

## FISH DIVERSITY IN THE TESSO NILO AREA, RIAU WITH NOTES ON RARE, CRYPTIC SPECIES

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### Abstract

A survey of the freshwater fishes of The Tesso Nillo area was conducted in June 2003 in conjunction of establishing this area as conservation area. In this brown water-forest streams of the upper part of Kampar catchment area, fifty fish species were found. This comprised of 31 genera, 16 familia and 4 orders. The dominant familia are Cyprinidae (18 species), Bagridae (5 species), Belontiidae (4 species) and Siluridae (4 species). Cryptic species: *Breinsteinea hypselurus* and *Chaca bankanensis* were found in the area.

**Keywords:** Fish diversity, rare and cryptic species, Cyprinidae, Bagridae, Balontiidae, Siluridae

### INTRODUCTION

Tesso Nilo conservation area lies in the upstream of the Kampar catchment area within the Tesso and Nilo river. This area is about 188.000 hectare that constitute the largest remaining swamp forest in Sumatra. This area was addressed for forest production, therefore several logging companies and plywood industry have been operating.

The Tesso Nilo conservation area was proposed for a reserve of the Sumatran elephant. This notion addressed to overcome the conflict between Sumatran Elephants and human beings that has been a problem since the Langgam (part of the Tesso Nilo area) has been converted to settlement. Then, this conservation area was declared as National park by Minister of Forestry in 19 July 2004, which encompasses the area of 38.576 hectare.

Fish diversity survey which was conducted from 4 to 13 June 2003 as a part of biodiversity survey team is aimed to reveal the fish fauna existing in this area by conducting fish collection within the Tesso Nilo area.

## METHODS

Fifteen sampling sites, each 100-200 m long were established. Later these sampling sites were grouped to become four groups of sites :

- (1) S. Sawan and S. Sangkalalo (at the junction of Setugal village 0°15.304'S; 101°40.660'E, alt. 162 m)
- (2) S. Toro (alt. 87 m) and at tributary of S. Toro (alt. 78 m) ( 0°13.245'S; 101° 45.695'E, alt. 87 m at the camp)
- (3) Segati River (alt. 45 m) and at tributary of Segati River (alt. 36 m) (0°00.940'N; 101°36.450'E, alt. 39 m at the bridge) :
- (4) a tributary of S. Mamahan (Group IV: 0°10.218'S; 101°39.946'E, alt. 105 m) S. Sangkalalo flows to Kuantan River, while S. Toro, Segati River and S. Mamahan flow to Nilo River. This group of sampling sites are inside the proposed national park except Sangkalalo which is located out side the park. A network of logging road has been well established that lead to this area making it easily accessible for car or motorcycle until the bank of the stream/rivers.

Administratively, the sampling sites at Sangkalalo are located in Ds. Setugal Kec. Kuantansingingi, Kab. Basra. While the sampling sites at S. Toro, S. Segati, S. Mamahan are located in Ds. Segati, Kec Langgam, Kab. Pelalawan.

Fish sampling in each site was conducted by using a variety of gears e.g. angling with small and big hook, electric fishing (12 V, 10 A) and cast net. In the surveyed area, the most effective gears was angling and electric fishing. The sampling period was done in the dry season (5 June- 13 June 2003), leading to the unevenness of the flow and the water depth. It led angling and electric fishing being the most effective fishing gears for this area. To get data as quantitative as possible, counting of collected specimens was conducted from every sampling sites. The identification was based on Weber and deBeaufort (1913), Weber and deBeaufort (1916), Weber and deBeaufort (1922), Ng and Siebert (1998), Tan and Ng (200). Data analysis for species diversity refers to Simpson index (ranged from 0-1), evenness and dominance refers to Ludwig and Reynolds (1988), and Odum (1978).

## TAXONOMIC ACCOUNT

### Cyprinidae

#### *Chela laubuca* (Hamilton and Buchanan, 1822)

Local name.-

Material examined-. MZB 13408 (Sungai Batu Panggal).

