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# FIRST RECORD OF THE CYPRINID FISH, *ONYCHOSTOMA GERLACHI* (CYPRINIFORMES: CYPRINIDAE), FROM THE NAN RIVER BASIN OF THE CHAO PHRAYA RIVER SYSTEM, NORTHERN THAILAND

*Amornchai Lothongkham[1*] and Prachya Musikasinthorn[1]*

ABSTRACT

A cyprinid fish, *Onychostoma gerlachi* was collected from the Nan River basin of the Chao Phraya River system, northern Thailand for the first time and described herein in detail. The species has been known previously only from Hong Kong, the Nanpanjiang basin of the Pearl River system in southern China through the Mekong basin in Yunnan of southern China and Laos. A distributional pattern of the species supports a previously proposed hypothesis, past drainage connections between the upper Nan River and the Mekong River.

Key words: Cyprinidae, *Onychostoma gerlachi*, Nan River, Chao Phraya River, Mekong River, Zoogeography.

## INTRODUCTION

The Asian cyprinids genus *Onychostoma* Günther 1896 is characterized by a broad, inferior, almost horizontal mouth, with a cornified cutting edge on a lower jaw (so-called "sector mouth"); a lateral groove running from a snout to an angle of a mouth; and 8 or 9 branched dorsal fin rays (BANARESCU, 1971; CHEN, 1989; KOTTELAT, 2001a, b; SHAN *ET AL.*, 2000). The genus is distributed in mountain streams from Hong Kong, the Pearl, Hwuang Ho and Yangtze River basins and Hainan Island of China, Taiwan, the Red River basin in Vietnam to the Mekong River basin in China, Laos and Cambodia, with 17 valid species (BANARESCU, 1971a, b, 1992; KOTTELAT, 2001a, b; SHAN *ET AL.*, 2000; TAKI, 1975). *Onychostoma gerlachi* (PETERS, 1880) is the most widely distributed species of the genus ranging from Hong Kong, the Nanpanjiang River basin of the Pearl River system in southern China, the Red River basin in northern Vietnam, the Nam Ma River basin in Laos to the Mekong River basin in Yunnan of southern China and Laos (PETERS, 1880; BANARESCU, 1971; KOTTELAT, 2001a, b).

[1]Department of Fishery Biology, Faculty of Fisheries, Kasetsart University, Chatuchak, Bangkok 10900, Thailand (e-mail: PM, ffispcm@ku.ac.th)

*Present address: Fisheries Department, Rajamangala University of Technology Lanna Nan. Phu Phieng, Nan 55000, Thailand
(e-mail: lek_amorn@yahoo.com)

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During a survey of fishes in the Nan River basin (a tributary of the Chao Phraya River) in Nan province of northern Thailand from 18 March 2003 to 30 July 2004, the first author collected specimens of a cyprinid fish, subsequently identified as *Onychostoma gerlachi* (Fig. 1). This is the first record of the species and also of the genus from the Chao Phraya River basin as well as Thailand. The specimens are now deposited in Research Laboratory of Ichthyology, Faculty of Fisheries, Kasetsart University (RLIKU) and described in detail below. The zoogeographic significance of the present record is also briefly discussed. Measurements and counts followed DOI & TAKI (1994). The method of counting vertebrae follows ROBERTS (1989).

## DESCRIPTION

Meristic and morphometric characters are shown in tables 1 and 2, respectively.

***Morphology.***—Body fusiform (depth 16.2–26.1% standard length [SL]), moderately compressed (width 10.9–15.7% SL), and relatively elongated posteriorly. Head small (length 22.8–27.2% SL). Eye large (diameter 27.4–35.0% head length). Snout prominent, rounded in lateral view, with a pendulous rostral fold on front and a lateral fold on each side. Mouth inferior, almost horizontal (Fig. 2a). Upper lip margin rounded, lower jaw margin nearly straight with a sharp cornified edge (Fig. 2a). A patch of tiny buds present at each corner of mouth. Lower lip restricted to each corner of mouth (Fig. 2a). A postlabial groove developed only at each corner of lower jaw. Rostral barbel tiny and blunt, present in between the rostral fold and lateral fold on each side (absent in some specimens). Maxillary barbel tiny, present at corner of each side of mouth (absent in some specimens) (from 41 examined specimens, 2 lack barbels entirely [60.6 and 71.6 mm SL], 1 possesses only maxillary barbels [95.8 mm SL], 25 possess only rostral barbels [51.1–96.8 mm SL] and 13 possess both maxillary and rostral barbels [57.2–93.5 mm SL] ). Eye with a narrow adipose lid present at anterior and posterior margins of orbit (Fig. 2a). Origin of dorsal fin anterior to pelvic fin origin. Last simple dorsal fin ray strong and serrated at posterior edge, with 11–14 serrations. Dorsal and anal fin margins emarginated. Pectoral fin slightly emarginated, inserted semi-horizontally and descending posteriorly. Pelvic fins slightly emarginated. Caudal fin strongly forked. Lateral line complete, running slightly downward on anterior portion of body and then running along middle of body side through caudal peduncle. Gill rakers on 1st gill arch 33–35, each triangle-shaped with many tiny finger-like projections at inner side (Fig. 2b). Pharyngeal teeth triserial, 2–3–5, each tooth pointed at top, slightly recurved mesially (Fig. 2c). Intestine running straight from esophagus toward the posterior end of abdominal cavity, then curving up in s-shaped loop toward the origin, then curving back toward the posterior end of abdominal cavity 3 time, then running to the posterior end of abdominal cavity and connect to the anus (Fig. 2d), (pattern G5'b sensu KAFUKU, 1997).

