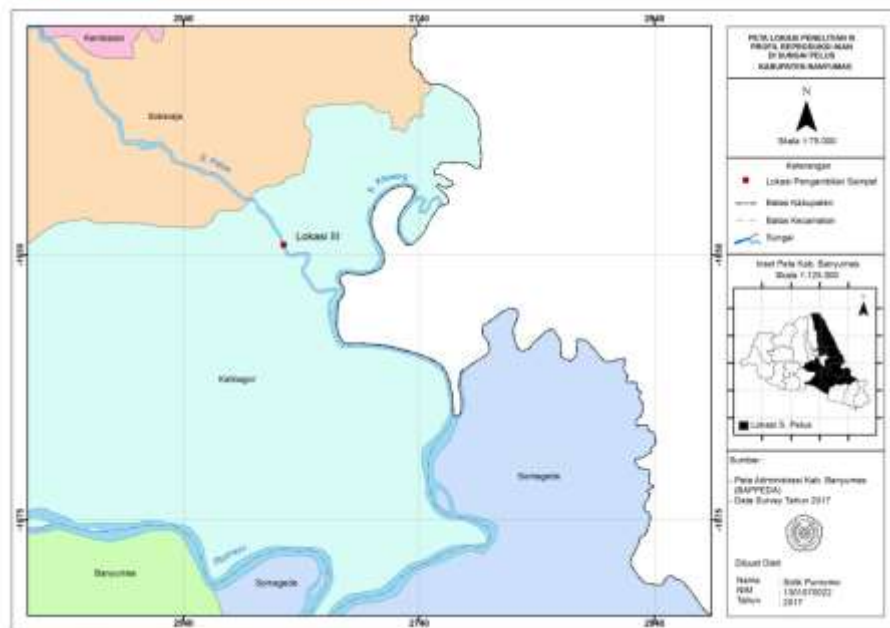


Fig. 2 Reseach location 1 Pandak village



(a)



(b)

Fig. 3 Pelus river location 2 Arcawinagun (a), location 3 Petir (b)

2. Location Determination and Research Station

The research was conducted using survey method, with purposive random sampling technique (Mantra and Kasto, 1989). The study was conducted for six months (December 2016 - May 2017). Sampling is done six times at one month interval, with consider the time of day (08.00 - 14.00) and night (at 20.00 - 24.00). Fish sampling and water quality

measurements in the form of physical and chemical parameters of the waters and variation of plankton species were conducted at each study site.

Fish sampling is done by using fishing gear nets, gill net, and fish net. Fish sampling is done by spreading nets 10 times and 10 times scoops for fish net at each sampling point. Measurements of water quality including temperature, flowrate, clarity, dissolved oxygen content and pH and variation of plankton species were performed three times at each sampling point.

3. Data Collection Procedure

Measurement of water quality. Physical and chemical parameters of the waters and variation of plankton species. Measurements of environmental factors that include the physical and chemical parameters of the waters, namely: temperature, flow velocity, water clarity, dissolved oxygen content and pH and variation of plankton species is done in situ, namely: (1) Water temperature is measured by using mercury thermometer. The thermometer is immersed in water until the mercury is constant or immobile, then the number listed is recorded in degrees Celcius ($^{\circ}\text{C}$). (2) The flow velocity is measured using by flowmeter. The flowmeter is inserted into the water and recorded the flow velocity shown by meters per second (m/s). (3) The clarity of the water is measured using Sechi Disc by gently inserting the device until it is not visible, then the Sechi Disc is inserted more deeper and lifted slowly until it begins to appear. The distance between the surface waters until the Sechi Disc does not appear or begins to appear is measured by measurement tape and recorded by centimeter (cm). (4) The dissolved oxygen content is measured using a DO meter, by inserting the sensor tip into water and then waiting until the digital number shows a constant number, the dissolved oxygen content is represented by the constant number and recorded in ppm. 5) The pH measurement is performed by using pH meter, the numbers appearing on the monitor then recorded. (6) Plankton sampling is done by filtering 100 liters of river water using plankton-net no. 25, then the water stored in the flacon bottle is transferred into the sample bottle and alcohol 70% is added. Each observation of a sample bottle, sampled one cc was observed with SRCC (Sedgwick Rafter Counting Cell) and identified variations in plankton species based on Sachlan (1982). In observation only recorded only species variations.

