

A New Species of *Koreocobitis* from Korea with a Redescription of *K. rotundicaudata*

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Two species of the genus *Koreocobitis* in Korea are reviewed with a key to species and their illustrations: *Koreocobitis rotundicaudata* and *K. naktongensis* sp. nov. A new species, *Koreocobitis naktongensis* is described based on 9 specimens collected from the Naktong River, Korea. The new species is distinguished from *Koreocobitis rotundicaudata* by the following combination of characters: yellow body colouration with many brownish speckles, truncate caudal fin, fewer vertebrae, and longer head. It is remarked biogeographically that *Koreocobitis naktongensis* is distributed only in the Naktong River, Korea.

Key words : Description, new species, *Koreocobitis naktongensis*, Cobitidae, Naktong River

Introduction

Since *Cobitis rotundicaudata* was described by Wakiya and Mori (1929) from the Han River, the Imjin River and the Naktong River in Korea, Nalbant (1963) mentioned that it would resemble rather the genus *Misgurnus* than the genus *Cobitis*. Thereafter the taxonomic problems were raised in this species on the basis of the morphological characters and geographical features (Kim, 1979; Park and Yang, 1992) and so this species was designated to the genus *Iksookimia* (Kim, 1997). However it was erected as a distinct genus *Koreocobitis* by the diagnostic characters of the colour patterns of the body sides and the movable suborbital spine of the present species (Kim *et al.*, 1997).

During recent investigation on the monotypic species, *Koreocobitis rotundicaudata*, we found that most populations of the species in the Naktong River differed from those of the Han River in the body colour patterns and the shape of the caudal fin. In this paper we are going to describe it as a new species of the genus *Koreocobitis* from the Naktong River and also to redescribe *K.*

rotundicaudata from the Han River, Korea.

Materials and Methods

Most specimens used on the present study were collected in the several streams of Korea by authors and deposited at the Faculty of Biological Sciences, Chonbuk National University, Chonju, Korea (CNUC). Methods of counting and measuring followed Hubbs and Lagler (1964). Vertebral counts were taken from radiographs and the Weberian apparatus located at the anterior vertebral column was counted as four vertebrae. Fin rays were counted with a binocular microscope. Meristics and measurements expressed as percentage of standard length (SL) or head length (HL) were given as range with mean.

Results

Systematic accounts

Genus *Koreocobitis* Kim, Park and Nalbant, 1997

Type species : *Cobitis rotundicaudata* Wakiya

and Mori, 1929

Diagnosis : A loach very similar with *Misgurnus* in shape but differ from it by having movable suborbital spine, scale with a large focal area, and reduced mental lobes.

Etymology : From Korea, the name of the country in which this loach is living and *Cobitis*, the name of a well known loach. Gender feminine.

Distribution : This genus is endemic to Korea; restricted in the Han River, the Imjin River, the Samchokoship-chon River and the Naktong River, Korea.

***Koreocobitis naktongensis* sp. nov.**
(New Korean name: Eolluksekomikkuri)
(Fig. 1)

Cobitis rotundicaudata Wakiya and Mori, 1929 : 33; Uchida, 1939 : 414, pl. 43; Chyung, 1977 : 212.

Iksookimia rotundicaudata, Kim, 1997 : 303, pl. 24.

Holotype : CNUC 21229, male, 108.3 mm SL, Naktong River, Jugkun-ri, Inwol-myon, Namwon-gun, Chollabuk-do, Korea; April 8, 1995, I. S. Kim and J. Y. Park.

Paratypes : CNUC 21231-21238, 2 males and 6

females, 84.3 ~ 134.0 mm SL, same collection data as for holotype.

Diagnosis : *Koreocobitis naktongensis* is distinguished from *K. rotundicaudata* by having many dark blotches on yellow body sides and somewhat truncate caudal fin marginally.

Description : Dorsal fin iii 7, anal fin iii 5, pectoral fin i 8~9, ventral i 6, caudal fin 7+7, vertebrae 45~47, gill rakers 13~14. Measurements of the new species are shown in Table 1.

