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Conservation and economic status fishes in the Krueng Sabee River, Aceh Jaya District, Aceh Province, Indonesia

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Abstract. The aims of this study were to documented and evaluate the conservation status of fishes in Krueng Sabee River, Aceh Jaya District, Indonesia. The study was conducted from April to May 2017 and April-May 2018 at three zonas of the river: upstream, middle stream and downstream or estuary area of Krueng Sabee River. Purposive sampling was conducted in determining the sampling locations and the data were analyzed descriptively. The results showed that a total of 581 individual of fishes were collected during the study. It was belonging to 12 species, 7 genera and 9 families. The conservation status analyzed showed that *Osteochilus vittatus*, *Ambassis vachellii*, *Puntius microps*, *Caranx ignobilis*, *Lutjanus argentimaculatus*, *Puntius* sp., *Mystus bimaculatus*, *Megalop cyprinoides* were categorized at Least Concern (LC). Then, six species were Not Evaluated (NE), namely: *Valamugil scheli*, *Oreochromis niloticus*, *Rasbora ruttleri*, *O. mossambicus*, *Channa striata*, and *Tricopodus trichopterus*. The analysis was also indicated that *Tor tambra* was considered Vulnerable (VU).

1. Introduction

Indonesia is a mega biodiversity country in the world just after Brazil [1], for example there were approximately 4.000 species of fishes in Indonesia waters [2], where 800 species freshwater and brackish water [3]. Kottelat *et al.* [4] recorded that there were 275 species of fresh water fish existed in Sumatera, which 30 of them were considered as endemic species, and predicted about 75 new species in average are recorded every 2-3 years [4].

In Aceh waters, there are several studies to reported the number of species that found in these water. Approximately 114 species of freshwater fish found in these water, where 15 species are classified as high economic values fishes [1]. Muchlisin *et al.* [5] also reported that there were 73 species of fishes are found in the area of Tripa Peat Swamp in Nagan Raya and Aceh Barat Daya Districts, Indonesia. In addition, Batubara *et al.* [6] reported 73 species of coral fishes from Simeulue Island. Moreover, Nasir *et al.* [7] reported 12 species of freshwater fishes from Geumpang River, Aceh Province, Indonesia. However, no information from other regions of Aceh are available. Therefore, this paper are reported the additional information on ichthyofauna from Aceh region



especially from Krueng Sabee River, Aceh Jaya district the western part of Aceh Province.

Krueng Sabee River was located in the administrative area of Krueng Sabee sub district in Aceh Jaya Regency, Aceh Province, Indonesia. The upstream of this river is located in between the sub district of Krueng Sabee and sub district of Tangse Pidie District. The river stream was about 30 kilometers long as the confluence of three small rivers, namely Krueng Teungoh, Krueng Gapuy, and Krueng Kusi in the upstream area. According local people, in the previous time until the late 1970s, the water of Krueng Sabee was clear and clean without any contamination with the depth around two up to three meters (Personal communication with local people of Krueng Sabee Village). However, currently the water is yellow and turbid with an average depth of less than two meters due to sedimentation.

Presently, Krueng Sabee River is threatened by various unfriendly activities such as logging for palm oil plantations and settlements, illegal gold and sand mining that had caused pollution to the river. But, on the other hand this river plays an important role for local people such as for fishing, agriculture and other domestic needs for example drinking waters and washing. Thus, the plan for conservation is crucially required to preserve the river and its biodiversity, as well as to give the benefit for local people. However, unfortunately, no study on biodiversity of the fishes of the Krueng Sabee was available. Therefore, this paper reported the biodiversity of fishes in Krueng Sabee River and its conservation status.

2. Materials and Methods

2.1 Time and site

This study was conducted along the river stream area of Krueng Sabee River in the regency of Aceh Jaya. The river is divided into three regions, namely; upper stream, middle stream and lower stream or estuary (Figure 1). The sampling were conducted in two phases: April-May 2017 and April-May 2018. The samples were identified in laboratory of the Department of Biology, Syiah Kuala University, Banda Aceh, Indonesia.

2.2 Sampling area

The sampling locations stations were determined using purposive random sampling. The samples were collected by various fishing gears such as handlines, nets, and fish trap. The collected samples were documented and identified based on Kottelat *et al.* [4].

2.3 Conservation status analysis

The conservation status of the fishes was analyzed based on the International Union for Conservation of Nature (IUCN) by checked in the IUCN website [20]. This institution categorized the levels of threat for extinction to be nine categories namely; Extinct (EX), Extinct in the wild (EW), Critically endangered (CR), Endangered (EN), Vulnerable (VU), Near threatened (NT), Least concern (LC), Data deficient (DD), and Not evaluated (NE).

