

A New Subspecies of Cobitid Fish (Pisces: Cobitidae) from the Paikchön Stream, Chöllabuk-do, Korea

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韓國產 기름종개屬 魚類의 1新亞種

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摘 要

全羅北道 扶安郡의 白川에 棲息하는 기름종개屬 魚類의 標本을 調査한 바, 種檢索의 基準이 되는 수컷 가슴지느러미 基部에 出現하는 骨質盤은 참종개 *Cobitis koreensis*와 비슷하지만, 調査水域의 기름종개屬 모든 標本은 體側斑紋의 모양이 特異하고, 脊椎骨數가 37~40개로 적으며 體長範圍가 85mm以下의 小形인 점이 참종개와는 잘 區別되어 新亞種 *C. koreensis pumilus* n. subsp.(부안종개, 신칭)로 命名 記載한다.

Key words: Subspecies, Cobitid, Paikchön, Korea.

INTRODUCTION

The Korean spined loach, *Cobitis koreensis*, was described based on the specimens collected from the several rivers which flow into the Yellow Sea, Korea (Kim, 1975). Originally, it was considered as a monotypic species. Recently, Kim and Lee (1984) reported that the Paikchön population of *C. koreensis* was distinguished from the other populations of this species. However, it was not fully described. In the present study, more detailed description as a distinct new subspecies was made by analyzing the specimens collected recently.

Type specimens were deposited in 10% formalin at the laboratory of Department of Biology, Chon-

buk National University (CUB). Method for counts and measurements follows Hubbs and Lagler (1964). Vertebrae were counted in the cleared specimens by the method of Taylor (1967).

***Cobitis koreensis pumilus*, n. subsp.**

(New Korean name; Puan-Jonggae, 부안종개) (Figs. 1,2)

Material: Holotype — one male (CUB 9374) of 51.5 mm in standard length(SL), collected in the Paikchön stream at Sangsö-myön, Puan-gun, Chöllabuk-do, on October 9, 1986; paratypes — 11 specimens (6 males and 5 females) (CUB 4624-4634) of 44.1-59.9 mm in SL, collected in Paikchön stream at Sannae-myön, Puan-gun, Chöllabuk-do, on April 30, 1983; (7 males and 8 females) (CUB 9375-9389) of 45.8-62.4 mm in SL, same locality and date as holotype. Holotype and paratypes of *Cobitis koreensis koreensis* Kim — 6 specimens (3 females and 3 males), 72.3-88.7 mm in SL, Han River at Sang-myön, Kapyong-gun, Kyonggi-do, on October 5, 1974; 12 specimens (5 males and 7 females)

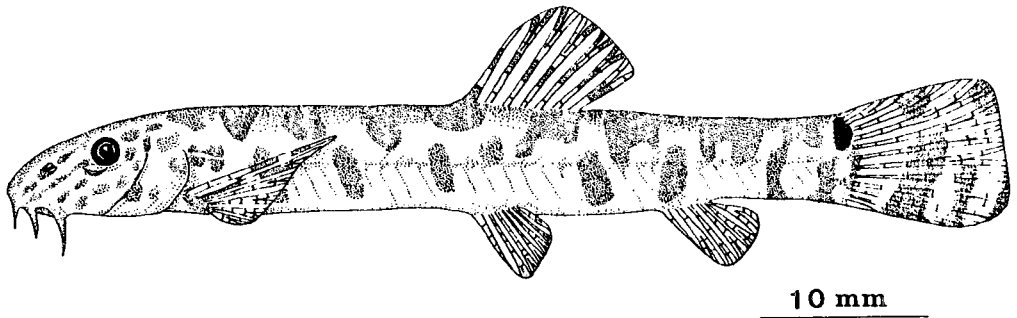


Fig. 1. *Cobitis koreensis pumilus* n. subsp., holotype (CUB 9374), male, 51.5 mm SL.