Body elongate and compressed. Head compressed with upper profile convex. Snout long, protruded and bluntly rounded; eye moderate, superior and lateral; mouth small, inferior, slightly arched with thickened lip well furrowed (Fig. 1B); mental lobes well developed with a short prolongation at tip. Barbel three pairs, one rostral, one maxillary and one maxillo-mandibular. Suborbital spine movable, relatively small straight (Fig. 1C); nostrils closer to eye than tip of snout, close together and anterior pair in a short tube; interorbital space narrow and convex.

Origin of dorsal fin somewhat posterior than origin of ventral fins and nearer base of caudal than tip of snout; distal edge of dorsal fin convex. Caudal peduncle with adipose crest shorter than head, much compressed; caudal fin somewhat truncated marginally. Body covered by minute

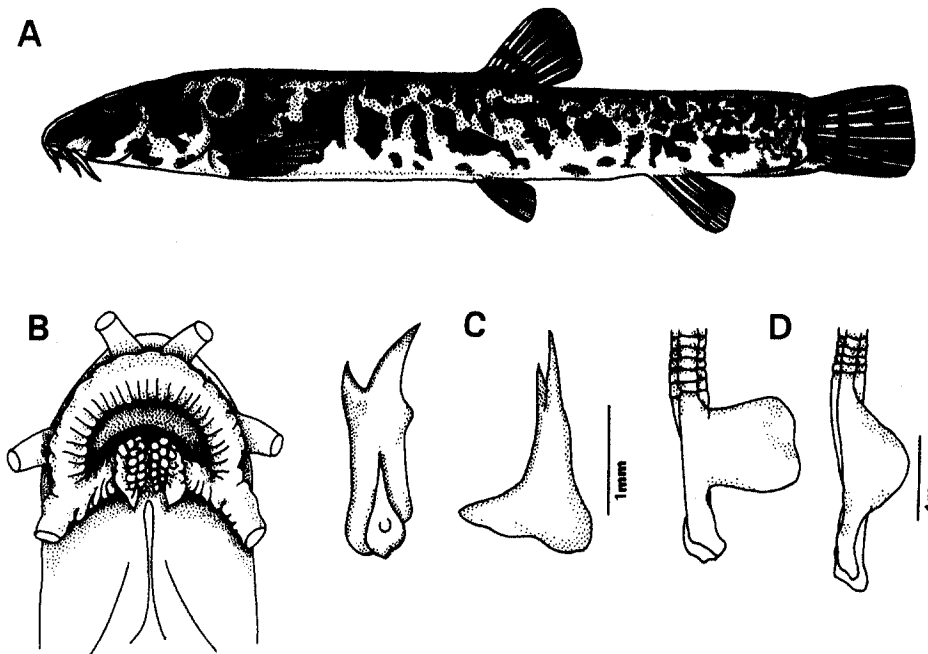


Fig. 1. *Koreocobitis naktongensis* sp. nov. CNUC 21229, male, holotype from the Naktong River, Namwon, Korea (A); mouth part (B); suborbital spine (C); lamina circularis at the base of pectoral fin of male (D) of *K. naktongensis* sp. nov.

Fig. 2. Colour patterns of *Koreocobitis naktongensis* sp. nov. (A) and *K. rotundicaudata* (B).

oval scales with large focal area; no scales on cheek and opercular part. Lateral line very short, not exceed pectoral fin. Largest recorded size 134.0 mm SL.

Colour : Body in life yellowish, with many irregular dark blotches above and below; caudal and dorsal fins yellowish with brown bands marginally. In formalin body grayish with many dark brown blotches; white stripe from tip of snout to back of head; dorsal fin dusky with a blackish band and caudal fin a black band marginally; caudal fin base with a black spot on upper part (Fig. 2A).

Sexual dimorphism : Males have second pectoral ray thickened and more longer than females. The lamina circularis at the base of the pectoral fins in males looks like squarish in larger specimens or round in small specimens (Fig. 1D).

Distribution and habitat : *Koreocobitis naktongensis* was distributed only in the Naktong River, Korea. This species inhabits on the large stones or rocks of the rapid areas in the upper streams (Fig. 3).

