On the Earliest Published Species of *Rhinogobius.* With a Redescription of *Gobius brunneus* Temminck and Schlegel, 1845.

記吻鰕虎*(Rhinogobius)*魚類的最早發表之種類，並將*Gobius brunneus* Temminck and Schlegel, 1845 重新描述為褐吻鰕虎

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Abstract : *Gobius brunneus* Temminck and Schlegel, 1845, the oldest species of the genus *Rhinogobius* Gill, 1859, was described on the basis of a single specimen. At present three undescribed, but nicknamed, *Rhinogobius* species occur sympatrically in the river mouths in Nagasaki Bay, the type locality of *Rhinogobius brunneus*. In order to find out which of them can be recognized as *R. brunneus*, we collected the three sympatric *Rhinogobius* species (*Rhinogobius* spp. CB, DA, and OR) from river basins around the Nagasaki Bay. After comparing representatives of the three species with the holotype of *G. brunneus*, we conclude that the so-called "*Rhinogobius* sp. DA" is the most similar one. A redescription of *Gobius brunneus* is provided in this paper. The identification of the extant "*Rhinogobius* sp. DA" with *R. brunneus* will be beneficial for further taxonomic studies on *Rhinogobius* species, especially in Japanese waters.

Keywords: *Gobius brunneus*, *Rhinogobius,* Yoshinobori species complex, redescription, freshwater fish, fish fauna, Japan.

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摘要：本文係報告重新檢視單一模式標本之日本鰕虎魚類*Gobius brunneus* Temminck and Schlegel, 1845，將此確定為最早發表的吻蝦虎屬(*Rhinogobius* Gill, 1859)的魚種，稱之為褐吻鰕虎。本研究為了能夠找出日本何種的吻鰕魚類為 *Rhinogobius brunneus*，我們重新採集了日本本州的長崎灣(本種之模式產地)溪流水系的三個生態共域物種之吻鰕虎魚類(*Rhinogobius* Gill, 1859)，包括有：橫斑型、黑色型、橙色型等三種。
經本研究詳細地針對模式標本與現存三種魚類之形態學比較，我們分析確定出「黑色型」為最早定名的吻鰕虎魚類。本文重新詳細描述本種之形態特徵，此重要的定名後，將對往後解析日本水域的各種吻鰕虎魚類之物種分類學上，確定有更進一步的研究助益。

關鍵詞：褐吻鰕虎、吻鰕虎、日本吻鰕虎相似種群、淡水魚類、魚類相、日本

Introduction

Rhinogobius Gill, 1859 is a very species-rich freshwater gobiid genus in river drainages, lakes and ponds of the west Pacific, comprising at least 85 valid species in the West Pacific region (Akihito et al., 1984, 1993, 2002; Masuda et al., 1989; Chen and Shao, 1996; Chen et al., 1998, 1999a-c; Chen and Miller, 1998; Chen and Fang, 1999, 2006; Chen and Kottelat, 2000, 2003, 2005; Chen et al., 2008; Chen and Miller, 2008; Yang et al., 2008).

On the main islands of Japan: Hokkaido, Honshu, Shikoku, and Kyushu, there are at least 8 distinct species of the “Yoshinobori species complex”, which tentatively have been named after their diagnostic colour patterns or specific localities: *Rhinogobius* spp. BF (=banded fin), BW (Biwa Lake), CB (cross band), CO (cobalt), DA (dark), LD (large dark), OR (orange), and TO (Tokai district). All above species have a common vertebral count of 26 except *R. flumineus* (Mizuno, 1960), a fluvial species with a high vertebral count, modally 27. The complicated synonymy problem has never been well resolved (Akihito et al., 2002; Takahashi and Okasaki, 2002; Suzuki and Sakamoto, 2005; Suzuki et al., 2010).

