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SUSANTO

Fish Community in Serayu River, Banyumas Residency, Central Java, Indonesia

ABSTRACT: *This research was purposed to reveal and discover fish community in Serayu river at Banyumas Residency, Central Java, Indonesia. Research was done in two years which replicated each 3 months, since October 2009 till July 2011. Data analysis including: aquatic physical and chemical parameter and plankton species variation, fish abundance, fish species diversity and domination, age structure, condition factor, fecundity, Gonade Growth Level (GGL), Gonade Growth Index (GGI), and environmental factor and fish community structure relationship. Analysis done in this research were diverse analysis with software: Plymouth Routines in Multivariate Ecological Research (Primer), Cluster, and Multi Dimensional Scalling (MDS). During research fishes caught were as many as 3,871 fishes divided to 29 species, 20 families, and 11 ordos. Aquatic qualities factor including aquatic physical and chemical parameters and plankton species variation in Serayu river at Banyumas Residency were in good condition and suitable for fishes life. Cyprinidae family found as most varied species and most founded species in individual number at Serayu river in Banyumas Residency. There were low species diversity, but there weren't found any dominance. Fish abundance in Serayu river increasing toward downstream, but discovered otherwise with fish diversity. Fish community in area toward upstream from Serayu Adjustable Dam differs with fish community in area toward downstream from Serayu Adjustable Dam. Serayu Adjustable Dam existence causing on decreasing fish species abundance and diversity in Serayu river at Banyumas Residency; thus, decrease fish community quality both in area before and after the dam. Fish growth pattern and reproduction profile in Banyumas Residency are not ideal.*
KEY WORDS: *Fish community, abundance, diversity, domination, upstream and downstream, Serayu river, Serayu Adjustable Dam, and pattern and reproduction.*

INTRODUCTION

Several little rivers were found along Serayu River in Central Java, Indonesia, which flow into it. At least there are nine tributaries with Serayu River as the main river, which are: Begaluh River, Tulis River, Merawu River, Sapi River, Pekacangan River, Gintung River, Klawing River, Logawa River, and Tajum River (BRLKT, 1997; and Pemprov Jateng, 2009). Klawing River, Logawa River, and Tajum River are the biggest tributaries in Banyumas Residency (BRLKT, 1997).

Whether it realized or not, every resource exploitation could lead to disturbances and stimulates ecosystem changes at certain level. Exploitation which not considers ecosystem

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principals could decrease environment quality and lead to damaged ecosystem and decreasing environment supporting ability. The RFA (River Flow Area) on Serayu River is one of among 35 RFAs in Central Java, Indonesia, in critical condition (Yuwono, 2014:21).

According to survey conducted in 2006, nine percent of local leader (Governors and Residents) are not care to the environment, 37 percent care enough, 47 percent care, and only seven percent highly care. Based on those data, then, local leaders should get refreshment about sustainable development, because they often using resources as political commodity without considering life and environmental resources (cited in Effendi, 2014:7).

People of Banyumas Residency, especially who stay in area along Serayu River, use the resources, both biological resources and non-biological resources, to fulfill their life stock or increase their wellfare. To use biological resources, they do fishing; and for non-biological resources usage, they do sand and stone mining (class C mining). Even, they unlikely understand what they did affect toward fish stock, growth, and species preservation.

Problems in this research are over fishing and dam construction in Serayu River in Banyumas Residency, and it could affect fish community which lives inside, especially with fish species abundance and diversity. Those fish species abundance and diversity will decrease and finally endanger fish preservation.

QUESTIONS, PURPOSES, AND HYPOTHESSES ON THE RESEARCH

As described problems before, then arisen questions for this research are: (1) How are the condition of aquatic qualities condition including aquatic physical and chemical parameters, which are: temperature, flow rate, brightness, dissolved oxygen, and pH or *puissance negatif de H* then also plankton species variation in Serayu River Residency?; (2) How are fish species community structure such as abundance, diversity, and domination in Serayu River at Banyumas Residency?; (3) Are there any differences of fish species abundance and diversity between upstream and downstream in Serayu River Banyumas Residency?; (4) How Serayu Adjustable Dam existence affects toward fish species abundance and diversity in Serayu River Banyumas Residency?; and (5) How are the fish growth patterns and fish reproduction profile in Serayu River Banyumas Residency?

The purposes of this research are to reveal and describe fish condition and aquatic qualities in Serayu River Banyumas Residency, which are: firstly, aquatic qualities including physical and chemical parameters, which are temperature, flowrate, brightness, dissolved oxygen and pH, then plankton species variation in Serayu River Banyumas Residency. Secondly, fish species community structure (abundance, diversity, and domination) in Serayu River at Banyumas Residency. Thirdly, fish species abundance and diversity on area of upstream and downstream in Serayu River at Banyumas Residency. Fourthly, effect of Serayu Adjustable Dam existence toward fish species abundance and diversity in Serayu River at Banyumas Residency. Fifthly, fish growth pattern and fish reproduction profile in Serayu River at Banyumas Residency.

Hypotheses on this research are: (1) "Aquatic qualities including physical and chemical parameters, which are temperature, flowrate, brightness, dissolved oxygen and pH, then also plankton species variation in Serayu River at Banyumas Residency is in good condition"; (2) "There are low fish species abundance and diversity in Serayu River at Banyumas Residency and there are fish species dominances"; (3) "Fish species abundance and diversity in downstream area, after Serayu Adjustable Dam, are higher than in upstream area"; (4) "Serayu Adjustable Dam existence affected on fish species abundance and diversity decrease in Serayu River at Banyumas Residency"; and (5) "Fish growth pattern and fish reproduction profile in Serayu River at Banyumas Residency are not ideal".

RESEARCH METHOD

Research done by survey methods, with *Purposive Random Sampling* methode. The research was conducted in Serayu River at Banyumas Residency in intersection of *tributaris*, Klawing River, Logawa River, and Tajum River. Fish sampling, physical chemical

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parameter data measuring, and plankton species variation sampling were done within two years, Year 1 from October 2009 to July 2010; and Year 2 from October 2010 to July 2011, with three months interval. Sampling was done from morning till noon (08.00 – 13.00 local time) and at night (19.00 – 24.00 local time).

Fish sampling, aquatic qualities measuring (including physical chemical parameters), and plankton species variety sampling were done in each research location. Each research location divided into three stations: (1) station located at ± 300m before intersection; (2) station located at ± 300m after intersection; and (3) station located at ± 300m before intersection in intersecting river. Each station divided into three sampling points: right side region of the river; middle region of the river; and left side region of the river.