Diversity and age structure of fish. Fish sampling is done by using mesh stocking and fish net equipment commonly used by fishermen. That taking is done by fishermen to get as many fish species as possible in the study area. The stocking net that used has a mesh net size one cm^2 with a diameter 3 m. Fish net as a second fishing equipment has an equilateral triangle shape on each side is given strengthener using bamboo. Each side has a length of 75 cm and with mesh net sized one mm^2 . Samples of fish caught by fishing nets are pelagic fish (surface waters) and demersal (bottom waters), while fish caught with fish net are peripheral (river edge) fish.

Samples of captured fish are placed in plastic bags, labeled, and put into Ice Box (storage place and temporary fish preservation) then taken to Zoology Laboratory, Biology Education Program, Faculty of Teacher Training and Education, Muhammadiyah University of Purwokerto to be identified and preserved with formalin 4%. Fish catches from each station were measured in total length by millimeters, weight was measured using digital scales with gram unit, fish species and number of caught fish are counted. Fish identification based on Kottelat et al. (1993) and verified with www.FishBase.org.

4. Data Analysis

Diversity of Fish. Index of diversity. Level of species diversity in a community can be known by using the species diversity formula from Shanon-Wiener Diversity Index

(Odum, 1971). The Shanon-Wiener diversity index shows the relationship between the number of species and the number of individuals which arranges the community, namely (eq. (1)):

$$H' = \sum (n_i/N) \log_{10}^{-1}(n_i/N) \dots\dots\dots (1)$$

Description :

Σ = amount

H' = Shannon-Wiener diversity index

n_i = individual amount of species -i

N = individual amount of all species

Age Structure of Fish. Analysis of age structure based on total length and weight of fish is done to know the condition of population, which is exist of young fish, adult and old. Fishes that have a total length and weight in small or low ranges indicated young fish, whereas the total length and weight values of fish in large or high ranges indicated adult and older fish.

RESULTS AND DISCUSSION

1. Water Quality of river

a. Physical parameters

Flow Velocity. It is known that in December 2016 the flow velocity ranged from 0.43 to 1.42 m/s, in January 2017 ranged from 0.65 - 1.65 m/s, in February 2017 ranged from 0.63 to 1.63 m/s, in March 2017 ranged from 0.60 to 1.18 m/s, in April 2017 ranged from 0.40 to 1.60 m/s and in May 2017 ranged from 0.70-0.95 m/s. It is known that at Location I the flow velocity is between 0.40-1.16 m / s, at Location II the flow velocity ranges between 0.40-1.42 m/s, and at Location III the flow velocity ranges between 0.60-1.67 m/s.

Clarity. Clarity of river waters during the research based on sampling time research, i.e. in December 2016 - April 2017 are: December 2016 clarity 30-50 cm, January 2017 clarity 35-65 cm, February 2017 clarity 35-60 cm, month March 2017 25-65 cm clarity, April 30-40 cm clarity and in May 2017 29-38 cm. The highest range of clarity values was found in January compared to other months.

Temperature. The results of temperature measurements based on the time and location of the sampling during the study on December 2016-April 2017, on December 2016 the temperature at the study site was between 24.7-29.8 ° C, on January 2017 between 24.0-27.8°C, on February 2017 between 24.1-31.4°C, on March 2017 between 24.5-31.6°C, on April 2017 between 25.4-27.8°C and on May 2017 ranged from 25.4-27.8 ° C. At Location I the temperature at the study sites was between 24.0-31.0°C, at Location II between 24.7-31.6 ° C, and at Location III between 24.7-31.3°C.

b. Chemical parameters

Acidity. The results of pH measurements based on the time and location of sampling during the study on December 2016-April 2017, were known on December 2016 the pH of water between 6-7, on January 2017 between 6-7, on February 2017 between 6-7, on March 2017 between 6-7, on April 2017 between 6 - 7 and on May 2017 ranged from 6-7. At Location I water pH of 6-7, at Location II of 6-7, and at Location III of 6-7.