Distribution.- Sumatera, Malaya, Indochina, India, Srilanka, Burma.  
Weber and De Beaufort (1916) p.48 (*Laubuca laubuca*); Smith (1945) p. 81;  
Kottelat *et al* (1993) p.45.

***Chela maasi* (Weber and de Beaufort, 1912)**

Local name.-

Material examined.- MZB 13514 (Sungai Sawan); MZB 13522 (Sungai Kesawan).

Distribution.- Sumatera, Borneo, Malaya

Weber and De Beaufort (1916) p.49 (*Laubuca maasi*); Roberts (1989) p. 31;  
Kottelat *et al* (1993) p.45.

***Cyclocheilichthys apogon* (Cuvier and Valenciennes, 1842)**

Local name.- Subhan.

Material examined-. MZB 13402 (Sungai Sangkalolo, Rawang); MZB 13469 (Sungai Segati); MZB 13483 (Sungai Segati); MZB 13552 (Sungai kecil di belakang camp anak Sungai Mamahan); 13553 (Anak Sungai Mamahan).

Distribution.- Sumatera, Jawa, Malaya, Burma, Indochina.

Weber and De Beaufort (1916) p.156; Smith (1945) p. 141; Sontirat (1976) p. 57; Roberts (1989) p.35; Inger and Chin (1990) p.66; Kottelat *et al* (1993) p.46.

***Cyclocheilichthys armatus* (Cuvier and Valenciennes, 1842)**

Local name.- Subhan.

Material examined-. MZB 13409, 13419, 13433, 13451 (Sungai Toro); MZB 13412, 13529 (Sungai Bukit Panggal); MZB 13459 (Sungai Batu Panggal).

Distribution.- Sumatra, Jawa, Borneo, Malaya, Indochina, Palawan.

Weber and De Beaufort (1916) p.159; Smith (1945) p. 144; Sontirat (1976) p. 41; Roberts (1989) p.35; Kottelat *et al* (1993) p.46.

***Epalzeorhynchus kallopterus* (Bleeker, 1850)**

Local name.- Selusur batang.

Material examined-. MZB 13449 (Sungai Toro).

Weber and De Beaufort (1916) p.230; Smith (1945) p. 263; Roberts (1989) p. 39 (*Epalzoerhyncos kallopterus*) Inger and Chin (1990) p. 100 (*Epalzoerhynchos kalliurus*); Kottelat *et al* (1993) p.47.

***Hampala macrolepidota* (Cuvier and Valenciennes, 1842)**

Local name.- Barau.

Material examined-. MZB 13424, 13430, 13453 (Sungai Toro); MZB 13456 (Sungai Batu Panggal).

Distribution.- Sundaland, Indochina.

Weber and De Beaufort (1916) p.143; Smith (1945) p. 132; Roberts (1989) p. 40; Inger and Chin (1990) p. 78; Kottelat *et al* (1993) p.47.

***Labiobarbus ocellata* (Heckel, 1850)**

Local name.- Ringo.

Material examined-. MZB 13466 (Sungai Segati).

Distribution.- Sumatra, Borneo, Malaya.

Weber and De Beaufort (1916) p.117; Kottelat *et al* (1993) p.49.

***Osteocheilus spilurus* (Bleeker, 1850)**

Local name.-

Material examined-. MZB 13515 (Sungai Sawan).

Distribution.- Sundaland.

Weber and De Beaufort (1916) p.139; Roberts (1989) p.53; Inger and Chin (1990) p. 90; Kottelat *et al* (1993) p.55.

***Osteocheilus waandersii* (Bleeker, 1850)**

Local name.-

Material examined-. MZB 13460 (Sungai Batu Panggal).

Distribution.- Sumatra, Borneo, Malaya, Indochina.