In Nagasaki Bay three *Rhinogobius* species are found (Fukagawa and Dotsu, unpublished data). However, which one of these 3 extant species should be considered conspecific with

the earliest published *Rhinogobius* species, *Gobius brunneus* Temminck and Schlegel, 1845 is still unsettled. Takagi's (1962) assumption that all Yoshinobori varieties can be lumped in one species which he identified as *R. brunneus*, is no longer tenable.

In order to resolve the problem, we decided not only to re-examine the holotype of *Gobius brunneus*, but also to collect all *Rhinogobius* species from the river basins of Nagasaki Bay, its type locality in Japan. The aim of this paper is to match an extant *Rhinogobius* species to the holotype of *G. brunneus*, which was collected about 180 years ago. The result of our research will be beneficial for further taxonomic studies of the Japanese Yoshinobori species complex.

Materials and Methods

All gobiid specimens were collected by hand-net. All counts and measurement were made from specimens preserved in 70% ethanol. Morphometric methods follow Miller (1988) and meristic methods follow Akihito et al. (1984), Chen et al. (1999) and Chen et al. (2008). Terminology of cephalic sensory canals and free neuromast organs is from Wongrat and Miller (1991), based on Sanzo (1911). The type specimen and comparative materials are deposited at both institutions including the NCB Naturalis, Leiden (RMNH) and the Osaka Museum of Natural History, Osaka (OMNH).

Meristic abbreviations: A, anal fin; C, Caudal fin; D1 and D2, 1st and 2nd dorsal fin respectively; P, pectoral fin; V, pelvic fin, and VC, vertebral count. The extension pattern of the predorsal squamation is described on the basis of three boundary points mentioned in the following section: 1. anterior extension of middle series, 2. anterior extension of lateral series, 3. anterior extension of most concave area (Fig. 1.).

Results and Discussion

Morphological comparison with 3 sympatric species collected from the Rivers of Nagasaki Bay.

Finding out which species of Yoshinobori species complex is conspecific with *Gobius brunneus* actually is difficult, since there are very few clues to identify them. As the holotype

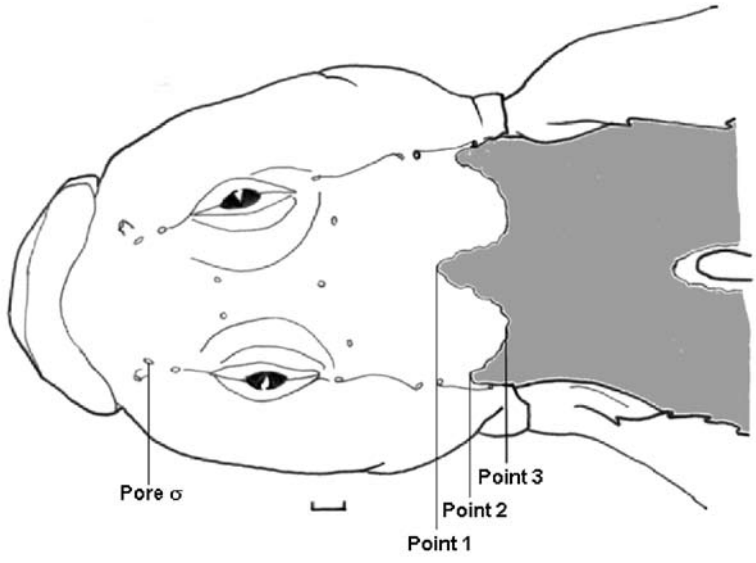


Fig. 1. Predorsal squamation pattern of *Rhinogobius brunneus* in Japan. The squamation region marked as gray background. Three boundary points mentioned in following section for anterior extension of middle series (point 1), that of lateral series (point 2) and most concave area (point 3). Anterior terminal pore σ just behind anterior nostril is also indicated. Illustration by I-Shiung Chen.

of *Gobius brunneus* at some stage of its preservation was seriously dehydrated and is now distorted (Fig. 2), it has only a limited number of characters that can be used for morphological comparison with specimens of the current new collection of 3 *Rhinogobius* species found at the type locality. The holotype of *G. brunneus* also lacks any trace of its former colour pattern. The description of the live colours by Temminck and Schlegel (1845) based on the accompanying plate and a description of Bürger is clearly referable to different species (Koumans, 1935; Boeseman, 1947; see below). However, after a detailed comparison of the species we found that the following features can be used as distinguishing characters: the number of the pectoral fin rays, the canal pore system, and the pattern of the predorsal squamation.

