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Checklist of Fishes at Selected Rivers around Bukit Merah Reservoir, Perak, Malaysia

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Abstract: A study was conducted at five selected rivers around Bukit Merah Reservoir, Perak, Malaysia for eight weeks in order to determine the fish diversity and distribution. A total of 28 species comprised of 9 families were identified. The study depicted that there were significant changes to the fish composition when compared to previous study which had captured 36 species due to different areas covered and different types of sampling gear used between both studies.

Keywords: Freshwater Fishes, Diversity, Distribution, River, Bukit Merah Reservoir

INTRODUCTION

Bukit Merah Reservoir (BMR), which is located in Perak, Malaysia is one of the oldest reservoirs in Malaysia and has officially operated in 1906 for irrigation purpose (Talib *et al.* 2012). There are several main rivers that flow into Bukit Merah Reservoir (BMR), such as Sungai Merah, Sungai Jelutung, and Sungai Kurau. These rivers play crucial roles in maintaining the number of fish population in this reservoir by assuring spawning and breeding habitats, by acting as fish refuge areas, and providing natural food sources to the fishes. The previous fish study around and within BMR was carried out by Yap (1982). Since the study by Yap (1982), there are a lot of changes in BMR catchment areas such as expansion of oil palm and rubber plantation areas, upgrading the existing road, railways and bridge, and introduction of sand mining activities. All these activities were directly or indirectly affecting the water quality of the nearby rivers and hydrology therein. Therefore, this study was carried out to evaluate the

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present status of fish diversity in the selected river feeders of BMR and compare it with the results obtained by Yap (1982).

MATERIAL AND METHODS

Eight sampling stations namely Sungai Merah (upstream and downstream), Sungai Jelutung (downstream), Sungai Kurau (upstream and downstream), Sungai Ara (upstream and downstream) and Sungai Jelai around BMR basin were chosen for the study (Fig. 1). Two units of cast nets with 2.5 cm diameter of mesh sizes each were used by two operators along the study period started from November 2012 to March 2013 (eight weeks). Fish were captured for an average of 15 casts per operator for one hour at each sampling stations in every sampling excursion. The captured fishes from each sampling stations were identified up to the species level by using standard taxonomic keys by Rainboth (1996), Ambak *et al.* (2010), and Kottelat (2013). Each specimen was then measured for its total length and weight. Several specimens were kept as voucher specimens at the School of Biological Sciences, Universiti Sains Malaysia.

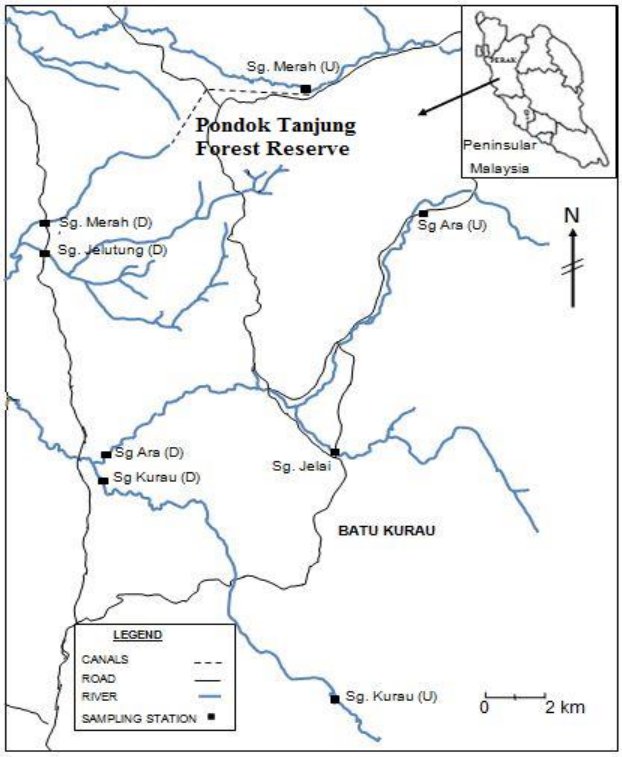

Figure 1: Location of fish sampling stations around Bukit Merah Reservoir during the study period (November 2012–March 2013).