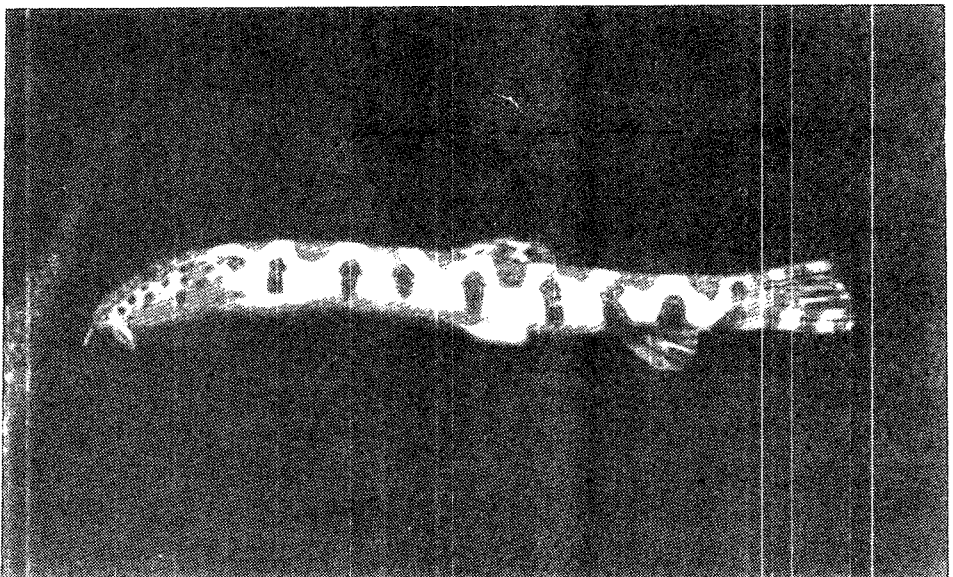


Fig. 2. *Cobitis koreensis pumilus* n. subsp., paratype (CUB 9386), female, 53.3 mm SL.

(CUB 4457-4469), of 61.6-90.5 mm in SL, same locality as the type specimens, on July 27, 1974.

Diagnosis: Small body size, long barbel length; 37-40 vertebrae; 5 to 11 dark brownish crossbars and 6 to 11 dorsal spots; no irregular speckles on the upper side of body.

Description: Dorsal fin rays 7; anal fin rays 5; pectoral fin rays 7; caudal branched fin rays, 16; vertebrae 37-40. Proportional measurements and counts for the holotype and paratypes are shown in Table 1. Body elongate and laterally compressed, but its thickness highly variable. Head very elongate, compressed and with profile convex; snout long, eye small; inferior small mouth and with fleshy lips, two lobes; long barbels 3 pairs, first on rostral, second on maxillar and third on maxillomandibular; third barbel length 1.5-2.5 times of eye diameter; nostrils nearer eye than tip of snout; suborbital spine bifid, thick and slightly curved; lateral line not complete, scales very small, cycloid on trunk, none on head; anterior sac of air-bladder covered by osseous capsule, posterior sac reduced.

Variation and pigmentation: Coloration in 10% formalin is pale yellowish. Dark brownish above on either side of body, from opercle to caudal base, row of 5-10 dark brownish crossbars of varying

Table 1. Counts and proportional measurement of *Cobitis koreensis pumilus* n. subsp. Mean and standard deviation followed by range in parenthesis.

Characters	Holotype	Paratypes	
	Male	Males	Females
Number of specimens	1	13	13
Total length (mm)	61.5	58.3 ± 4.30(51.8 - 67.0)	64.0 ± 5.36(57.3 - 75.4)
Standard length (mm)	51.5	48.7 ± 3.58(42.2 - 51.9)	53.8 ± 4.66(47.9 - 62.4)
In % of standard length			
Head length	21.7	21.8 ± 0.65(20.4 - 22.8)	22.3 ± 1.06(19.0 - 23.1)
Body depth	13.8	13.8 ± 0.68(12.6 - 15.2)	13.2 ± 0.56(12.2 - 14.1)
Caudal peduncle length	14.4	14.6 ± 0.99(12.7 - 16.4)	13.9 ± 1.19(12.6 - 16.3)
Caudal peduncle depth	9.9	10.0 ± 0.27(9.7 - 10.5)	9.7 ± 0.33(9.3 - 10.5)
Pre-dorsal distance	54.8	54.7 ± 0.91(53.1 - 56.6)	56.2 ± 1.87(53.3 - 60.0)
Pre-ventral distance	57.9	56.3 ± 1.27(54.6 - 59.5)	57.2 ± 1.17(54.5 - 59.1)
Pre-anal distance	80.2	79.7 ± 1.08(77.3 - 80.9)	80.6 ± 1.15(77.8 - 81.6)
Pectoral-ventral distance	35.1	35.0 ± 1.13(33.0 - 37.7)	35.3 ± 1.19(33.7 - 38.6)
Pectoral fin length	21.1	20.8 ± 1.26(18.8 - 23.2)	13.5 ± 0.95(12.6 - 14.4)
In % of head length			
Snout length	49.1	44.3 ± 3.59(40.0 - 52.6)	45.1 ± 2.45(40.7 - 48.7)
Eye diameter	15.2	17.0 ± 2.82(14.4 - 21.0)	15.4 ± 1.42(13.6 - 17.1)
Interorbital width	16.9	17.4 ± 1.35(15.2 - 19.4)	15.7 ± 0.92(14.8 - 17.3)
Length of 3-rd barbel	30.4	30.3 ± 1.40(27.8 - 32.7)	28.2 ± 1.75(25.0 - 30.8)
In % caudal peduncle length			
Caudal peduncle depth	68.9	69.3 ± 5.50(60.0 - 81.0)	70.5 ± 5.55(61.1 - 80.0)
Number of dorsal spots	9	9.0 ± 0.78(8 - 11)	9.1 ± 0.86(8 - 10)
Number of cross bars	6	7.8 ± 1.36(5 - 10)	7.5 ± 1.39(5 - 9)