Fish sampling wash done by spread-net and hand-web, 10 times sampling for spread-net and 10 times sampling for hand-web in each sampling point. Sampled species then identified and verified in Biology Research Center at LIPI (*Lembaga Ilmu Pengetahuan Indonesia* or Indonesian Sciences Institute) in Cibinong, West Java, at website: www.FishBase.org (16/4/2012).

Data analysis including *aquatic physical and chemical parameter* (Odum, 1971; Krebs, 1989 and 2009; and Goldman & Horne, 1994) and *plankton species variation* (Sachlan, 1982; and APHA, 1989). Data analysis was done to know fish community structure: fish abundance, fish species diversity, and domination in this research were diverse analysed with software: PRIMER (Plymouth Routines in Multivariate Ecological Research); Cluster; MDS (Multi Dimensional Scalling); and Simper (Simpson, 1949; Bray & Curtis, 1957; and Clarke & Warwick, 2001).

Age structure analysis toward three most abundant fish species and seven most economically important fish species was based on total length, total weight, condition factor, fecundity, GGL or *Gonade Growth Level*, GGI or *Gonade Growth Index*, and Sex Ratio (Effendie, 1979). Those analyses were done to reveal fish species population conditions living in Serayu River at Banyumas Residency, Central Java, Indonesia.

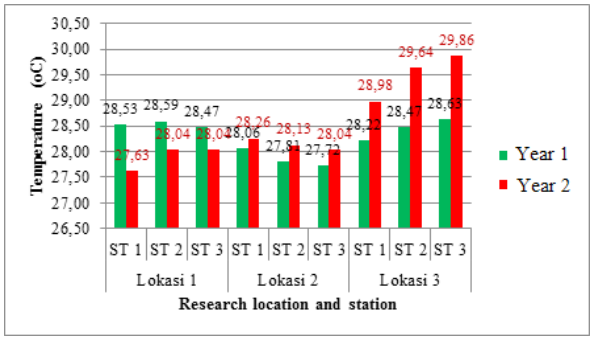
RESULTS AND DISCUSSIONS

Based on PP (*Peraturan Pemerintah* or Government Regulation) No.82 Year 2001 (Setneg RI, 2001); and also based on the arguments of E.P. Odum (1971); K. Sumawidjaja (1975); Lee, Wang & Kov (1978); S.T.H. Wardoyo (1981); K.R. Clarke & R.M. Warwick (2001); Welch (2001); and A.T. Barus (2002), analysis result toward aquatic physical chemical parameters, which are: temperature (27.63 to 29.86°c); flow rate (0.25 to 0.90 m/s); brightness (25.10 to 70.00 cm); dissolved oxygen (4.20 to 8.45 ppm); pH (6.72 to 7.22); and plankton species variation (during research 109 plankton species were identified and included in 47 Families and 23 Ordo, it consists of 97 Phytoplankton species in 36 Families and 18 Ordo, and 12 Zooplankton species in 11 Families and five Ordo) both in Year 1 and Year 2.

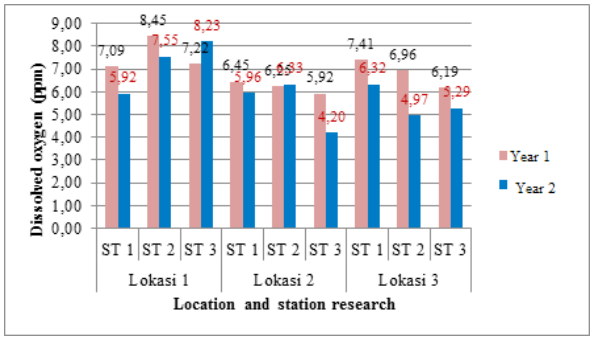
The analysis shows that aquatic qualities are in good and suitable condition for fishes life, based on parameters sampling time parameters as research was conducted. Complete data about it are delivered in picture 1 till picture 5 and in table 1.

There are 3,871 fishes caught in this research included in 29 species, 20 families, and 11 Ordo. Most caught fish numbers in Year 1 and Year 2 of research are from *Cyprinidae* Family, each 794 fishes (55.23%) and 941 fishes (38.65%) respectively. The most least fish caught on Year 1 of research are from *Anguillodae*, with two fishes caught (0.13%); while the most least fish caught on Year 2 of research are from *Clariidae* Family and *Synbhrachidae* Family with only one fish caught (0.003% and 0.06%). Complete result delivered in picture 6.

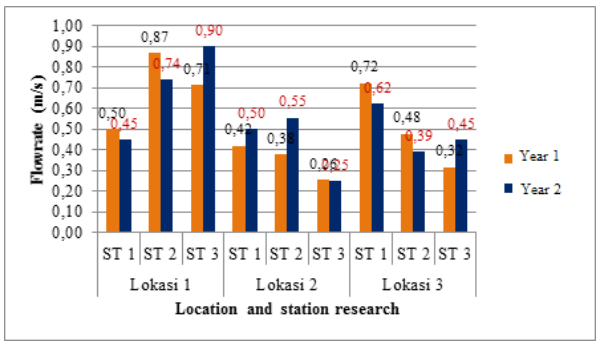
Picture 7 shows that highest Serayu River fish abundance both in Year 1 and Year 2 was located in Location Three (Tajum River intersection on Serayu River), the most downstream Serayu River at Banyumas Residency. Average abundance was: 103.17 pst on Year 1 of research and 120.83 pst on Year 2 of research; then, Location One (Klawing River intersection on Serayu River) had abundance average as 54.75 pst on Year 1 of research and 81.58 pst on Year 2 of research. Location Two (Logawa River intersection on



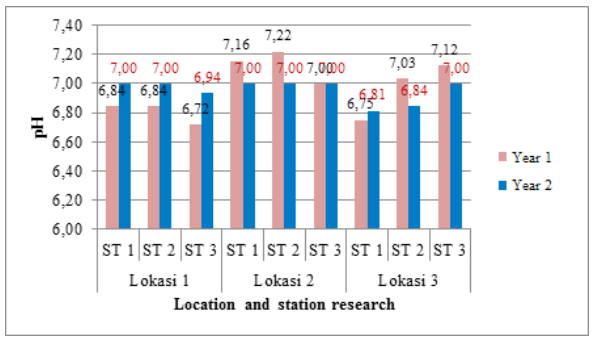
Picture 1:
Water Temperature Average Data of Serayu River at Banyumas Residency: On Year 1 and Year 2 during Research in Entire Locations and Stations