Weber and De Beaufort (1916) p.136; Smith (1945) p. 213 (*Osteochilus waandersii*); Roberts (1989) p.54; Kottelat *et al* (1993) p.56.

***Puntius binotatus* (Cuvier and Valenciennes, 1842)**

Local name.- Kepurai.

Material examined-. MZB 13403 (Sungai Sangkalalo, Rawang); MZB 13502 (Sungai Toro); 13539 (Sungai kecil di belakang camp anak Sungai Mamahan); MZB 13555 (Anak Sungai Mamahan).

Distribution.- Sundaland, Bali, Lombok, Philipina, Indochina.

Weber and De Beaufort (1916) p.186; Smith (1945) p. 183; Roberts (1989) p.61; Inger and Chin (1990) p. 71; Kottelat *et al* (1993) p.57.

***Puntius lateristriga* (Cuvier and Valenciennes, 1842)**

Local name.- Gedegung.

Material examined-. MZB 13401 (Sungai Sangkalalo, Rawang).

Distribution.- Sumatra, Borneo, Jawa, Peninsular Thailand, Malay Peninsula  
Weber and De Beaufort (1916) p.179; Smith (1945) p. 181; Roberts (1989) p.  
65; Kottelat *et al* (1993) p.59.

***Puntius lineatus* (Popta, 1904)**

Local name.- Mengkai.

Material examined.-MZB 13468 (Sungai Segati); MZB 13478 (Anak Sungai  
Segati); MZB 13540 (Sungai kecil di belakang camp anak Sungai Mamahan);  
MZB 13554 (Anak Sungai Mamahan).

Distribution.- Sumatra, Borneo W., Malaya.

Roberts (1989) p. 65; Kottelat *et al* (1993) p. 59.

***Rasbora bankanensis* (Bleeker, 1853)**

Local name.- Pantau.

Material examined.-MZB 13516 (Sungai Sawan); MZB 13523 (Sungai Kesawan);  
MZB 13530 (Sungai Bukit Panggal); MZB 13541 (Sungai kecil belakang camp  
anak Sungai Mamahan); MZB 13557 (Anak Sungai Mamahan).

Distribution.- Sumatra, Borneo, Malaya

Weber and De Beaufort (1916) p.69; Brittan (1954) p. 96; Roberts (1989) p.  
70; Kottelat *et al* (1993) p.61.

***Rasbora caudimaculata* (Volz, 1903)**

Local name.- Pantau Banau.

Material examined.-MZB 13418, 13455 (Sungai Batu Panggal); MZB 13421, MZB  
13427 (Sungai Toro); MZB 13465 (Sungai Segati); MZB 13499 (Sungai Toro);  
MZB 134500 (Sungai Toro); MZB 13558 (Anak Sungai Mamahan).

Distribution.- Sumatra, Borneo, Malaya

Weber and De Beaufort (1916) p.74; Brittan (1954) p. 76; Roberts (1989) p.  
72; Kottelat *et al* (1993) p.62.

***Rasbora cephalotaenia* (Bleeker, 1852)**

Local name.- Bada Mayang.

Material examined.- MZB 13467 (Sungai Segati); MZB 13488 (Sungai Segati);  
MZB 13494 (Anak Sungai Segati); MZB 13543 (Sungai kecil di belakang anak  
Sungai Mamahan); MZB 13559 (Anak Sungai Mamahan).

Distribution.- Sumatra, Borneo, Malaya

Weber and De Beaufort (1916) p.74; Brittan (1954) p. 153; Roberts (1989) p.  
72; Kottelat *et al* (1993) p.62.

***Rasbora einthovenii* (Bleeker, 1851)**

Local name.- Pantau Biasa.

Material examined.- MZB 13511 (Sungai Sangkalalo); MZB 13542 (Sungai kecil di belakang anak Sungai Mamahan).

Distribution.- Sumatra, Borneo, Malaya, Singapura.