sharpness, vertically without or with a little brownish irregular, cloudy speckles on upper part (Table 2). A series of 6-11 dorsal median dusky gray spots arranged as follows: 2-4 predorsal, 1-2 dorsal and 3-4 postdorsal (Table 2). 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. The medio-lateral intermuscular septum visible. Conspicuous black spot above the caudal base. Dorsal and caudal fin rays have rows of dark speckles; pectoral and ventral fin rays rows of lightly dark speckles; ventral and anal fin rays whitish or yellowish.

Sexual dimorphism: The males show smaller body size and longer pectoral fins than in female (Table 1). Particularly the pectoral fins are elongated with a beak-like projection at the end. The structure of the lamina circularis at the base of pectoral fins is similar to *C. k. koreensis*, but distinctly different from the other cobitid species (Kim and Son, 1984). In female the pectoral fins do not possess the peculiarities mentioned above.

Distribution and Habitats: The present subspecies seems to be distributed only in Paikchŏn stream at Sangsŏ-myŏn and Sannae-myŏn, Puan-gun, Chŏllabuk-do. Individuals of *C. k. pumilus* were found on the clear, pebble and sand bottom at the slow current of the upper and middle reaches of the stream.

Remarks: The present subspecies is found in a stream flowing into the Yellow Sea of Korea. *C. k. koreensis* is not found in this stream while they are abundant in other streams and rivers in this area. Both subspecies are common in the lamina circularis at the base of pectoral fin of male which plays an important role as a key character for identifying the species within the genus (Vladykov, 1935). However it differs from *C. k. koreensis* by having a small number of vertebrae (37-40 instead of 42-45) and different number of dorsal spots and crossbars (Table 2). Kim and Lee (1984) reported that the Paikchŏn populations of this species are easily distinguished from *C. k. koreensis* by the smaller body size (*C. k. pumilus* is lower than 85 mm in total length, while in *C. k. koreensis* the maximum size of the specimen collected is 140 mm in total length), the less number of female eggs, and the relatively large interorbital width. *C. k. pumilus* is restricted to the Paikchŏn stream which sites in the extreme southern region of *C. k. koreensis* distribution area. Hence these two subspecies of *C. koreensis* have allopatric ranges (Fig. 3). *C. k. pumilus* differs from *C. longicarpus* from the Sŏmjŏn-river and *C. chŏi* from the tributaries of Kŏm-river by having different color pattern and different lamina circularis at the base of pectoral fins of male specimens. And this new subspecies can be distinguished easily from *C. rarus* (Chen, 1981) of China Mainland which has a large number of vertebrae (41-42), higher body depth (14.5-17.2%), and shorter head length (17.5-19.6%).

Table 2. Numbers of dorsal spots and crossbars in two subspecies of *Cobitis koreensis*.

Subspecies	Number of crossbars																Number of dorsal spots											
																	Predorsal			Dorsal			Postdorsal					
	5	6	7	8	9	10	11	12	13	14	15	16	2	3	4	5	6	7	1	2	3	3	4	5	6	7	8	
<i>Cobitis koreensis koreensis</i> type specimens (n=6)									2	2	1	1					2	3	1	5	1					2	3	1
<i>Cobitis koreensis pumilus</i> type specimens (n=27)	3	2	5	9	7	1											12	14	1	1	26		14	13				

Kim and Lee (1986) reported that the karyotype of *C. koreensis* including the Paikchŏn population shows 10 pairs of metacentric, 12 pairs of submetacentric and 28 pairs of acrocentric chromosomes. They mentioned that Paikchŏn population did not show any difference from the other populations of *C. koreensis* in karyotype.