RESULTS AND DISCUSSION

A total of 28 fish species comprising of 9 families were recorded during the study period (Table 1). Cyprinidae was the dominant fish family representing 60% of total species caught (Fig. 2) followed by Channidae (11%), Mastacembelidae (7%), and Bagridae (7%). Cyprinids are the most common species found in Malaysian freshwater bodies (Mohd Shafiq *et al.* 2014). The number of species captured in this study is low compared to Yap (1982), who had recorded 36 fish species from 15 families. Out of 28 species recorded, only 10 species namely *Osteochilus vittatus*, *Hampala macrolepidota*, *Cyclocheilichthys apogon, Oxygaster anomalura, Barbonymus schwanenfeldii*, *Barbonymus gonionotus, Notopterus notopterus, Channa lucius, Mystus castaneus,* and *Hemibagrus capitulum* were recorded as common species in both studies (Table 1). Twenty six species recorded by Yap (1982) were not recorded in the present study while 18 fish species were recorded for the first time to the existing fish checklist of BMR catchment areas. Therefore, the total numbers of fish species that was recorded in BMR catchment areas is 54 (Table 1).

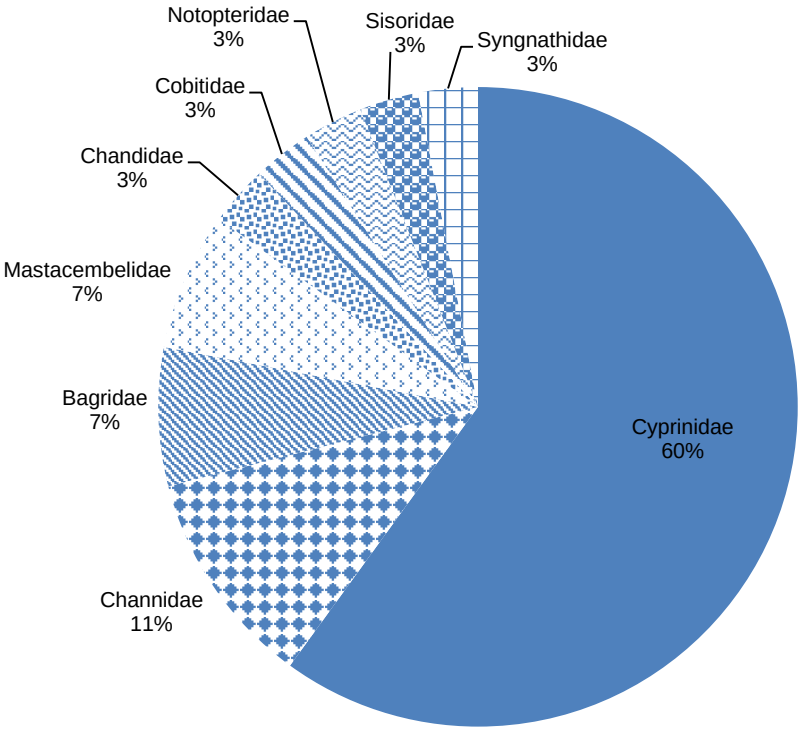

Figure 2: Percentage of fish species by family captured based on data collected from November 2012 until March 2013 at 8 sampling stations of selected rivers around Bukit Merah Reservoir, Perak, Malaysia.

Table 1: A comparative fish species checklist recorded in this study compared to Yap (1982) at Bukit Merah Reservoir, Perak, Malaysia.

