

A New Tilefish, *Branchiostegus okinawaensis* (Perciformes: Branchiostegidae), from Okinawa Island, Southern Japan

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Abstract A new tilefish, *Branchiostegus okinawaensis*, is described on the basis of 9 specimens collected from Okinawa Island, Ryukyu Islands, Japan. This species is easily distinguished from other congeners by the following combination of characters: 5–6 diagonal scale rows on cheek with 2 enlarged scales in the middle of row, its maximum diameter 2.2–3.0 in orbit diameter; scales on cheek not covered with skin; head length 3.0–3.3 in standard length; first dorsal-fin spine 1.7–2.3 in orbital diameter; second dorsal-fin spine 0.9–1.3 in orbit diameter; second pelvic-fin soft-ray longest; pelvic-fin length shorter than the longest dorsal-fin soft ray length (13th); longitudinal lateral-line scales 75–86; silvery cheek; a rectangular, dusky-yellow blotch on the fin membrane between first and third dorsal spines; upper half of caudal fin bright yellow and lower half greenish grey with 2 yellow stripes running horizontally from the middle of caudal peduncle to caudal-fin margin. It is known only from Okinawa Island on sandy to muddy bottoms of the type locality at depths of 100–200 m.

Key words: Branchiostegidae, *Branchiostegus okinawaensis*, new species, Okinawa.

Tilefishes of the branchiostegid genus *Branchiostegus* burrow in sandy or muddy bottoms ranging from 20–600 m in the Eastern Atlantic and Indo-West Pacific, comprises 15 extant species (Dooley, 1978, 1999; Nelson, 2006): *B. japonicus* (Houttuyn, 1782), *B. argentatus* (Cuvier, 1830), *B. doliatus* (Cuvier, 1830 in Cuvier and Valenciennes, 1830), *B. auratus* (Kishinouye, 1907), *B. vittatus* Herre, 1926, *B. ilocanus* Herre, 1928, *B. semifasciatus* (Norman, 1931), *B. wardi* Whitely, 1932, *B. sawakinensis* Amirthalingam, 1969, *B. serratus* Dooley and Paxton, 1975, *B. albus* Dooley, 1978, *B. australiensis* Dooley and Kailola, 1988, *B. gloerfelti* Dooley and Kailola, 1988, *B. paxtoni* Dooley and Kailola, 1988, and *B. hedlandensis* Dooley and Kailola, 1988. In addition, an unde-

scribed species was recorded from Okinawa Island by several Japanese ichthyologists (Yoshino *et al.*, 1984; Araga, 1984, 1988; Yamada *et al.*, 1986; Aizawa, 1993, 2000, 2002; Dooley, 1999; Horikawa *et al.*, 2001) under the Japanese name “Hana-amadai” after Gushiken (1972) first reported it as *B. japonicus auratus*. We describe herein it as a new species based on 9 specimens from Okinawa Island. Other new species of tilefishes are known from Vietnam (W. Hiramatsu, personal observation) and the Philippines (J. K. Dooley, personal comm.).

Methods used in making counts and measurements follow Hubbs and Lagler (1958). All measurements expressed in hundreds of standard length (SL) except given below: cheek-scale diameter is the longitudinal length of the largest

scale; the distances between the snout and the dorsal, anal, pectoral and pelvic fins were measured from the anterior tip of the upper jaw to the origin of each fin; the distance between the snout and the anus was measured from the anterior tip of the upper jaw to the anterior margin of the anus. Head length and orbit diameter were abbreviated as HL and OD, respectively. Institutional codes follow Leviton *et al.* (1985). The specimens described in this study are deposited in the Department of Marine Science, University of the Ryukyus (URM-P), National Museum of Nature and Science, formerly National Science Museum, Tokyo (NSMT) and Bernice Bishop Museum, Honolulu (BPBM).

***Branchiostegus okinawaensis* sp. nov.**

(Japanese name: Hana-amadai)

(New English name: Okinawan Tilefish)

(Figs. 1–2; Tables 1–3)

Branchiostegus japonicus auratus (not of Kishinouye): Gushiken, 1972: 48, 140, pl. 244.

Branchiostegus sp.: Yoshino *et al.*, 1984: 145; Araga, 1984, 1988: 147, pl. 134-H; Yamada *et al.*, 1986: 158 (key), 163; Dooley and Kailola, 1988: 251–252 (key); Aizawa, 1993: 685 (key); Dooley, 1999: 2635, fig. 10 (key); Aizawa, 2000:

783 (key); Aizawa, 2002: 783 (key); Horikawa *et al.*, 2001: 70 (key).