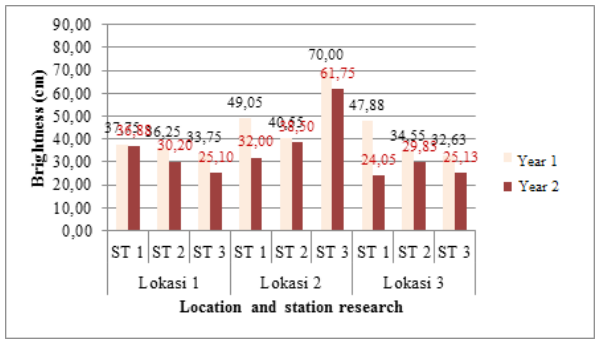
Picture 4:
Dissolved Oxygen Average of Serayu River at Banyumas Residency: On Year 1 and Year 2 during Research in Entire Locations and Stations



Picture 2:
Flowrate Average of Serayu River at Banyumas Residency: On Year 1 and Year 2 during Research in Entire Locations and Stations



Picture 5:
pH (*puissance negatif de H*) Water Average of Serayu River at Banyumas Residency: On Year 1 and Year 2 during Research in Entire Locations and Stations



Picture 3:
Water Turbidity Average of Serayu River at Banyumas Residency: On Year 1 and Year 2 during Research in Entire Locations and Stations

Serayu River) had lowest abundance average on 40.42 pst on Year 1 of research and 56.08 pst on Year 2 of research.

Location Two had lowest individual fishes caught, so it has lowest abundance average value. It's because location two is the nearest point with Serayu Adjustable Dam (2.5 kilometers), so fishes that live there feel most of the impact from the dam existence. Fishes that live in location two must adapt to the dam existence, which had not been there yet till 1997. Fishes abundance was affected by environmental condition, so any differences on river aquatic environment condition will arise fish abundance differences, in this case Serayu Adjustable Dam existence.

Diverse analysis result, as showed by table 2, reveal that fish species diversity on Year 1 and Year 2 of research based on sampling time during research was in low condition, so does fish species domination value. The conditions mean even there are no dominances found, but fish existence in Serayu River at Banyumas Residency is in endangered condition. It explained by *Dendogram* Analysis result and MDS (Multi-Dimensional Scaling) Analysis result as showed by picture 8 and picture 9.

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Table 1:
Identification Result of Plankton Species Variation during Research (October 2009 to July 2011)

Phytoplankton:		
Ordo	**Ordo**	**Ordo**
Bacillariales	*Fragilariaceae*	*Asterionella formena*
		Tabellaria sp.
		Diatomella sp.
		Fragillaria sp.
		Meridion sp.
		Synedra sp.
		Diatoma sp.
		Opepora sp.
	Cymellaceae	*Amphora ovalis*
		Rhopalodia gibba
		Cymbella astula
	Naviculaceae	*Mastogloba dansen*
		Gyrosigma sp.
		Amphiprora alata
		Navicula sp.
		Pleurosigma sp.
		Amphlipluera sp.
		Pinnularia sp
	Nitzchiaceae	*Nitzchia actinastroides*
		Nitzchia vermicularia
		Nitzchia brebissoni
		Talasionik nitzchoides
		Nitzchia sp.
	Epithemiaceae	*Deuticula tenuis*
		Deuticula thermalis
		Epithemia argus
		Epithermia turgid
		Epithermia sp.
	Surirellaceae	*Surirella sp.*
	Rhizosoleniaceae	*Rhizosolenia sp.*
Chlorococcales	*Scenedesmaceae*	*Actinastrum hantzchii*
		Actinostrum sp.
	Oocystaceae	*Chlorella sp.*
		Treubarin sp.
		Ankistrodesmus sp.
		Salenastrum sp.
		Kirchneriella sp.
		Polydropsis sp.
		Quadricoccus sp.
		Treubarin triapendiculata
	Hydrodictyaceae	*Hydrodiction sp.*
		Hydroction reticulatum
	Zygnemataceae	*Spyrogira sp.*
	Chlorococcaceae	*Holoplodium sp.*
Ulothrichales	*Ulothrichaseae*	*Binuclearia sp.*
		Ulothrix kutzing
		Hormidium kutzing
		Stichococcus negeli
		Binucleria wittrock
		Bunucleria sp.
		Stichococcus sp.

Phytoplankton:		
Ordo	**Ordo**	**Ordo**
Ulothrichales	*Chaetophoraceae*	*Aphanizomenon sp.*
		Drapalnaldia sp.
		Drapalnaldiopsis sp.
		Aphanizomenon flosaquae
		Psudoulvella will
	Cylindrocapsaceae	*Cylindrocapsa sp.*
		Fridaea torienlicola
		Firidaea sp.
	Microsporaceae	*Microspore sp.*
Nostocales	*Rivulariaceae*	*Gloeotrichiae chinulata*
	Nostocaceae	*Anabaena sp.*
Zygnematales	*Mesotaeniaceae*	*Spirulina sp.*
		Gonatozygon sp.
	Zygnemataceae	*Zyganema sp.*
		Spyrogira sp.
	Desmidiaceae	*Pleurotaenium sp.*
		Demisdium sp.
Peridiniales	*Ceratiaceae*	*Ceratinium hirudinella*
		Ceratinium sp.
	Perinidiaceae	*Peridinium sp.*
	Phytodiniaceae	*Noctiluca sp.*
Tetrasporales	*Palmellaceae*	*Palmella lyngbya*
		Gleothece rupestris
Colaciales	*Colaciaceae*	*Colacium sp.*
Volvocales	*Volvocaceae*	*Volvox sp.*
	Chlamydomonadaceae	*Chlamydomonas sp.*
Oscilatoriales	*Oscilatoriaceae*	*Oscilatoria limosa*
Chrysocapsales	*Chrysocapsaceae*	*Phaeopalaca thaliosa*
Chrysotricales	*Phaeothammiaceae*	*Heribaudinella sp.*
		Phaeotammion sp.
Cladophorales	*Cladophoraceae*	*Rhizoclonium kutzingii*
		Cladopora sp.
Euglenales	*Euglenaceae*	*Petalomonas sp.*
Gymnodiniales	*Gymnodiniaceae*	*Massantia sp.*
Heterotrichales	*Tribonemataceae*	*Bumillaria sp.*
Rhizochloridales	*Pleurochloridaceae*	*Leuvenia sp.*

