

**GASTROMYZON EMBALOHENSIS, A NEW SPECIES OF  
SUCKER LOACH (TELEOSTEI: BALITORIDAE) FROM THE  
BENTUANG KARIMUN NATIONAL PARK,  
WEST KALIMANTAN, INDONESIA**

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**ABSTRACT.** - *Gastromyzon embalohensis* is described from the middle Embaloh and Mendalam Rivers in the Bentuang Karimun National Park of West Kalimantan, Indonesia. It is distinguished from other species of *Gastromyzon* by the combination of the following: absence of scales on the abdomen, angular gill opening, absence of postoral pouch, uniformly brownish body with white vermiculation on head and predorsum, presence of subopercular groove, snout profile gently sloping in front of the nasal opening, and pectoral fin usually not overlapping pelvic fin.

**KEYWORDS.** - New species, *Gastromyzon embalohensis*, Kapuas Basin, West Kalimantan.

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**INTRODUCTION**

The genus *Gastromyzon* consists of small fishes with a relatively wide head, a broadly rounded snout, tapered body, inferior mouth and flattened abdomen with pelvic fins united to each other posteriorly to form a suction disk. The latter feature reflects a morphological adaptation to coping with swift currents by enabling the fish to adhere onto stony substrates. The tribe Gastromyzontini occurs in China, Vietnam, and Borneo, but the genus *Gastromyzon* is endemic to Borneo (Inger & Chin, 1961; Roberts, 1982, 1989).

Until 1953, *Gastromyzon* was regarded as monotypic (Silas, 1953), with only *G. borneensis* Günther. Since then, nine additional species have been added. Inger & Chin (1961) described *G. punctulatus* and *G. fasciatus*. Roberts (1982) described *G. contractus*, *G. ctenocephalus*, *G. ridens*, *G. lepidogaster*, *G. megalepis* and recognized *G. monticola* (Vaillant) as valid. *G. monticola* was considered by Weber & de Beaufort (1916) as a synonym of *G. borneensis*. Recently, Chin & Inger (1989) described *G. danumensis*. During a series of ichthyological

surveys in the middle Embaloh and Mendalam Rivers in the Bentuang Karimun National Park, a new species of *Gastromyzon* was collected. Described in the present paper, it brings the total number of recognized *Gastromyzon* species to eleven.

## MATERIAL AND METHODS

Specimens were collected with electrofishing gear (10 A, 12 volt) and a dipnet (mesh size 1 mm) from 14 localities: two along the Embaloh River, six along streams (= Sungai) flowing directly into the Embaloh River, four along the Sungai Peyang and its tributaries, and two along the tributaries of the Sungai Tekelan (Figure 3).

Specimens were fixed in 4% formalin in the field and transferred to 76% ethanol for long-term preservation. Measurements follow that of Hubbs & Lagler (1976). Anatomical terms follow Roberts (1982). Specimens are deposited in the Museum Zoologicum Bogoriense, Indonesia (MZB); Zoological Reference Collection, National University of Singapore (ZRC); The Natural History Museum, London (BMNH) and The National Museum of Natural History, Washington, D.C. (NMNH).

## TAXONOMY

### *Gastromyzon embalohensis*, new species

(Figs. 1 & 2)

**Material examined.** - Holotype. MZB 9205, 42.48 mm SL, unnamed small, high gradient stream near its confluence with Sungai Tekelan, tributary of the Embaloh River (ca. 126°646'N, 11228'196"E, 130 m above sea level), coll. I. Rachmatika et al., 25 Jun.1996.

Paratypes. MZB 9206, 7 ex., 21.21-33.68 mm SL, lower part of Sungai Aur, tributary of Embaloh River, coll. I. Rachmatika et al., 3 Dec.1996; MZB 9207, 2 ex., 27.48-29.50 mm SL, lower part of Sungai Sabong, tributary of Sungai Tekelan, coll. I. Rachmatika et al., 22 Nov.1996; MZB 9208, 1 ex., 25.44 mm SL, lower part of Sungai Tungun, tributary of Embaloh River, coll. D. Wowor et al., 15 Dec.1996; MZB 9209, 3 ex., 33.46 mm SL, 750 m upstream of an unnamed small, high gradient tributary of Sungai Peyang, coll. I. Rachmatika et al., 4 Dec.1996; MZB 9210, 1 ex., 35.50 mm SL, Embaloh River near mouth of Sungai Tekelan, coll. I. Rachmatika et al., 28 Nov.1996; ZRC 42981, 1 ex., 29.78 mm SL, Sungai Sabong, tributary of Sungai Tekelan, coll. I. Rachmatika et al., 23 Nov.1996; BMNH 1997.9.16.1, 1 ex., 32.74 mm SL, Sungai Yatapang, tributary of Embaloh River, coll. I. Rachmatika et al., 23 Nov.1996; NMNH uncat, 1 ex., 24.98 mm SL, same data as preceding.