The ranges of pectoral-fin ray counts of the 3 *Rhinogobius* species and the holotype of *G. brunneus* are shown in Table 1. Apparently the total number of pectoral-fin rays of the holotype, 37, well fits the range of *Rhinogobius* sp. DA, which has a range of 36–40, modally 38, whereas it does not fit within the ranges of *Rhinogobius* sp. CB and sp. OR, both of which have a higher number of rays, with the range 41–42 and 40–42 respectively modally 42.

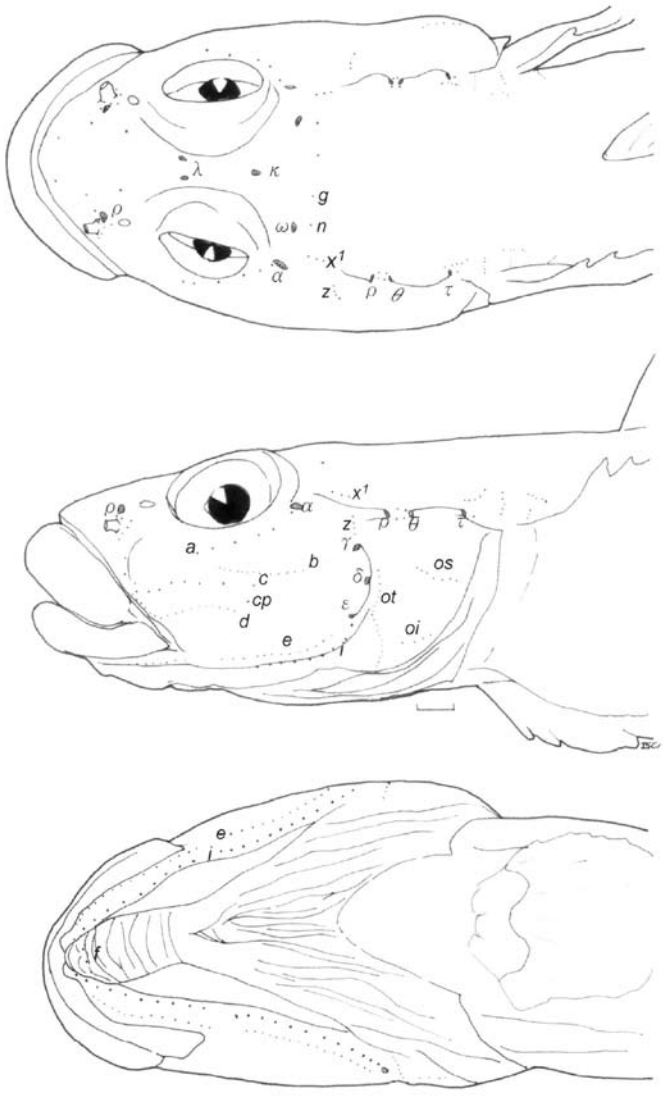


Fig. 2. Head lateral-line system of *Rhinogobius brunneus.* male, OMNH–P 35063, 40.1 mm SL, Aikawagawa-River, Nagasaki, Japan. Illustration by I-Shiung Chen.

A comparison of the position of the anterior terminal canal pore σ (shown in Table 2) makes clear that the holotype of *G. brunneus* in this respect is very similar to both *Rhinogobius* spp. DA and OR with the pore slightly behind the anterior nostril, unlike *Rhinogobius* sp. CB where the pore lies somewhat in front of the anterior nostril.

Table 1. Comparison of distribution frequency of total pectoral fin rays for holotype of R. *brunneus* with three defined colouration types.