Zooplankton:		
Ordo	**Ordo**	**Ordo**
Holotrichida	*Frontoniidae*	*Pseudoglaucoma sp.*
	Holophryidae	*Platyophrya sp.*
Cladocera	*Dapharíidae*	*Daphnia pulex*
		Daphnia sp.
	Mactrithricidae	*Macrothria roses*
	Sididae	*Diaphanosoma sp.*
	Bosminidae	*Bosmia sp.*
	Chydoridae	*Acroperus sp.*
Cyclopoida	*Cylopidae*	*Cylops sp.*
	Calanoid	*Naupilus sp.*
Mysiodocea	*Mysidae*	*Mysis sp.*
Ploima	*Branchionidae*	*Keratella sp.*

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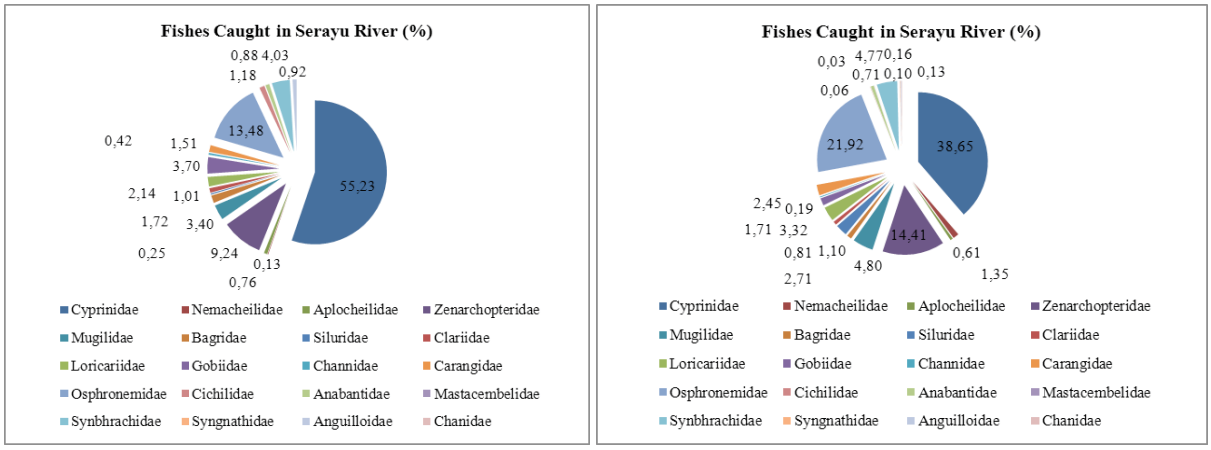
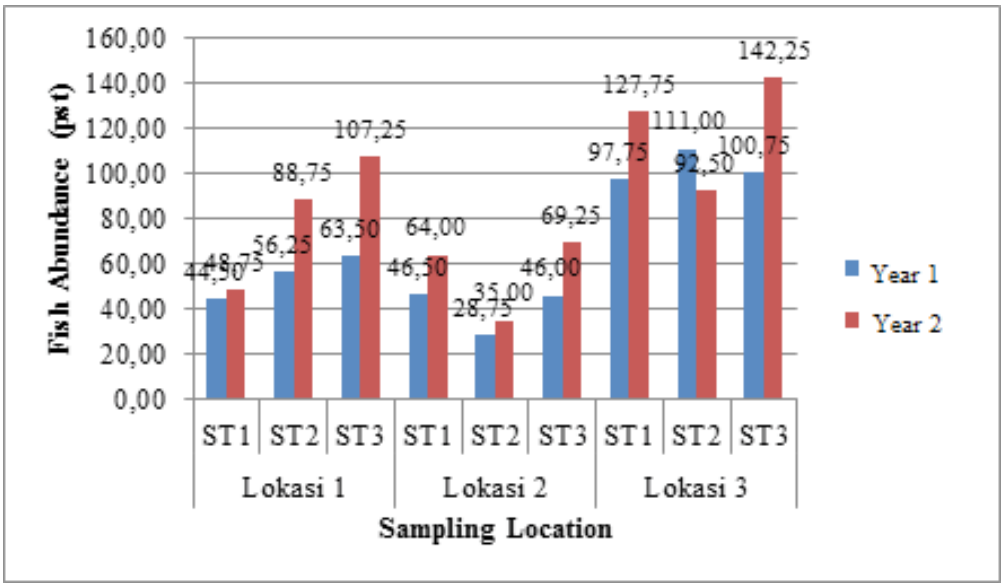


(A) (B)

Picture 6:
Caught Fish Count Based on Family in Percentage (%) Year 1 (A) and Year 2 (B)



Picture 7:
Fish Abundance Average on Year 1 and Year 2 Research

The condition was caused by fishing activity in Serayu River at Banyumas Residency done by fishermen are in overfishing category. Fishing activity was done only by economical motives and doesn't look upon to preservation factors. Most fishermen found by writer didn't even live in surrounding area of Serayu River at Banyumas Residency near research location, but they were come from region of Patikraja Sub-Residency of Banyumas Residency. They stated that fishing on Serayu River at Banyumas Residency was done solely on living needs. These conditions were more exaggerated by increasing consumption needs of Serayu River fishes.

Lembutan fish kind needs (little sized fish species), such as *R. Lateristriata* or *Lunjar Andong* in Javanese language, and *N. Fasciatus* or *Uceng* in Javanese language were needed as much as 58 kg each day. *Putihan* fish kind, such as *O. Vitatus* or *Melem* in Javanese language, *B. Goniopnotus* or *Tawes* in Javanese language, *B. Balleroides* or *Brek* in Javanese language, *L. Leptocheilus* or *Lukas* in Javanese language, *H. Macrolepidota* or *Palung* in Javanese language, and *M. Singaringan* or *Baceman* in Javanese

Table 2:
Diverse Analysis Result of Fish Community on Year 1 and Year 2 Research (A), and Diverse Analysis Result of Fish Species Dominancies on Year 1 and Year 2 Research (B)

Station	Year 1			Year 2		
	S	N	H'	S	N	H'
L1S1	16	45	2,065	14	49	1,672
L1S2	15	56	2,395	16	89	2,284
L1S3	12	64	1,362	18	107	2,125
L2S1	17	47	2,248	14	64	1,585
L2S2	16	29	2,305	12	35	1,882
L2S3	16	46	2,024	15	69	1,920
L3S1	18	98	1,907	17	128	1,452
L3S2	20	111	1,422	16	93	1,522
L3S3	18	101	1,364	19	142	1,759
Entire location	26	66	2,105	29	86	2,231

(A)

Station	Year 1			Year 2		
	S	N	D	S	N	D
L1S1	16	45	0.1896	14	49	0.2453
L1S2	15	56	0.0928	16	89	0.1338
L1S3	12	64	0.3947	18	107	0.1568
L2S1	17	47	0.1367	14	64	0.3220
L2S2	16	29	0.1013	12	35	0.1873
L2S3	16	46	0.1839	15	69	0.2150
L3S1	18	98	0.2319	17	128	0.3110
L3S2	20	111	0.4421	16	93	0.3457
L3S3	18	101	0.4581	19	142	0.2885
Entire location	26	66	0.2308	29	86	0.1658

(B)

Remarks: S = Species Count; N = Individual Count Average; H' = Shanon Wienner Index; and D = Simpson Domination Index.

language were needed as much as 80 kg each day. Another contributing factor are fish price on markets is relatively high, it ranged between IDR (Rupiah Indonesia) 70,000 to IDR 125,000 per kg. These conditions become the reasons for fishermen to fishing in Serayu River with economical motives.

