

NEW RECORD OF INDONESIAN PIGFISH, *BODIANUS IZUENSIS* ARAGA AND YOSHINO, 1975, AND *B. MASUDAI* ARAGA AND YOSHINO, 1975 (PERCIFORMES: LABRIDAE), FROM NORTH SULAWESI, INDONESIA

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ABSTRACT

One specimen of *Bodianus izuensis* Araga and Yoshino, 1975, and three specimens of *B. masudai* Araga and Yoshino, 1975, were obtained from fish markets in Bitung and Kema, Minahasa, North Sulawesi, Indonesia, between March–July 2009. The specimens were caught from depths of about 20–30 m at coral reef ecosystem around Lembeh Island and Kema. This is the first record of these species in Indonesian waters. Morphological features, diagnostic characters, and distribution are discussed and illustrated, and color photographs of the species are presented.

Keywords: *Bodianus izuensis*, *B. masudai*, Labridae, Indonesia.

INTRODUCTION

Labridae commonly known as wrasse consist of about 57 genera and 575 species (Parenti and Randall, 2000) is one of the most dominant fish families in Indonesia and its adjacent waters. Wrasses are small to medium-sized marine fishes, mostly tropical, associated with coral reefs; some species have a warm temperate distribution. One of the genera in the Labridae is *Bodianus*, characterized by the possession of a prominent frontal shelf on the neurocranium, posteriorly roofing a distinct medial ethmoid-frontal depression, and a sharply angled anteroventral profile of the dentary with an interdigitating joint at the symphysis (Gomon, 2006). Although most species of *Bodianus* are found in relatively shallow waters a few live in greater depths (Gomon, 2006), such as *Bodianus* sp. recorded by ROV Fukushima Aquarium in more than 150 m at Manado, North Sulawesi (Iwata, pers. comm.) and *Bodianus masudai* collected from rocky reefs at 30–113 m depth (Gomon, 2006).

Most labrids are protogynous hermaphrodites and have three distinct colour patterns correspond-

ing with age and sexual development. Gomon (2006) described the ancestral color pattern of *Bodianus* as follows: “juveniles darkly pigmented with 5 or 6 narrow pale bands on the body posterior to the head; a prominent black spot anteriorly and posteriorly on dorsal fin, a third somewhat centrally on the fleshy caudal-fin base, a fourth posteriorly on the anal fin, a fifth on the fleshy pectoral-fin base and a sixth on the pelvic fin; initial-phase adults with red, horizontal stripes; initial- and terminal-phase adults with vermiculations around the eye”.

The first specimen of *Bodianus* Bloch, 1790 (type species *Bodianus bodianus*) species is collected from Fish Market, Jakarta, by Hardenberg and Hubbs on 6 May 1929 and now is deposited at University of Michigan Museum of Zoology (UMMZ), Ann Arbor, Michigan, USA (Eschmeyer, 2012). The genus *Bodianus*, one of the genera in the family Labridae, comprises 43 species representing 10 subgenera, with the greatest diversity in the Indo-West Pacific (Gomon, 2006).

Ten species of fish of genus *Bodianus* (*B. anthioides*, *B. axillaris*, *B. bilunulatus*, *B. bimaculatus*, *B. frenchii*, *B. leucosticticus*, *B. loxozonus*, *B. mesothorax*, *B. perditio* and *B. sanguineus*) have been reported from Indonesia (Eschmeyer, 2012). Additional two species of *B. izuensis* and *B. masudai* from Kema, North Sulawesi, reported herein are bringing the total number of species of this genus known in Indonesian waters to 12. This number of species is relatively high compared to those reported from several other localities, so far only eight species were reported from South China Sea (Randall and Lim, 2000) and four species from southwestern Thailand, Andaman Sea (Satapomin, 2011).

MATERIALS AND METHODS

Four specimens of pigfish were obtained from Girian Fish Market, Bitung, North Sulawesi. The specimens were immediately photographed, labeled and preserved in formalin solution 10% and deposited at the Technical Implementation Unit for Marine Biota Conservation, Indonesian Institute of Sciences, Bitung, for further study. Valid record of the fish specimen referred to the data from Eschmeyer (2012).