Etymology : The species name *naktongensis* referred to the type locality, the Naktong River, Korea.

Koreocobitis rotundicaudata
(Wakiya and Mori, 1929)
(Korean name : Sekomikkuri)
(Fig. 4)

Fig. 3. The geographical distributions of *Koreocobitis naktongensis* sp. nov. (circles) and *K. rotundicaudata* (rectangles) in Korea.

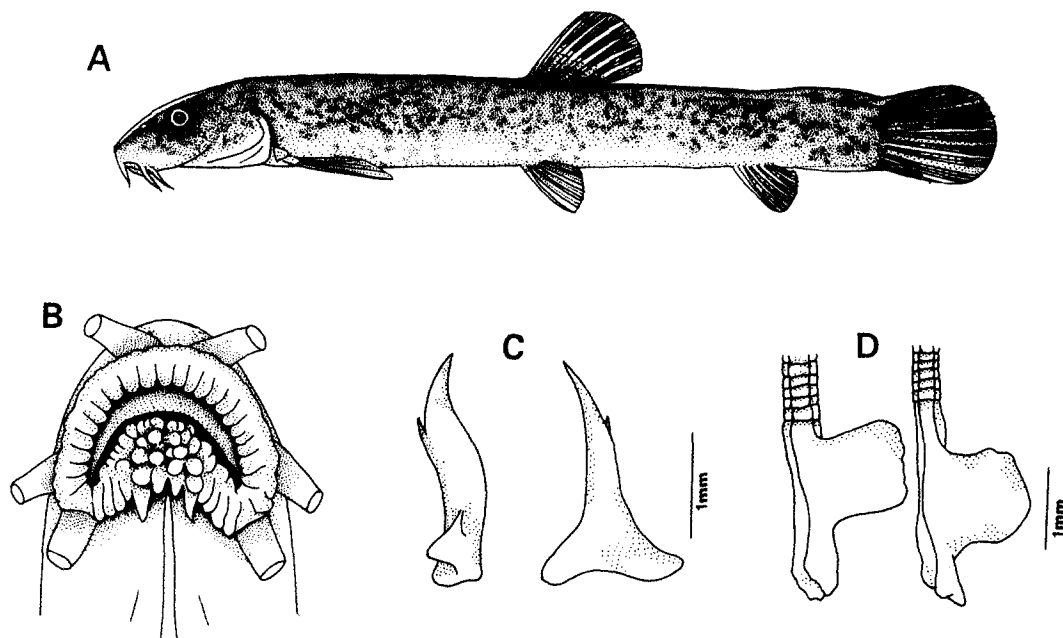


Fig. 4. *Koreocobitis rotundicaudata*, CNUC 24925, female, 123.7 mm SL from the Han River, Chongseon, Kangwon-do, Korea (A); mouth part (B); suborbital spine (C); lamina circularis at the base of pectoral fin of male (D) of *K. rotundicaudata*.

Cobitis rotundicaudata Wakiya and Mori, 1929 : 32, pl. 2, Fig. 2 (orig. description, Danyang, South Han River, Korea); Uchida, 1939 : 414; Chyung, 1977 : 212.

Iksookimia rotundicaudata, Kim, 1997 : 303, Pl. 24 (88 a-c).

Materials : CNUC 24918-24925, 107.2~132.6 mm SL. one male and 7 females, Yorang-myon, Chongseon-gun, Kangwon-do, Korea, Jul. 9, 1996, I.S. Kim and J.Y. Park.

Diagnosis : *Koreocobitis rotundicaudata* is distinguished from *K. naktongensis* by dense dark small spots with orange background on body sides and caudal fin round marginally.

Description : Dorsal fin ray iii 7; anal fin ray iii 5; pectoral fin ray 10; pelvic fin ray 7; vertebrae (47) 48~49; gill rakers 13~15. The measurements of *Koreocobitis rotundicaudata* collected in the South Han River, Korea are shown in Table 1.

Body elongate, cylindrical and compressed behind dorsal fin origin. Head somewhat compressed with upper profile convex; snout long, protruded and rounded; eye small, superior lateral; mouth small, inferior, slightly arched with thickened lips well furrowed. Mental lobes well developed with a short prolongation at tip (Fig. 4B).