Others (Non type). MZB 9211, 1 ex., 39.71 mm SL, Embaloh River near mouth of Sungai Tungun, coll. I. Rachmatika et al., 27 Nov.1996; MZB 9212, 1 ex., 21.70 mm SL, Sungai Jot, tributary of Embaloh River, coll. I. Rachmatika et al., 3 Dec.1996; MZB 9213, 1 ex., 30.30 mm SL, lower part of Sungai Peyang, tributary of Embaloh River, coll. I. Rachmatika et al., 5 Dec.1996; MZB 9214, 1 ex., 26.63 mm SL, lower part of Sungai Labu, tributary of Embaloh River, coll. I. Rachmatika et al., 29 Nov.1996; MZB 9215, 1 ex., 29.31 mm SL, Sungai Engkauk, tributary of Embaloh River, coll. D. Wowor et al., 14 Dec.1996; MZB 9217, 1 ex., 30.17 mm SL, Sungai Santu, tributary of Sungai Tekelan, coll. I. Rachmatika et al., 24 Nov.1996; MZB 9447, 36 ex., 27.92-58.56 mm SL, Sungai Pait, coll. I. Rachmatika et al., 13 & 15 Sep.1997; MZB 9448, 3 ex., 29.57-36.88 mm SL, Sungai Dajo, coll. I. Rachmatika et al., 23 Sep.1997; MZB 9449, 10 ex., 26.43-44.67 mm SL, Sungai Tungun, coll. I. Rachmatika et al., 23 Sep.1997; MZB 9450, 4 ex., 24.92-41.51 mm SL, Sungai Gong, coll. I. Rachmatika et al., 24 Sep.1997; MZB 9451, 10 ex., 32.28-42.33 mm SL, Sungai Jacket, coll. I. Rachmatika et al., 19 Sep.1997; MZB 9452, 4 ex., 22.82-39.91 mm SL, Sungai Ange, coll. I. Rachmatika et al., 20 Sep.1997; MZB 9453, 9 ex., 20.54-38.49 mm SL, Sungai Tekelan, coll. I. Rachmatika et al., 7 Sep.1997; MZB 9454, 1 ex., 30.20 mm SL, Sungai Tawang, coll. I. Rachmatika

et al., 16 Sep.1997; MZB 9455, 25 ex., 20.86-45.47 mm SL, Sungai Pajau, coll. I. Rachmatika et al, 6 Sep.1997; MZB 9456, 5 ex., 24.51-43.70 mm SL, Sungai Mendalam, coll. D. Wowor et al., 24 May.1998; MZB 9457, 4 ex., 45.33-62.19 mm SL, Sungai Habunut, coll. I. Rachmatika et al., 7 May.1998; MZB 9458, 10 ex.,31.75-50.63 mm SL, Sungai Begatan, coll. D. Wowor et al., 23 May.1998; MZB 9459, 7 ex., 26.23-46.72 mm SL, Sungai Jepala I, coll. I. Rachmatika et al., 8 May.1998; MZB 9460, 3 ex., 36.68-46.60 mm SL, Sungai Lebang Ajem, coll. I. Rachmatika et al., 6 May.1998; MZB 9461, 1 ex., 30.82 mm SL, Sungai Sebang Ke, coll. D. Wowor et al., 21 May.1998; MZB 9462, 2 ex., 28.05-39.47 mm SL, Sungai Jepala II, coll. I. Rachmatika et al., 8 May.1998; MZB 9463, 1 ex., 56.44 mm SL, Sungai Nyampi, coll. I. Rachmatika et al., 7 May.1998; BMZB 9464, 3 ex., 29.42-42.20 mm SL, Sungai Haloi, coll. I. Rachmatika et al., 6 May.1998; MZB 9465, 1 ex., 37.04 mm SL, Sungai Otang, coll. I. Rachmatika et al., 6 May.1998; MZB 9466, 1 ex., 31.33 mm SL, Sungai Harongon, coll. I. Rachmatika et al., 7 May.1998.

