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Scientific name of Nippon-baratanago, a Japanese bitterling of the genus *Rhodeus*

Seirô Kimura[1] and Yoshikazu Nagata[2]

[1] Laboratory of Fishery Environmental Science, Faculty of Agriculture, Kyushu University 46-04, Fukuoka 812, Japan
[2] Department of Biology, Osaka Kyoiku University, 3-1-1 Jonan, Ikeda 563, Japan

The bitterling, *Rhodeus ocellatus*, Japanese name Baratanago, comprises two subspecies in Japan, i.e., the Japanese endemic, *Rhodeus ocellatus smithii* (Regan), Nippon-baratanago, and an immigrant from mainland China, *R. ocellatus ocellatus* (Kner), Tairiku-baratanago, (Nakamura, 1955, 1963, 1969). The immigrant subspecies is rapidly expanding its distribution in lowland waters, covering the original ranges of the endemic form and hybridization between them is occurring intensely in central Honshu and northern Kyushu (Nagata and Nishiyama, 1976; Nagata, 1980). Recently, Nippon-baratanago, the endemic subspecies, has been ranked as one of the most endangered freshwater fishes in Japan (Arai, 1991).

Acheiloganathus smithii, which was erected by Regan (1908) on the basis of a single specimen from the Nodogawa River in Kioto (=Kyoto), was applied to specimens of Nippon-baratanago collected from the Yodogawa River by Jordan et al. (1913). Miyadi (1928) suggested that Nippon-baratanago from Lake Biwa may also be this species and later Miyadi (1935) suggested that the generic name *Rhodeus* was more appropriate than *Acheilognathus*, because Nippon-baratanago had neither barbels nor an extensive lateral line, or at most a very short lateral line posterior to the opercle.

On the other hand, Jordan and Thompson (1914) erected *R. kurumeus* on the basis of specimens of Nippon-baratanago from the Chikugo River near Kurume in northern Kiusiu (=Kyushu). Jordan and Hubbs (1925) and Tanaka (1933) also identified Nippon-baratanago in Kyushu as *R. kurumeus*. Most Japanese ichthyologists, however, have considered both *R. kurumeus* and *A. smithii* to be a junior synonym of *R. ocellatus*.

In 1942, *R. ocellatus ocellatus* was introduced into Japan from China (Nakamura, 1955). Subsequently, Nakamura (1955) gave the names Nippon-baratanago for *R. ocellatus smithii* and Tairiku-baratanago for *R. ocellatus ocellatus*. According to Nakamura (1955, 1963, 1969), the introduced subspecies showed a distinct white line along the anterior margin of the ventral fin, whereas the Japanese endemic lacked such a line, its mature males usually having blackish ventral fins. Nakamura's classification (1955) has been followed by Miyadi et al. (1963) and most Japanese ichthyologists.

In the summer of 1986, the senior author had an opportunity to examine the holotype of *A. smithii* at British Museum (Natural History) (BMNH), and had doubts on its identity. Therefore we requested loans of the type specimens of *A. smithii* and *R. kurumeus*, and reconsidered the scientific name of Nippon-baratanago. As we concluded that *Rhodeus ocellatus kurumeus* is the valid name for this subspecies, the details are reported below.

Comparison of type specimens of *Rhodeus kurumeus* and *Acheilognathus smithii*. Photographs, illustrations, proportional measurements and counts of the type and non-type specimens of *R. kurumeus* and *A. smithii* are shown in Figs. 1A, C, 2, 3A and Table 1. Also, those of *R. ocellatus kurumeus* from Osaka Prefecture are added as Figs. 1B, 3B and in Table 1.

The type and non-type specimens of *R. kurumeus*, collected at Kurume in 1900, are considered to be a pure strain of Nippon-baratanago endemic to Japan, because the first introduction of Tairiku-baratanago seems to have occurred during World War II (Nakamura, 1955). In addition, none of the specimens collected from Osaka Prefecture, which is about 500 km east of Kurume, could be distinguished from the borrowed examples of *R. kurumeus* (see Fig. 1A, B; Table 1).