Barbel three pairs, one rostral, one maxillary and one maxillo-mandibular. Suborbital spine movable, relatively small slightly curved (Fig. 4C); nostrils closer eye than tip of snout, close to together and anterior pair in a short tube; interorbital space narrow and convex.

Dorsal fin origin closer to base of caudal fin than tip of snout, a little in behind of ventrals; distal edge of dorsal fin convex. Caudal peduncle with adipose crest shorter than head, much compressed; caudal fin rounded marginally. Body covered by minute oval scales with large focal area; no scales on cheek and opercular part. Lateral line very short, not exceed pectoral fin. Largest recorded size 132.6 mm SL.

Colour : Body in life light pink to orange colour with dense brown spots. And tip of snout and base of caudal also light pink to orange. Colour in formalin dark brown above and gray below on body. Dorsal with a blackish band along margin and dusky band its base. Caudal fin base with a black spot on upper part and a less black spot on lower part; submarginal part of caudal fin with a broad black concentric circle (Fig. 2B).

Sexual dimorphism : Males have a more or less squarish laminar process at the base of second ray of pectoral fins (Fig. 4D).

Distribution and habitat : *Koreocobitis ro-*

Table 1. Counts and proportional measurements of *Koreocobitis naktongensis* sp. nov. and *K. rotundicaudata* (mean and standard deviations shown values in parenthesis)

Characters	<i>K. naktongensis</i> sp. nov.		<i>K. rotundicaudata</i>
	Holotype (1 male)	Paratypes (2 males and 6 females)	2 males and 6 females
Standard length (mm)	108.3	84.3~134.0	107.2~132.6
Measurements in SL* (%)			
Head length	20.5	20.3~22.2 (20.8±0.5)	17.9~19.5 (19.0±0.5)
Body depth	12.9	11.2~13.5 (12.3±0.7)	9.8~13.6 (11.6±1.2)
Predorsal length	55.9	54.8~57.7 (56.2±0.8)	52.9~57.7 (55.7±1.4)
Prepectoral length	20.2	19.7~21.1 (20.5±0.4)	18.6~19.9 (19.4±0.4)
Preanal length	78.4	78.2~81.7 (79.7±1.2)	75.1~78.8 (77.3±1.1)
Pelvic-anal length	24.0	23.6~27.7 (25.3±1.3)	22.4~26.4 (24.5±1.1)
Caudal peduncle length	15.9	13.9~16.1 (14.8±0.7)	15.5~19.1 (16.9±1.0)
Caudal peduncle depth	11.5	10.0~12.2 (11.1±0.8)	9.6~11.2 (10.2±0.5)
Base of dorsal fin	8.1	7.3~8.5 (8.1±0.4)	6.5~7.9 (7.3±0.5)
Base of anal fin	6.1	4.7~6.1 (5.5±0.4)	4.8~6.0 (5.3±0.4)
Measurements in HL* (%)			
Snout length	46.0	42.9~49.8 (46.3±1.9)	45.4~49.6 (47.0±1.2)
Eye diameter	12.5	10.9~13.8 (12.6±0.8)	10.8~14.2 (12.5±1.0)
Interorbital width	15.0	12.6~15.7 (14.1±1.0)	11.3~13.0 (12.1±0.5)
3rd barbel length	32.4	24.6~34.0 (29.1±3.2)	20.4~30.0 (26.7±2.9)
Measurements in CPL* (%)			
Caudal peduncle depth	72.3	66.7~86.4 (75.0±5.9)	50.7~72.0 (60.6±5.6)
Counts			
Dorsal fin rays	iii, 7	iii, 6~7	iii, 7
Anal fin rays	iii, 5	iii, 4~5	iii, 5
Pectoral fin rays	i, 9	i, 9~10	i, 9
Ventral fin rays	i, 6	i, 6	i, 6
Vertebrae	45	45~47	47~49

* SL: standard length, HL: head length, CPL: caudal peduncle length

tundicaudata was distributed in the Han River, Imjin River, and Samchokoship-chon River, Korea (Fig. 3) and inhabits usually on the bottoms with small pebbles of the slowly flowing streams, less than 70 cm deep. The stomachs of

adult specimens contained mostly aquatic insects.