***Coloration.***—*When fresh* (based on transparency films of freshly dead specimens): Dorsal side of snout to nape and upper margin of orbit black. Cheek silver-gold. Single dark spot behind gill opening. Upper half of body darkish blue and lower half pale gold and whitish abdominally. Lateral line scales each possessing a darkish blue spot at base. Anterior half of scales on upper half of body each possessing a dark crescent mark. Dorsal

Figure 1. *Onychostoma gerlachi*, RLIKU 95, 86.9 mm SL, Yao River, Nae Nung Village, Tha Wang Pha, Nan Province, northern Thailand.

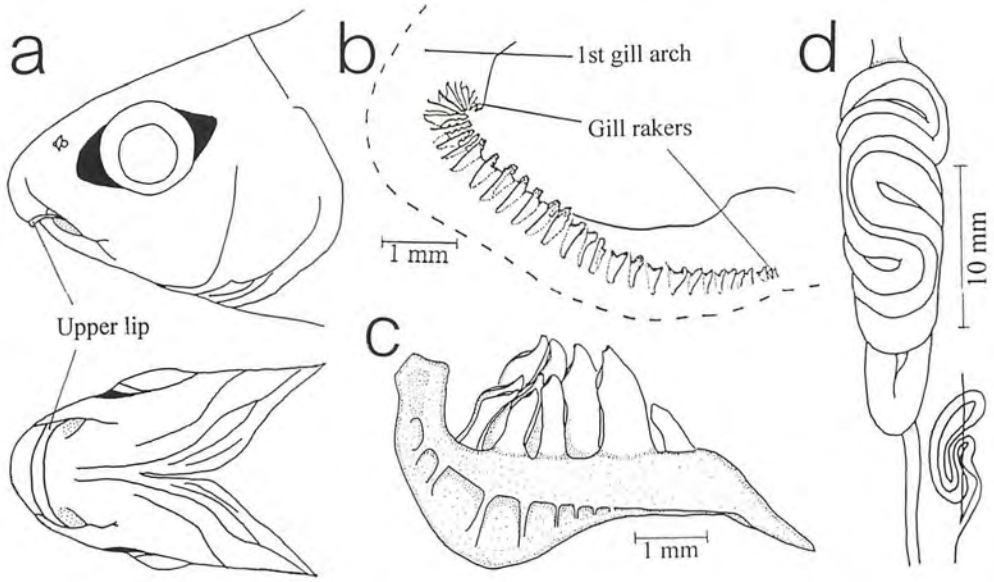


Figure 2. Some characters of *Onychostoma gerlachi*. a, lateral (above, RLIKU 96, 96.8 mm SL) and ventral (below, RLIKU 97, 92.3 mm SL) views of head showing adipose eyelid (in black), and lower lip (dotted regions); b, lateral view of the first gill arch(right side) (gill filaments omitted), RLIKU 97; c, ventro-mesial view of pharyngeal teeth (right side), RLIKU 97; d, ventral view of intestine loop with a coiling pattern shown as a diagram (lower right corner), RLIKU 98, 93.5 mm SL.

Figure 3. Collecting site of *Onychostoma gerlachi* at the Yao River, a tributary of the upper Nan River, Nae Nung Village, Tha Wang Pha, Nan Province, northern Thailand (19° 10' 26" N, 100° 46' 20" E).

fin rays pale yellow with blackish distal margin, membrane pale gray. Anterior margin of pectoral fin blackish, yellow on fin ray with blackish on membrane. Caudal fin yellow on rays, with blackish distal margin. Pelvic fin yellow and anal fin pale yellow, with somewhat blackish on membrane.