Species	Total rays of both pectoral fins							
	36	37	38	39	40	41	42	M
Holotype of *Gobius brunneus*	-	1	-	-	-	-	-	37.0
Rhinogobius sp. DA (Nagasaki)	1	1	3	-	1	-	-	37.8
Rhinogobius sp. OR (Nagasaki)	-	-	-	-	1	-	4	41.6
Rhinogobius sp. CR (Nagasaki)	-	-	-	-	-	2	5	41.7

Concerning the predorsal squamation, all 3 extant species from the type locality seem to have a similar pattern with a trifurcate anterior margin (Fig. 1 and Table 2). However, in the holotype of *G. brunneus* and *Rhinogobius* sp. DA "point 3" lies on a level in front of the vertical through the upper end of the gill opening, whereas in both *Rhinogobius* spp. CB and sp. OR "point 3" always lies behind a vertical through the upper end of the gill opening.

On the basis of the similarity in the three above mentioned features we conclude that the holotype of *Gobius brunneus* is conspecific with the so-called "*Rhinogobius* sp. DA" collected from the Nagasaki Bay.

The following section contains a formal redescription of *Rhinogobius brunneus* based on the holotype and recently collected specimens of *Rhinogobius* sp. DA from river basins of the type locality.

Table 2. Morphological comparison of anterior terminal pore and extension pattern of predorsal squamation for holotype of *G. brunneus* and 3 sympatric species from the Rivers of Nagasaki, Japan.

Species/types	Terminal pore Θ	Point 1	Point 2	Point 3
Holotype of *G. brunneus*	slightly behind AN*	close to pore Θ	slightly beyond pore τ	Extending slightly beyond vertical through upper end of gill-opening
Rhinogobius sp. CR (Nagasaki)	in front of AN	close to pore Θ to beyond pore Θ	extending beyond pore τ	Not reaching to vertical through upper end of gill-opening
Rhinogobius sp. DA (Nagasaki)	slightly behind AN	close pore Θ to vertical between pore Θ	slightly beyond pore τ	Extending slightly beyond vertical through upper end of gill-opening
Rhinogobius sp. OR (Nagasaki)	slightly behind AN	reaching between pores Θ and τ	slightly beyond pore τ	Not reaching to vertical through upper end of gill-opening

* AN = Anterior nostril.

SYSTEMATICS

Redescription of *Gobius brunneus.*

Rhinogobius brunneus (Temminck and Schlegel, 1845)

(Figs. 2–4) , 〔Japanese name: Kuro-Yoshinbori〕

Gobius brunneus Temminck and Schlegel, 1845 (Type locality: Bay of Nagasaki, Japan).

Rhinogobius brunneus, Boeseman, 1947: 123; Takagi, 1962: 296; Akihito et al., 1984: 269 (in part).

Rhinogobius sp. DA, Akihito et al., 1993: 1080; Akihito et al., 2002: 1253.

Material examined:

Type material

Holotype.- RMNH PISC 1923, 46.0 mm SL, Nagasaki Bay, Japan.

Non-type material.

OMNH–P 35046, 3 specimens, 33.8–41.2 mm SL, coll. G. Fukagawa, 11 Jan. 2009, Aikawagawa-River, Aikawa-chou, Nagasaki, Nagasaki Pref., Japan.

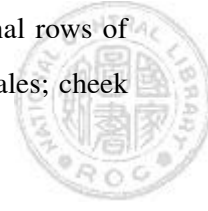
OMNH–P 35063, 1 specimen, 40.1 mm SL, male, other data same as above.

OMNH–P 35064, 1 specimen, 42.0 mm SL, female, other data same as above.

OMNH–P 35065, 2 specimens, 40.7–42.9 mm SL, other data same as above.

Diagnosis.