Dissolved oxygen. The results of the dissolved oxygen measurements based on the time and location of sampling, ie on December 2016-April 2017 it can be seen that on December 2016 dissolved oxygen content between 5.85-8.25 ppm, on January 2017 between 3.76-8, 11 ppm, on February 2017 between 4.68-7.75 ppm, on March 2017

between 3.5-8.11 ppm, on April 2017 between 4.20-6.70 ppm and on May 2017 ranged between 5, 90-7.10 ppm. Location I of dissolved oxygen content between 3,5-8,25 ppm, Location II between 5,20-8,16 ppm, and Location III between 3,76-8,11 ppm.

2. Fish Diversity

During the research (December 2016-May 2017) successfully obtained 544 fishes consisting of 18 species which including into the eight Family and five Ordo. The results of the complete analysis are presented in Table 1.

Table 1. Species Variation And Individual Count of Fish Which Obtained During Research (December 2016-May 2017)

Ordo	Family	Species	Local Name	Individual Count (tail)		
Cypriniformes	Cyprinidae	<i>Osteochilus vitatus</i>	Melem	172		
		<i>Barbonymus balleroides</i>	Brek	205		
		<i>Osteochilus hasselti</i>	Melem Seruni	2		
		<i>Barbonymus gonionotus</i>	Tawes	11		
		<i>Hampala macrolepidota</i>	Palung	6		
		<i>Rasbora lateristriata</i>	Lunjar andong	55		
		<i>Barbodes binotatus</i>	Benter	14		
		<i>Neolissochilus hexagonolepis</i>	Lempon/ mahser/ ikan batak	11		
		Nemacheilidae	<i>Nemacheilus pfeifferae</i>	Uceng	5	
				Perciformes	Cichilidae	<i>Oreochromis niloticus</i>
		<i>Amphilophus labiatus</i>	Red devil			12
		<i>Amphilophus trimaculatus</i>	Louhan			1
		Siluriformes	Bagridae	<i>Hemibagrus nemurus</i>	Baceman	8
<i>Nemateryx caelata</i>	Kathing			3		
Loricariidae	<i>Pterygoplichthys pardalis</i>		Sapu-sapu	11		
Perciformes	Sisoridae	<i>Acrochordonichthys rugosus</i>	Kekel	8		
		Channidae	<i>Channa striata</i>	Bogo	3	
Synbranchiformes	Mastacembelidae	<i>Macragnatus aculeatus</i>	Sili	4		
5 Ordo	8 Famili	18 Species	Amount	544		

The index value of diversity on December 2016, January 2017, February 2017, March 2017, April 2017, May 2017 were 0.18-0.91, 0.09-0.86, 0.23-0.31, 0.08-9.72, 0.14-0.92, and 0.13 to 0.15, respectively (Picture 4 and 5). Percentage of family-level of fish that

caught during the study at Pelus River Region of Banyumas District during the study December 2016 - May 2017 showed at Fig. 6

