

# Nemacheilus troglotaractus, a new blind cavefish from Thailand

(Osteichthyes, Balitoridae)

By M. Kottelat and J. Géry

## Abstract

*Nemacheilus troglotaractus*, a new blind loach, is described from Tham Sai Yok Noi in Kanchanaburi Province, Thailand. The affinities of the new species with any of the now existing surface species in the Mae Nam Meklong basin are not clear; it is possibly related with *N. masyae*.

## Introduction

Although the presence of cave fishes had been expected for some time in the karstic areas of north-western and western Thailand, this has only been confirmed in recent times. One of us (KOTTELAT 1988a) recently reported two species collected in Mae Hong Son Province by an Australian team: *Homaloptera thamicola*, the first cave-dwelling Balitorinae (= Homalopterinae auct., see KOTTELAT 1988b) and *Nemacheilus oedipus* (later placed in *Schistura* by KOTTELAT in press), the first known microphthalmic cave-dwelling loach.

A few months earlier, the second author (GÉRY 1987) had briefly reported on the fishes collected in caves of Thailand and Sulawesi by the French Thai-Maros expeditions of 1985 and 1986: 3 species were reported from caves in Mae Hong Son Province (*Nemacheilus* sp. [probably *oedipus*], *Danio* cf. *peninsulae* and *Puntius* sp.) and two were reported and illustrated from a cave in Kanchanaburi Province: one as *Silurichthys* sp. and one as *Nemacheilus* sp. The *Silurichthys* sp. in fact is a *Silurus*, possibly new, still under study, while the nemacheiline is described hereunder.

## Material and methods

The types have been deposited in Kasetsart University Museum of Fisheries, Bangkok (KUMF), Muséum d'Histoire Naturelle, Genève (MHNG), Muséum National d'Histoire Naturelle, Paris (MNHN), National Inland Fisheries Institute, Bangkok (NIFI), Zoologische Staatssammlung München (ZSM) and the collection of the first author (CMK). Method for counts and measurements follows KOTTELAT (1984) except for terminology of cephalic lateral line canals which follows KOTTELAT (in press). Note that in measurements expressed as % of head length, dorsal head length is used. Comparative material of Indochinese nemacheilines is listed by KOTTELAT (in press).

## *Nemacheilus troglotaractus* spec. nov.

Figs 1–2

*Noemacheilus* sp.

GÉRY 1987: 145, fig. 14.2.