Weber and De Beaufort (1916) p.78; Brittan (1954) p. 149; Smith (1945) p. 114; Roberts (1989) p. 73; Inger and Chin (1990) p.52; Kottelat *et al* (1993) p.62.

***Rasbora gracilis* (Kottelat, 1991)**

Local name.- Pantau Biasa.

Material examined.- MZB 13432, 13503 (Sungai Toro); MZB 13517 (Sungai Sawan); MZB 13524 (Sungai Kesawan); MZB 13544 (Sungai kecil di belakang camp anak Sungai Mamahan).

Distribution.- Sumatra, Borneo, Malaya

Kottelat *et al* (1993) p.63.

***Rasbora heteromorpha* (Duncker, 1904)**

Local name.- Ikan Segitiga.

Material examined.- MZB 13504 (Sungai Toro); MZB 13521 (Sungai Sawan); MZB 13525 (Sungai Kesawan); MZB 13545 (Sungai kecil di belakang camp anak Sungai Mamahan); MZB 13556 (Anak Sungai Mamahan)

Distribution.- Sumatra N. E., Malaya N.

Weber and De Beaufort (1916) p.79; Brittan (1954) p. 187; Smith (1945) p. 107; Kottelat *et al* (1993) p.63.

***Rasbora maculata* (Duncker, 1904)**

Local name.- Bada.

Material examined.- MZB 13501 (Sungai Toro); MZB 13512 (Sungai Sangkalalo); MZB 13518 (Sungai Sawan); MZB 13526 (Sungai Kesawan).

Distribution.- Sumatra, Borneo, Malaya .

Weber and De Beaufort (1916) p.70; Brittan (1954) p. 194; Kottelat *et al* (1993) p.64.

***Rasbora* sp.**

Local name.-

Material examined.- MZB 13461 (Sungai Batu Panggal); MZB 13513 (Sungai Sangkalalo); MZB 13470 (Sungai Segati); MZB 13474 (Sungai Segati); MZB 13506 (Sungai Toro).

Distribution.- Tesso nilo.

***Rasbora trilineata* (Steindachner, 1870)**

Local name.- Pantau Kuning/Beras.

Material examined.- MZB 13470 (Sungai Segati); MZB 13474 (Sungai Segati); MZB 13506 (Sungai Toro).

Distribution.- Sumatra, Borneo, Malaya, Thailand.

Weber and De Beaufort (1916) p.67; Brittan (1954) p. 81; Smith (1945) p. 112; Roberts (1989) p. 76; Inger and Chin (1990) p. 56 (*Rasbora sumatrana*); Kottelat *et al* (1993) p.66.

**Balitoridae**

***Homaloptera tweedei* (Herre, 1940)**

Local name.- Ikan Rayap.

Material examined.- MZB 13413 (Sungai Batu panggah); MZB 13532 (Sungai Bukit Panggal).

Distribution.- Borneo W., Malaya .

Roberts (1989) p. 90; Kottelat *et al* (1993) p.74.

***Nemacheilus cf. spiniferus* (Kottelat, 1984)**

Local name.- Ili

Material examined.- MZB 13415 (Sungai Sawan); MZB 13479 (Sungai Segati); MZB 13531 (Sungai Bukit Panggal, Riau); MZB 13479, 13484 (Sungai Segati).

Distribution.- Borneo N.W.

Kottelat *et al* (1993) p.77.

**Bagridae**

***Glyptothorax major* (Boulenger, 1894)**

Local name.- Lopu.

Material examined.- MZB 13410 (Sungai Sawan); MZB 13426 (Sungai Batu Panggal); MZB 13487 (Sungai Segati); MZB 13510 (Sungai Toro); MZB 13536 (Sungai Bukit Panggal).

Distribution.- Borneo, Malaya.

Smith (1945) p. 401; Roberts (1989) p. 134; Inger and Chin (1990) p. 145; Kottelat *et al* (1993) p.106.