*In alcohol:* Similar to that of fresh condition except noted below. Upper half of body including head dark brown. Lower half of body including head pale brawn. All yellowish, silverly gold, bluish and whitish colors disappeared.

***Ecological notes.***—All specimens were collected from swift running clear mountain streams (width 5–15 m, depth 0.3–0.8 m, current 0.50–0.75 m/s) (Fig. 3). Bottom composed of gravel and coarse sand, most gravel with attached filamentous algae. The stomach of two specimens of *O. gerlachi*, RLIKU 33, 74.7 mm SL and RLIKU 28, 72.4 mm SL, contained pinnate diatoms (Order Bacillariales) (ca. 70% and 50% respectively) and filamentous algae (*Oscillatoria* spp., *Chaetophora* sp. and *Spirogyra* sp.) (ca. 30% and 50%, respectively). Other items observed in the stomach were mud and sand.

***Remarks.***—DOI & KOTTELAT (1998) wrote that distributional patterns of fish species or sister species pairs distributed in the Mekong basin and present in the Chao Phraya basin only in the upper Nan River, *Rhinogobius mekongianus, Hemimyzon* (*H. nanensis* in the upper Nan basin, *H. elongatus* in the Mekong basin of Yunnan) and *Sectoria* (*S. atriceps* in the upper Nan basin, *Sectoria* sp. in Xishuangbanna, suggest past drainage connections

Table 1. Meristic characters of *Onychostoma gerlachi* (N=41)

| | Frequencies* | Mean ± SD |
|---|---|---|
| Simple dorsal fin rays | 4 (41) | 4.0±0.0 |
| Branched dorsal fin rays | 8 (41) | 8.0±0.0 |
| Total pectoral fin rays | 17 (41) | 17.0±0.0 |
| Total pelvic fin rays | 8 (1), 9 (40) | 8.9±0.2 |
| Simple anal fin rays | 3 (41) | 3.0±0.0 |
| Branched anal fin rays | 5 (41) | 5.0±0.0 |
| Principal caudal fin rays (upper + lower) | 10+9 (41) | 19.0±0.0 |
| Lateral line scales | 47 (4), 48 (35), 49 (1), 50(1) | 47.9±0.5 |
| Scales above lateral line to dorsal origin | 5.5 (1), 6.5 (40) | 6.4±0.2 |
| Scales below lateral line to pelvic insertion | 4.5 (34), 5 (7) | 4.5±0.2 |
| Predorsal scales | 12 (1), 13 (21), 14 (15), 15 (4) | 13.5±0.7 |
| Circumpeduncular scales | 16 (41) | 16.0±0.0 |
| Total vertebrae | 42 (1), 44 (13), 45 (27) | 44.6±0.6 |
| Abdominal vertebrae | 26 (7), 27 (30), 28 (4) | 26.9±0.5 |
| Caudal vertebrae | 16 (1), 17 (16), 18 (19), 19 (5) | 17.6±0.7 |

* Numbers in parentheses indicate number of specimens.

Table 2. Morphometric characters of *Onychostoma gerlachi*

| | Ranges | Mean ± SD | n |
|---|---|---|---|
| Standard length (mm) | 51.1–96.8 | 72.4±12.8 | 41 |
| In % of standard length: | | | |
| Head length | 22.8–27.2 | 25.0±1.1 | 41 |
| Head depth at occiput | 16.0–19.8 | 18.6±0.7 | 41 |
| Head width | 12.2–16.6 | 13.8±0.8 | 41 |
| Body depth | 16.2–26.1 | 23.6±1.7 | 41 |
| Body width | 10.9–15.7 | 13.2±1.2 | 41 |
| Caudal peduncle length | 19.3–22.8 | 21.6±0.8 | 41 |
| Caudal peduncle depth | 8.1–10.2 | 9.1±0.3 | 41 |
| Predorsal length | 41.4–47.7 | 46.2±1.2 | 41 |
| Prepectoral length | 21.4–26.5 | 23.8±1.3 | 41 |
| Prepelvic length | 44.0–52.9 | 49.8±1.6 | 41 |
| Height of dorsal fin | 16.3–23.8 | 21.5±1.4 | 40 |
| Pectoral fin length | 16.4–19.3 | 17.8±0.9 | 41 |
| Pelvic fin length | 14.3–18.2 | 15.7±2.7 | 40 |
| Height of anal fin | 13.4–18.2 | 16.0±1.1 | 41 |
| Length of dorsal fin base | 14.9–17.2 | 17.8±0.5 | 41 |
| Length of anal fin base | 7.5–9.0 | 8.5±0.4 | 41 |
| Head length (mm) | 13.1–22.9 | 18.0±2.7 | 41 |
| In % of head length: | | | |
| Head depth at occiput | 68.8–82.6 | 74.6±3.5 | 41 |
| Head width | 48.6–67.5 | 55.4±3.3 | 41 |
| Snout length | 29.3–36.8 | 33.0±1.5 | 41 |
| Orbital diameter | 27.4–35.0 | 30.8±1.9 | 41 |
| Interorbital width* | 26.3–34.6 | 30.3±2.2 | 41 |
| Upper jaw length | 15.8–29.9 | 22.1±2.5 | 41 |
| Lower jaw length | 14.2–24.5 | 18.9±2.1 | 41 |
| Mouth width | 22.9–31.1 | 28.0±1.7 | 41 |

