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FISH OCCURRING IN A BLACK WATER OXBOW LAKE IN SOUTH BORNEO

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Introduction

In South Borneo, many oxbow lakes are distributed around lower reaches of rivers. Some of them are already separated from the main river and others are still connecting with it. The latter type of oxbow lakes are similar to flood plain of river with slow water current, which is important as the spawning area of fish in Southeast Asia (cf. Chevey, 1936; Taki, 1978; Doi, 1992). In this study, we tried to clarify the relationships between fish and environmental factors in an oxbow lake.

Methods

On 17th - 18th September 1998, three gill nets with different mesh sizes were used to collect fish in an oxbow lake, Lake Tundai, Indonesia (Fig. 1). Lake Tundai is still connecting with the Kahayan River. The net size was 2 m (depth) × 18 m (width) each. Mesh sizes of the gill nets were 5.0 cm, 2.5 cm and 1.5 cm. Fishes were collected every 3 h. A large four-armed scoop net was also used to collect additional samples. DO concentration and pH of water were measured with electrodes (YSI Model 55, USA and HORIBA ES-14, Japan). The specimens used in this study were deposited in Museum Zoologicum Bogorense (MZB), LIPI.

Results and Discussion

Ten families, 21 genera and 26 species were collected from Lake Tundai (Table 1). Main fishes collected with the gill nets and their size range are shown in Table 2.

The reported maximum size of *Leptobarbus hoevenii* is 700 mm in standard length (SL) (Rainboth, 1996) whereas the largest size of the specimens collected from Lake Tundai was 147.0 mm in SL (21.0% of the maximum size). The largest size (in SL) of *Osteochilus melanopleura* in Lake Tundai was 140.4 mm, which was 35.0% of the maximum size reported for this species (400 mm, Rainboth, 1996). That of *Osteochilus schlegelii* was 90.2 mm which was 22.6% of the report maximum size of 400 mm (Rainboth, 1996). That of *Helostoma temminkii* was 117.3 mm which was 56.5% of the reported maximum size of 200 mm (Rainboth, 1996). That of *Trichogaster lerrii* was 71.4 mm which was 59.5% of the reported maximum size.120 mm (Smith, 1945).

By using a large four-armed scoop net, *Osteochilus microcephalus*, *Thinnichthys thynnoides* and *Chela maasii* were collected as main fish. All fishes were juveniles or small-sized fish. Juveniles of *Osteochilus melanopleura* and *O. schlegelii* were also collected.

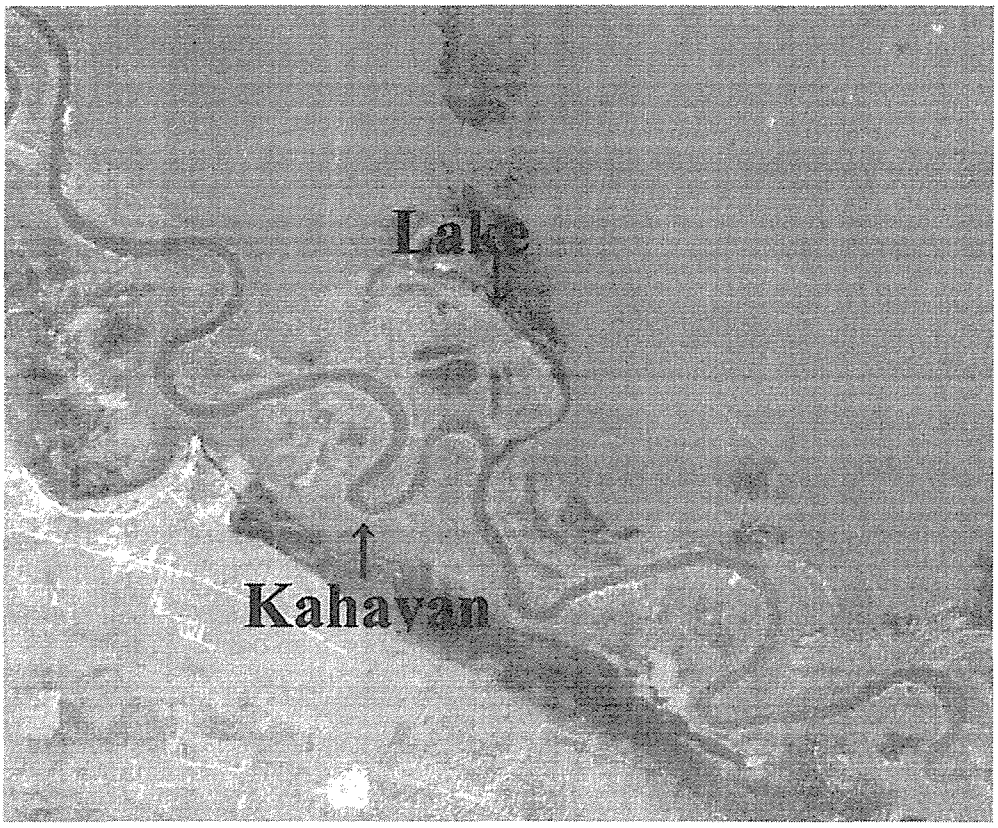

Fig. 1. Drainage network of Lake Tundai and Kahayan River.