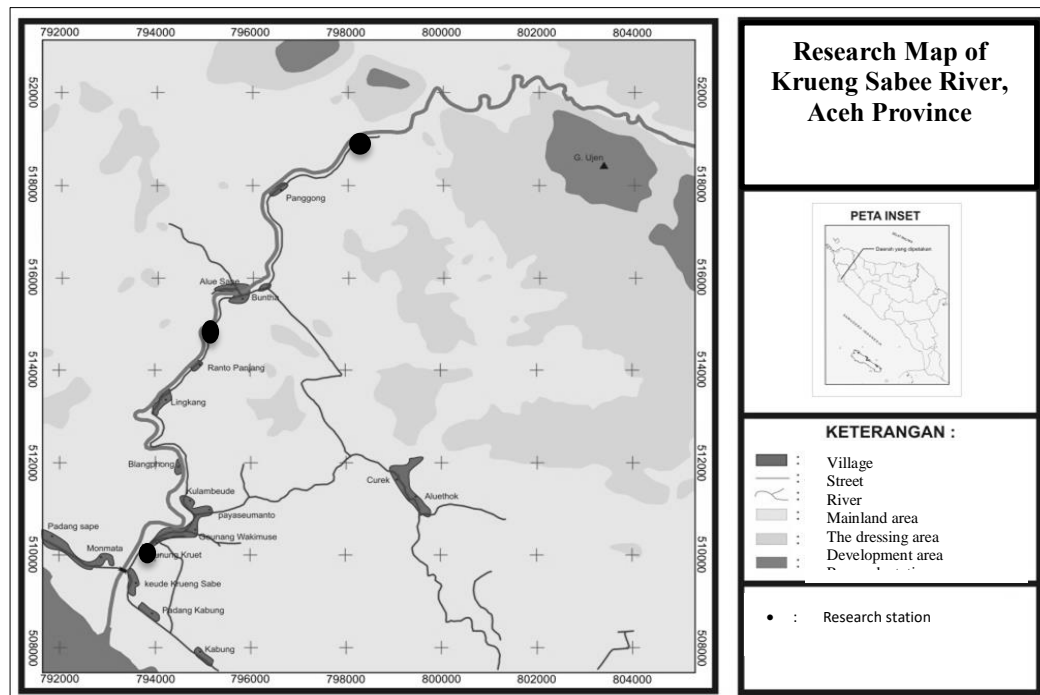


Figure 1. Map of the Krueng Sabee River showing sampling location

2.4 Economic status evaluation

The economic values were evaluated by performing depth interview with local fishermen. The level of economic status is categorized based on selling price modified from Muchlisin [8] as follows: low (IDR15.000/kg), moderate value (IDR15.000-IDR30.000/kg), and high value (>IDR30.000/kg).

3. Results and Discussion

Total 581 individual fish were caught during the study belong to nine families: Ambassidae, Carangidae, Cichlidae, Cyprinidae, Lutjanidae, Mugilidae, Channidae, Bagridae, and Osphronemidae and 15 species, namely ; *Ambassis vachellii*, *Caranx ignobilis*, *Oreochromis niloticus*, *O. mossambicus*, *Osteochillus vittatus*, *Puntius microps*, *Puntius* sp., *Tor tambra*, *Lutjanus argentimaculatus*, *Valamugil seheli*, *Rasbora ruttnei*, *Mytus bimaculatus*, *Channa striata*, *Trichopodus trichopterus*, and *Megalop cyprinoides* (Table 1).

There were 216 fish were found in Station I, 333 fish were identified in Station II and 32 fish are recorded in Station III. However, some species could only be found in certain stations. Keureling fish *T. tambra* for instance, this species was recorded at the Station I. The keureling fish is a true freshwater fish and therefore, this species was not recorded at lower stream or estuary area. In addition, *A. vachellii*, *C. striata*, *O. mossambicus*, *O. niloticus*, and *V. scheli* were only found at the Station II. Meanwhile, in the rest of the stations, the fish found were *Puntius* sp., *P. microps* and *O. vittatus*. Moreover, *C. ignobilis*, *M. cyprinoides*, *T. trichopterus*, and *L. argentimaculatus* were discovered at the Station III, while *T. tambra*, *R. ruttnei* and *M. bimaculatus* could only be spotted at the Station I. This is because these species are true freshwater fishes and intolerance to high salinity.