*Bony width

between the upper Nan basin and the Mekong River. The present finding of *O. gerlachi,* which has been known previously only from Hong Kong to the Mekong River basin, in the upper Nan River adds further evidence in support of their hypothesis.

***Material examined.***—RLIKU 21, 5 specimens, 57.3–73.2 mm SL, Nan River, Pa Puoi Village, Pon, Thung Chang District, Nan Province, 19° 30' 48" N, 100° 56' 02" E, 19 March 2003; RLIKU 22, 1 specimen, 57.2 mm SL, Nan River, Thung Sun Village, Ngob, Thung Chang District, Nan Province, 19° 27' 42" N, 100° 52' 37" E, 19 March 2003; RLIKU 23, 2 specimens, 70.9–84.1 mm SL, Nan River, Nong Phuk Village, Puoi, Chiang Klang District, Nan Province, 19° 17' 37" N, 100° 51' 05" E, 20 March 2003; RLIKU 24, 2 specimens, 68.7–95.8 mm SL, Nan River, Don Than Village, Chiang Khan, Chiang Klang District, Nan Province, 19° 15' 30" N, 100° 50' 38" E, 8 May 2004; RLIKU 25, 2 specimens, 60.6–69.4 mm SL, Nan River, Sa La Village, Jedi Chai, Pua District, Nan Province, 19° 10' 46", 100° 50' 17" E, 23 April 2003; RLIKU 26, 1 specimen, 60.4 mm SL, Nan River, Tha Kham Village, Rim, Tha Wang Pha District, Nan Province, 19° 05' 33" N, 100° 48' 17" E, 22 April 2003; RLIKU 27, 1 specimen, 77.8 mm SL, Wa River, Nam Wa Village, Nam Phang, Mae Charim District, Nan Province, 18° 38' 32" N, 101° 00' 56" E, 27 April 2004; RLIKU 28, 3 specimens, 64.2–72.4 mm SL, Wa River, Tha Kham Village, Lai Nan Wiang Sa District, Nan Province, 18° 34' 26" N, 100° 52' 09" E, 27 April 2004; RLIKU 29, 2 specimens, 52.0–54.1 mm SL, Ri River, Kew Chan Village, Khun Nan Chaloem Phra Kiat District, Nan Province, 18 March 2003; RLIKU 30, 2 specimens, 57.0–57.5 mm SL, same locality for RLIKU 29, 26 March 2004; RLIKU 31, 3 specimens, 65.0–83.2 mm SL, Yao River, Pang Puk Village, Na Rai Luang, Song Khwae District, Nan Province, 19° 17' 57" N, 100° 43' 04" E, 31 March 2004; RLIKU 32, 4 specimens, 72.3–88.1 mm SL, same locality as RLIKU 31, 13 May 2004; RLIKU 33, 4 specimens, 64.9–74.1 mm SL, Yao River, Nae Noung Village, Pha Thong, Tha Wang Pha District, Nan Province, 19° 10' 26" N, 100° 46' 20" E, 24 April 2004; RLIKU 34, 4 specimens, 78.4–92.8 mm SL, same locality as RLIKU 33, 13 May 2004; RLIKU 35, 2 specimens, 51.1–67.1 mm SL, Sa River, Klang Wiang Village, Klang Wiang, Wiang Sa District, Nan Province, 18° 34' 36" N, 100° 44' 57" E, 26 April 2004; RLIKU 95, 1 specimen, 86.9 mm SL, same data as RLIKU 33; RLIKU 96, 1 specimen, 96.8 mm SL, same data as RLIKU 33; RLIKU 97, 1 specimen, 92.3 mm SL, same data as RLIKU 33; RLIKU 98, 1 specimen, 93.5 mm SL, same data as RLIKU 32.

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