Holotype. URM-P 593, 286.4 mm SL, female, Naha fish market, Okinawa Pref., 26 May 1975.

Paratypes. Eight specimens collected at Naha fish market, Okinawa Pref.: BPBM 22261, 301.0 mm SL, male, 7 Sept. 1977; URM-P 594, 595, 227.4–281.3 mm SL, male and female, respectively, 26 May 1975; URM-P 17424, 306.8 mm SL, male, 6 May 1986; URM-P 17425, 261.1 mm SL, female, 6 May 1986; URM-P 17426, 276.6 mm SL, male, 6 May 1986; URM-P 17427, 312.5 mm SL, male, 6 May 1986; NSMT-P. 68350 (formerly URM-P 26972), 298.3 mm SL, male, 24 Dec. 1991.

Diagnosis. A species of *Branchiostegus* is distinguished from other species in the genus by having the following characters: 5–6 diagonal scale rows on cheek with 2 enlarged scales in the middle of row, its maximum diameter 2.2–3.0 in OD; scales on cheek not covered with skin; HL 3.0–3.3 in SL; first dorsal-fin spine 1.7–2.3 in OD; second dorsal-fin spine 0.9–1.3 in OD; second pelvic-fin soft ray longest; pelvic fin length shorter than the longest dorsal-fin soft ray (13th); longitudinal lateral line scales 75–86; silvery cheek; a rectangular, dusky-yellow blotch on the fin membrane between first and third dorsal



Fig. 1. Photograph of *Branchiostegus okinawaensis* sp. nov. URM-P 593, holotype. 286.4 mm SL, Naha, Okinawa Island, Japan.

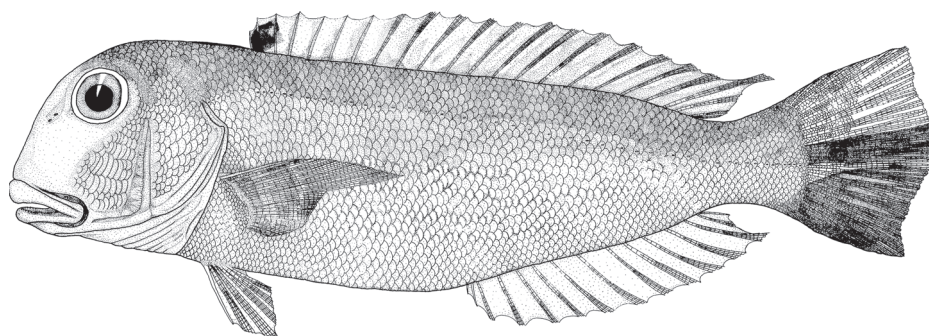


Fig. 2. Line drawing of *Branchiostegus okinawaensis* sp. nov. URM-P 593, holotype. 286.4 mm SL, Naha, Okinawa Island, Japan.

spines; upper half of caudal fin bright yellow and lower half greenish grey with 2 yellow stripes running horizontally from the middle of caudal peduncle to caudal-fin margin.

Description. Proportional measurements and counts are shown in Table 1. Data for holotype are presented first, followed by paratypes in parentheses. Body elongate, compressed, its depth slightly shorter than head depth; head enlarged, HL 3.3 (3.0–3.3) in SL; anterior profile straight, steep; body depth 3.8 (3.4–3.7) in SL; predorsal ridge formed into a prominent seam running from the origin of dorsal fin to a vertical through anterior margin of eye; eye close to dorsal contour of head, its diameter subequal to or longer than suborbital depth; 2 nostrils small, located about mid-point between anterior margins of orbit and contour of snout; anterior nostril oval, opening in a short tube with a cutaneous tongue-shaped flap on its posterior rim; posterior nostril slit-like; mouth terminal, oblique, and protractile; maxilla reaching to or slightly extending beyond a vertical through middle of pupil, when mouth is closed; jaw teeth composed of an outer series of canine-like teeth and inner villiform tooth band; canine-like teeth on upper jaw 18 (17–22, modally 17), those near corner of mouth enlarged; villiform tooth band comprising of 4 (3–4) tooth rows, becoming narrower posteriorly; canine-like teeth on lower jaw 10 (8–12, modally 11), lining along posterior half of jaw, those near mouth of corner enlarged; villiform teeth band comprising of 4 (4–5) rows near sym-

physis, becoming narrower posteriorly, 2 rows at its end; no teeth on vomer and palatines; posterior margin of preopercle serrated, lower margin smooth; gill rakers short and pointed.