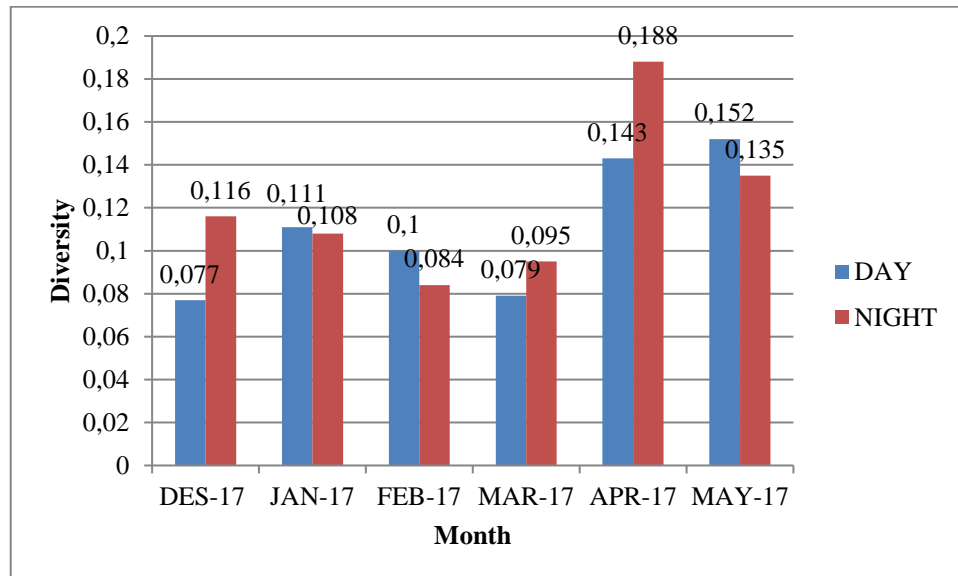


Fig 4. Diversity index of fish based on research time (December 2016-May 2017)