Fishermen doesn't select upon caught fish, whether the selection based upon fish species or sizes, and then they sold all caught fish. This condition indicates fishing in Serayu River at Banyumas Residency done by fishermen doesn't look upon to preservation factors. It causing a condition which there are only a little number of fish species on Serayu River at Banyumas Residency could grow to mature ages, thus most caught fishes are young fishes.

Whether it been realized or not, any resource usage could lead into disturbances that cause ecosystem changes in some scale. Resources usage that doesn't look upon ecosystem principle could decrease environmental quality, and then ecosystem order damage will happen and environmental supporting capability will decrease. Proportionally river management, resources usage with considering preservation factors, must be done to protect fish diversity and production increase (Purwanto & Bustaman, 1986; Bain, Finn & Booke, 1988; Welch, 2001; Das & Chakrabarty, 2007; and Propst, Gido & Stefferud, 2008).

Serayu River at Banyumas Residency over fishing may lead into fish species abundance and diversity decreasing thus decreases the fish community quality. Non-selected fishing both in size and in fishing time will lead into non-maximally growth of young fish and

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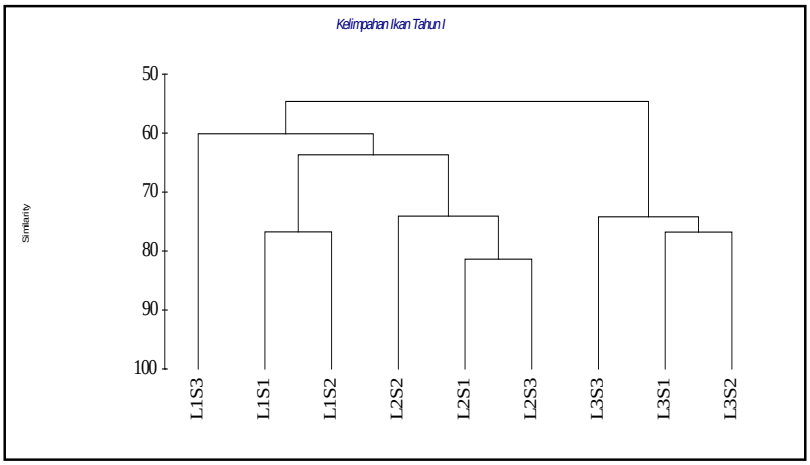
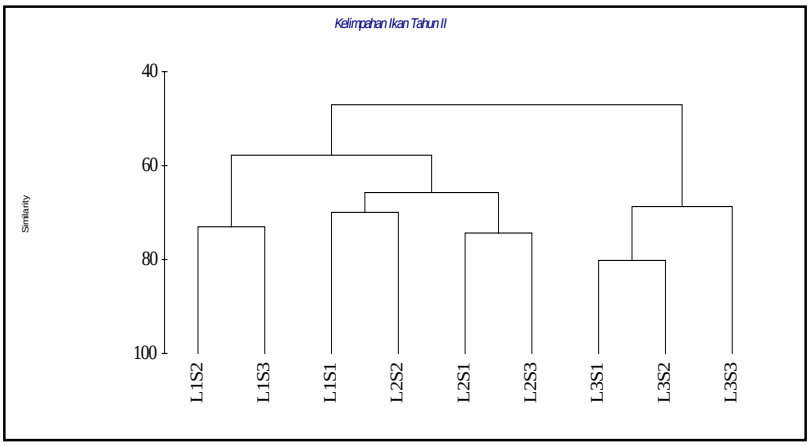
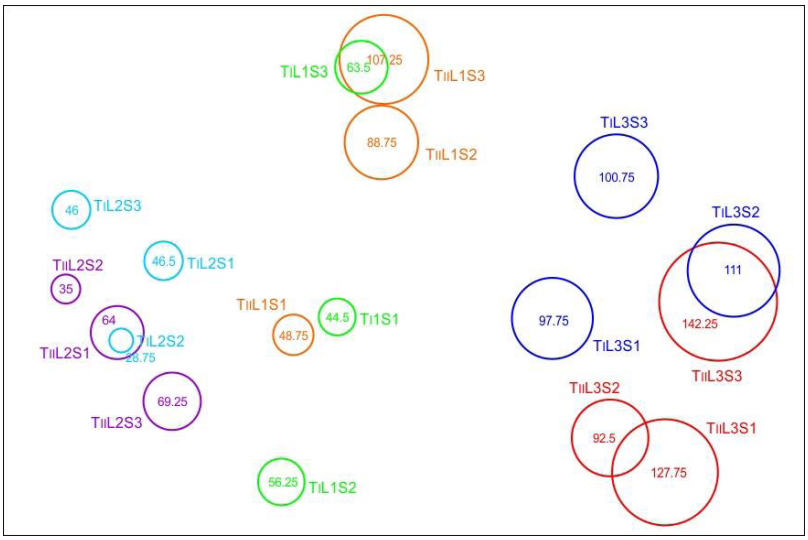


(A)



(B)

Picture 8:
Dendogram of Cluster Analysis Result on Fish Community on Year 1 (A) and Year 2 (B) Research



Picture 9:
MDS (Multi-Dimensional Scaling) Analysis Result of Fish Community on Year 1 and Year 2 Research

prevents them to reach mature age. Continuing of over fishing in Serayu River at Banyumas Residency doesn't give fish species their chance to growth till maximum size, reach mature age, and do well reproducing. It will threaten the fish species preservation live in Serayu River at Banyumas Residency.

Fish community quality increasing should be done by authorized bureau as Serayu River management together with surrounding people. Managing authority on Serayu River at Banyumas Residency should give serious attention and protection toward fish community. Exploitation and fishing in Serayu River at Banyumas Residency might not over-fishing and continuously, and it should consider preservation factor. This should be done for river fish species, so they could get chance to reach optimal growth, reach mature age, and reproduce well thus give good quality and quantity of offsprings. Those conditions will guarantee nutritional needs and revenue toward surrounding people sustainably.