Scales on body ctenoid, large; scales on nape extending near anterior margin of eye, becoming smaller anteriorly, larger posteriorly; five or six diagonal scale rows on cheek, 2 of which are enlarged (Fig. 2), the diameter of the largest scale 2.7 (2.2–3.0) in OD, scales on cheek not covered with skin; scales present on opercle and throat; breast and abdomen from just below pectoral-fin base to slightly before anus covered with small cycloid scales.

Dorsal fin originates just above pectoral-fin base, gradually rising posteriorly; first dorsal spine very short, 2.3 (1.7–2.3) in OD, second spine nearly equal to OD, 1.3 (0.9–1.3) in OD, 5th to 7th spines subequal to or slightly longer than OD; first soft ray shortest 1.3 (1.2–1.5) in OD; 13th soft ray longest, longer than pelvic-fin length, reaching to caudal-fin base, whereas 12th and 14th soft rays falling short of caudal-fin base. Anal fin originates below 5th or 6th dorsal soft rays, with configuration increasing to 11th soft ray, then becoming shorter posteriorly; 2 anal spines tiny; first spine shortest, about 1/2 of 2nd spine; second anal spine about 2/3 of first anal soft ray; eleventh anal soft ray longest, reaching to caudal-fin base. Pectoral fin short, falciform, not reaching to anus, length 1.3 (1.1–1.3) in HL, 8th dorsal soft rays abruptly decreased in length; pectoral-fin base covered

Table 1. Counts and proportional measurements of *Branchiostegus okinawaensis* sp. nov.

Catalogue number	Holotype URM-P 593	Paratypes (N = 8)
Total length (mm)	340.0	272.6–373.0
Standard length (mm)	286.4	227.1–312.5
Counts		
Dorsal-fin rays	VII, 15	VII, 15
Pectoral-fin rays	18	17–18 (18)
Anal-fin rays	I, 5	I, 5
Pelvic-fin rays	II, 12	II, 12
Gill rakers	7 + 13	6–7 (7)/12–14 (12)
Cheek scale rows	6	5–6 (5)
Pored lateral-line scale rows	49	46–50 (48)
Longitudinal scale rows	86	75–85 (82)
Proportional measurements (%SL)		
Head length	30.4	30.1–33.3 (31.2)
Head depth	26.0	24.4–28.3 (26.0)
Snout length	13.2	10.6–13.4 (12.5)
Body depth	26.5	27.1–29.8 (27.6)
Tip of snout to dorsal-fin origin	34.9	33.2–36.6 (34.7)
Tip of snout to anal-fin origin	61.4	58.0–62.3 (59.1)
Tip of snout to pectoral-fin origin	29.8	27.8–30.9 (29.8)
Tip of snout to pelvic-fin origin	29.4	26.8–34.5 (29.6)
Tip of snout to anus	58.5	51.7–57.1 (55.0)
Orbit diameter	8.1	6.8–8.6 (7.7)
Cheek-scale length	2.7	2.5–3.3 (2.9)
Upper jaw length	11.8	10.9–12.8 (11.7)
Interorbital width	30.0	24.2–30.5 (28.0)
Suborbital depth	25.7	21.1–30.6 (23.9)
Length of dorsal-fin base	53.9	53.1–58.0 (55.8)
First dorsal spine length	3.5	3.6–4.5 (4.1)
Second dorsal spine length	6.3	6.5–8.9 (7.5)
Longest dorsal spine length	8.4	9.1–10.9 (9.7)
Longest dorsal ray length	18.9	18.3–20.9 (19.5)
Length of anal-fin base	30.4	28.3–30.9 (29.7)
First anal spine length	2.4	2.4–3.6 (2.8)
Second anal spine length	4.9	5.0–6.3 (5.6)
Longest anal ray length	14.0	13.2–15.6 (14.6)
Pectoral-fin length	24.3	24.6–29.9 (26.0)
Pelvic-fin length	14.2	13.4–15.9 (14.9)
Pelvic spine length	9.8	9.2–11.9 (10.3)
First pelvic ray length	12.2	11.5–15.4 (13.0)
Second pelvic ray length	13.2	12.6–16.8 (14.0)
Third pelvic ray length	12.8	12.0–15.6 (13.2)
Caudal peduncle length	18.1	14.3–17.4 (16.4)
Caudal peduncle depth	10.5	10.4–11.3 (10.5)

with small cycloid scales. Pelvic fin short, 2.1 (1.8–2.4) in HL, with 2nd soft ray longest, 5th soft ray shortest. Caudal fin double emarginated, upper-most ray as long as lower-most one. Small scales present on caudal fin base.