**Diagnosis.** - *Gastromyzon embalohensis* is distinguished from its congeners by a combination of the following characters: scales absent on abdomen, gill opening angular, postoral pouch absent, body uniformly brownish with white vermiculation on head and predorsal surface, subopercular groove present but discontinuous, snout broadly rounded and gently sloping downwards in front of the nasal opening, pectoral fin not overlapping pelvic fin.

**Description.** - General morphological aspect shown in Figure 1. Morphometric proportions and meristic counts shown in Tables 1 and 2 respectively. Dorsal fin rays ii.8-9 (ii.9), pectoral fin rays i.24-29 (i.27), pelvic fin rays i.20-24 (i.24), anal fin rays ii.5-6 (ii.5), caudal fin rays: 10-14 (12) unbranched, 10-14 (14) branched (data from holotype in parentheses). Body depressed, tapered posteriorly. Head relatively wide, with white vermiculation extending to the predorsal surface. Snout broadly rounded, gently sloping downwards in front of the nasal opening (Figure 2a). Subopercular groove present, discontinuous. Anteriormost part of snout with scarce to dense concentration of conical tubercles on all specimens examined (21.70-58.85 mm). Rostral and maxillary barbels well-developed, mandibular barbels small. Papilla on lower lip in two or three rows. In most specimens including the holotype, pectoral fin reaches pelvic fin, pelvic fin not reaching anal fin. Caudal fin truncate, slightly sloping downward (Figure 2b). Anal fin tapering. In all specimens examined, the abdomen is naked,

Table 1. Morphometric data for *Gastromyzon embalohensis* presented as percentage of standard length.

	Holotype MZB 9205	Variation within <i>G. embalohensis</i> (N=24)	
		Range	Mean SE
Standard length (in mm)	42.48	21.21 - 42.48	29.42 ± 0.92
Total length	126.62	123.98 - 131.38	127.79 ± 0.40
Body depth	23.73	14.94 - 25.79	19.27 ± 0.57
Body width1)	23.87	21.47 - 25.59	23.41 ± 0.28
Head length	28.48	28.18 - 31.58	30.06 ± 0.22
Snout length	18.34	16.61 - 20.95	18.91 ± 0.22
Orbit diameter	4.42	4.45 - 6.68	5.33 ± 0.12
Interorbital width	13.46	12.69 - 15.70	13.40 ± 0.16
Caudal peduncle length	9.56	8.10 - 13.55	10.36 ± 0.25
Predorsal length	56.54	50.06 - 60.77	54.91 ± 0.47
Preanal length	86.18	83.75 - 88.26	84.67 ± 0.34
Prepectoral length	15.51	17.04 - 38.48	20.06 ± 0.82
Length of the longest caudal fin ray	25.45	23.59 - 38.48	26.79 ± 0.59
Vertebrae	36	32 - 34	