***Hemibagrus nemurus* (Valenciennes, in Cuvier & Valenciennes, 1840)**

Local name.- Baung.

Material examined.- MZB 13429, 13446, 13447 (Sungai Toro); MZB 13477, 13491 (Sungai Segati); MZB 13481 (Sungai Segati); MZB 13493 (Anak Sungai Segati).

Distribution.- Sundaland, Indochina

Weber and De Beaufort (1913) p.341 (*Macrones nemurus*); Smith (1945) p. 386 (*Mystus nemurus*); Inger dan Chin (1990) p. 138 (*Mystus nemurus*); Roberts (1989) p. 122; Kottelat *et al* (1993) p.92.

***Mystus nigriceps* (Valenciennes, in Cuvier & Valenciennes, 1840)**

Local name.- Nginggir.

Material examined.- MZB 13406 (Sungai Sangkalalo); MZB 13428, 13442, 13444, 13507, 13508 (Sungai Toro); MZB 13441 (Sungai Toro depan camp); MZB 13528 (Sungai Kesawan).

Distribution.- Sumatra, Borneo, Jawa, Malay Peninsula, Thailand.

Weber and De Beaufort (1913) p.337 (*Macrones nigriceps*); Smith (1945) p. 389 (*Mystus cavasius*); Roberts (1989) p. 122 (*Mystus nigriceps*); Kottelat *et al* (1993) p.92.

***Mystus singaringan* (Bleeker, 1846)**

Local name.- Sungkit.

Material examined.- MZB 13436, 13440, 13445 (Sungai Toro); MZB 13439 (Sungai Toro depan camp); MZB 13475 (Anak Sungai Segati); MZB 13476 (Sungai Segati); MZB 13549 (Sungai kecil di belakang camp anak Sungai Mamahan).

Distribution.- Sumatra, Borneo, Jawa, Malay Peninsula, Thailand.

Tan and Ng (2000) p.278.

**Siluridae**

***Ompok fumidus* (Tan and Ng, 1996)**

Local name.- Selais.

Material examined.- MZB 13548 (Sungai kecil di belakang anak sungai Mamahan).

Distribution.- Peninsular, Malaysia, Thailand, Borneo, Kepulauan Riau, Sumatra.

Tan and Ng (1996) p.537.

***Ompok hypophthalmus* (Bleeker, 1846)**

Local name.- Selais.

Material examined.- MZB 13492 (Sungai Segati).

Distribution.- Sundaland, Indochina.

Roberts (1989) p. 150; Kottelat *et al* (1993) p.97.



***Silurichthys hasseltii* (Bleeker, 1858)**

Local name.- Kuro.

Material examined.- MZB 13464 (Sungai Batu Panggal); MZB 13547 (Sungai kecil di belakang camp anak sungai Mamahan).

Distribution.- Borneo W., Jawa, Malaya.

Weber and De Beaufort (1913) p. 198; Roberts (1989) p. 151; Kottelat *et al* (1993) p. 98.

***Wallago attu* (Bloch and Schneider, 1801)**

Local name.- Tapah.

Material examined.- MZB 13452 (Sungai Toro).

Distribution.- Sumatra, Jawa, Malaya, Indochina, India.

Weber and De Beaufort (1913) p. 201; Smith (1945) p. 332 (*Wallagonia attu*); Kottelat *et al* (1993) p. 99.

**Akysidae*****Breinstenia hypselurus* (Ng and Siebert, 1998)**

(Photo by G.W. Dewantoro)

Local name.- Ikan beliung

Material examined.- MZB 13568 (Sungai Bukit Panggal); MZB 13569 (Sungai Toro).

Distribution.- Sumatra, Kalimantan

Ng and Siebert (1998) p. 650

***Leiocassis fuscus* (Popta, 1904)**

Local name.- Copu.

Material examined.- MZB 13473 (Sungai Segati); MZB 13533 (Sungai Bukit Panggal).