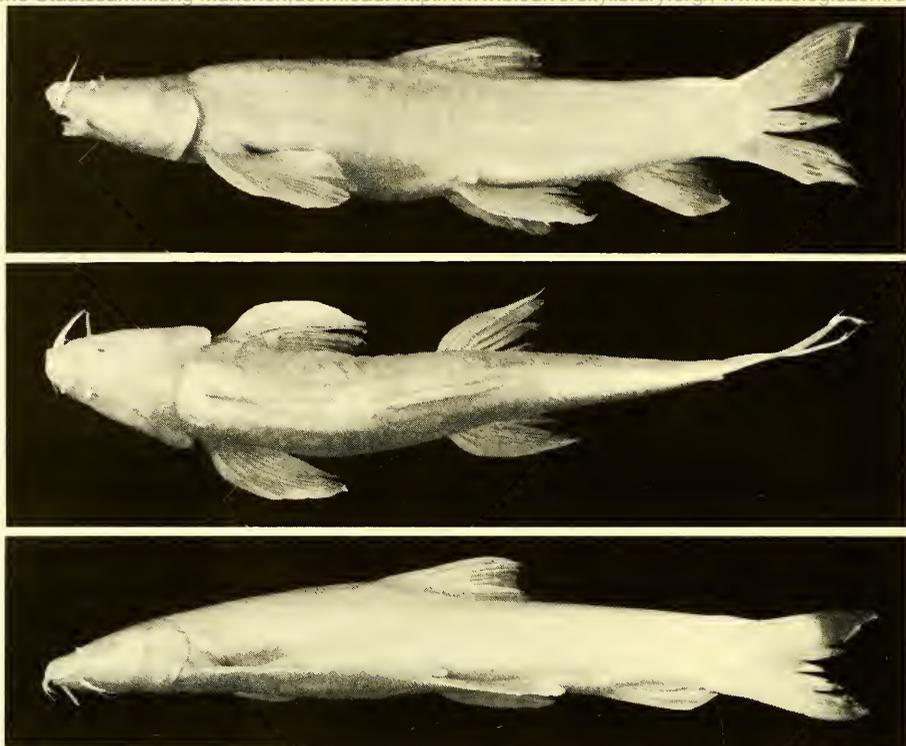


Fig. 1. *Nemacheilus troglodactaractus*, Thailand: Tham Sai Yok Noi. above: MHNG 2407.54, 67.7 mm SL, holotype. below: CMK 5960, 51.8 mm SL, paratype.

Holotype:

MHNG 2407.54, 67.7 mm SL; Thailand: Kanchanaburi Prov.: Tham Sai Yok Noi [= Tham Nam Tok], 3 km NNW of Nam Tok; 14°15'N 99°04'E; J.-M. Osterman, II 1986 and Expédition Thai-Maros 86, VI 1986. — Paratypes: MHNG 2407.55, 2 ex., 55.2–57.3 mm SL; same data. — NIFI 2184,

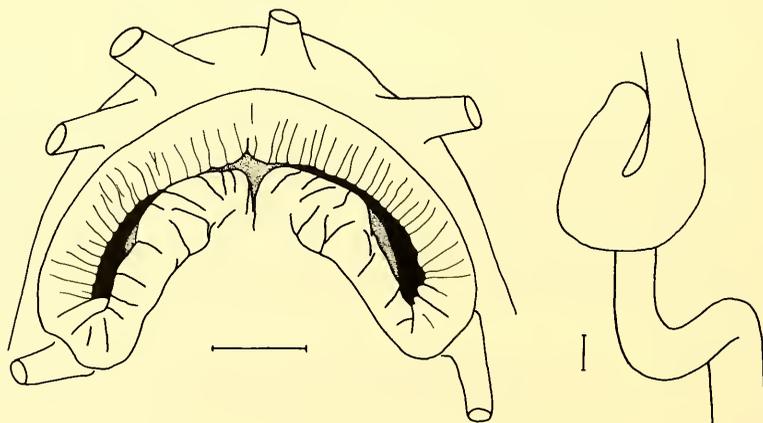


Fig. 2. *Nemacheilus troglodactaractus*. a. Mouth of MHNG 2407.55, 55.2 mm SL. b. Digestive tract of CMK 5960, 59.7 mm SL. Scale bars 1 mm.

1 ex., 47.8 mm SL; same data. — KUMF 2958, 1 ex., 58.3 mm SL; same data. — MNHN 1989 266, 3 ex., 48.2–55.7 mm SL; same data. — ZSM 26794, 2 ex., 58.2–61.3 mm SL; same data. — CMK 5960, 2 ex., 51.8–59.7 mm SL; same data. — CMK 5961, 1 ex., 55.3 mm SL; same data; cleared and stained.

A blind nemacheiline with slightly compressed body, tapering posteriorly. Head depressed, conical when seen from above. A well marked nuchal concavity in the largest specimens. Pectoral fin reaches  $1/2$ – $2/3$  of distance to pelvic fin base. Axillary pelvic lobe present. Pelvic fin origin under branched dorsal rays 3–5. Pelvic fin reaches anus or slightly beyond. Distal margin of dorsal fin slightly concave. Caudal fin forked, with subequal lobes. Small dorsal and ventral adipose keels; dorsal keel with a small notch at base of caudal fin. Caudal peduncle 0.90–1.17 (mean 1.08, S. D. 0.07) times longer than deep.

D 4 / 7 (–8)  $1/2$ . A 3 / 5  $1/2$ .

