Diversity and Conservation Status of Fish in The Water of Rolak Songo Dam, Mojokerto District East Java Indonesia

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Abstract. The purpose of this study was to analyze and to describe the diversity and conservation status of fish in dam Rolak Songo which are located in Mojokerto District. Sampling of fish using gill nets was carried out during the dry and rainy seasons. Research result showed that in the dry season there were three species of fish, namely two endemic species of Brantas river (Channa sriata and Barbonymous gonivatus), and one exotic species (Oreochompis mossambica). While in the rainy season, we found four species of fish i.e Barbonymous gonivatus, Mysticus micronantus, Puntius bromoides (Brantas River endemic fish species), and Oreochompis mossambica (exotic fish species). Fish diversity in the water of Rolak Songo dam was low. Conservation status of these endemic fish (C. sriata, B.gonivatus, M. micronantus, and P. bromoides) is vulnerable (VU), while status of O. mossambica is least concern.

1. Introduction

One source of income for the people around the Rolak Songo dam is fishing (Renitasari, 2016). The availability of fish in the Rolak Songo dam is a major aspect and has an important influence on life (PJT I, 2010). The fish found in the Rolak Songo dam can be found in almost all rivers in Indonesia (Risdjani, et.all. 1998). Types of fish in various areas of the rivers types of fish in various regions of the rivers several types of fish can be found, especially in the Brantas river (Wibowo, 2002). The diversity of fish species in the Rolak Songo dam is used for consumption, fisheries and health needs (Renitasari, 2016), and the Brantas river fish requires a comprehensive policy to control hunting (Nugroho, 2013 & Wibowo, 2009). For this reason, biological studies such as biodiversity, distribution, species status, water quality, riparian quality, conservation steps and patterns are the key to sustainable Brantas river fish sustainability. For this reason, biological studies such as diversity, distribution, species status, water quality, riparian quality, conservation steps and patterns are key to the sustainability of Brantas river fish (Risdjani, et.all. 1998, & Widdodo et.all. 1994).

Until now, in the Rolak Songo dam, no specific regulations regarding river fish conservation areas have been found in the entire Brantas river. Based on the Governor of East Java's Decree No. 188/229/KPTS/013/2014 about Surabaya River Fish Sanctuary which is located at the Mlirip floodgate in Mojokerto district to the Legundi Bridge in Gresik district. However, data bases related to Brantas river fish still very limited and sectoral. Therefore, this research was conducted to provide biological information and insights that began with data collection on the types and numbers of individuals and the river fish conservation plan in the Rolak Songo dam.

2. Materials and Method

2.1. Study Site

The location of the research was in Rolak Dam, Songo Lengkong, Mojokerto district, East Java. The sampling map is presented in Figure 1 below.
2.2. Duration of Study
This research was conducted in October 2017-February 2018. The equipment used was gillnet measuring 2-4 cm, camera, ruler, and identification key book. The method used is a survey and purposive sampling, with the determination of station criteria based on (1) the characteristics of environmental bases, (2) fishing area of fishermen. Fish collection is carried out in the dry and rainy season and is carried out in the morning at 06.00-10.00 a.m and evening at 3-5 p.m (Foltz, 1982; Yustina, 2001; Kaemink, 2007; Pegg, 2007). The fish caught were identified by the identification key book (Saanin, 1988 Kottelat, et al (1993) and Weber, et al (1901-1922) and the captured species were recorded by local names and photographed. Calculation of size and weight of fish caught (Karr, 1989).

2.3. Data Analysis
Shannon-Winner index (H), were calculated with the help of software PAST, version 3. Shannon-Winner diversity index depends on the number of species and the distribution of individuals among species. The Shannon-Winner diversity expressed by the following formula:

\[ H' = \sum Pi \times \log Pi \]

Where, \( Pi = \frac{ni}{N} \).

Where \( ni \) equal the number of individuals of each species in the sample, \( N \) is the total number of individual organism of all the species in the sample. Conservation status of fish analyzed by descriptive methods (IUCN, 2017).

3. Result and Discussion
Fish found in the Rolak Songo dam during the dry season have six individuals, namely: *Channa sriata*, *Mystus planiceps*, *Barboides blotoroides*, *Barboides gonionatus*. In the rainy season three individuals are found, namely: *Mystus planiceps*, *Barboides gonionatus*, dan *Oreochompis mossambicus*. Dam Rolak Songo, Lengkong village, Mojokerto Regency has five species, including four orders and three families, among others: *Channa Sriata*, *Barbonymus goninivatus*, *Barboides blotoroides*, *Mystus planiceps* dan *Oreochompis mossambicus*. Four Brantas river endemic fish species, that is: *Channa sriata*, *Mystus planiceps*, *Barboides blotoroides*, *Barboides gonionatus*, and one exotic type (*Oreochompis mossambicus*) presented in table 1.

| Ordo    | Family   | Species                        | Rainy Season | Dry Season |
|---------|----------|--------------------------------|--------------|------------|
| Perciformes | Channidae | *Channa Sriata*               | 1            |            |
| Cypriniformes | Cypridae | *Barbonymus goninivatus*      | 1            |            |
|         |          | *Oreochompis*                 |              |            |
| Perciformes | Cichidae | *Oreochompis*                 | 1            |            |

Table 1. Classification of Brantas river fish Caughted in the Rolak Songo dam
Over and indiscriminate fishing over the years in the dam Rolak songo has resulted in a decrease in fish diversity. Fish diversity in the dry season, that is: \textit{Channa sriata} (H' 0,31), \textit{Barbonymus gonivinatus} (H' 0,41), \textit{Barbonymus biatoroides} (H' 0,15), \textit{Mystus planiceps} (H' 0,41). Rainy season of cath the study, recorded season varification of shannon-winner index yaitu : \textit{Channa sriata} (H' 0,31), \textit{Barbonymus gonivinatus} (H' 0,41) and \textit{Oreochompis mossambicus} (H'0,44). The highest recorded in the dry season that is found as many as 4 species in the rainy season found 3 species. The difference in the number of fish between the dry and rainy season cannot be separated from the processes of taking food available around the Rolak Songo dam and the condition of the waters that support these types of fish.