Rhinogobius brunneus can be distinguished from its congeners by the unique combination of the following features: Second dorsal fin I/8; anal fin I/8; pectoral fin rays modally 19, total fin rays 36–40; longitudinal scale rows 32–35; transverse scale rows 9–10; predorsal scales 11–13 with a trifurcate anterior margin of which point 3 lies above the upper gill opening; 10 + 16 = 26 vertebrae; gill opening extending ventrally to the vertical midline of the opercle; and specific coloration: basal region of body scale pockets with a bright orange spot in males, but somewhat indistinct in females; lateral side with a middle longitudinal row of discontinuous brownish black spots or bars in females; dorsal lateral region with 3–4 longitudinal rows of black spots in females; caudal fin base with 2 separate, vertical black bars in females; cheek



scattered with 16–25 small, orange red spots; second dorsal fin with 4 longitudinal rows of reddish brown bars or spots in males; pectoral fin base with a basal distinct, oblique deep brown stripe; caudal fin with 8-10 waving vertical orange to brown stripes in males.

Description.

For body proportions see Table 3. Body cylindrical anteriorly, compressed posteriorly. Head relatively larger in males. Snout slightly depressed. Eye large, dorsolateral. Cheek rather fleshy in males. Lips thick. Mouth oblique, rear edge extending to vertical of anterior margin of eye. Both jaws with 3–4 rows of conical teeth. Outer row teeth enlarged. Tongue margin rounded. Anterior nostril in a short tube and posterior nostril round. Gill opening extending ventrally to vertical midline of opercle. Vertebral count 10 + 16 = 26.

Fins. –D1 VI, D2 I/8; A I/8; P 18–20 (modally 19) with total rays 36–40 (modally 38); V I/5+I/5. D1 2nd or 3rd spinous rays longest, with rear tip when depressed, in males extending to base of 1st to 2nd branched rays of D2; not extending to D2 base in females. The rear tips of D2 and A rays when depressed not reaching the procurrent rays of C. P large and oblong, its rear tip almost extending to vertical line of anus in males, but never reaching so far in females. V rounded, spinous rays with pointed membrane lobe. C elliptical, rear edge rounded.

Scales. –Body with moderately large ctenoid scales, anterior predorsal area naked; posterior predorsal area and belly with cycloid scales. Longitudinal scale rows 32–35 (modally 33); transverse scale rows 9–10 (modally 10); predorsal squamation trifurcate anteriorly with middle scale series 11–13 (modally 12) with the concave area-"point 3" slightly beyond the crossing vertical of upper tips of both gill-openings; scales between D1 origin and upper origin of P base 9–11 (modally 10). Head, prepectoral and prepelvic regions naked.

Head lateral-line system. (Fig. 2) –

Canals. – Nasal extension of anterior oculoscapular canal as paired terminal pores σ. Anterior interorbital sections of oculoscapular canal separated, with paired pores λ. A single pore κ on posterior interorbital region. Pore ω present near posterior edge of eye. Lateral section of anterior oculoscapular canal with pores and terminal pores ρ. Posterior oculoscapular canal with two terminal pores θ and τ.

Gap between anterior and posterior oculoscapular canals rather smaller than the length of posterior oculoscapular canal. Preopercular canal present, with three pores γ, δ, and ε.

Sensory papillae. – Row *a* extending forward to the point beyond the vertical through middle of eye. Row *b* rather long, with densely set row of papilla extending forward to the vertical through middle of the eye. Row *c* and *d* long, row *c* extending behind rear margin of pupil. A single *cp* papilla. Row *f* as a pair of papillae. The anterior extension of the opercular row *oi* well separated with row *ot*. Other papillae can be seen in detail in Fig. 2.