Fresh coloration. Body reddish-pink above, silvery below; chin and throat whitish-pink to light-pink; circumorbital area greenish yellow dorsally, yellowish ventrally. Snout yellow, max-

illary light pink and cheek silver; predorsal ridge dark; dorsal-fin membrane almost translucent except for yellow base, a rectangular, dusky-yellow blotch present between first and third spines; upper half of pectoral fin yellowish, remainders whitish except a dusky line on upper-most ray; pelvic and anal fins white; upper half of caudal fin yellow, lower half greenish grey, upper- and lower-most rays white, 2 yellow stripes running

horizontally from middle of the caudal peduncle to caudal-fin margin.

Preserved coloration. Body uniformly light-yellow; predorsal ridge dusky; dorsal blotch dark; upper-most pectoral ray blackish, remainder light yellow; caudal fin light-yellow above, dark below, with upper stripe indistinct and lower one light yellow on middle of caudal fin.

Distribution. Known only from the type locality, Okinawa Island, the Ryukyu Islands, southern Japan on sandy to muddy bottoms at depths of about 100 to 200 m.

Etymology. The species name refers to its type locality.

Remarks. The new species is clearly different from the other *Branchiostegus* species in its cheek squamation, viz., the counts of diagonal rows (5–6 vs. 8–12) and the largest size (32.9–45.8% OD vs. 10.0–32.0% OD) (Table 2). In addition, *B. okinawaensis* apparently differs in coloration from the other congeners in having a rectangular, dusky-yellow blotch on the fin membrane between 1st and 3rd dorsal spines (Fig. 1; Table 3).

Within the genus, *B. okinawaensis* is similar to *B. ilocanus* in sharing large cheek-scale rows (Herre, 1928; Dooley, 1978, 1999). *Branchiostegus ilocanus* was originally described on the basis of a single specimen (270 mm SL) collected from Ilocos, Luzon, the Philippine Islands (Herre, 1928). Unfortunately, the holotype of *B. ilocanus* was destroyed during World War II and no additional specimens have been reported (Dooley, 1978). In the original description, however, Herre (1928: 48, pl. 244) noted that *B. ilocanus* has “8 rows of scales on cheek, the three middle rows of enlarged scales”. Additionally, the original figure indicated the large cheek-scale was about half the size of OD and the cheek-scale rows numbered 7–8. Based on a comparison with the original description of *B. ilocanus*, *B. okinawaensis* is easily distinguished from *B. ilocanus* in having 5 or 6 diagonal cheek-scale rows (vs. 7 or 8), short first and second dorsal spines (43.2–58.8% OD and 75.6–107.5% OD vs. 75% OD and 150% OD), 75–86 longitudinal

lateral-line scales (vs. ca. 60), and the presence of dusky yellow blotch on anterior dorsal fin and silvery cheek (absent and yellow in *B. ilocanus*) (Table 3; Herre, 1928; Dooley, 1978, 1999; Araga, 1984, 1988; Aizawa, 1993, 2000, 2002). Dooley considered the two species described by Herre as both *nomen dubium* (personal comm.).

Among the species known from the Indo-West Pacific, *B. okinawaensis*, *B. argentatus* and *B. sawakinensis* share one or more black to dusky blotches on the dorsal fin membrane, but the first one has a single rectangular-shaped blotch on the membrane between the 1st and 3rd dorsal spines, while the last two have a series of blotches scattered along the entire fin (Table 3). Furthermore, *B. okinawaensis* also differs from the others by lacking longitudinal bands or spots on the sides of body (2 yellow longitudinal stripes in *B. argentatus*, and several rows of black spots in *B. sawakinensis*). Other useful key characters separating the three species are: HL short, first dorsal-fin spine long in *B. argentatus* (26.5–26.7% SL and 106.6–116.0% OD in *B. argentatus* vs. 30.1–33.3% SL and 43.2–58.8% OD in *B. okinawaensis*), and the longest pelvic soft ray is the 3rd in *B. sawakinensis* (2nd in the others).