Key to the species of *Koreocobitis*

- a. Body colour orange with dense small dark spots from head to tail; caudal fin with round margin; Han, Imjin and Samchokoship-chon River *K. rotundicaudata*
 b. Body colour yellow with large dark mottled blotches from head to tail; caudal fin with somewhat truncate margin; Naktong River *K. naktongensis* sp. nov.

Discussion

After *Koreocobitis rotundicaudata* was briefly described as the genus *Cobitis* from a male specimen in the South Han River, Korea (Wakiya and Mori, 1929), Uchida (1939) detailed it about its morphology and colour based on the specimens in the Naktong River, Korea. Park and Chung (1985) reported that the nucleus of *K. rotundicaudata* contained exceptionally low genome size of 1.3 pg among the 7 cobitid fishes investigated. Park and Yang (1992) pointed that the Sanchong population in the Naktong River of the species might be a distinct species based on the morphometric and electrophoretic analysis of the species without any taxonomic discussion. In the present study we found a new species of the genus *Koreocobitis* from the Naktong River and described it as a *K. naktongensis*, which differed from *K. rotundicaudata* easily by the following characters: body in life yellow with many dark brownish blotches in *K. naktongensis* (vs orange colour with denser minute brown spots in *K. rotundicaudata*), margin of caudal fin truncated (vs rounded), fewer vertebrae (45~47 vs 47~49), longer head length (20.3~22.2 vs 17.9~19.5), more higher caudal peduncle depth (66.7~86.4% in caudal peduncle length vs 50.7~72.0), and wider interorbital width (12.6~15.7% in head length vs 11.3~13.0%). And it is very interesting that the new species lives in the upper streams with swift current, while *K. rotundicaudata* inhabits on the pebble bottoms in the slow-flowing streams.

The genus *Koreocobitis* is very similar with the genus *Misgurnus* in shape and body colour, however the former has a movable suborbital spine and scales with large focal area such as genera *Cobitis* and *Iksookimia*. Nalbant (1963) mention-

ed that the genus *Misgurnus* have more primitive characters than the genera *Cobitis*, *Sabanejewia* and *Niwaella* in the structure of the osseous capsule of the air bladder and the suborbital spine. Recently Nalbant (1993) pointed that the genus *Iksookimia* appears more plesiomorphic than genus *Cobitis* in the features, pigmentation and sexual dimorphism. Based on these opinions, we considered that the genus *Koreocobitis* seems to be more specialized than the genus *Misgurnus* owing to the movable suborbital spine and scale structure, while it seems more plesiomorphic than the genera *Iksookimia* and *Cobitis* in the body colour patterns, shape of caudal fin, and the longer barbels.

It is remarked biogeographically that 2 species of the genus *Koreocobitis* are allopatrically distributed (Fig. 3): *K. rotundicaudata* is occurred in the Han River, the Imjin River, and the Samchokoship-chon River of the West Korean Subdistrict, while *K. naktongensis* restricted in the Naktong River of the South Korea Subdistrict (Kim, 1997) with the other three Korean endemic species, *Niwaella multifasciata*, *Pseudobagrus brevicorpus* and *Microphysogobio rapidus*.

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새코미꾸리속 *Koreocobitis* 어류의 1 신종 및 새코미꾸리 *K. rotundicaudata*의 재기재
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한국산 새코미꾸리속 *Koreocobitis*에는 새코미꾸리 *Koreocobitis rotundicaudata*와 얼룩새코미꾸리(신종) *K. nakdongensis* 2종이 분포한다. 신종인 얼룩새코미꾸리는 새코미꾸리에 비해 갈색의 얼룩무늬반점, 절단형의 꼬리지느러미 후연, 척수골 수의 감소, 긴 두부 등에서 형태적인 뚜렷한 차이를 보여 주고 있으며, 낙동강에만 제한 분포하고 있어 생물지리적으로 주목된다. 또한 이들 2종에 대한 검색표와 함께 형태적 특징을 기재하였다.