

Cobitis choii, A New Cobitid Fish from Korea

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韓國產 기름종개屬 魚類의 1新種 *Cobitis choii*

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요 약

1983年 5月 錦江 支流인 美湖川 (忠北道 清源郡 梧倉面)에서 아직까지 報告되지 않은 *Cobitis*屬 魚類 1種을 發見하여 이를 新種 *Cobitis choii*라고 記載하고, 國名으로는 「미호종개」로 提唱한다. 本 新種은 美湖川에서 함께 出現하는 참종개 *C. koreensis*와 점줄종개 *C. taenia lutheri*와 비슷하게 보이지만, 本 新種은 體側斑紋이 둥글고, 수컷의 가슴지느러미 基部에 있는 骨質盤에는 鋸齒가 있으며, 비늘의 크기는 아주 작고, 尾柄部가 가늘게 되어있는 등, 그 모양이 *Cobitis*屬의 여러 既知種과도 현저하게 다르다.

The Cobitid fish genus *Cobitis* is represented by at least 7 species or subspecies in Korea (Kim, 1980): *Cobitis taenia taenia* Linne, *C. t. striata* Ikeda, *C. t. lutheri* Rendahl, *C. rotundicaudata* Wakiya and Mori, *C. koreensis* Kim, *C. longicorpus* Kim, Choi and Nalbant, and *C. granoiei* Rendahl. The species identification of Cobitid fishes previously has depended heavily on the basis of secondary sexual characters at the base of pectoral fins in male, thus often making identification of females difficult. Accordingly, many investigators (Ikeda, 1936; Uchida, 1939; Chyung, 1977) have avoided color patterns, proportional characters etc., as being generally unreliable indicators. However, Mizuno (1970) and Kim (1975, 1976, 1980) found color patterns as well as secondary sexual characters to be taxonomically useful in distinguishing the species of *Cobitis*.

A new species of the genus *Cobitis* was discovered in May 1983 on the sand bottoms of the Miho-cheon stream, the tributary of the Geum-River in the Chungcheongbug-do province. Prior to this discovery, this species was identified as *C. koreensis* which is sympatric with it and close to it (Son, 1983). In this paper we describe it as a new species of the genus *Cobitis*.

All specimens studied have been preserved in 10% formalin at the department of Biology, Jeonbug National University, Jeonju, Korea.

***Cobitis choii* sp. nov.**

(New Korean name: *Miho-Jong-gae*)

(Figs 1, 2A, and 3A)

Materials: Holotype. BSJNU (Department of Biology, College of Natural Sciences, Jeonbug National University) 4854, a male, 55.1 mm in standard length, collected in the Miho-cheon stream, the tributary of the Geum River at Yecheon-ri, Ochang-myon, Cheongwon-gun, Chungcheongbug-do province, on May 28, 1983.

Paratype. The specimens of 2 males and 11 females, 55.5-69.7 mm in standard length collected at the same locality as holotype on May 28, 1983.

Data for the holotype are presented first, followed in parentheses by range for paratypes. Counts of vertebrae number and the observations of lamina circularis at the base of pectoral fins in males were made from other three clearing and staining specimens (Taylor, 1967) except holotype and paratypes.

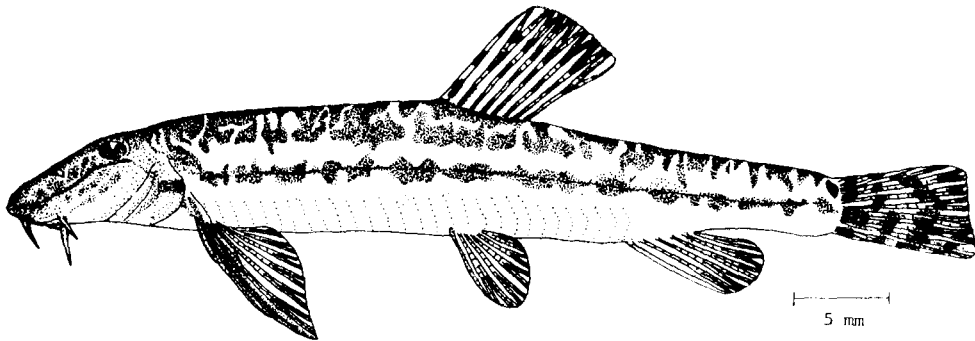


Fig. 1. *Cobitis choii* sp. nov., holotype (BSJNU 4854)