C / 9–10 + 8–9/. P 12–14. V (8–)9.

Body entirely covered by embedded scales, including between base of pectoral fins. No enlarged scales above and below lateral line. Lateral line complete or virtually so, with 90–111 pores. Cephalic lateral line system with 6 supraorbital, 4 + 10 infraorbital, 9–10 preoperculo-mandibular and 3 supra-temporal pores (difficult to count with precision).

Anterior nare pierced in the front side of a flap-like tube with a pointed tip; the tube is about as long as posterior nare. Mouth approximately twice wider than long (Fig. 2a). Lips moderately developed. Upper lip with a median incision and numerous, regularly set, low furrows. Processus dentiformis present, not well marked. A shallow median concavity in lower jaw present only in the largest specimens. Inner rostral barbel reaches or nearly reaches corner of mouth. Length of maxillary and outer rostral barbels about equal to mouth width. Stomach small; intestine with a loop at some distance behind stomach (Fig. 2b).

Table 1. Morphometric data of *Nemacheilus troglodactaractus*, 12 specimens.

	% SL			% HL		
	mean	range	S. D.	mean	range	S. D.
standard length [mm]		46.9– 67.7				
total length	121.5	118.0–127.3	2.67			
dorsal head length	21.3	19.9– 22.8	0.82			
lateral head length	23.2	22.2– 25.0	0.85	109	101–117	4.8
predorsal length	50.3	47.3– 53.7	1.71			
pre-pelvic length	56.6	54.0– 58.9	1.45			
pre-anus length	75.8	74.5– 77.6	0.87			
preanal length	81.8	80.3– 85.1	1.15			
head depth (at nape)	12.0	10.8– 13.0	0.70	56	51– 60	2.4
body depth	18.0	15.8– 19.7	1.13	85	72– 92	5.6
depth of caudal peduncle	11.1	10.2– 11.8	0.57	52	45– 55	2.4
length of caudal peduncle	11.9	9.1– 12.8	0.95	56	41– 61	5.1
head width (at nares)	10.7	9.5– 11.7	0.79	50	45– 57	3.7
maximum head width	15.7	13.1– 17.4	1.18	74	65– 83	5.3
body width (dorsal origin)	12.8	10.8– 14.5	1.04	60	53– 70	4.7
body width (anal origin)	7.0	5.4– 8.4	0.87	33	27– 40	4.0
interpelvic distance	4.5	3.7– 5.6	0.57	21	17– 26	2.8
height of dorsal fin	18.7	17.0– 19.7	0.76	88	79– 95	4.4
length of upper caudal lobe	22.1	18.5– 24.2	1.68	104	82–121	10.6
length of lower caudal lobe	21.0	16.2– 23.6	1.86	99	80–118	9.7
length of median caudal rays	14.9	11.1– 17.3	1.69	70	49– 82	9.6
depth of anal fin	17.5	15.8– 19.4	1.09	82	76– 94	6.4
length of pelvic fin	19.8	18.1– 21.2	0.73	93	87–102	4.4
length of pectoral fin	22.3	20.1– 23.5	0.91	105	92–114	6.1

Sexual dimorphism unknown.

Colouration: No trace of colouration. Alive, white, slightly pinkish.

#### Habitat:

Underwater stream in Tham [= cave] Sai Yok Noi, where a first specimen had been secured in early 1986 by J. M. Osterman and his team. A second exploration of this cave is reported by R. BROUQUISSE (1987); a detailed exploration was not possible due to the high concentration in CO<sub>2</sub> (5%). F. BROUQUISSE & DALGER (1987) provide some data on water: 24.5°C, pH 6.25, total hardness 22.6° dH (deutsche Härtegrade), carbonate hardness 21.2° dH, conductivity 481 μS.cm<sup>-1</sup>, Na 2.95 mg.l<sup>-1</sup>, K 1.40 mg.l<sup>-1</sup>, Mg 42.5 mg.l<sup>-1</sup>, Ca 91.0 mg.l<sup>-1</sup>, HCO<sub>3</sub> 462.8 mg.l<sup>-1</sup>. The only other fish collected in the cave is *Silurus* sp. (see Introduction).