Family	Species	Present study	Yap (1982)
Anabantidae	*Anabas testudineus*	–	+
Bagridae	*Hemibagrus capitulum*	+	+
	Mystus planiceps	–	+
	Mystus castaneus	+	+
Chandidae	*Parambassis siamensis*	+	–
Channiidae	*Channa gachua*	+	–
	Channa striata	–	+
	Channa marulioides	+	–
	Channa micropeltes	–	+
	Channa lucius	+	+
Clariidae	*Clarias batrachus*	–	+
	Clarias macrocephalus	–	+
	Clarias leiacanthus	–	+
Cobitidae	*Acanthopsis dialuzona*	+	–
Cyprinidae	*Barbodes binotatus*	+	–
	Barbonymus gonionotus	+	+
	Barbonymus schwanenfeldii	+	+
	Crossocheilus oblongus	+	–
	Cyclocheilichthys apogon	+	+
	Cyprinus carpio	–	+
	Devario regina	+	-
	Hampala macrolepidota	+	+
	Labiobarbus fasciatus	+	–
	Labiobarbus festivus	–	+
	Labiobarbus leptocheilus	+	–
	Mystacoleucus obtusirostris	+	–
	Neolissochilus soroides	+	–
	Osteochilus vittatus	+	+
	Oxygaster anomalura	+	+
	Puntius fasciata	–	+
	Puntius strigatus	–	+
	Rasbora borapetensis	–	+
	Rasbora caudimaculata	+	–
	Rasbora einthovenii	–	+
	Rasbora heteromorpha	–	+
	Rasbora paviana	+	–
	Thynnichthys thynnoides	+	–
Eleotridae	*Oxyeleotris marmorata*	–	+
Helostomatidae	*Helostoma temminkii*	–	+
Mastacembelidae	*Mastacembalus armatus*	+	–
	Mastacembelus favus	+	–

(*continued on next page*)

Table 1: (*continued*)

Family	Species	Present study	Yap (1982)
Megalopidae	*Megalops cyprinoides*	–	+
Nandidae	*Pristolepis fasciata*	–	+
Notopteridae	*Notopterus chitala*	–	+
	Notopterus notopterus	+	+
Osphronemidae	*Betta pugnax*	–	+
	Osphronemus goramy	–	+
	Trichopodus pectoralis	–	+
Osteoglossidae	*Scleropages formosus*	–	+
Siluridae	*Wallago leeri*	–	+
Sisoridae	*Glyptothorax major*	+	–
Synbranchidae	*Monopterus javanensis*	–	+
Syngnathidae	*Doryichthys deokhatoides*	+	–
Tetraodontidae	*Tetraodon kretamensis*	–	+
Total family		9	15
Total species		28	36

The changes in land use of BMR catchment areas might have significant contribution to the results. In early 80's, most of the BMR catchment areas were considered as virgin forests where there were no sand mining activities. However, from personal observation during the study, it was observed that several areas such as Pondok Tanjung Forest Reserve are converted to farm areas. Moreover, the expansion of palm and rubber plantation was also remarkable. The flood mitigation activity, especially along downstream of Sungai Ara and Sungai Kurau may pose negative impacts to the existing fish population in near future. According to Hasan *et al.* (2012), the changes of land use increased the sediment yields of BMR river feeders which might exacerbate the BMR operation problem. However, different number of fish species recorded in this study might be due to different of sampling strategies. Different sampling gears used also might contributed to the variation in results, as Yap (1982) used variety of sampling gears such as gillnets, fish traps, and cast nets whereas the present study depended solely on cast nets. In this study, samplings were carried out for five months focusing at various sites, mainly upper part of the BMR, while Yap (1982) took two years covering the upstream (Sungai Kurau), within and downstream of BMR (Selinsing canal/spillways). Yap's (1982) study recorded only 24 fish species at Sungai Kurau and number of fish recorded is bit lower when compared to the present study which recorded 28 species at Sungai Kurau.

In conclusion, changes of land use in terms of human intervention (e.g., expansion of oil palm and rubber plantation, upgrading the existing road, railways and bridge, and introduction of sand mining activities) in BMR catchment areas may pose negative impacts to the existing fish population in long term. Oil palm plantation or any plantation can be a leading cause of tropical deforestation, biodiversity loss, and water pollution (Dayang Norwana *et al.* 2011). Moreover, upgrading the existing road, railways, and bridge activities would have negative impacts to the ichthyodiversity because all these activities intercepts natural flow routes of water, change flow regime, and increase surface runoff which has direct impacts on fish (Toews & Brownlee 1981). Apart from that, sand mining adversely distorts the natural equilibrium of a stream channel (Department of Irrigation and Drainage Malaysia 2009). In-stream mines also interrupt the continuity of sediment transport through the river system. Therefore, further study should be carried out to gain more detail information on fish biodiversity and population of BMR river feeders.

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