Diagnosis: A species of *Cobitis* with very pointed snout anteriorly and with very slender caudal peduncle posteriorly. Thirteen of more dark brown lateral spots on the body are small. Male has a thin elongate lamina circularis with the serrated margin at the base of pectoral fins.

Descriptor: Dorsal fin rays II, 7 (II, 6-7); Anal fin rays II, 5; Pectoral fin rays II, 7; Ventral fin rays II, 6; Caudal branched fin rays 16; Gill rakers on first arch 14; Vertebrae 19~21+23. Proportional measurements of holotype and paratypes are shown in Table 1.

Body elongate and laterally compressed but its thickness high variable, tapering into a slender caudal peduncle. Head more or less triangular, slightly compressed; snout pointed, narrowed anteriorly; nostril closer to eye than tip of snout. Eye small, superior, lateral and intermediate between tip of snout and gill opening. Mouth small, inferior; upper lip continuous and well separated from upper jaw; lower lip interrupted in middle conspicuously

Table 1. Proportional measurements of *Cobitis choii*, sp. nov. Mean and standard deviation followed by range in parenthesis.

Characters	Holotype	Paratypes
sex	1 male	2 males and 11 females
Total length (mm)	65.8	65.4~80.3
Standard length (mm)	55.1	55.5~69.7
In % of standard length		
Head length	20.3	19.4±0.86 (18.6~21.5)
Body depth	15.0	14.9±1.20 (13.1~16.4)
Caudal peduncle length	16.3	16.0±0.99 (14.6~17.5)
Caudal peduncle depth	7.9	7.3±0.35 (6.7~7.8)
Pre-dorsal distance	52.4	51.0±0.94 (50.0~52.5)
Pre-ventral distance	54.2	53.8±1.32 (51.9~56.5)
Pre-anal distance	77.1	77.0±1.65 (73.6~79.4)
P-V distance	31.5	34.3±1.32 (31.0~36.2)
V-A distance	22.7	23.5±1.27 (22.0~25.8)
Snout length	9.8	8.4±0.51 (7.6~9.2)
Pectoral fin length	19.9	14.8±3.06 (12.2~21.7)
Anal fin length	14.3	13.0±0.98 (12.1~15.2)
Caudal fin length	19.1	16.8±1.53 (15.5~19.2)
Base of dorsal	10.4	8.7±0.56 (7.1~9.6)
Base of anal	7.3	6.9±0.34 (6.2~7.3)
In % of caudal peduncle length		
Caudal peduncle depth	48.9	44.9±2.48 (42.1~52.1)

grooved. Barbels short, especially rostral pair, mental lobes developed with pointed tips. Interorbital space narrow and convex. Suborbital spine slender with mediocaudal process longer and slightly curved, than laterocaudal process.

Origin of dorsal nearer base of caudal than tip of snout, and a little in front of ventrals. Caudal peduncle shorter than head, narrow.

Lateral line short, not exceeding length of pectorals. Body covered by minute oval scales with large focal area (Fig. 2A).

Color patterns in formalin pale yellowish; a series of 14 (14~19) dorsal median dusky gray spots arranged as follows: 8 (7~11) predorsal, 3 (3~4) subdorsal and 5 (4~7) post dorsal. A series of 14 (12~17) small round or triangular brownish gray spots on body side, and with brownish gray, cloudy speckles on upper part. Pigmentation of head and its sides based on minute dots. A dusky gray line from tip of snout to front of eye on each side of head. Conspicuous black spot on the caudal base above. Dorsal fin with three, and caudal fin with three to five rows of grayish dots. First and second ray of pectoral fin of male grayish. Other fins pale.