Distribution.- Borneo, Malaya.

Weber and De Beaufort (1913) p. 353; Kottelat *et al* (1993) p. 88.

***Leiocassis micropogon* (Bleeker, 1852)**

Local name.- Baung pisang.

Material examined.- MZB 13431,13534 (Sungai Bukit Panggal).

Distribution.- Sumatra, Borneo, Malaya.

Weber and De Beaufort (1913) p. 357; Roberts (1989) p.117; Inger and Chin (1990) p. 144; Kottelat *et al* (1993) p. 89.

**Clariidae*****Clarias leiacanthus* (Bleeker, 1851)**

Local name.- Lemat.

Material examined.- MZB 13563 (Anak Sungai Mamahan).

Distribution.- Sumatra, Nias, Borneo.

Weber and De Beaufort (1913) p. 192; Smith (1945) p.350; Roberts (1989) p. 127; Kottelat *et al* (1993) p. 108.

**Chacidae*****Chaca bankanensis* (Bleeker, 1852)**

(Photo by D.M. Prawiradilaga)

Local name.- Ikan beliung.

Material examined.- photo above (tributary of Sungai Mamahan)

Distribution.- Sumatra, Kalimantan, Malaya.

Weber and De Beaufort (1913) p. 246 (*Chaca chaca*); Roberts (1989) p. 143; Kottelat *et al* (1993) p. 109.

**Belonidae*****Xenontodon canciloides* (Bleeker, 1853)**

Local name.- Toda.

Material examined.- MZB 13462 (Sungai Batu Panggal)

Distribution.- Sumatra, Borneo, Malaya.  
 Weber and De Beaufort (1922) p. 133; Smith (1945) p. 428; Roberts (1989) p.153; Kottelat *et al* (1993) p. 124.

#### Hemirhamphidae

##### *Hemirhamphodon pogonognathus* (Bleeker, 1853)

Local name.- Julung-julung.

Material examined.- MZB 13405 (Sungai Sangkalalo); MZB 13414, 13519 (Sungai Sawan); MZB 13416, 13457 (Sungai Batu Panggal); MZB 13527 (Sungai Kesawan); MZB 13535 (Sungai Bukit Panggal, Riau); MZB 13546 (Sungai kecil di belakang camp anak Sungai Mamahan).

Distribution.- Sundaland (tetapi tidak termasuk Sarawak dan Sabah).

Weber and De Beaufort (1922) p. 144; Roberts (1989) p.155; Kottelat *et al* (1993) p. 120.

#### Mastacembelidae

##### *Macrognathus aculeatus* (Bloch, 1786)

Local name.- Sigombu.

Material examined.- MZB 13463 (kolam dekat Sungai Batu Panggal); MZB 13497 (Anak Sungai Segati).

Distribution.- Sumatra, Borneo, Jawa, Peninsular Thailand, Malay Peninsula.

Smith (1965) p. 61; Roberts (1989) p.180; Kottelat *et al* (1993) p. 232.

##### *Macrognathus maculates* (Cuvier, 1831)

Local name.- Tilan.

Material examined.- MZB 13422 (Sungai Toro); MZB 13425 (Sungai Sawan); MZB 13528 (Sungai Bukit Panggal).

Distribution.- Sumatra, Borneo, Jawa, Thailand, Malay Peninsula.

Weber and de Beaufort (1962) p. 428 (*Mastacembelus maculates*); Smith (1945) p. 63 (*Mastocembelus maculates*); Kottelat *et al* (1993) p. 232.

#### Pristolepidae

##### *Pristolepis fasciata* (Bleeker, 1851 )

Local name.- Batung.

Material examined.- MZB 13420, 13423 (Sungai Toro); MZB 13471, 13485, 13490 (Sungai Segati).

Distribution.- Sundaland, Indochina, Burma dan India.