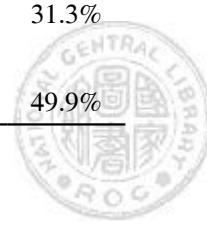
Colouration in fresh specimens. (Fig. 4) – Body brown to light brown. Basal region of most body scale pockets with a bright orange spot in males, but a somewhat smaller, indistinct, orange brown spot in females. Middle of lateral side with a longitudinal row of discontinuous brownish black spots or bars in females. Caudal fin base with 2 separate, vertical black bars in females. Dorsal lateral region with 3–4 longitudinal rows of black spots in females. Snout with a pair of broad red lines in front of the orbit united at the snout tip. Cheek with an infraorbital, oblique red line, which is shorter in males, and longer, extending to the upper lip in females. Cheek scattered with 16–25 small, orange-red spots, which are more bright in males. Upper region of opercle with three somewhat oblique, parallel reddish-brown stripes. First dorsal fin with yellow margin on upper region of anterior 3 rays, indistinct in females. The fin membrane with a dark brown background and all spinous rays deep reddish brown. Second dorsal fin with outer margin yellow. The fin membrane with dark brown background and all spinous rays deep reddish brown or deep brown. The fin with about 4 longitudinal rows of reddish brown bars or spots in males and 2 longitudinal rows of brown spots in females. Anal fin with grey background and rays orange brown in males, but greyish brown in females. Pectoral fin base with a basal distinct, oblique deep brown stripe following with a parallel shorter, lighter stripe or waving mark. Caudal fin with 8–10 waving vertical orange to brown stripes with grey background in males; merely with 3–5 basal vertical rows of brown spots in females. Pelvic fin deep grey in males, pale grey in females.

Fig. 3. Dehydrated holotype of *Gobius brunneus* (= *Rhinogobius brunneus*), RMNH 1923, 46.0 mm SL, Nagasaki Bay, Japan. Photograph by eelco Kruidenier.

Fig. 4. *Rhinogobius brunneus*, (a) male, OMNH–P 35063, 40.1 mm SL; and (b) female, OMNH–P 35064, 42.0 mm SL, Aikawagawa-River, Nagasaki, Japan. Photograph by Toshiyuki Suzuki.

Table 3. Morphometry of *Rhinogobius brunneus* from Nagasaki, Japan.

Cat. No. (OMNH)	35063	35064	35046	35046	35065	35065
Sex.	M	F	F	F	F	F
Standard length (mm)	40.1	42.0	37.7	41.2	42.9	40.1
% in standard length						
Head length	33.0%	29.9%	32.0%	32.1%	31.0%	29.9%
Predorsal length	42.6%	42.1%	40.0%	41.6%	41.3%	41.2%
Snout to 2nd dorsal length	61.4%	63.2%	61.3%	62.8%	62.3%	63.6%
Snout to anus	58.8%	60.0%	58.8%	60.3%	59.6%	59.9%
Snout to anal fin origin	64.9%	65.1%	64.1%	65.7%	64.4%	65.2%
Prepelvic length	31.8%	26.7%	28.8%	30.6%	29.0%	28.5%
Caudal peduncle length	22.5%	25.5%	21.9%	24.0%	22.9%	23.5%
Caudal peduncle depth	12.2%	11.5%	11.4%	12.2%	12.4%	11.7%
1st dorsal fin base	16.7%	16.8%	16.1%	16.3%	16.0%	18.1%
2nd dorsal fin base	16.6%	16.8%	15.3%	16.7%	18.0%	18.5%
Anal fin base	13.9%	13.5%	14.0%	14.5%	14.1%	16.2%
Caudal fin length	28.7%	27.9%	24.8%	25.2%	25.3%	25.2%
Pectoral fin length	24.6%	23.7%	23.1%	26.7%	26.7%	24.1%
Pelvic fin length	15.9%	15.3%	15.0%	15.1%	16.6%	17.1%
Body depth at pelvic fin origin	14.7%	15.8%	14.6%	16.5%	17.1%	16.0%
Body depth at anal fin origin	15.4%	14.9%	14.7%	16.1%	15.9%	15.1%
Body width at anal fin origin	11.0%	10.2%	10.4%	11.5%	11.5%	10.8%
Pelvic fin origin to anus	28.1%	30.7%	31.8%	31.2%	29.5%	32.4%
% in head length						
Snout length	42.9%	32.8%	32.3%	31.6%	35.5%	33.7%
Eye diameter	24.5%	26.0%	23.9%	24.9%	23.8%	26.5%
Cheek depth	27.6%	26.6%	25.0%	26.9%	29.5%	27.7%
Postorbital length	47.2%	48.1%	41.5%	42.5%	46.7%	49.4%
Head width in maximum	55.2%	73.2%	60.4%	67.5%	62.9%	69.2%
Head width in upper gill	40.0%	49.3%	43.8%	41.1%	41.3%	46.6%
Bony interorbital width	7.0%	6.3%	4.8%	7.3%	7.5%	7.8%
Fleshy interorbital width	20.0%	28.3%	22.8%	24.9%	28.7%	25.3%
Low jaw length	36.4%	32.4%	27.8%	27.9%	34.4%	31.3%
% in caudal peduncle length						
Caudal peduncle depth	54.3%	45.1%	52.2%	50.9%	54.0%	49.9%