The cobitid population occurring in the Paikchŏn stream is easily distinguished from all other populations of *C. koreensis* since it has the peculiar color pattern on the body sides and small number of vertebrae. However, we could not confirm whether this subspecies acquires the complete reproductive isolation or not and whether it comes in contact with the main population secondarily. Thus it

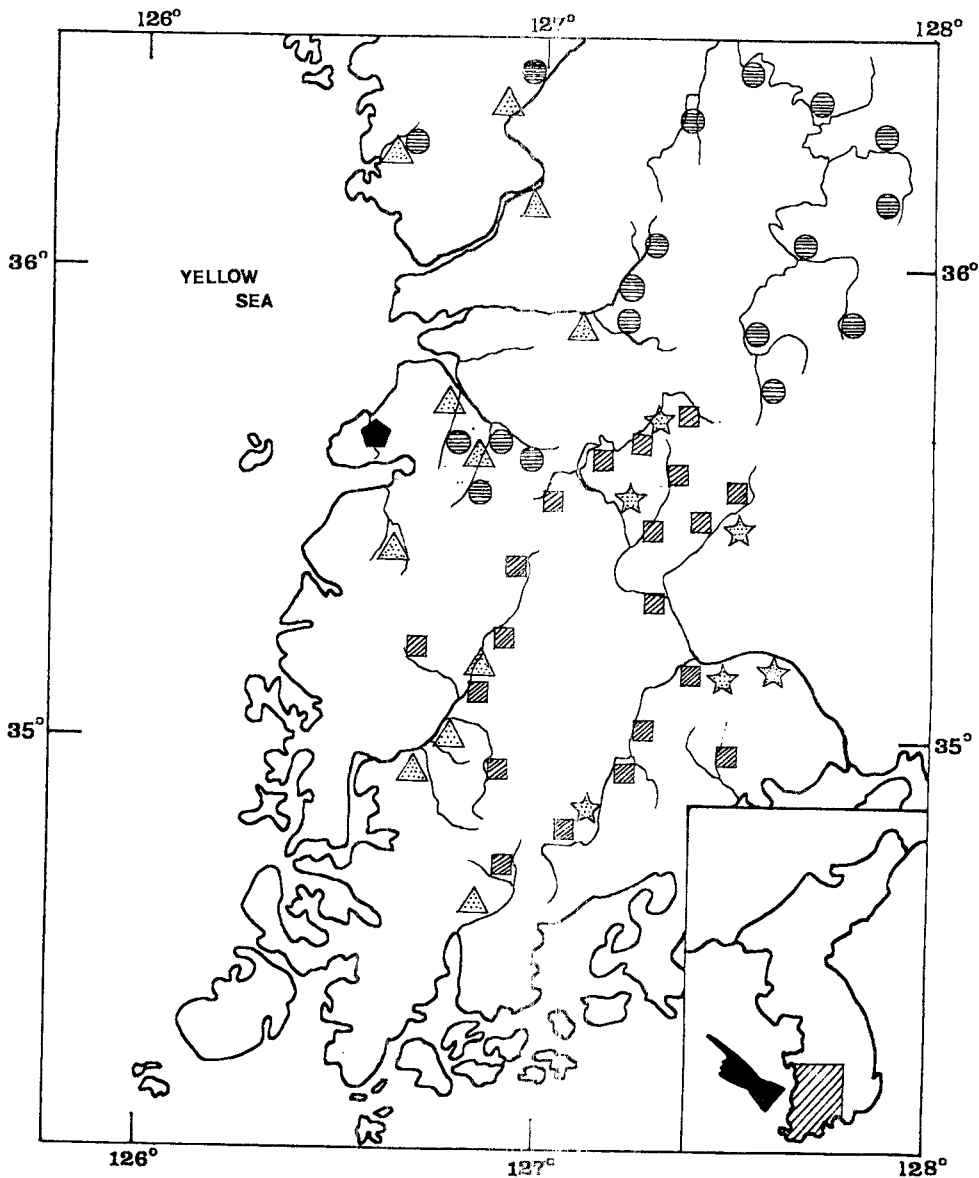


Fig. 3. Distribution of the genus *Cobitis* in the southern part of Korea: *Cobitis koreensis pumilus* n. subsp. (●), *C. k. koreensis* (◐), *C. longicorpus* (◑), *C. lutheri* (△), *C. striata* (☆).

may be safe to conclude that this specimen is placed in the undescribed subspecies of *C. koreensis*.

Etymology: The subspecific name is the Latin, *pumilus* (meaning "dwarfish"), which refers to its small body.

ABSTRACT

Cobitis koreensis pumilus n. subsp. was described on the basis of 27 specimens from the Paikchön stream, Puan-gun, Chöllabuk-do, Korea and was compared to allied species. The new subspecies differs from *C. k. koreensis* by the peculiar crossbars on the body sides, smaller number of vertebrae (37-40 instead of 42-45) and small body size.

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