Local wisdom as showed by surrounding people should be considered as example by other people. They took fish only as it needed, not using mass fish catcher, only conducted in certain time, and not all year long. The fishes were given chance to reproduce and growth. According to them, reproduce time would take time on *mangsa kapapat* or "end of draught season and beginning of wet season". Local wisdom should widely socialize, so people will understand about how important to preserve natural resources, especially fish preservation in Serayu River at Banyumas Residency.

Serayu Adjustable Dam existence causing catadromic fish species like *Anguilla Bicolor Bicolor* were halted on their movement or even blocked in their movement toward upstream; then, those fish species cannot continue their journey and stopped at location after the dam. A. Budiharjo (2010), in his research about *sidat* migration or *Anguilla spp.* in Progo River, Yogyakarta, explained that *sidat* fish phase glass *eel, elver,* and yellow *eel* will migrate toward upstream till it found ideal habitat with their life needs or stopped by migration blocker like dam.

Dam existence could block *sidat* to reach reproducing site, then halt the reproduction process. *Sidat* are *catadromic* fishes, they will migrate from upstream toward downstream then deep sea as reproducing location (Amir *et al.,* 2009). W.T. Kadye & N.A.G. Moyo (2007) explain that Kunzvi Dam construction in Nyagui River annihilates *catadromic* fish species existence, and then *Cichlidae* Family species trend to increase.

Research result show that Serayu Adjustable Dam existence have effect toward fish species abundance and diversity decreasing which live in Serayu River at Banyumas Residency, both in area before and after the dam. It's because Serayu Adjustable Dam had become a blocker and it cut fish movement in Serayu River in area before and after the dam.

Some actions are needed to be done to minimize Serayu Adjustable Dam effect toward fish species abundance and diversity decreasing in Serayu River at Banyumas Residency. Those actions are open Serayu Adjustable Dam periodically and add fish ladder in the dam to facilitate fish to pass the dam. Those actions coherent with the recommendation from A. Budiharjo (2010), in his research about *sidat* larva or *anguilla spp*. migration in Progo River estuary in Yogyakarta, Indonesia.

Age structure analysis results based on total length and weight on most caught fish species and most economically important fish spesies reveal that most fishes are in lowest range, as showed by picture 10 and picture 11. It means most of Serayu River fishes are young fishes. The population that had too many young individuals indicates the populations are not in good condition (Odum, 1971). M. Kottelat *et al*. (1993) said that fish number and size decreasing are the indicatios of fish population quality and quantity decreasing.

Analysis results toward condition factors, fecundity, GGL (Gonade Growth Level), GGI (Gonade Growth Index), and sex ratio from three most found fish species and seven most economically important fish species reveal: for condition factor of three most found fish species all are in negative allometric category (means slender). Meanwhile, condition factors of seven most economically important fish show only three species included in positive allometric category (means fat), the three

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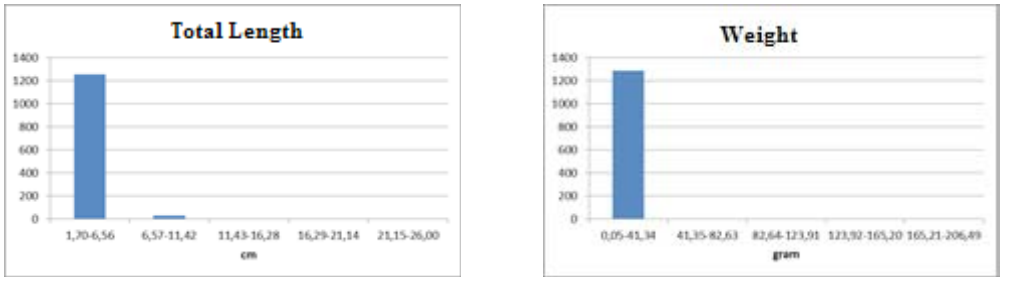
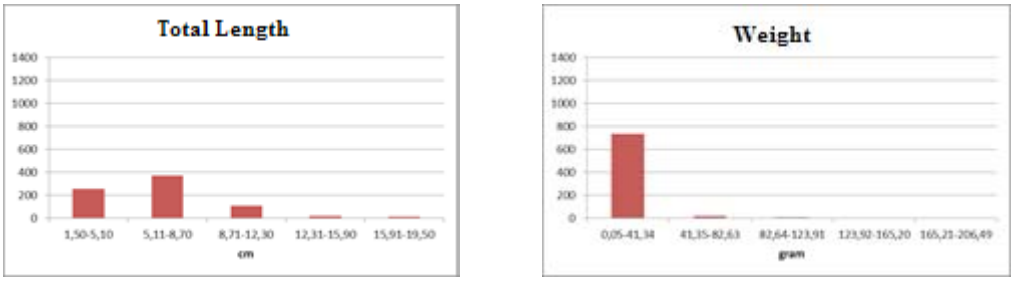
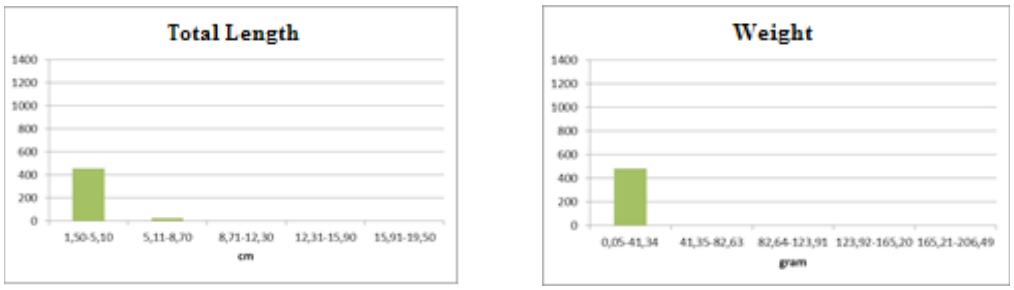


(A)