Notes on the original description of *Gobius brunneus*

According to the shipping lists, Heinrich Bürger identified and shipped specimens of no less than 11 goby "species" from Japan to the Netherlands. Eight of these had Japanese names: Kurohaze, Nekohaze, Okihaze, Simahaze, Kawahaze, Dompohaze, Inmots and Nekomots. The remaining ones were labeled as species No 1, 2 and 3. In the Fauna Japonica Temminck and Schlegel described only 5 species (of which one was based on a plate and a description only). We have no information about the way Burger's specimens were labeled, but as during their voyage from Nagasaki to Leiden the state of their preservation was checked, and some may have been repacked in Buitenzorg (now Bogor), Indonesia, it is not impossible that an error was made in relabeling.

After a comparison of the original figure , the description by Bürger, and the specimen RMNH 1923, we are inclined to believe each of these represent a different species.

The difference in length of the described and the depicted specimen already indicates that different specimen are concerned. In the description Bürger gives the length of his specimen as 4 inches (= 10.2 cm). The length of the fish on the original (Keiga?) drawing (natural size) is 13.5 cm (5.3 inches).

But the specimens not only differ in size. There are many differences between the drawing and the description as already noted by Koumans (1935) and Boeseman (1947). Most obvious thing as the following: Bürger described the shape of the caudal fin of his *Gobius* "Kurohade" as lanceolate (comparable to the pectoral fin), and its color dark green. However, in the drawing the caudal fin is rounded and the overall color is brown, hence the name brunneus (= brown) given by Temminck and Schlegel.

In Bürger's collection many water colours of writings and descriptions can be matched as they bear the same number written in Indian Ink by the same hand. Whereas the description of *Gobius* Kurohade bears a number 52 in the same hand (be it in somewhat lighter ink), the water colour reproduced in the Fauna japonica as *G. brunneus* has "No 52" written in pencil in a different hand. Therefore it seems that Bürger himself did not match the description and the drawing.

The description of *Gobius brunneus* in the Fauna Japonica seems a mixture of data from the description and the painting, with the characters visible on painting strongly dominating. For their detailed description of the coloration Temminck and Schlegel have relied totally on the painting. The difference in fin ray count of the second dorsal fin (10 vs 11), can be ascribed to the fact that they considered the last ray as a branch of the previous one. In the original painting the base of the last ray is neither connected to preceding ray nor the back, in the Fauna Japonica the figure is corrected in this respect. Possibly Temminck and Schlegel believed the differences between the painting and the only specimen could be ascribed to the fact that it was very small (interpreted as young).

The type specimen differs not only from the plate, but also from the description by Burger and the description in the fauna Japonica. The measurements in the description seem to have been based on the plate of the Fauna Japonica. The fins in the type specimen are all damaged, so the shape cannot be seen anymore, but judging from the surface of the scales between the first and second dorsal it seems unlikely that the membrane of the last ray of the first dorsal touched the first ray of the second dorsal fin. In fact there is no distinct character that connects the holotype to the description.