Based on these results, in large-sized cyprinid fish, *Leptobarbus hoe*venii, *Osteochilus melanopleura* and *O. schlegelii*, juvenile fish is only distributed in Lake Tundai. Their standard length was less than 35% of the maximum size. In air-breathing fish, *Helostoma temminkii* and *Trichogaster lerrii*, adult fish is distributed in the lake. Their standard length was more than 56% of the maximum size.

In the connecting point of Lake Takapan (oxbow lake) with the Kahayan River, fishermen collected adult size fish of large size cyprinids (based on field observation).

In the flood plain of Lake Tonle Sap (Cambodia), adult and juvenile fishes were collected (Doi, 1992).

These differences in the fish occurring seem to be related to water quality. Water of Lake Tundai was brown-colored, pH 3.92 – 4.65 and 0.11 – 2.93 mg/L of DO concentration (black water). Water colour of flood plain of Lake Tonle Sap was the same as that of the Tonle Sap and Mekong Rivers. Water quality of flood plain of Lake Tonle Sap was pH 6.74 – 7.73 and 0.52 – 6.00 mg/L of DO concentration (Matsui and Matsuda, 1992). Water quality at the connecting point of Lake Takapan with Kahayan River was the same as that of river. In large-sized cyprinids, juvenile was only distributed in black water area.

Table 1. The fishes collected from Lake Tundai

Family	Species
Notopteroidae	*Chitara ornata*
Cyprinidae	*Chela maassi*
	Cyclocheilichthys apogon
	Leptobarbus hoevenii
	Luciosoma trinema
	Osteochilus melanopleura
	Osteochilus schlegelii
	Osteochilus tripore
	Parachela hypopthalmus
	Parachela sp.
	Puntioplites waandersii
	Puntius lineatus
	Rasbora sp.
	Thinnichthys thynnoides
Cobitidae	*Botia hymenophysa*
Bagridae	*Mystus nigriceps*
	Mystus sp.
Siluridae	*Kryptopterus* sp.
	Ompok sp.
	Waallago leerri
Schilbidae	*Pseudeutropius* sp.
Helostomatidae	*Helostoma temminckii*
Anabantoidae	*Anabas testudineus*
Belontiidae	*Trichogaster leerri*
	Trichogaster trichopterus
Mastacembelidae	*Macrognathus* sp.

Table 2. Standard length (mm) of the main fish collected with gill nets from Lake Tundai

	Range	Average
Cyprinid fish		
Leptobarbus hoevenii	98.5 - 147.0	111.5
Osteochilus malanopleura	75.0 - 140.4	83.0
Osteochilus schlegelii	78.0 - 90.2	83.0
Air-breathing fish		
Helostoma temminkii	54.7 - 117.3	99.5
Trichogaster lerrii	47.8 - 71.4	64.8

Based on juvenile fish occurred, oxbow lake is considered as an important area for the growth of juvenile fish. But, to clarify the importance of oxbow lakes for the growth of juvenile fish, the questions "Why are only juvenile fishes distributed in a black water oxbow lake for large-sized cyprinids?" and "Why are adult cyprinids absent

from the black water lake?" must be clear. This question may be related to the geomorphology and the change of water quality of oxbow lake.

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Literature cited

Chevey, P., 1936. La grand lac du Cambodge. Les causes profoundes de sa richesse ichthyologique. *Notes Inst. Oceanogr. Indochine*, 29: 39-49.

Doi, A., 1992. Fish fauna of Lake Tonle Sap and its surrounding areas. Kankyogizyutsu, 21: 782-785. (in Japanese)

Matsui, S. and Matuda, T., 1992. Water quality of Tonlesap and its surrounding areas. *Kankyogizytsu*, 21: 777-782. (in Japanese)

Rainboth, W., 1996. *Fishes of the Cambodian Mekong. FAO species identification field guide for purposes.* FAO, Rome. 265pp, 27 color plates.

Smith, H. G., 1945. The fresh-water fishes of Siame, or Thailand. *Bull. U. S. Natn. Mus.*, 188: I-xi + 1-662, 9 pls.

Taki, Y., 1978. An analytical study of the fish fauna of the Mekong basin as s biological production system in nature. Res. Inst. Evol. Biol., Tokyo Univ. Agri., Spec. Publ., No. 1. I+77 pp.