**Niwaella brevifasciata**, a New Cobitid Fish (Cypriniformes: Cobitidae) with a Revised Key to the Species of Niwaella

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Abstract  A new cobitid, *Niwaella brevifasciata* is described from 17 specimens collected in small streams near the southwestern coast of Korea. It is distinguishable from congeners by the following characters: lower sides of body with 13 to 19 short vertical bars; mouth with relatively longer barbels and well-developed mental lobes; dorsal fin origin more anterior, between 55.3% and 60.3% SL; vertebral number fewer, 43 to 45; branched anal fin rays fewer, 4. A key to species of *Niwaella* and a brief discussion of the evolutionary history of the genus are included.

Nalbant (1963) erected the genus *Niwaella* (type species *Cobitis delicata* Niwa, 1937) separating it from other cobitoid genera on the basis of a small head and sucker-like mouth with small barbels and the absence of a lamina circularis on the pectoral fin in males. Although Bănărescu and Nalbant (1968) recognized *C. multifasciata* Wakiya and Mori, 1929 as a second species of *Niwaella*, no reasons were given. However Sawada and Kim (1977) substantiated the transfer of *C. multifasciata* from *Cobitis* to *Niwaella* noting the position of the dorsal fin as well as the agreement of the species with the diagnosis of *Niwaella*. To date only the two species of *Niwaella* have been reported.

Recently, cobitid specimens found in small streams flowing to the southwestern coast of Korea have been determined as representing a third species assignable to *Niwaella*. It is described herein and compared with related species. A key to the species of *Niwaella* is provided.

Material and Methods

Counts and measurements followed Hubbs and Lagler (1964), except for caudal peduncle depth, including height of the dorsal and ventral crests. The last two elements of the dorsal and anal fins were counted as one ray. Vertebral counts were from radiographs and include four components associated with the Weberian apparatus. Measurements were taken by dial caliper under a dissecting microscope. The sex of the specimens was determined by direct examination of the gonads. Specimens were deposited at the Department of Biology, Chonbuk National University, Chonju, Korea (CNUC) and National Science Museum, Tokyo, Japan (NSMT).

**Niwaella brevifasciata** sp. nov.

(New Korean name: Jom-susuchi)

(Figs. 1–3; Table 1)


Paratypes. CNUC 19909, male, 39.2 mm SL, and CNUC 19900–19902, 3 females, 47.5–55.3 mm SL, collection date as for holotype; CNUC 19889–19890, 19894, 3 females, 52.4–59.9 mm SL, and NSMT-P 46666–46668, 3 females, 51.8–53.9 mm SL, small stream on Kogum Island, Sinpyong-ri, Kumsan-myon, Chollanam-do, Korea (34°28'44"N, 127°12'04"E), W.-O. Lee, June 14, 1994; CNUC 18943, 18948, and 18957, 3 males, 34.4–36.0 mm SL, and CNUC 18950–18952, 3 females, 39.0–45.2 mm SL, Kumo Island, Dumo-ri, Nam-myon, Yochon-gun, Chollanam-do, Korea (34°31'24"N, 127°45'00"E), I.-S. Kim and W.-O. Lee, August 3, 1993.

Diagnosis. *Niwaella brevifasciata* sp. nov. is distinguishable from its congeners by the following characteristics: color pattern on lower body sides consisting of 13 to 19 short vertical bars; barbels relatively longer; dorsal fin origin more anterior, between 55.3% to 60.3%; vertebral number fewer, 43 to 45; branched anal fin rays fewer, 4; distal margin of caudal fin slightly rounded; caudal peduncle with strong dorsal and ventral crests.

Body elongated laterally compressed (Fig. 1; Table 1). Head small, slightly compressed with blunt snout. Nostrils double on each side, closer to eye than snout, anterior nostril with short tube. Eye small, on upper lateral surface intermediate between snout and gill opening. Interorbital space narrow, convex. Distal part of suborbital spine strongly curved, bifid.

Mouth small, inferior, with fleshy lips; lower lip divided with two well-developed lobes; upper lip with weak transverse wrinkles on surface, well separated from upper jaw. Barbels 3 long pairs, first on rostral, second on maxillae and third on maxillo-mandibular; third barbel 1.5 to 2.0 times eye diameter.