1) from posterior base of pectoral fin

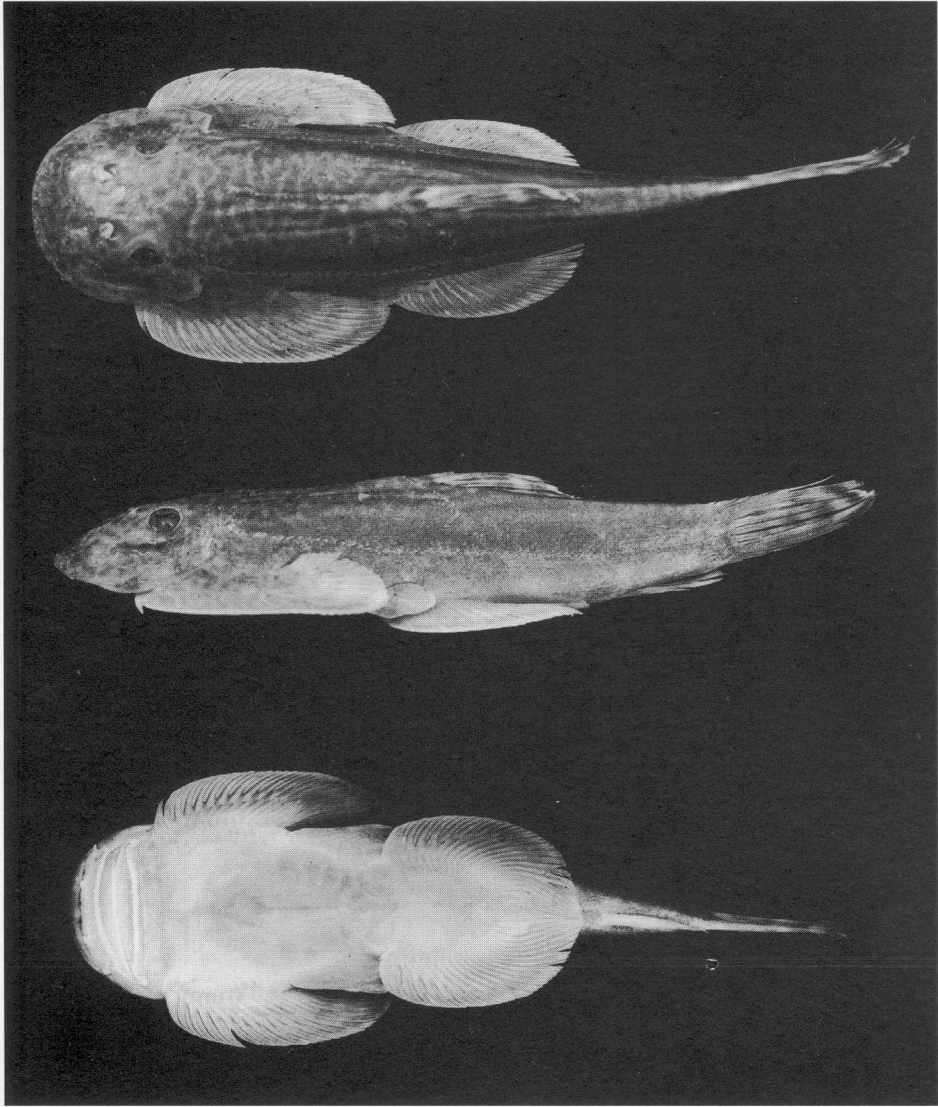


Fig. 1. Dorsal, lateral and ventral views of *Gastromyzon embalohensis* (holotype: MZB 9205, 42.48 mm SL).

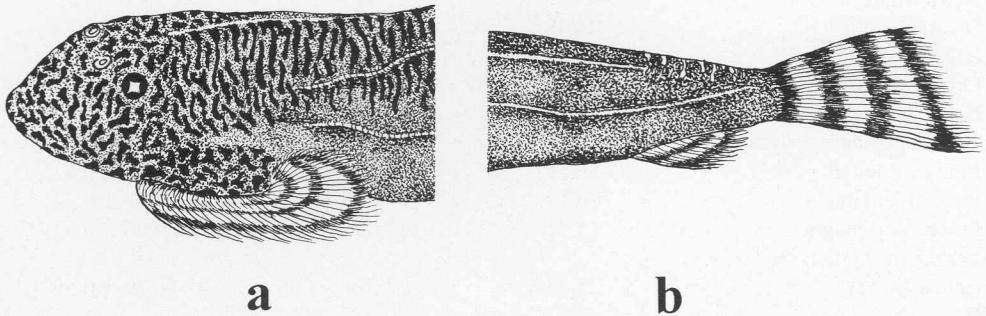


Fig. 2. View of snout (a) and tail (b) of *Gastromyzon embalohensis*.