In fact the only way in which we can connect specimen RMNH 1923 with the description is the old label on the cylinder containing the specimen. This label bears the name *Gobius brunneus* Schl. under which is written Type v. [= of] Fauna Japonica. Furthermore, this label contains the register number 1923, the catch locality Japan, and the date 1854. The meaning of this date is not clear. The specimen must have been collected during the period von Siebold and Burger stayed in Japan, between 1823 and 1834. As the installment of the Fauna Japonica containing the description of *G. brunneus* was published in 1845, the specimen must have reached the RMNH before that date. So very probably 1854 is a clerical error.

The fact that the Fauna Japonica plate and the holotype of *Gobius brunneus* represent different species (and genera!) has consequences for the work of authors who based their conclusion of the species on the plate only. Thus Richardson (1846: 318) tentatively synonymized his *Gobius platycephalus* with *G. brunneus* species and Fowler (1960)

synonymized *G. brunneus* with *G. giuris* (Hammilton, 1822). Both authors represented the some congruent conclusion for similar decision – typical *Glossogobius* species which comprising most of species with reasonable size up 13.5 cm like the drawing.

However, in order to stablise the nomenclature for *Gobius brunneus* after the comments of Takagi (1962), we would make the conclusion for grouping the goby as *Rhinogobius* member based on the only reliable type specimen.

Remarks. – In main islands of Japan, there are 6 published names for *Rhinogobius* species with a normal vertebral count of 26. The oldest name is *R. brunneus* (Temmick and Schlegel, 1845), from the Bay of Nagasaki, Nagasaki Pref., Kyushu, Japan. Thereafter the following species were described; *R. similis* Gill, 1859, from Shimoda, Izu Prov., Shizuoka Pref., the Pacific coast of Honshu as the type species of the current genus; *R. nagoyae* Jordan and Seale, 1906, from Nagoya, Aichi Pref., the Pacific coast of Honshu; *R. kurodai* (Tanaka, 1908), from Tokyo Pref., the Pacific coast of Honshu; *R. katonis* (Tanaka, 1908), from Kanazawa, Ishikawa Pref., the Sea of Japan coast of Honshu; *R. fluvatilis* Tanaka, 1925, from Himeji, Hyogo Pref., the coast of the Inland Sea of Seto in Honshu. In Korean waters, 2 nominal species have been described as *R. bedfordi* (Regan, 1908) and *R. sowerbyi* (Ginsburg, 1917). However, besides *Rhinogobius* sp. DA, here recognized as the earliest one: *R. brunneus*, there are 4 remaining species (*Rhinogobius* spp. CB, CO, LD, and OR) that probably have been described already under one of the above mentioned names (Chen and Suzuki, unpublished data). The current research of *R. brunneus* actually is the first step necessary for clarifying the subsequent taxonomic problems of all other, Japanese *Rhinogobius* species. Producing detailed redescriptions of the Japanese and Korean nominal species of *Rhinogobius* in order to match them to the extant species should be a very essential task for taxonomic research on the Japanese Yoshinobori species complex.

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Appendix I.

Comparative materials.

***Rhinogobius* sp. CB.** OMNH–P 35045, 4 specimens, 24.4 – 34.2 mm SL, coll. G. Fukagawa, 11 Jan. 2009, Kanoogawa-River, Sannwa-chou, Nagasaki, Nagasaki Pref., Japan. OMNH–P 35060, 1 specimen, 37.8 mm SL, other data same as above. OMNH-P 35061, 1 specimen, 45.6 mm SL, other data same as above. OMNH–P 35062, 3 specimens, 39.6 – 43.1 mm SL, other data same as above.

***Rhinogobius* sp. OR.** OMNH–P 35043, 5 specimens, 37.8 – 44.3 mm SL, coll. G. Fukagawa, 11 Jan. 2009, Urakami-gawa River, Ohashi, Nagasaki, Nagasaki Pref., Japan.

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