Dorsal fin origin almost directly above pelvic fin origin, predorsal distance 55.3% to 60.3% of SL. Distal margin of dorsal fin more or less straight, that of caudal fin slightly rounded. Caudal peduncle shorter, well-developed crests dorsally and ventrally.

Body covered with minute oval scales with large focal area. Lateral line short, not exceeding length of pectoral fin.
Largest recorded size 59.9 mm SL.

Color in formalin.—Body pale yellow to light brown with dark brown markings. First zone of pigmentation (see Gambetta, 1934) comprising a series of 17–21 dark brown, saddle-like blotches. Second and third zones continuous with irregular brownish speckles. Fourth zone with 13–19 dark brown vertical bars, narrower than interspaces. A conspicuous black spot on upper part of caudal base. Head uniformly spotted, lacking a dark oblique line from snout to eye. Dorsal and caudal fins with 2 or 3 rows of brown dots. Anal, pectoral, and pelvic fins transparent, but sometimes dusky with diffuse pigment spots. Peritoneum appearing black or pigmented with black or dark brown chromatophores.

Sexual dimorphism.—Not obvious in external morphology. Males are possibly smaller than females.

Distribution. The new species was found in small streams flowing to the southern coast of Kohang and its two adjacent islands, Kogum Island of Kohang-gun, and Kumo Island of Yochon-gun, Chollanam-do, Korea (Fig. 4).

Ecological notes. The species inhabits the pebble-covered bottoms of shallow, quick flowing streams, less than 80 cm deep and about 1–3 m wide, for a short distance about two to three kilometers upstream from the mouth.

The stomachs of adult specimens contained insect larvae, algae and vegetal remains. A dissected female, 52.4 mm SL (CNUC 19894) collected in June 14, 1994, carried 54 eggs, 1.30–1.45 mm in diameter.

Etymology. The specific name "brevifasciata" is from Latin brevis meaning "short," and Latin fasciatus meaning "banded," in reference to the lateral body coloration of the species.

Discussion

Niwaella brevifasciata sp. nov. closely resembles Cobitis longicorpus and C. koreensis from Korea in the lateral body color pattern and morphological features of the mouth. It is here included in Niwaella owing to the lack of a lamina circularis on the pectoral fin base in males and a dark oblique line from the snout to the eye, and on the basis of some proportional characters, but is distinguished from the two other species of that genus by its color pattern and long barbels. The mosaic character

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<tr>
<th>Table 1. Proportional measurements of Niwaella brevifasciata sp. nov., expressed as percentage of standard length or head length</th>
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<td><strong>Holotype</strong></td>
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<td><strong>Mean</strong></td>
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<td><strong>Standard length (mm)</strong></td>
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<td>Caudal fin length</td>
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<td>Base of dorsal fin</td>
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Fig. 4. Map showing the localities of *Niwaella brevifasciata* sp. nov. (●) from southwestern Korea.

Fig. 5. Distribution of the genus *Niwaella* of family Cobitidae.
New Cobitid Fish from Korea

appearance of the new species may indicate an initial evolutionary trend towards typical Niwaella from the more generalized Cobitis.

The geographic range of *N. brevifasciata* is very narrow in the southwestern coastal area of Korea (Fig. 5), being disjunct with the ranges of *N. multifasciata* and *N. delicata*. Nalbant (1963) proposed that Niwaella was recently separated from Cobitis, probably in the upper Neogene, and was thus characterised by more specialized characters. Based on the assumption that the ancestor of the subfamily Cobitinae originated in Southeast Asia (Sawada, 1982) and probably extended into Korea and Japan via the Paleo Hwangho River, it is likely that the three species of Niwaella might have arisen by subsequent geographical isolation.

**Key to the species of Niwaella**

1a. 13–19 brown vertical bars on sides of body ... 2
1b. A brown longitudinal stripe or a series of brown blotches along the mid-lateral body surface (Fig. 6b) ................. *N. delicata*
2a. Continuous or discontinuous vertical bars on entire side of body; barbels nearly equal to eye diameter (Fig. 6c) ............ *N. multifasciata*
2b. Vertical bars on lower sides of body only; barbels about twice eye diameter (Fig. 6a)

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*N. brevifasciata* sp. nov.

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