The holotype of *A. smithii* was slightly low in body depth and showed a long, dark, lateral band, extending from below the mid point between the posterior margin of the orbit and the origin of the dorsal fin to the base of the caudal fin (Figs. 1C, 2). However, the dark lateral band in the type and non-type specimens of *R. kurumeus* and in *R. ocellatus kurumeus* from Osaka was, anteriorly, very faint below the midpoint of the dorsal fin, and tapered to nothing posteriorly (Fig. 1A, B). The first principal rays of the dorsal and anal fins of *A. smithii* were more stout, spinous and fewer in distal segments than those of the types and non-types of *R. kurumeus* and *R. ocellatus kurumeus* (Fig. 3A, B). The uppermost row of scales of *A. smithii* covered the basal part of

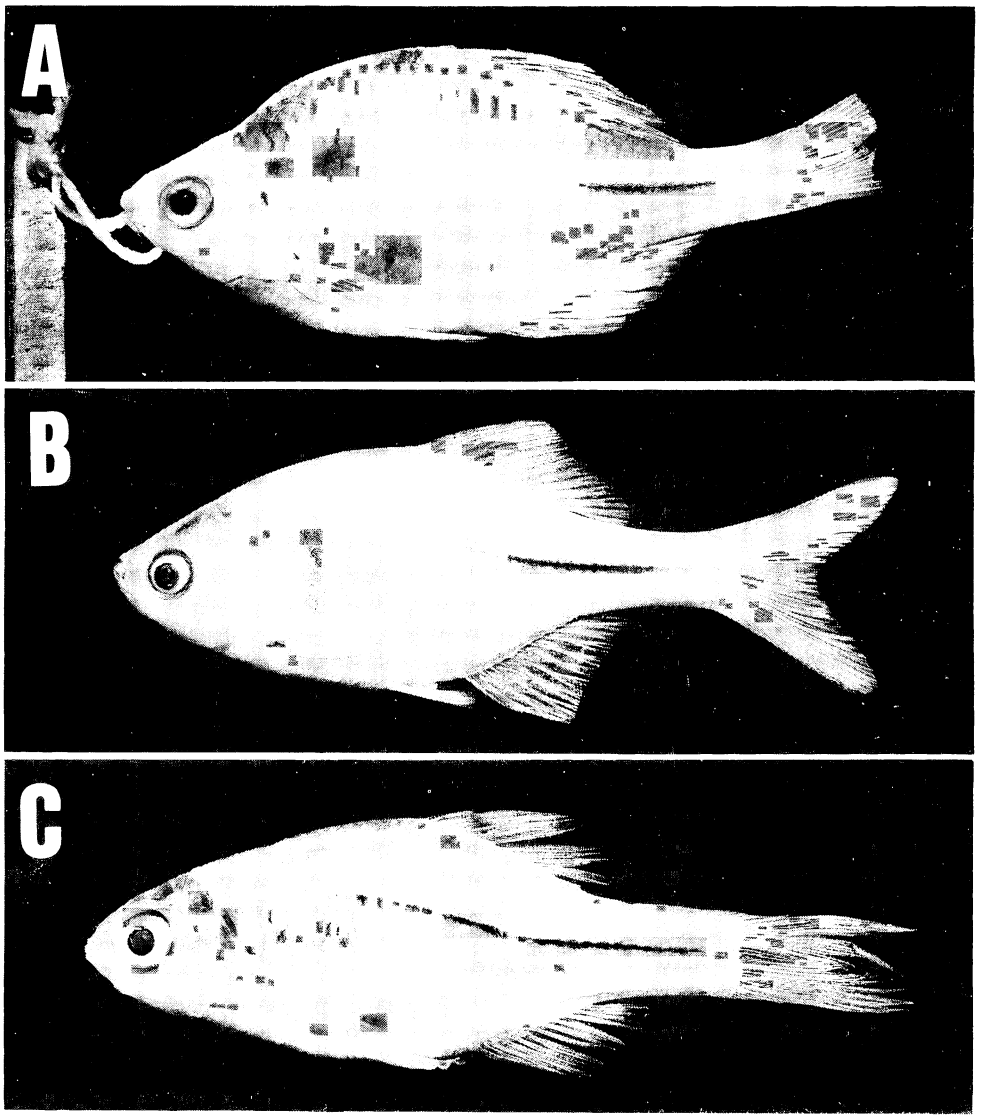

Fig. 1. Photographs of the holotype of *Rhodeus kurumeus* and *Acheilognathus smithii*, and a specimen of *R. ocellatus kurumeus*. A. *Rhodeus kurumeus*, holotype, SU 22605, male, 41.7 mm SL. B. *R. ocellatus kurumeus*, KMNH VR 100107, male, 32.1 mm. C. *Acheilognathus smithii*, holotype, BMNH 1907. 12. 23. 125, female, 29.3 mm.

the dorsal fin rays, but this character was not observed in the specimens of *R. kurumeus* and *R. ocellatus kurumeus* (see Fig. 3A, B). However, such character can be seen clearly in specimens of *R. atremius* (Jordan et Thompson), Kaze-togetanago, and *R. suigensis* (Mori), Suigen-zenitanago (Fig. 3C, D). These characters were not seen in the two subspecies of *R. ocellatus* (Figs. 1–3).