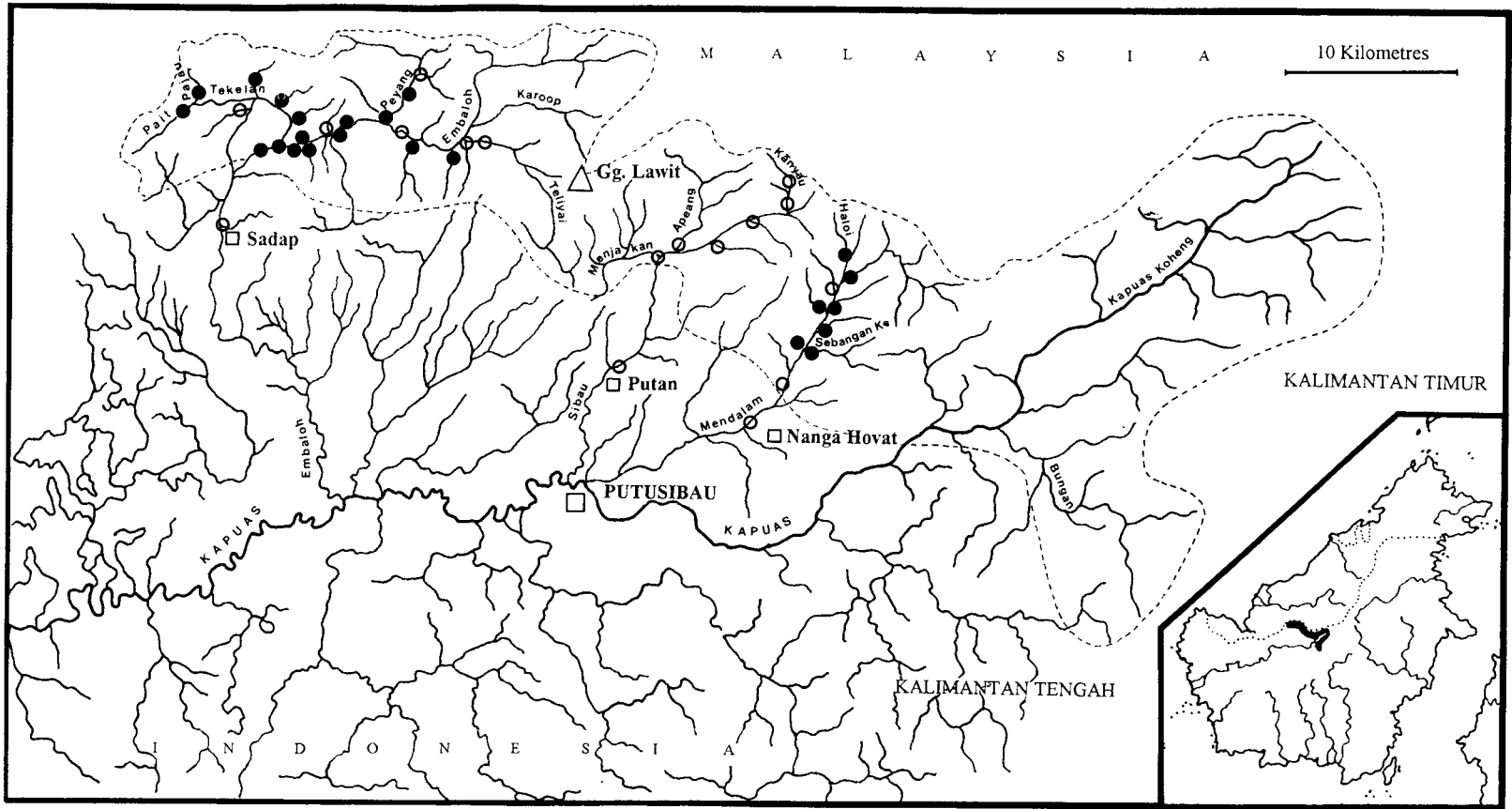


Fig. 3. Map of drainages in the Bentuang Karimun National Park, West Kalimantan, showing collecting sites (circles) and sites in which *Gastromyzon embalohensis* were collected (black circle). Interrupted line represent boundary of National Park. Inset: map of Borneo showing location of Bentuang Karimun National Park (darkened area).

Table 2. Meristic counts and qualitative characters of *G. embalohensis* and ten other species of *Gastromyzon*. Apart from *G. embalohensis*, data for *G. danumensis* from Chin & Inger (1989), data for all other *Gastromyzon* spp. from Roberts (1982).