#### Etymology:

From *trôglê* (Greek): hole, and *cataracta* (Latin): waterfall; Nam Tok, the nearest populated place and an alternative name for the cave means waterfall.

#### Discussion:

The nemacheilines of the Indochinese area (Thailand, Burma, Laos, Kampuchea, southern Viet Nam and western Malaysia) have recently been revised by KOTTELAT (in press). The following species have been reported from the Mae Nam Meklong basin to which the stream in Tham Sai Yok Noi belongs: *Acanthocobitis zonalternans* (Blyth, 1860), *A. botia* (Hamilton, 1822), *Nemacheilus masyae* Smith, 1933, *N. binotatus* Smith, 1933 and *Schistura desmotes* (Fowler, 1934). In addition to the absence of eyes and pigmentation, the new species is distinguished from all by a different body shape and the presence of a nuchal concavity. It is also distinguished from *A. botia* and *A. zonalternans* by a forked caudal fin (vs truncate or slightly emarginate), less branched dorsal rays (7 [-8] 1/2, vs 9-13 1/2), absence of suborbital groove or flap in males.

From *N. masyae*, it differs by the absence of suborbital flap in males, caudal lobes of equal length (vs upper lobe conspicuously longer), pleural ribs not modified (vs fringed), antepenultimate pleural rib not enlarged and connected to pelvic base; less branched dorsal (7 [-8] 1/2, vs 9 [-10] 1/2) and pelvic rays (8, vs usually 9). From *N. binotatus*, it differs by a larger size (up to 67.6 mm SL, vs 44), more pectoral (12-14, vs 11-12) and pelvic rays ([8]-9, vs 8), absence of suborbital flap in males.

From *Schistura desmotes*, it differs by absence of suborbital flap in males, more pelvic ([8]-9, vs 8) and pectoral rays (12-14, vs 11-12), completely scaled belly (vs no scales between pectoral fin base and on back in front of dorsal fin), more pores along lateral line (90-111, vs 65-82).

Presently, few nemacheiline lineages are defined in terms of shared derived characters and most species lack salient diagnostic morphological features, so that it is almost impossible to find the nearest relative(s) of a species whose principal characteristics are reductions or loss of characters.

KOTTELAT (in press) retained 9 genera for the 62 nemacheiline species known in Indochinese waters. 15 species belong to seven genera which are easily recognized by the possession of unique derived characters, while the remaining 47 species were distributed into *Nemacheilus* Bleeker, 1863 and *Schistura* M'Clelland, 1838, which presently cannot be defined by synapomorphies. Future researches may show them polyphyletic, especially *Schistura*.

The following characters suggest that the new species be placed in *Nemacheilus*: lower lip with a median incision, pointed head, long barbels, forked caudal fin and general appearance. Species retained in *Schistura* have a lower lip with a distinct median interruption, a more massive head and shorter barbels; they usually have a truncate or slightly emarginate caudal fin. Other characters distinguishing the two "genera" (colour pattern, behaviour) are of no use in present case. KOTTELAT (in press) reported that large specimens of *N. fasciatus* and *N. masyae* are unique among nemacheilines already examined for that character in having pleural ribs of vertebrae 9-13 with fringed proximal lamellae along their posterior margin and antepenultimate pleural rib enlarged and connected to the pelvic bone. In *N. tro-*

*glocataractus*, the antepenultimate pleural rib has a process apparently homologous with this fringed lamellae and this same rib is apparently also connected to the pelvic bone (this last feature is difficult to examine as the specimen did not cleared well; presumably it was already dead at the time of fixation); this would support some kind of relationships between the new species and *N. masyae* and *N. fasciatus*. Further work on nemacheilines interrelationships is needed before a definitive placement of *N. troglotataractus* is possible.

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