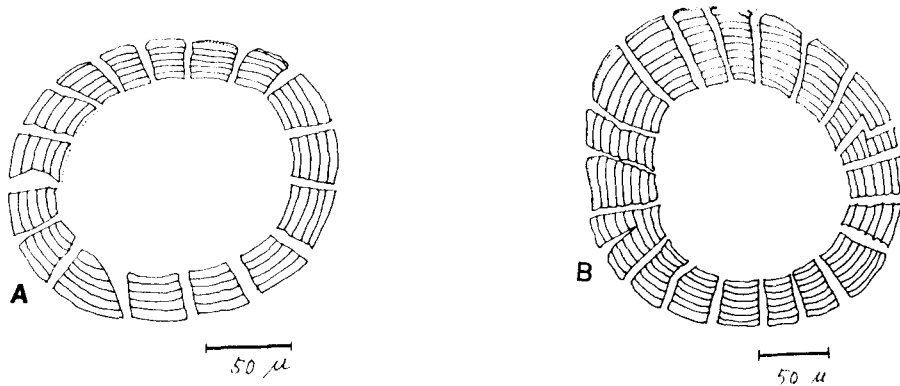


Fig. 2. Subdorsal scales of the two Cobitid species.
A: *Cobitis choii* sp. nov. B: *Cobitis koreensis*

Sexual dimorphism: Male; The males show smaller body size and longer pectoral fins than female. Particulary the pectoral fins are elongated with a beak like projection at the end. This due to the elongation of the second ray which is about two times as wide as the first ray. Furthermore, it is very peculiar to have the narrow and elongate lamina circularis with about 40 to 50 serrated parts at the base of pectoral fins in males (Fig. 3A).

Female; The pectoral fin does not possess the peculiarities mentioned above.

Distribution and Habitats: The present species seems to be distributed only in the Mihocheon stream which joins at the lower part of the Geum River. The collecting locality of *Cobitis choii* is the Yeocheon-ri, Ochang-myon, Cheongwon-gun, Chungcheongbug-do province.

This species inhabits the sand bottoms with few pebbles in the waters of streams with currents ranging from slow to swift, and generally it is found in shallow waters less than

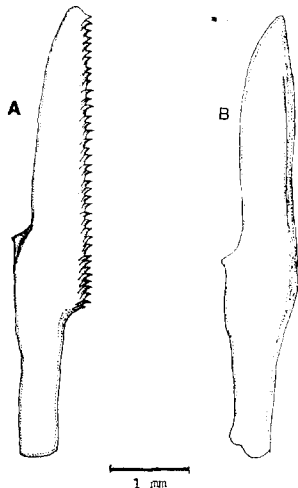


Fig. 3. Lamina circularis at the base of right pectoral fin in males of the two Cobitid species.
A: *Cobitis choii* sp. nov.
B: *Cobitis koreensis*

one meter deep.

Remarks: This new species is placed in the genus *Cobitis* after the study of the genera of Botinae and Cobitinae of Nalbant (1963). From the view point of lamina circularis at the pectoral fins in males which play an important role in taxonomy of this genus (Valdykov, 1935; Ikeda, 1936), the present species resembles *C. koreensis*. But *C. choui* differs from *C. koreensis* by the fine structure of the lamina circularis (Fig. 3A, 3B), the color patterns of body sides (*C. choui*: the size of color pattern is smaller than *C. koreensis* and triangular or round shape; *C. koreensis*: Conspicuous cross band and sharp), the thickness of caudal peduncle (the caudal peduncle depth of *C. choui* is 6.7~7.8 of standard length while 8.3~11.1 in *C. koreensis*), the structure of subdorsal scales (*C. choui*: smaller oval scales with large forcal area; *C. koreensis*: larger round scales with excentric forcal area: Fig. 2), and the shape of snout anteriorly (pointed in *C. choui*; blunt in *C. koreensis*).