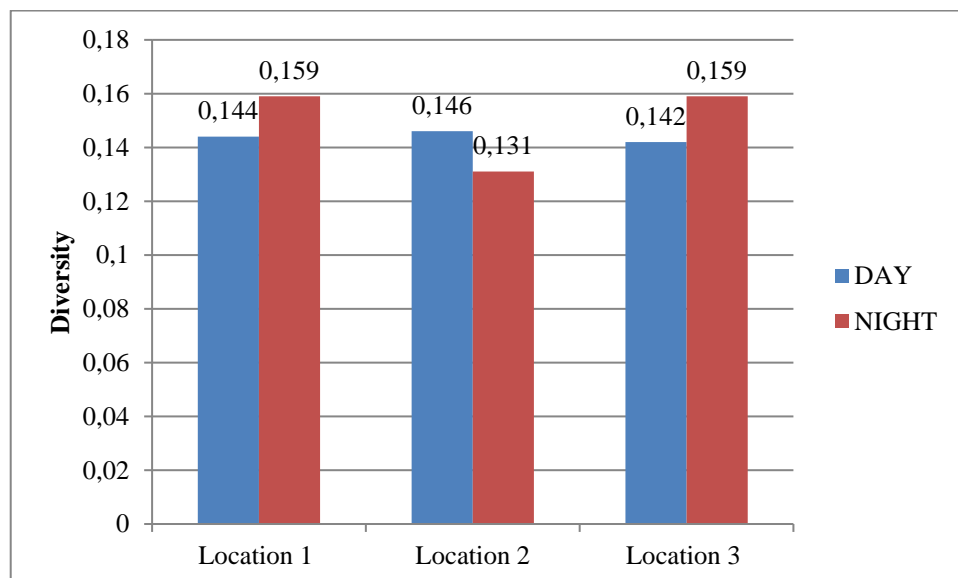


Fig 5. Diversity index of fish based on research location

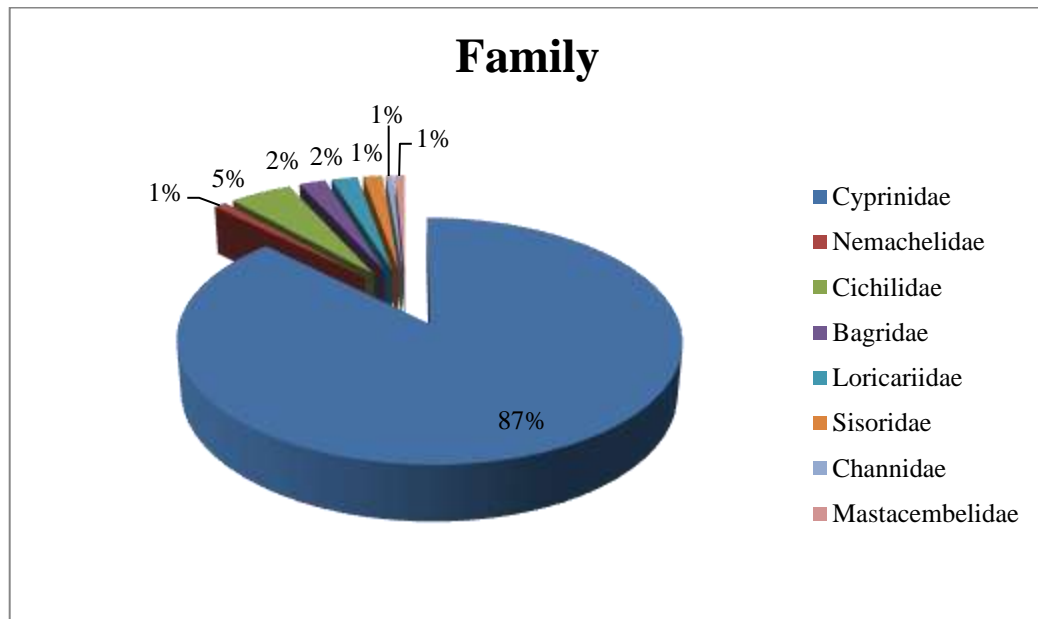


Fig. 6. Percentage of family-level of fish that caught during the study at Pelus river region of Banyumas district during the study (December 2016 - May 2017)

3. Age Structure Based on Total Weight and Length of Fish

Eighteen fishes which obtained, the total length of all fish types ranged from 2.9 to 85.5 cm and the average length is 82.6 cm, while the weight of all fish types ranged from 0.02 - 398.0 grams and the average weight is 397, 98 grams. The range of the smallest or lowest total length ranges from 0.0-13,76 cm and the largest or highest total length range is 68,85-85,62 cm, while the smallest or lowest weight range is around 0,0-66,33 grams and the largest or highest weight range that is around 331,69-1662,0 gram.

4. Water Quality of River

Flow velocity. In accordance with the nature characteristic of the river that is more getting upstream, then the flow is getting faster and if more getting downstream then the flow more slower (Odum 1971; Effendie 2002). During the study at three locations the flow velocity ranged from 0.40 to 1.67 m/s. Location three with an average velocity of 0.88 - 1.67 m/s including high and relatively fast flows (Setijanto and Sulisty, 2008).

The flow velocity of the river is influenced by river water discharge. Water discharge is influenced by rainfall, the higher rainfall then the water flow higher, that resulting in faster flow velocity and the lower the rainfall, then water flow slower so that the flow velocity is slower. In the rainy season the water discharge will rise, so the higher of flow velocity, otherwise in the dry season the rain discharge will decrease so the flow velocity will decrease as well.

The flow velocity may be affected by the depth of a water and may also be affected by wind power given to the surface layer of water, so it can generate the flow surface which having a speed about two percent of the wind velocity itself. Waters that have a greater angular angle, basically the resulting flow will be faster and if the bottom of the water is more flat then the resulting flow will be slower. In general, the waters in the upper part of the river have a rapid flow velocity and progressively slowed to the downstream. Flows can also be slow in the stagnant waters (Odum, 1971, Welch, 2001).

Clarity. Clarity based on sampling location during research, that is December 2016-April 2017 is: at Location I clarity between 30-50 cm, at Location II clarity between 30-65 cm, and at Location III clarity between 25-65 cm. Based on the data, the highest clarity level is in Location II.

The clarity of the waters of the Pelus River during the study was included in the low category, that the good water clarity value for fish survival is greater than 45 cm. The low value of water clarity in this study is caused during the study of rainfall included in the high category. This condition causes the river water becomes turbid, so the average value of the water clarity becomes low, but keep in mind the low level of this water clarity is not fixed because the seasons changes and the river is a lotik waters.

The clarity level in a region is influenced by the presence or absence of shade and weather conditions (cloudy or not). If a region there is a lot of shade, the clarity becomes low otherwise if there is no shade then the area becomes brighter. If the weather is cloudy or the sky is cloud covered then the clarity will be low, otherwise if there is no cloud then the clarity becomes high. The higher of clarity then the penetration of sunlight in the water will be high too, so the productive water layer will become thick. The function of measuring the clarity of the water is to give a thin and thickness picture of the layer productive (eufotic) of waters observed, because sunlight is one of the main factors as determining the photosynthesis process. The higher water level the more sunlight that can penetrate into the water, which means the more sunlight energy is absorbed by the water mass in that waters. Sunlight helps phytoplankton in the photosynthesis process, thus role as a primary producer which capable of converting inorganic substances into organic substances. Water clarity is a reflection of penetrating power or the intensity of sunlight into the waters.