	<i>embalohensis</i> (N = 24)		<i>borneensis</i>	<i>contractus</i>	<i>ctenocephalus</i>	<i>fasciatus</i>	<i>megalepis</i>	<i>monticola</i>	<i>punctulatus</i>	<i>ridens</i>	<i>lepidogaster</i>	<i>danumensis</i>
	range	meanSE										
Scales in lateral line	57-66	61.66±0.53	51-62	52-63	50-60	55-68	44-48	55-58	58-59	56-78	54-62	48-58
Predorsal scales	32-47	40.42±0.99	at least 40	36-44	32-60	40-55	24-28	±40	40-42	32-52	39-42	20-30
Scales above lateral line	17-24	20.91±0.30	20	16-20	15-20	20-23	11-12	20	21-22	15-26	16-20	14-18
Caudal peduncle scales	27-39	33.20±0.60	28-32	25-30	28-30	30-43	20-21	30-32	±33	30-40	30-32	20-26
Gill opening	Angular		Vertical	Slightly angular	Strongly angular	Angular	Vertical	Vertical	Slightly angular	Vertical	Vertical	Vertical
Postoral pouch	Absent		Present	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent
Subopercular groove	Present		Absent	Present	Present	Present	Absent	Absent	Present or absent	Absent	Absent	Present or absent
Secondary rostrum	Absent		Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present
Colour on body and Head	Uniformly brownish on body with vermiculations on head and predorsum.		Body with irregular hexagonal or pentagonal figures.	Body with irregular hexagonal or pentagonal figures.	Body uniformly pale brownish.	Body with narrow, vertical white bars.	Posterior part of body brownish or mottled.	Dorsal surface of head brownish with irregular hexagonal or pentagonal figures.	Body uniformly brownish.	Dorsal and lateral surface of head and body with small, pale, round spots	Body brownish or with thin vertical bars.	Without distinct markings.
Scales on belly	Absent		Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present	Present

although its finely granular surface may appear to scale-covered. Lateral line well-marked, extending to base of caudal fin, with 57-66 pores. Suprapelvic flap present in all specimens. Vertebral counts in 17 examples: 32-34.

**Colour.** - In life, the back and sides of the body are uniformly brownish-black, fins yellow or red with two dusky vertical bands on the dorsal fin; dorsal fin with a tiny black spot on anterior base; a faint vertical band on the anal fin; one to three dusky cross-bands on the caudal fin; two dusky longitudinal bands on the pectoral and ventral fins. Mature females have bright yellow fins, while those of mature males are bright red. Specimens preserved in 76% ethanol have the body uniformly brownish-black, while the fins are whitish with blackish bands.

**Biological notes.** - Examination of gut contents from five specimens shows that this fish feeds on green algae and desmids. The thin and highly coiled intestine is 2.13-2.53 (mean 2.3) times the fish's standard length. Most specimens collected between 6 and 24 September 1997, prior to the raining season, were sexually mature. Six females (54.40- 58.85 mm SL), were found with 654 to 1431 eggs. The diameter of the eggs varies from 0.58 to 0.85 mm. White, elongated testis was noted in six males (41.38-46.42 mm SL).

**Ecological notes.** - This species mostly inhabits streams with steep gradient. Most streams in which the new species occur are directly connected to the Embaloh River. *Gastromyzon embalohensis* was taken in shallow (up to a depth of 75 cm), clear, swift water, over an even substrate of stones some 20 to 50 cm in diameter. Sungai Aur, from which the most specimens were collected, has the following ecological characteristics: water up to 50 cm deep, average dissolved oxygen 6.8 mg/l, average pH 5.54, water velocity 0.17-0.60 m/sec., uniform bedrock forms a large portion of the substrate. In this habitat, *G. embalohensis* is syntopic with the cyprinids *Schismatorhynchus heterorhynchus*, *Garra borneensis*, *Paracrossochilus acerus*, *Osteochilus microcephalus*, *Lobocheilos* cf. *kahajanensis* and the cobitid *Botia hymenophysa*. The holotype was obtained from the shallow part (up to 75 cm deep) of a pool in a high gradient stream (5-6 m wide) over rocky and gravel substrate, in clear and swift water. Dissolved oxygen and pH at the site were 5.9 mg/L and 6.65 respectively.