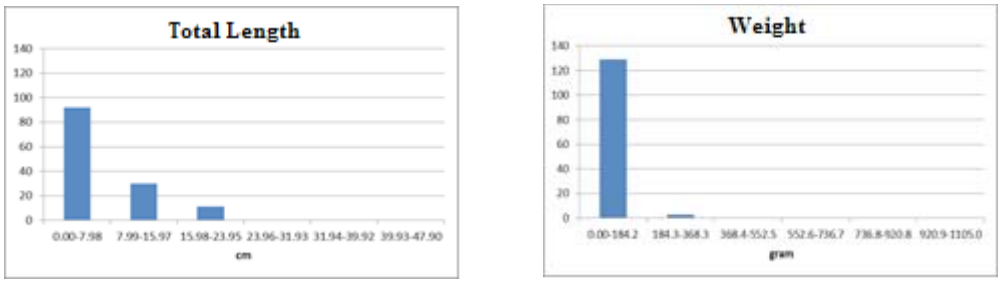


(B)

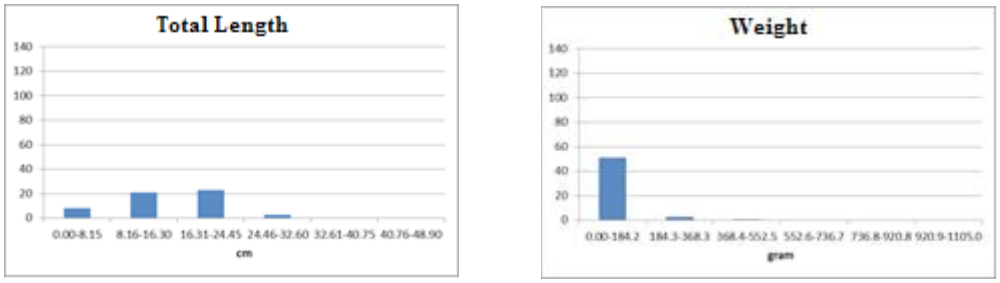


(C)

Picture 10:
Age Structure Based on Total Length and Weight from Most Caught Fish Species: (A) *Rasbora lateristriata* or *Lunjar Andong*, (B) *Glossogobius Giuris* or *Betutu*, and (C) *Dermogenys Pusilla* or *Julung-julung.*



(A)



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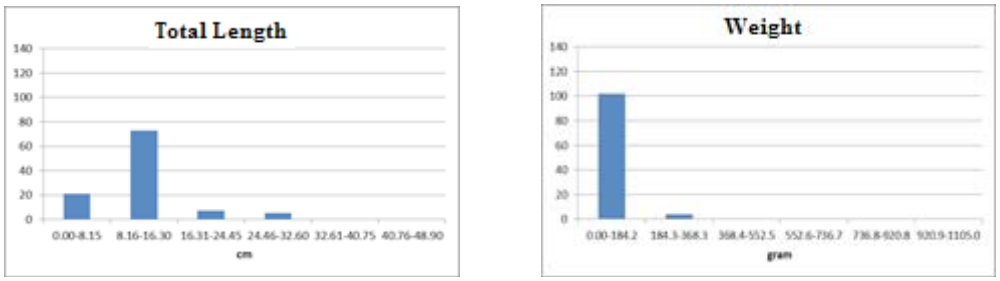
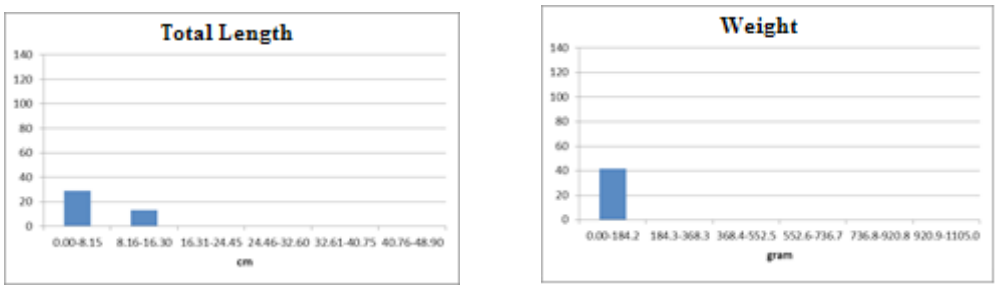
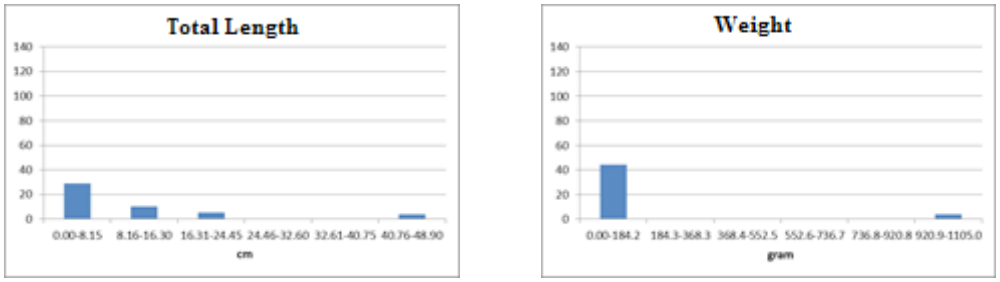


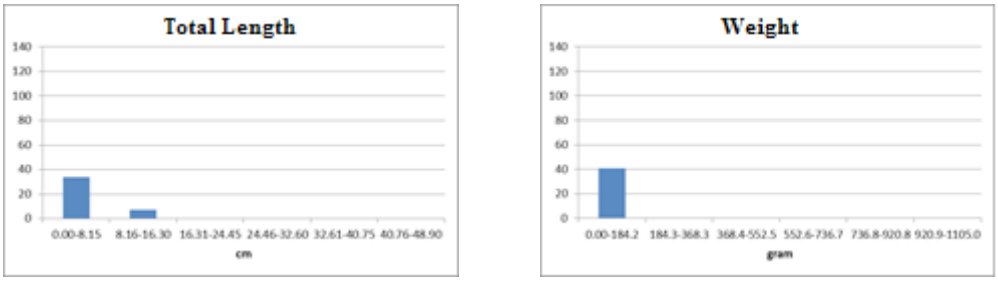
(C)



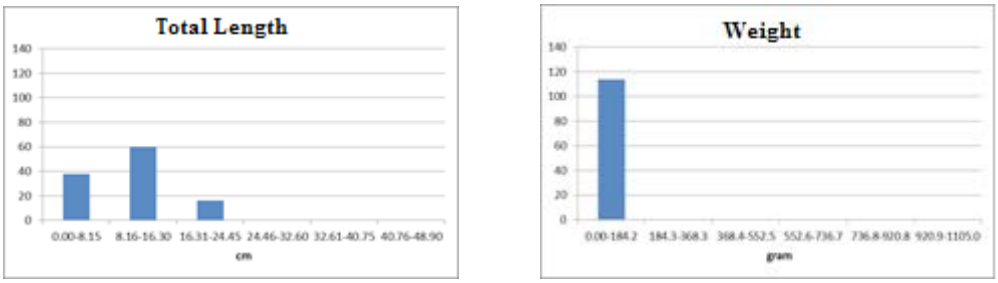
(D)



(E)



(F)



(G)

Picture 11:
Age Structure Based on Total Length and Weight from Economically Important Fish Species: (A) *Osteochilus Vitatus* or *Melem*, (B) *Barbonymus Gonionotus* or *Tawes*, (C) *Barbonymus Balleroides* or *Brek*, (D) *Labiobarbus Leptocheilus* or *Lukas*, (E) *Hampala Macrolepidota* or *Palung*, (F) *Osphronemus Goramy* or *Gurameh*, and (G) *Mystus Singaringan* or *Baceman*.