Temperature. Water temperature ranges of Pelus River Banyumas regency has a preference towards the downstream, the temperature is getting higher, this is a natural condition because the temperature of waters will usually increase if the intensity of sunlight entering into the water in large quantities. The more downstream river has the bigger the size and the temperature is also increasing as the intensity of the light gets bigger (Odum1971; Effendie 2002).

According to Akrimi and Subroto (2002) the temperature range 24°C-29°C for the tropics is still within reasonable limits and does not endanger the life of fish, whereas according to Anwar (2008) the water temperature for the tropics is not much varied and the best for aquatic organisms is in the range 25°C-32°C.

Water temperature is the intensity of the heat energy so that temperature becomes an important factor in regulating the process that occurs in the waters (Poole, 2001). Temperature of a waters is affected by the season, the duration of day and night time, air circulation, cloud cover, river flow and water depth. Temperature conditions in waters have an important role for the aquatic organisms life, an increasing temperatures causes the increasing metabolic rate and respiration of aquatic organisms and further increasing oxygen consumption. In general, the rate of growth increases with the rise of temperature to some extent that can depress the fish life even cause death (Effendi, 2002). Based on Government Regulation No.82 of 2001 (for class II and III waters), it is explained that the temperature range for freshwater aquaculture is a deviation of 3°C from a natural state (20-30 °C). That a good water temperature tolerance to support optimal growth for fish is 20-30°C. Such circumstances shows that the waters of the Pelus River are still within the water quality standard threshold and has temperature range that support the life of aquatic organisms, especially fish.

Acidity (pH). Based on the data, it can be said that the waters of the Pelus River are neutral and are considered to be productive waters for aquaculture and plankton growth. According to Anwar (2008), aquatic organisms can live in a waters that have a neutral pH

value with a tolerance range between weak acid to the weak base. The ideal pH value for life for aquatic organisms generally ranges 7. Naturally, the pH of the waters is influenced by the concentration of carbon dioxide and the acidic compounds.

The acidity of a water indicates the presence of hydrogen ion levels contained therein and can be used as a guide to indicate whether a waters or a fertility level of a waters. The degree of acidity can also reflect biological production and is a limiting factor in the life of aquatic organisms. The ideal pH value for the life of aquatic organisms is generally in the range of 6-9 (PP No.82 of 2001). Conditions of waters that are very acidic or very alkaline will endanger the survival of aquatic organisms because it can cause metabolic and respiratory disorders (Barus, 2002). The results showed that the pH value in the Pelus River is still within the ideal tolerance range for fish life.

Dissolved oxygen. Oxygen is a limiting factor for aquatic environments and the most important aspect of fish life, especially used for respiration and as a regulator of metabolic processes (Welch, 2001). Loss of oxygen in the water caused by the respiration process of plants and animals and dismantling process of organic material in the bottom of water which is reducing. Dissolved oxygen depends on the presence of photosynthesis plants, temperature, and the level of light penetration can be affected by water turbidity and the amount of organic matter DESCRIBED. Air pressure can also affect oxygen solubility in water because air pressure affects the speed of oxygen diffusion from air into water.

The waters are polluted or not, and if polluted, how much pollution levels can be determined from the dissolved oxygen content of the waters, namely: the dissolved oxygen content more than 6,5 ppm means uncontaminated waters, while the dissolved oxygen content is between 4,5 to 6,5 ppm means lightly polluted waters, dissolved oxygen content between 2.0 - 4.5 ppm means medium tempered waters, and dissolved oxygen content of less than 2.0 ppm means heavily polluted waters. Water quality standards according to Government Regulation No.82 of 2001 (class II and III waters) explain that good dissolved oxygen for fish life is range from 4-6 ppm. Based on these two references, the condition of Pelus River waters can be declared good and proper for organism life, especially fish.

5. Plankton

Biological parameters of river water quality can be measured by knowing the variation of plankton species that found in that river water. Plankton is a floated organism whose the movements are approximately depends on flows. Although some zooplankton showed activated swimming movements which help maintain a vertical position, the plankton can not move against the flow (Odum, 1971).