**Distribution.** - *Gastromyzon embalohensis* is presently known only from the middle Embaloh and Mendalam Rivers of the Kapuas Basin in West Kalimantan (Figure 3).

**Etymology.** - Named after its type locality, the Embaloh River.

## DISCUSSION

*Gastromyzon embalohensis* differs from its congeners (see Table 2) in having a naked abdomen, an angular gill opening, a discontinuous subopercular groove and no secondary rostrum. *G. lepidogaster*, *G. megalepis*, and *G. danumensis* have a vertical gill opening. In addition, *G. lepidogaster* and *G. megalepis* lack a subopercular groove and *G. danumensis* has a secondary rostrum. *G. lepidogaster* and *G. danumensis* have scales on their abdomen. *G. borneensis* has a secondary rostrum and a postoral pouch (both absent in *G. embalohensis*), *G. contractus* has a snout that slopes abruptly downwards in front of the eye (slopes gently downwards in *G. embalohensis*), males of *G. ctenocephalus* possess ctenoid tubercles (tubercles not ctenoid in *G. embalohensis*) on the head and pectoral fin base, *G. fasciatus* has thin vertical white lines on the side of the body (body uniformly brown in *G.*

*embalohensis*), *G. monticola* possesses a postoral pouch and a vertical gill opening (postoral pouch absent and gill opening angular in *G. embalohensis*), *G. punctulatus* has a truncate snout (snout rounded in *G. embalohensis*), and *G. ridens* has the sublacrimal groove extending onto the side of the head (sublacrimal groove confined to ventral surface of the head in *G. embalohensis*).

There is variation in number of dusky vertical bands on the caudal fin, and in the coloration of the anus and the anal fin in *G. embalohensis* that is apparently attributable to ontogenetic change. In smaller specimens (less than 30 mm) the number of dusky bands on the caudal fin is one to two; in larger specimens however, there are three. The color of the anus and anal fin base is white on specimens less than 25 mm, and blackish on specimens over 25 mm.

The local vernacular name for *Gastromyzon embalohensis* is 'ikan pelekat', of which 'pelekat' in Tamambaloh, Iban and Kantu languages means 'clinger onto substrate'.

**Comparative material.** - *Gastromyzon fasciatus* - MZB 3451, 1 ex., 24.5 mm SL, Sungai Telebian, tributary of Sungai Pinoh, 19 km south of Nanga Pinoh, West Kalimantan, coll. T. R. Roberts, 22 Jul.1976; MZB 3452, 1 ex., 44.7 mm SL, Sungai Sekumpai, tributary of Sungai Pinoh, 23 km from Nanga Pinoh, Kalimantan Barat, coll. T. R. Roberts, 23 Jul.1976; *Gastromyzon ridens* - MZB 3455, holotype, 50 mm SL, Sungai Pinoh, 20-60 km south of Nanga Pinoh, Kalimantan Barat, coll. T. R. Roberts & Soetikno, 22-26 Jul.1976; *Gastromyzon contractus* - MZB 3447, holotype, 34.4 mm SL, Sungai Telebian, tributary of Sungai Pinoh, 19 km south of Nanga Pinoh, coll. T. R. Roberts & Soetikno, 22 Jul.1976.

### ACKNOWLEDGEMENTS

I thank Dr. Herwasono Soedjito, project leader of WWF/IP of the Bentuang Karimun National Park and staff, who invited me to conduct ichthyological surveys in the Embaloh and Sibau River systems. I am grateful to Dr. D. J. Siebert (BMNH) and Dr. S. Wirjoatmodjo (MZB) for commenting on the manuscript, to Mr. A. H. Tjakrawidjaja (curator of the Fish Section at MZB) who helped me prepare specimens of *Gastromyzon* under his care, to Bapak Sodek, Bapak Majid, D. Wowor, D. I. Hartoto, C. Leh, I. Wong, S. Shaky, Ketuan and M. Jawa for assistance in the field. Thanks also to Ng Heok Hee for taking the x-ray photograph, and to A. Supriatna and Yanuar for the photographs and illustrations. Funding for this research was granted by the International Tropical Timber Organization (ITTO) through ITTO Project PD 26/93 to the Indonesian Department of Forestry as implemented by the WWF Indonesian Programme.

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