Branchiostegus okinawaensis was first reported as *B. japonicus auratus* by Gushiken (1972) from Okinawa Island. Although he did not provide a detailed description of morphological characters or body coloration, the color photograph (40, pl. 244) clearly shows it to be *B. okinawaensis* in that there is a dark blotch on the anteriormost part of the dorsal-fin membrane (vs. absent in *B. auratus*) and the caudal fin is yellow on the upper lobe and greenish grey (dark in preservation) on the lower lobe (vs. several yellow stripes on upper lobe and dark on lower lobe in *B. auratus*). Furthermore, the difference in the distribution patterns of these two species is also useful for distinguishing species. *Branchiostegus okinawaensis* is currently known only from Okinawa Island, whereas *B. auratus* is widely known from the South and East China seas to southern Japan along the continental shelf

Table 2. Frequency distribution of cheek scale counts and the size of cheek scales in 16 species of *Branchiostegus*.

Species	Size of cheek scale in OD (%)			Cheek scale counts							
	mean	n	range	5	6	7	8	9	10	11	12
<i>B. albus</i>	24.9	5	21.4–31.4				5				
<i>B. argenatatus</i>	—	2	23.7–24.7				1	1			
<i>B. auratus</i>	22.3	4	18.3–27.1				1	2	1		
<i>B. australiensis</i>	25.8	3	22.1–29.2				2	1			
<i>B. doliatus</i>	16.8	9	14.5–19.0				4	4	1		
<i>B. gloerfelti</i>	16.1	1	—					1			
<i>B. hedlandensis</i>	—	2	20.2, 24.1					1			1
<i>B. ilocanus</i>	?	1	—				1				
<i>B. japonicus</i>	18.5	7	14.6–21.1				5	2			
<i>B. okinawaensis</i>	37.7	9	32.9–45.8	4	5						
<i>B. paxtoni</i>	19.4	3	17.1–22.6				1	2			
<i>B. sawakinensis</i>	—	2	31.1, 32.0				2				
<i>B. semifasciatus</i>	14.2	8	10.0–17.4				2	3	3		
<i>B. serratus</i>	16.1	5	14.0–17.4				1	4			
<i>B. vittatus</i>	?	3	—						3		
<i>B. wardi</i>	20.4	11	16.5–24.5					1	5	5	

including the Nansha Islands, Hong Kong, Taiwan and southern Korea (Yamada *et al.* 1986; Aizawa, 1993, 2000, 2002; Kim and Ryu, 1998; Dooley, 1999; Horikawa *et al.* 2001; Chen *et al.*, 2002).

The remaining three other species, *B. vittatus*, *B. japonicus* and *B. albus*, are known from the East Asian region. As mentioned above, the count and size of cheek scales are the most important characters for separating *B. okinawaensis* from the others (Table 2). For other characters, *B. okinawaensis* is easily distinguished from *B. albus* and *B. japonicus* by having the following: *B. albus* in having the 2nd pelvic-fin soft ray longest (vs. 3rd soft ray in *B. albus*) and the pelvic fin shorter than the longest dorsal-fin soft ray (vs. the pelvic fin longer than the longest dorsal-fin soft ray in *B. albus*); from *B. japonicus* in having scales on cheek not covered with skin (vs. cheek covered with skin in *B. japonicus*) (Table 3). As far is known, all *Branchiostegus* species except *B. japonicus* have scales on cheek not covered with skin (Horikawa *et al.* 2001). Based on our examination, in a small specimen of *B. japonicus* less than 150mm SL, approximately half of scales on the cheek are covered with skin. In those specimens of *B. japonicus* greater than 180mm SL, the area covered with skin on the cheek becomes wider. Additionally,

the scales on the cheek are covered with thick skin in those specimens exceeding 200mm SL (Hiramatsu, unpublished data).

In body coloration, *B. okinawaensis* is clearly distinguished from the 3 species above in having a silvery cheek (vs. red with three silver bands in *B. vittatus*, reddish with one triangle, silver blotch on the posterior margin of eye in *B. japonicus*, and reddish in *B. albus*) and the caudal fin with yellow above and dark below (vs. six yellow bands on the upper two-thirds in *B. vittatus*, five yellow bands above and dark below in *B. japonicus*, and yellow or white spots spreading over the entire fin in *B. albus*) (Table 3). Further, the color of predorsal ridge is unique in *B. albus* (white vs. dark or black in the others).