The waters of Rolak Songo have the following water profile during the dry season: DHL 399,5, BOD 5,7, COD 11,5115, NO$\textsubscript{3}$ 12,525, TKN 0,36275, PO$\textsubscript{4}$ 0,119, pH 7,4485, DO 1,27375, temperature 3$\textsuperscript{0}$, Turbidity 9,9575, Orthophosphate 0,01625. Whereas in the rainy season the profile in the Rolak Songo dam is as follows: DHL 240,25, BOD 8,8925, COD, 17,64, NO$\textsubscript{3}$ 10,22075, TKN 0,157845, PO$\textsubscript{4}$ 0,451515, pH 7,575, DO 5,62, temperature 25,8, Turbidity 0,755, Orthophosphate 0,362175 indicates excellent water quality to support the breeding of fish. Brantas river fish began to be rare and rarely found in the Rolak Songo dam. The Shannon-Wiener Diversity Index \textit{Oreochampus mosambiccus} (H '0, 44) indicates excellent water quality, because environmental conditions are very supportive for its breeding. so that the compatibility of the environmental conditions with these species, will support the spread of Oreochampus mosambicus more widely throughout the waters of the Brantas river and will ultimately suppress the number of species of fish native to the Brantas river. thus there will be competition in the struggle for food and also the struggle for spawning areas so that the impact on the reduction of native Brantas river fish species. Several species fish of Brantas river are becoming scarce and difficult to find in the Rolak Songo dam (Ecoton, 2009), the species of fish are presented in table 2.

| No. | Localy   | Fish Name                  |
|-----|----------|----------------------------|
| 1   | Rengkik  | Hambragus nemurus          |
| 2   | Jambal   | Pangasius djambal          |
| 3   | Bethik   | Anabas tesduineus          |
| 4   | Jendil   | Pangasius micronmus        |
| 5   | Gathul   | Puntius binotatus          |
| 6   | Belut    | Fluta alba                 |
| 7   | Bakepek  | Mystacoleocus sp           |
| 8   | Bader Merah | Barbodes balleroides     |
| 9   | Sili     | Macronatus aculeatus       |
| 10  | Sepat    | Trichogaster tricopterus   |
| 11  | Ulo      | Loides longibarbaris       |
| 12  | Muntu    | Osteochilus haseltti       |

Source: secondary data, Ecoton 2009.

Based on the Shannon-Winner diversity index values, the species of fish found at the Rolak Songo dam have a low diversity, so it can be categorized as poor fish species diversity (Tjakrawidjaja dan Haryono1997). Therefore, there is a need for habitat variation to increase the proportion of diversity (Kottelat dkk. 1996; Junaidi 2008). Fish ecology is closely related to flexibility in taking food, and the availability of various types of food choices and the availability of places to breed (Araújo dkk., 2003; Montag dkk., 2011; dan Kottelat dkk., 1993). The natural habitat of fish species of these fish, often found in river conditions that have ecological calm water many plants, the presence of rocks and sandy (Arthur
The conservation status of endemic fish species of the Brantas river owned by the Rolak Songo Lengkong Mojokerto district, is presented in table 3.

Table 3. Conservation status of Brantas river fish caught in the dam Rolak Songo

| Species                      | Conservation Status (IUCN Redlist, 2017) |
|------------------------------|-----------------------------------------|
| Channa sriata (Endemik)      | Vulnerable (VU)                         |
| Barbonymus gonivinatus (Endemik) | Vulnerable (VU)                         |
| Oreochompis mossambicus (Eksotik) | least concern (LC)                     |
| Barbonymus blotoroides (Endemik) | Vulnerable (VU)                         |
| Mystus planiceps (Endemik)   | Vulnerable (VU)                         |

Source: primary data, 2017

The conservation status of fish caught in the Rolak Songo dam is included in the category, namely Vulnerable (susceptible) and Least concern (low risk). Some types of fish caught in the Rolak Songo dam included in the category of vulnerable are endemic fish of the Brantas river, that is: Channa sriata, Barbonymus gonivinatus, Barbonymus blotoroides, dan Mystus planiceps. Some species of fish are declared to have a vulnerable category because these endemic fish species have a suitable habitat for breeding, both in terms of availability of food, spawning sites, riparian quality and also the quality of water that does not support fish life. Where as Oreochompis mossambicus is a low risk category, because this taxa has the potential to develop widely and abundantly so that it will have an impact on the availability of natural food, and also the breeding speed of fish species will narrow the space for endemic fish in the Brantas River. Based on the IUCN Read list (2017), these fish species, that is: Channa sriata, Barbonymus gonivinatus, Barbonymus blotoroides and Mystus planiceps get conservation status with predicate susceptible to survive in nature. Thus, these endemic fish species of the Brantas River can survive in nature if natural habitats are properly met. The types of fish endemic to the Brantas River are presented in Figure 2, below.
4. Conclusions

It is very important to carry out conservation activities for Channa sriata, Barbonymus gonivinatus, Barbonymus blotoroides and Mystus planicep fish species to restore the diversity of Brantas river fish species.

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