Table 1. Fish species composition and its distribution in Kreuang Sabee River, Aceh Jaya District, Indonesia

Family	Species	Local name	Sampling station		
			I	II	III
Ambassidae	<i>Ambassis vachellii</i>	<i>Serudeng</i>	-	81	-
Carangidae	<i>Caranx ignobilis</i>	<i>Rambe</i>	-	-	12
Cichlidae	<i>Oreochromis niloticus</i>	<i>Nila</i>	-	35	-
	<i>Oreochromis mossambicus</i>	<i>Mujair</i>	-	10	-
Cyprinidae	<i>Osteochillus vittatus</i>	<i>Gampet</i>	86	66	-
	<i>Puntius microps</i>	<i>Groh</i>	43	85	-
	<i>Puntius</i> sp.	<i>Groh</i>	5	20	-
	<i>Rasbora rutteni</i>	<i>Bileh</i>	19	-	-
	<i>Tor tambra</i>	<i>Keureling</i>	57	-	-
Lutjanidae	<i>Lutjanus argentimaculatus</i>	<i>Bateung</i>	-	-	8
	<i>Megalop cyprinoides</i>	<i>Buleun</i>	-	-	3
Mugilidae	<i>Valamugil scheli</i>	<i>Belaneuk</i>	-	26	-
Bagridae	<i>Mytus bimaculatus</i>	<i>Suwiek</i>	6	-	-
Channidae	<i>Channa striata</i>	<i>Bacee</i>	-	10	-
Osphronemidae	<i>Trichopodus trichopterus</i>	<i>Seupat</i>	-	-	9
Total of Fish			216	333	32

The result indicated that Cyprinidae is predominant in Krueng Sabee River; a total five species belongs to this family are *O. vittatus*, *P. microps*, *T. tambra*, *Puntius* sp., and *R. rutteni*. This result was similar to previous study conducted in rivers and lakes in Sumatera as reported by Muchlisin and Siti Azizah [1] and Muchlisin *et al.* [5] in the peat area of Tripa.

The study revealed that the higher abundance of fish was recorded at Station II (333 individual of fishes), while the lower abundance was found at Station III, having 32 individual. The high number of fishes are living at the Station II might be caused by the suitable condition of the waters that supported the fish life. This is the area palm oil plantations, probably the palm fruits fallen to the river became as the food source for the fish. Besides, the river current was relatively quiet, which preserved the food supply. According to Humpries *et al.* [9], the quiet water current may produce the food supply, including plankton and macro-vertebrata. In addition, they believe that the warmer the water temperature exists, the faster the growths of the larvae will be. Those are supported by Robert [10], who asserts that the food availability is a major factor of fish reproduction, which occurred in particular seasons, the freshwater fish for instance.

Meanwhile, the different condition of waters at three stations was also contributed to influence the distribution of fishes in the river. The Station I is the gold mining area, which means that dangerous chemical substances are existed. For example, mercury is applied as the gold mining practices. The mining activities conducted at that location potentially damaged the environment, including the fish habitat. According Alonso [11] that fish is a sensitive and vulnerable organism against the environmental changes. The changes like physical, chemical and biological factors greatly affect the composition and distribution of fish.

Out of 15 fish species caught in the area of Krueng Sabee River, two of them were labelled into the introduced species; *O. niloticus* and *O. mossambicus*. A study carried out by Muchlisin [12, 13], recorded that nine introduced fish species were found in the aquatic area of Aceh including both those species. The present study showed that no

endemic species was recorded during the study. However, Sunarya [14] believes that 17.3% endemic fish inhabit the waters of Sumatra. Unfortunately, environment perturbation resulted in the decline of the fish species.

The analysis of conservational status showed that most of fishes had LC status, such as *O. vittatus*, *A. vachellii*, *P. microps*, *C. ignobilis*, *L. argentimaculatus*. Meanwhile, *V. scheli*, and *O. niloticus* were classified as NE. Furthermore, one species, *T. tambra*, was classified as VU.

In general, most fish species caught have an economic value. Based on the analysis of the economic value showed that *T. tambra* or *keureuling* fish had the highest economic price and had potency as fish target for aquaculture [8]. Several studies have been conducted on the *keureuling* fish, for example; feeding habit and growth patterns [15], endo parasites infestation [16], and feeding in aquaculture system [17, 18, 19].

4. Conclusions

A total of 9 families, 12 genera and 15 species of fishes were recorded during the study where Cyprinidae is predominant in the Krueng Sabee River. Five species categorized as Least Concern (LC) six species Not Evaluated (NE) and one species was considered Vulnerable (VU). In addition, two species had high economic value and 13 species had a moderate value.

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