On the other hand, *C. choui* is relatively close to *C. granoei* (Kim, 1980, 224-227, Fig. 3, Gangreung, Korea) in having smaller scales on the body sides, smaller triangular color patterns, and slender caudal peduncles, but differs from *C. granoei* in the elongate lamina circularis of pectoral fin in males and the pointed snout anteriorly. And *C. choui* also differs from *C. taenia lutheri* in having the elongate lamina circularis at the base pectoral fins of males, smaller color patterns on the body sides pointed snout anteriorly, and slender caudal peduncle.

C. choui is sympatric with *C. taenia lutheri* and *C. koreensis* (Table 2) but is usually found in different microhabitats and thus is only partially syntopic with them.

Table 2. Numbers of individuals of three Cobitid species collected sympatrically in the Miho-cheon stream in the Ochang-myon, Cheongwon-gun, Chungcheongbug-do province from May 23 to June 20, 1983.

sample date	<i>C. choui</i>		<i>C. taenia lutheri</i>		<i>C. koreensis</i>	
	♀	♂	♀	♂	♀	♂
May 23, 1983	28	15	20	5	1	0
May 30, 1983	5	1	23	19	4	2
June 20, 1983	29	7	51	21	0	1
Total	62	23	94	45	5	3

The sexes of Cobitid fish in adults was determined by the presence or absence of lamina circularis at the base of pectoral fins. The sex ratio of the new species in adults was 62 females and 23 males as the unequal sex ratio found in other Cobitid fishes (Lodi, 1967; Kim, 1978).

The present new species shares important character with *C. koreensis* in the elongated lamina circularis at the base of pectoral fins in males, and this indicated that they are more closely related to each other than to other without the character. Moreover it is very

interesting based on the phylogeny this genus that the new species has the serrated form on the elongated lamina circularis.

Key to the eight species or subspecies of Genus *Cobitis* from Korea

- 1a A row of dark brown spots or two or more stripes laterally.....2
 1b Body covered cloudy dark brown speckles.....*C. rotundicaudata*
 2a A row of dark brown cross-bands in body sides3
 2b A row of brown (quadrangular, triangular, or roundish) spots or striped bands on the body sides4
 3a All of 10 or more dark brown cross-bands same in color. Pectoral fins of males elongated lamina circularis at the base part.....*C. koreensis*
 3b The first or second cross-bands at the back or operculum being more blackish than others. Pectoral fins of males semicircular lamina circularis at the base part *C. longicorpus*
 4a Caudal peduncle slender (6.7~7.8% in SL). A row of triangular or round brown spots on the body sides. Body covered minute scales with large central forcal area ...5
 4b Caudal peduncle deeper (8.3~12.7% in SL). A row of quadrangular spots or striped bands in body sides. Body covered large scales with mediate forcal area6
 5a Pectoral fins of male with elongated lamina circularis at the base parts...*C. choui* sp. nov.
 5b Pectoral fins of male with triangular lamina circularis at the base parts.....*C. granoei*
 6a Two broad brownish stripes from opercle to caudal base, a narrow brownish stripe between two former stripes*C. taenia striata*
 6b Longitudinal rows of spots or two broad stripes with small brown spots between two stripes in front of body sides7
 7a Caudal peduncle depth high (above 65% in caudal peduncle length), Color patterns generally shows sexual dimorphisms (male-two striped form; female-quadrangular spotted form)*C. taenia lutheri*
 7b Caudal peduncle depth low (below 65% in caudal peduncle length). Both male and female a row of roundish or quadrangular spots on body sides.....*C. taenia taenia*

Etymology: The name *choui* is dedicated to Dr. Ki-chul Choi, who has contributed much to the studies of fresh-water fishes in Korea.

ABSTRACT

Cobitis choui, n. sp. is described from 14 specimens (55.1~69.7 mm SL) collected from sand bottoms in the Miho-cheon stream, Chungcheongbug-do province, Korea. *C. choui* is compared with the specimens of *C. koreensis*, *C. granoei*, and *C. taenia lutheri*. The new species differ from them in the serrated lamina circularis at the base of pectoral fins in male, the rounded spots and small scales on the body sides, and slender caudal peduncle.

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