Weber and de Beaufort (1936) p. 480 (*Pristolepis fasciatus*); Smith (1945) p. 487 (*Pristolepis fasciatus*); Kottelat *et al* (1993) p. 169.

#### Belontiidae

##### ***Bellontia hasseltii* (Cuvier in Cuvier and Valenciennes, 1831)**

Local name.- Kepar.

Material examined.- MZB 13482 (Sungai Segati).

Distribution.- Sumatra, Borneo, Jawa, Malay Peninsula.

Weber and de Beaufort (1936) p. 338; Roberts (1989) p. 171; Kottelat *et al* (1993) p. 223.

##### ***Betta edithae* (Vierke, 1984)**

Local name.- Tempalo/cupang.

Material examined.- MZB 13495 (Anak Sungai Segati); MZB 13550 (Sungai kecil di belakang camp anak Sungai Mamahan); MZB 13560 (Anak Sungai Mamahan, Riau).

Distribution.- Borneo S.W., South and East Sumatra, Malaya.

Roberts (1989) p. 173 (*Betta cf taeniata*); Kottelat *et al* (1993) p. 224.

##### ***Betta fusca* (Regan, 1910)**

Local name.- Tempalo/cupang.

Material examined.- MZB 13496 (Anak Sungai Segati); MZB 13561 ( anak Sungai Mamahan).

Distribution.- Sumatra.

Weber and de Beaufort (1922) p. 356; Kottelat *et al* (1993) p. 225.

##### ***Sphaerichthys osphromenoides* (Canestrini, 1860)**

Local name.- Tampe-tampe.

Material examined.- MZB 13520 (Sungai Sawan).

Distribution.- Sumatra. Borneo W., Malaya.

Weber and de Beaufort (1922) p. 349; Roberts (1989) p.176; Kottelat *et al* (1993) p. 228.

#### Luciocephalidae

##### ***Luciocephalus pulcher* (Bleeker, 1851)**

Local name.- Tumbukbane.

Material examined.- MZB 13537 (Sungai Bukit Panggal).

Distribution.- Sumatra. Borneo, Malaya.

Weber and de Beaufort (1922) p. 369; Roberts (1989) p. 178; Kottelat *et al* (1993) p. 219.

### Channidae

#### ***Channa lucius* (Cuvier in Cuvier and Valenciennes, 1831)**

Local name.- Pelumpung.

Material examined.- MZB 13435 (Sungai Toro); MZB 13454 (Sungai Batu Panggal); MZB 13472 (Sungai Segati).

Distribution.- Sundaland.

Weber and de Beaufort (1922) p. 326 (*Ophiocephalus lucius*); Smith (1945) p. 472 (*Ophicephalus lucius*); Roberts (1989) p. 170; Kottelat *et al* (1993) p. 230.

#### ***Channa striata* (Bloch, 1793)**

Local name.- Toman padi.

Material examined.- MZB 13404 (Sungai Sangkalalo); MZB 13407 (di habitat kolam di Sungai Batu Panggal); MZB 13438 (Sungai Air sawan); MZB 13498 (Anak Sungai Segati); MZB 13562 (Anak Sungai Mamahan); MZB 13566 (Sungai Segati); MZB 13567 (Sungai Toro).

Distribution.- Sundaland, Sulawesi, Lesser Sundas, Moluccas, India, Indochina, China.

Weber and de Beaufort (1922) p. 317 (*Ophiocephalus striatus*); Smith (1945) p. 468 (*Ophicephalus striatus*); Roberts (1989) p. 170; Inger and Chin (1990) (*Ophiocephalus striatus*); Kottelat *et al* (1993) p. 230.