Materials examined. *Rhodeus kurumeus*: SU (Natural History Museum, Stanford University) 22605, holotype, mature male, 41.8 mm SL, Chikugo River at Kurume, Kiusiu, 1900, deposited at CAS; USNM 074785, formerly SU 7350, paratype, mature male, 42.2 mm, Chikugo River, 1900?, catalogued on June 2, 1913; SU 22576 (10 of 20 non-type specimens), 1 male and 9 females, 26.5–34.7 mm, data as for holotype, deposited at CAS.

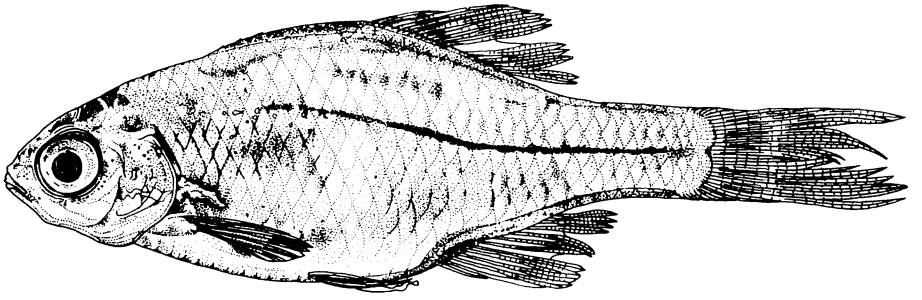

Fig. 2. Illustration of the holotype of *A. smithii.*

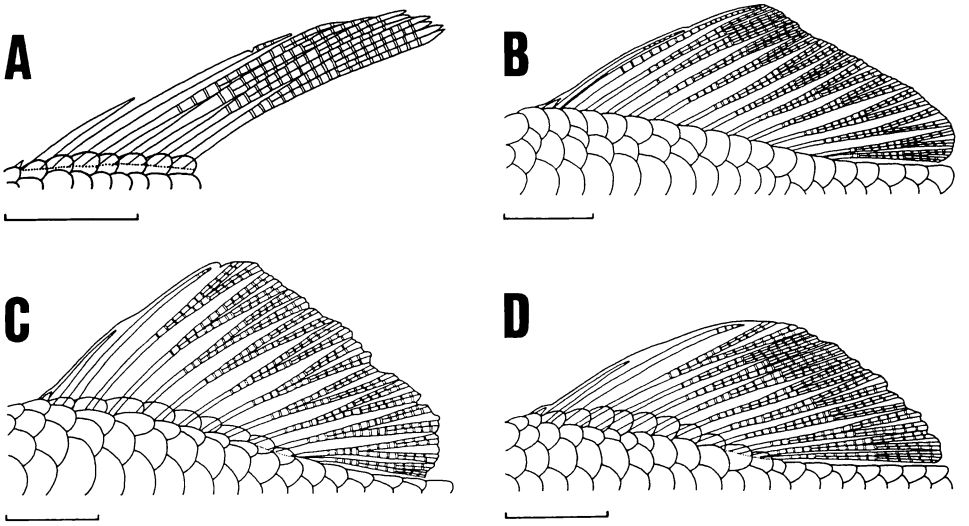

Fig. 3. Illustrations of the dorsal fin of *A. smithii* and Japanese members of *Rhodeus.* Scales indicate 2.5 mm. A. *A. smithii*, holotype, partial sketch. B. *R. ocellatus kurumeus*, KMNH VR 100107, male 32.1 mm SL. C. *R. atremius*, KMNH VR 100125, male, 30.1 mm. D. *R. suigensis*, KMNH VR 100120, male, 28.6 mm.

Rhodeus ocellatus kurumeus: KMNH VR (Kitakyushu Museum of Natural History, Vertebrate Recent) 100107–100119, 10 males and 3 females, 26.0–33.2 mm SL, Kô-dachi, Yao-shi, Osaka Prefecture, August 24, 1988.

Acheilognathus smithii: BMNH 1907. 12. 23. 125, holotype, adult female, 29.3 mm SL, Nodogawa River, Kioto, December 23, 1907.