In a study of three locations found various types of plankton both phytoplankton and zooplankton. That three locations has a various types of plankton, in Location I, location II and location III has many kinds of plankton from various classes. From the research results in three locations of zooplankton that found in the waters of Pelus River is zooplankton from Class Infosoria, Oligohymenophorea, Calanoida, Arcellenida, Proteomyxa, and Hymnostimatida. Apsilus, Holotricida, Lamiales dan fitoplankton dari Kelas Chlorophyceae, Bacillarophyceae, Penales, Euglenida, Tetrasporales, Eunotiales, Batrachospermales, Euglenales.

6. Fish Diversity

The research results of Hadisusanto et al. (2000), Rasbora lateristriata and Barbnymus gonoinotus species are members of Cyprinidae Family and they are two predominant species among 15 fish species which found in the Upper Serayu River Region of Wonosobo District, Central Java. Muthmainnah (2010) in her research on the variation

of fish species along the Musi River flows explains that fish species which Cyprinidae Family member are the most common.

Kottelat et al. (1993) explain the fish species which Cyprinidae Family member are well known and one of the family with largest amount in fresh waters. The same statement was also stated by Hamidah (2004) who studied about the diversity of fish species in Enim River of Muara Enim District, Province South Sumatra, she has been succeeded get 14 fish species from Cyprinidae Family. Yustina (2001) states that most fish species along the waters of the Rangau River, Riau (17 species) include from Cyprinidae Family. Species variety of Cyprinidae Family is the most numerous and has a wide distribution and has an important role in supporting human life (Triyatmo 2001, Haryono 2004). The most fish species in Serayu River and Logawa River are included in the Cyprinidae Family (Setijanto and Nasution, 2005; Lestari and Sugiharto, 2007; Sulistiyarto et al. 2007).

This condition is in accordance with the explanation of population which living in the Pelus river area near the research location. They explained that the most common fish that found in the Pelus River are Melem (*Osteochilus vitatus*), Tawes (*Barbonymus gonionotus*), Carp (*Barbonymus amatus*), Brek (*Barbonymus balleroides*) and Lunjar Andong (*Rasbora lateristriata*). That species is a fish species which commonly called by residents with fish Putih. Five species of fish Putih is the type of Cyprinidae family.

7. Age structure based on total weight and length of fish

An analysis of the age structure based on the total weight and length of fish is done to determine the population condition, ie the existence of young and adult fishes. Fishes that have a total weight and length size in small or low range indicated young fish, while the total weight and length with a large or high ranges indicated adult fish.

Most of fish in the long range in the smallest or lowest ranges is from 0.0-13.76 cm, while in the weight range in the smallest or lowest ranges is from 0.0-66.33 grams. This shows that fish with a total length and weight in the small or low range indicates young fish, whereas in fish with total length and weight in the large or high range indicates adult or old fish. The results showed all of fish species which obtained during the study inclined to be in the age range that indicates young fish.

Amir et al. (2009) stated that excessive fishing activities has a negative impact on biological resources and the environment, but until now there is still very limited research that reveals the problem. Sulisty and Setijanto (2002) in research about ecology and reproduction aspects of Senggarangan fish (*M. nigriceps*) in Serayu River most of the samples obtained are young individuals. Populations that have so many young individuals while the small amount of adult individuals indicate the population is in poor condition (Odum, 1971). Thus it can be said the condition of fish in the Pelus River Region of Banyumas regency needs to get attention and protection in order to maintain its sustainability. Very important to has ability to understand that the river is a fish habitat, so in exploiting the river should be cultivated to maintain its sustainability and not adversely affect the river biological resources, especially fish (Pander and Geist, 2010).

CONCLUSION

Based on the results and discussion, it can be concluded: 1) water quality that includes physical and chemical parameters of waters, namely: temperature, flowrate, clarity, dissolved oxygen content and pH and variation of plankton species in Pelus River Banyumas regency in a good condition and suitable for fish life; 2) fish diversity is considered low due to over fishing; 3) age structure shows the condition of fish in Pelus

River of Banyumas regency is in a vulnerable condition, so it needs attention in order to conserve fish species.

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