As mentioned above, *B. okinawaensis* was first reported as *B. japonicus auratus*, “Ki-amadai”, by Gushiken (1972). However, Yoshino *et al.* (1984) considered it an undescribed species, and gave it a new Japanese name, “Hana-amadai”. Subsequently, many authors have followed Yoshino *et al.* (1984) in recognizing this undescribed species called “Hana-amadai” known only from Okinawa Island (Araga, 1984, 1988; Yamada *et al.*, 1986; Dooley and Kailola, 1988; Aizawa, 1993, 2000, 2002; Dooley, 1999; Horikawa *et al.*, 2001).

Comparative materials. *Branchiostegus albus*:

Table 3. Comparison of *B. okinawaensis* with other *Branchiostegus* species in selected characters.

	<i>B. okinawaensis</i>	<i>B. ilocanus</i>	<i>B. vittatus</i>	<i>B. japonicus</i>	<i>B. auratus</i>	<i>B. albus</i>	<i>B. argentatus</i>	<i>B. sawakinwnsis</i>
Source	Aizawa (2002); this study	Herre (1928); Dooley (1978)	Herre (1926); Dooley (1978)	Aizawa (2002); this study	Aizawa (2002); this study	Aizawa (2002); this study	Aizawa (2002); this study	Amirthalingam (1969); Dooley (1978); this study
Head length/SL (%)	30.1–33.3	33.3	27.5–28.7	27.3–29.7	27.0–32.3	27.6–28.9	26.5–26.7	30.2–31.2
Cheek covered with skin	no	no	no	yes	no	no	no	no
Scale rows on cheek	5–6	8	10	8–9	8–10 (rarely 8)	8–10	8–9	8
Size of cheek scales	Large	Large	Small	Small	Small	Medium	Small	Medium
Largest cheek scale/ OD (%)	32.9–45.8	?	?	14.6–21.1	18.3–27.1	21.4–31.4	23.7–24.7	31.1–32.0
Lateral line scales	75–86	ca. 60	68–72	69–79	73–74	70–78	69–79	67 & 75
Longest pelvic soft ray	2nd ray	?	?	2nd ray	2nd ray	3rd ray	2nd ray	3rd
Pelvic fin (PF) vs. longest dorsal soft ray (LD)	PF<LD	PF<LD	PF<LD	PF<LD	PF<LD	PF>LD	PF<LD	PF = LD
First dorsal spine/OD (%)	43.2–58.8	75	?	48.5–74.4	51.6–79.8	60.0–92.0	106.6–116.0	56.7–80.2
Second dorsal spine/ OD (%)	75.6–107.5	150	?	68.2–103.0	97.4–108.0	94.5–98.0	123.7–151.2	85.2–110.8
Predorsal ridge	Dark	Dark	Black	Dark	Dark	White	Dark	Black
Blotches on dorsal-fin membrane	One dusky yellow blotch	Absent	Absent	Absent	Absent	Absent	A series of black blotches	A series of dark blotches
Stripes or spots on the sides of body	Absent	Absent	Absent	Absent	Absent	Absent	Two yellow stripes across the body	Black spot rows on the body
Cheek	Silver	Yellow	Bright deep pink with 3 silver stripes	Reddish with a silver triangular blotch	Yellow with a silver stripe	Reddish	Bright yellow with 2 silver stripes	Silvery yellow
Stripes on caudal fin	Two yellow stripes	Central olive brown stripe	Six yellow stripes	Five yellow stripes	Four or five yellow stripes	Yellow or white spots	Six yellow stripes	Vivid yellow and orange stripes
Distribution	Okinawa Island	Philippine Islands	Philippine Islands	South China Sea, East China Sea, Korean and southern Japan	South China Sea, East China Sea, Korean and southern Japan	South China Sea, East China Sea, Korean and southern Japan	South China Sea, East China Sea, Korean and southern Japan	Red Sea, South Africa and the Philippines

5 specimens, BPBM 18750, 257.0 mm SL, female, Aberdeen Market, Hong Kong, 20 June 1975; BSKU 81648, 148.0 mm SL, male, Kochi, Japan, 5 Nov. 1993; BSKU 82127, 163.6 mm SL, male, 16 Oct. 1995; BSKU 57003, 107.4 mm SL, male, Kochi, Japan, 3 Oct. 1975; BSKU 82057, 236.0 mm SL, female, Kochi, Japan, 1 June 1995. *Branchiostegus argentatus*: 2 specimens,