Rhodeus atremius: KMNH VR 100123–100130, 3 males and 5 females, 28.6–33.5 mm SL, Shirogane River, Omuta-shi, Fukuoka Prefecture, July 11, 1987.

Rhodeus suigensis: KMNH VR 100120–100122, 3 males, 24.4–29.0 mm SL, Asahi River basin, Shoda, Okayama-shi, Okayama Prefecture, March 3, 1978.

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Table 1. Proportional measurements and counts of types and non-types of *Rhodeus kurumeus*, specimens of *R. ocellatus kurumeus* from Osaka Prefecture and the holotype of *Acheilognathus smithii*. Mean values are enclosed in parentheses.

	Rhodeus kurumeus			*R. ocellatus kurumeus*	*Acheilognathus smithii*
	SU 22605	USNM 074785 (SU 7350)	SU 22576 10 of 20 specimens	KMNH VR 100107–100119 13 specimens	BMNH 1907.12.23.125
	Holotype	Paratype	Non-types	Specimens from Osaka	Holotype
In mm					
total length	?	54.4	?	33.4–42.5 (39.5)	39.0
standard length (SL)	41.8	42.2	26.5–34.7 (29.3)	26.0–33.2 (30.5)	29.3
In parcentage in SL					
body depth	45.5	46.4	37.8–44.6 (41.0)	37.3–40.8 (39.4)	41.0
head length	27.0	26.3	24.9–28.2 (26.5)	24.4–25.8 (25.0)	26.6
snout length	6.5	5.2	3.8– 5.8 (4.8)	5.1– 6.2 (5.6)	5.8
post orbital space	12.0	12.6	10.7–12.8 (11.7)	10.3–11.5 (10.9)	10.1
eye diameter	8.6	8.5	9.2–10.7 (9.9)	8.0– 9.2 (8.6)	10.6
depth of caudal peduncle	12.4	12.6	11.5–12.8 (12.3)	11.2–13.2 (12.3)	14.3
In number					
D (branched rays)	11	10	9–11 (10.1)	10–11 (10.9)	11
A (branched rays)	11	10	9–11 (10.0)	10–11 (10.8)	11
scales	32	32	31–33 (32.3)	32–34 (32.9)	33
pored scales (left/right)	0/0	0/0	0–2/0 (0.3/0)	0/0	?/3
vertebrae*	11+18=29	12+17=29	11 or 12+17 or 18=29 (29)	12 or 13+17, 18, 19=29–31 (30.2)	11+17=28
Sexuality (M, male; F, female)	M	M	M, 1; F, 9	M, 10; F, 3	F
Date of collection	1900	1900?	1900	Aug. 24, 1988	Dec. 23, 1907
Locality	Chikugo R.	Chikugo R.	Chikugo R.	Kôdachi, Yao-shi, Osaka	R. Nodogawa, Kioto
Collector	D. S. Jordan & J. O. Snyder	D. S. Jordan	D. S. Jordan & J. O. Snyder	Yoshikazu Nagata	R. Gordon Smith

* From soft X-ray photographs. The four anteriormost transformed centra are excluded.

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ニッポンバラタナゴの学名について

木村清朗・長田芳和

日本産バラタナゴは，在来のニッポンバラタナゴ *Rhodeus ocellatus smithii* と中国渡来のタイリクバラタナゴ *R. ocellatus ocellatus* に分けられていた．*Acheilognatus smithii* と *R. kurumeus* の完模式標本を観察したところ，*A. smithii* は，体側に長い明瞭な暗色縦帯をもち，背鰭と臀鰭の最初の主鰭条がやや強く，分節が少ないので，バラタナゴとはいえない．*R. kurumeus* の形態は，ニッポンバラタナゴによく一致した．タイリクバラタナゴの日本への侵入は第二次大戦中であったので，1900年採集の *R. kurumeus* の完模式標本，副模式標本1個体，ほか10個体の標本は，すべてニッポンバラタナゴと判断された．したがって，ニッポンバラタナゴの学名として *R. ocellatus kurumeus* が正しい．一方，*A. smithii* は，カゼトゲタナゴ *R. atremius* とスイゲンゼニタナゴ *R. suigensis* によく似るが，どちらとも判定できなかった．

（木村：812 福岡市東区箱崎 6-10-1 九州大学農学部水産増殖環境学講座；長田：563 池田市城南 3-1-1 大阪教育大学教育学部生物学教室）