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Table 3:
Condition Factor Average, Value Range of B, from Most Caught Fish Species (A),
and Economically Important Fish Species (B)

No	Species	Local Name	B Value Range	B Value Average	Category
1	*Rasbora Lateristriata*	*Lunjar Andong*	0.03 – 3.84	2.78	*All -*
2	*Glossogobius Giuris*	*Betutu*	1.39 – 4.03	2.87	*All -*
3	*Dermogenis Pusilla*	*Julung-julung*	0.42 – 4.81	2.60	*All -*

(A)

No	Species	Local Name	B Value Range	B Value Average	Category
1	*Osteochilus Vitatus*	*Melem*	2.26 – 3.38	2.78	*All -*
2	*Barbonymus Gonionotus*	*Tawes*	2.73 – 3.89	3.36	*All +*
3	*Barbonymus Balleroides*	*Brek*	1.63 – 5.01	3.03	*All +*
4	*Labiobarbus Leptocheilus*	*Lukas*	0.85 – 4.43	2.85	*All -*
5	*Hampala Macrolepidota*	*Palung*	2.74 – 4.03	3.08	*All +*
6	*Osphronemus Goramy*	*Gurameh*	2.78 – 3.11	2.64	*All -*
7	*Mystus Singaringan*	*Baceman*	0.39 – 3.57	2.18	*All -*

(B)

Remarks: *All -* : *Allometrik* negatif (mean thin).
All + : *Allometrik* positif (mean fat).

Table 4:
Fecundity, Gonade Growth Level, and Gonade Growth Index from Most Caught Fish Species (A),
and Economically Important Fish Species (B)

Species	F	GGL	EW	GW	GGI (%)
Rasbora Lateristriata	649.84	IV	3.52	0.54	15.99
Glossogobius Giuris	551.50	III	5.85	0.28	9.78
Dermogenis Pusilla	30.42	IV	0.80	0.09	7.96

(A)

Species	F	GGL	EW	GW	GGI (%)
Osteochilus Vittatus	2511.96	IV	35.80	1.06	3.28
Barbonymus Gonionotus	1173.71	IV	110.13	0.55	0.34
Barbonymus Balleroides	2733.01	IV	55.91	0.90	1.83
Labiobarbus Leptocheilus	418.96	IV	20.21	0.54	2.79
Hampala Macrolepidota	168.33	IV	29.65	0.49	1.63
Osphronemus Goramy	-	-	-	-	-
Mystus Singaringan	1466.25	III	51.70	4.40	10.90

(B)

Remarks: F = Fekunditas; GW = Gonade Weight; GGL = Gonade Growth Level;
GGI = Gonade Growth Index; and EW = Egg Weight.

species are: *Barbonymus Goniopnotus* or *Tawes* in Javanese language, *Barbonymus Balleroides* or *Brek* in Javanese language, and *Hampala Macrolepidota* or *Palung* in Javanese language.

Comparation between fecundity, GGL, and GGI of three most found fish species and seven most economically important fish species reveal less ideal result. It showed by there are non-optimal eggs number, but GGL is in growth level III and IV, this non-ideal result showed as well as by GGI values were neither in less than 50% or more (Effendie, 2002).

Analysys result of average fecundity, GGL, and GGI of three most found fish species and seven most economically important fish species reveal only sex ratio show good result by the values which were less than 50% value (means there are more feminine individuals

Table 5:
Sex Ratio Average from Most Caught Fish Species (A), and Economically Important Fish Species (B)

Species	F	M	SR (%)
Rasbora Lateristriata	893	394	44.12
Glossogobius Giuris	526	479	46.95
Dermogenis Pusilla	350	134	38.28

(A)

Species	F	M	SR (%)
Osteochilus Vitatus	89	43	48.31
Barbonymus Gonionotus	41	14	34.14
Barbonymus Balleroides	73	33	45.21
Labiobarbus Leptocheilus	29	13	44.83
Hampala Macrolepidota	35	13	37.14
Osphronemus Goramy	29	12	41.37
Mystus Singaringan	55	27	49.09

(B)

Remarks: F = Female; M = Male; and SR = Sex Ratio.

than masculine individuals). This sex ratio condition will guarantee species preservation in their habitat if it also supported by good aquatic quality condition (*cf* Purwanto & Bustaman, 1986; Jannah, 2001; and Sulistiono, Jannah & Ernawati, 2001). Complete result showed in table 3, table 4, and table 5.

CONCLUSION [1]

Conclusions of this research are the aquatic qualities, including physical chemical parameters such as temperature, flow rate, brightness, dissolved oxygen, pH (*puissance negatif de H*), and plankton species variation in Serayu River at Banyumas Residency in Central Java, Indonesia are in good and suitable condition for fishes life. Most found species variation and individual counts in Serayu River at Banyumas Residency are from *Cyprinidae* Family, with low species diversity, but there are no fish species dominances found.

Fish Abundance in Serayu River at Banyumas Residency toward downstream is higher than those toward upstream. Fish community in Serayu River at Banyumas Residency toward upstream from Serayu Adjustable Dam is differed with fish community toward the downstream. Catadromic fish species and estuary fish species only found at area after Serayu Adjustable Dam.

Serayu Adjustable Dam existence become reason of fish species abundance and diversity decreasing which live on Serayu River at Banyumas Residency; thus, decrease fish community quality both in area before and after the dam. Fish growth pattern and fish reproduction profile in Serayu River at Banyumas Residency are not ideal.[2]

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[2]***Statement:*** Herewith, I have declared that this paper is my original work; so, it is not product of plagiarism and not yet be reviewed as well as be published by other scholarly journals.

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Serayu River at Banyumas Residency
(Source: http://www.sma2-purwokerto.sch.id, 15/4/2015)

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