## DISCUSSION

### Biodiversity

Fifty fish species were found belonging to 31 genera, 16 families and 4 orders, 18 species of which are of the families Cyprinidae, 5 species of Bagridae, 4 species of Belontiidae and 4 species of Siluridae. Fishes which tolerate the low oxygen content of the water are the Chaniid, Clariid and Belontiid group because they have an additional respiratory chamber on their gill structure. Compared with other freshwater fish fauna of lowland forested stream in other areas such as Batam and Bintan islands (Ng and Kelvin, 1994; Tan and Tan, 1994), the waters of the survey area shared 11 (22 %) and 14 species (28 %) respectively. Neither endemic fishes nor fishes belonging to IUCN 2001 threatened species (Wargasasmita, 2002), the Government Gazette No 7, 1999, CITES listing were found in this area.

Species that could be categorized as rare such as *Breinsteinea* and *Chaca* were found ( Fig 1 and Fig. 2) The population of the fishes is low since just one or a few individuals can be found in one sampling site. It appears that these fishes can conceal themselves from the surrounding environment. The color of the live or fresh preserved specimens as well as the body form resemble the litters on the bottom of the stream. These fishes dwell on the bottom of the tributaries of the forested stream with more or less 4 m wide, in sites where the litter or detritus is abound. The habitat of the fishes has clay, gravelly and stony bottom with yellowish- brown water color and slow current. These fishes were caught by electric fishing and hook and line respectively.

The diversity is relatively high as indicated by the number of species (50 species) and number of families (16 familia), as well as the average diversity index (0.883). This is attributable to the condition of the forest along the rivers that is relatively dense and the condition of the water is still pristine. The presence of Rasboriid, Hemirhamphiid, Belontiid and other fishes that obligate to live in swamp forest stream corroborate the healthy condition of this swamp ecosystem. *Rasbora bankanensis* is the most abundant. *Rasbora* group, which is known as detritus feeder and vegetation material, more important component than fitoplankton chain on the tropic structure on the swamp ecosystem (Hartoto *et al*, 1999). It is also found in Malaysian water where *Rasbora* is abound in acid water, unproductive forested stream and black water (Lowe-McConnel, 1975).

#### **Fisheries and Fishes which have economic potential**

Usually people in the area have known fisheries well. It is reflected by the knowledge of the existing fish name, the way of fishing and the season of migration. The fishing gear mostly used is hook and line which is usually operated in a series at night (at the dusk until dark). It is performed by utilizing of the food habit and the time activity of the target fishes. Lemat, *Clarias* sp. is used as suitable prey for in angling fishing of Toman, *C. micropeltes*. To fish Baung, *Hemibagrus nemurus*, Rasboriid fishes were used as bait. The use of root of certain plant is used to poison fishes in this area.

There are three groups of fishes are potentially of economic importance i.e. as ornamental fishes, food fishes, and sport fishes. Ornamental fishes known as trade commodity from this area are Ikan Segi Tiga, *Rasbora heteromorpha*, Bada Mayang, *R. cephalotaenia*, Pantau Banau, *R. caudimaculata*, and Pantau Kuning/Pantau Beras, *R. trilineata*. The others are

Selusur Batang, *Epalzeorhynchus kallopterus*, Jalai, *Channa micropeltes*, and Ikan Beliang, *Chacha bankanensis*.

Food fishes known from this area are Baung, *Hemibagrus nemurus*, Chaniid fishes: *Channa striata*, *C. lucius*, *C. micropeltes*; Lemat, *Clarias* sp.; Selais, *Ompok hypopthalmus*, and Subhan; *Cyclocheilichthys apogon* and *C. armatus*.

A lot of fishes in the area could be generated for sport fishing. For example, *Channa micropeltes* besides being delicious food fish, also can be used as sport fish. Ng and Lim (1990) reported that many angling ponds in Singapore was intentionally introduced this fish for sport. As for other ornamental fishes, Indonesia is known as a supplier of *Channa micropeltes* for Singapore market beside Peninsular Malaysia (Ng and Lim, 1990). *Hampala microlepidota*, *Cyclocheilichthys* spp., *Hemibagrus nemurus*, *Wallago attu* are other examples that could be used for sport fishing local people are used to perform this activity.

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