BSKU 54026, 180.4 mm SL, female, Qui Nhon, Vietnam, bottom trawl, 16 June 1997; BSKU 54027, 206.0 mm SL, female, Qui Nhon, Vietnam, bottom trawl, 16 June 1997. *Branchiostegus auratus*: 5 specimens, BSKU 57155, 207.0 mm SL, female, fish-market, Kochi-city, Kochi Pref., Japan, 8 May 1993; BSKU 57156, 162.0 mm SL, sex indistinct, Kochi, Japan, 10

July 1995; BSKU 57152, 114.9mm SL, sex indistinct, Kochi, Japan, 10 July 1995; BSKU 57154, 129.7mm SL, sex indistinct, Kochi, Japan, bottom trawl, 13 Oct. 1995; HUMZ 33749, 231.1mm SL, sex indistinct, 30°09' to 31°31'N, 124°13' to 127°13' to 127°53'E, East China Sea, bottom trawl, 6 April 1968. *Branchiostegus australiensis*: 3 specimens, WAM P. 27217-004, holotype, 263.0mm SL, sex indistinct, southeast of Bay, 26°21'S, 112°35'E, Western Australia, 164–170m, 3 Mar. 1981; WAM P. 30952-005, 2 specimens, 266.0mm SL, male, 362.0mm SL, female, Dirk Hartog, 26°00'S, 112°22.00'E, Western Australia, 200–220m, 20 May 1994. *Branchiostegus japonicus*: 6 specimens, BSKU 52954, 94.4mm SL, male, Ogatacho, Kochi Pref., Japan, 30 Oct. 2000; BSKU 52657, 107.8mm SL, female, Ogatacho, Kochi Pref., Japan, 10 Nov. 2000; BSKU 81668, 148.6mm SL, male, Kokadai Fish market, Kochi-city, Kochi Pref., Japan, 19 Nov. 1993; BSKU 81641, 177.6mm SL, male, Echizen, Fukui Pref., Japan, 1 Nov. 1993; BSKU 81651, 222.2mm SL, female, fish-market, Kochi-city, Kochi Pref., Japan, 6 Nov. 1993; BSKU 81647, 237.0mm SL, female, fish-market, Kochi-city, Kochi Pref., Japan, 3 Nov. 1993. *Branchiostegus wardi*: 11specimens, AMS IA. 5130, holotype, 324.0mm SL, sex indistinct, off Port Stephens, 32°S, 152°E, New South Wales, Australia, 91–110m, Sept. 18, 1931; AMS IB. 4334, 109.0mm SL, female, off Broken Bay, 33°S, 151°E, Australia, 82m, 16 June 1959; AMS I. 2595001, 247.0mm SL, female, 33°S, 151°E, off Eastern North of Terrigal Harem, Australia, 36m, 7 Aug. 1985; AMS 17003-001, 204.0mm SL, female, 32°42'S, 152°15E, off Port Stephens, Australia, 10 Jan. 1973; AMS 15885-005, 286.0mm SL, sex indistinct, 33°13'S, 151°51'E, Australia, 110–146m, 26 Oct. 1970; WAM P. 30510-009, 311.0mm SL, male, 14°04.00'E, 145°41.00'E, Ribbon Reef, Great Barrier Reef, Queensland, Australia, 110–335m, June 1992; NTM S. 14624-001, 371.0mm SL, male, 9°45.5'S, 129°32.0'E, 32 miles northward Evans Shoal, Arafura Sea, Northern Territory, Australia,

300m, hooked and line, 7 Sept. 1997; NTM S. 14981-001, 399.0mm SL, male, off eastern north of Lyndock Bank, 9°35'S, 131°25'E, Arafura Sea, Northern Territory, Australia, 140m, 1 Feb. 2000; HUMZ 87226, 325.0mm SL, female, 7°18.0'N, 116°20.0'E, off Sabah, Kalimantan, Malaysia, 94–110m, 23 Sept. 1975; HUMZ 87401, 405.0mm SL, 7°13.0'N, 116°17.0'E, off Sabah, Kalimantan, Malaysia, 106–112m, Sept. 24, 1975; HUMZ 876941, 294.0mm SL, 7°18.0'N, 116°20.0'E, off Sabah, Kalimantan, Malaysia, 94–100m, 23–24 Sept. 1975.

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