Counts and measurements generally followed those of Hubs and Lagler (1947) with some modifications (Gomon, 2006). Standard length and total length were abbreviated as SL and TL, respectively. Measurements were made on the left

side of specimen using dial-point caliper to the nearest of 0.01 mm. Proportional measurements on body and head are presented as percentages of standard length (SL) and head length (HL), consecutively.

Taxonomy

Bodianus izuensis Araga et Yoshino, 1975

Striped pigfish

(Fig. 1; Tabel 1)

Bodianus izuensis Araga and Yoshino, in Masuda et al., 1975: 296, pl. 103, fig. G; Shao, 1986: 182, fig. 2; Yearsley et al., 1997: fig. Append. D; Shao, 1997 in Froese and Pauly, 2006: Gomon, 2006: 26; fig. 3c, 10, 13; pl.1 F-G;

Materials – One specimen, SL 125.1 mm (LBRCF-000876); Fish market Kema, Minahasa, North Sulawesi; hooks and line, no accurate data on depth, 21 June 2009; T. Peristiwady.

Description – Meristic data and proportional measurements were presented in Table 1. Dorsal-fin rays XII, 10; anal-fin rays III, 11; caudal-fin rays 18; pectoral-fin rays ii, 15; lateral-line scales 30; scales above lateral line 4; scales below lateral line 11; predorsal scales 8; body and caudal peduncle of moderate depth; snout rather short. Posterior corner of mouth just to vertical through anterior of orbit. Anterior of upper jaw with prominent canine, posterior end of jaw with prominent canine smaller than canines at anterior upper jaw. Anterior lower



Figure 1. *Bodianus izuensis* Araga and Yoshino, 1975; terminal-phase adult, SL 125.1 mm (LBRC-F 000876).

Table 1. Counts and measurements of *Bodianus izuensis* Araga and Yoshino, 1975.

Counts and Measurements		LBRCF 876	<i>Bodianus izuensis</i> *)	
		n=1	n=5	
Standard length (mm)		125.07	54.7–82.4	
Counts	Dorsal-fin rays	XII, 10	XII, 9-10	
	Anal-fin rays	III, 11	III, 12	
	Pectoral-fin rays	15	14-15	
	Pelvic-fin rays	I, 5	-	
	Caudal-fin rays	18	10+10	
	Scales on lateral line	30	30	
	Scales above lateral line	4	4½	
	Scales below lateral line	11	10½-12	
	Predorsal scales	8	8-10	
Measurements (%SL)	Body depth	29.00	27.5–28.3	
	Body width	15.14	-	
	Predorsal length	35.06	-	
	Preanal length	64.24	-	
	Prepelvic length	38.31	-	
	Head length	36.97	34.1–35.1	
	Caudal-peduncle depth	15.34	16.2–16.8	
	Caudal-peduncle length	16.14	-	
	Dorsal-fin base	49.92	53.6–54.7	
	First dorsal spine	6.32	5.8–6.0	
	Second dorsal spine	7.94	7.6–8.4	
	Third dorsal spine	8.82	-	
	Fourth dorsal spine	9.51	-	
	Fifth dorsal spine	9.52	-	
	Longest dorsal ray	10.11	-	
	Anal-fin base	23.87	25.1–25.4	
	First anal spine	3.76	4.2–5.3	
	Second anal spine	7.14	-	
	Third anal spine	8.99	10.5–11.5	
	Longest anal ray	11.90	-	
	Caudal-fin length	17.93	-	
	Pectoral-fin length	19.83	19.9–22.3	
	Pelvic spine length	12.35	-	
	Pelvic-fin length	16.09	19.4–20.3	
	Measurements (%HL)	Snout length	32.59	8.2–10.4 **)
		Orbit diameter	19.90	7.5–8.2 **)
		Interorbital width	25.24	7.3–7.6 **)
Upper-jaw length		34.75	-	

*) data from Gomon (2006)

**) values are expressed as percent of standard length

jaw with with 2 pairs of prominent canine. Pelvic fin distinctly not reaching anus. Body depth 29.0% in SL; fifth dorsal spine length 9.52 of SL, longest dorsal rays 10.11% of SL; snout length 32.59% of HL, orbit diameter 19.90% of HL, bigger than interorbital width.

Color in life – Ventral part of body with faint reddish brown stripe just after pectoral fin base; dorsal body with two black stripes, lower stripes forming an irregular zigzag pattern on sides behind head, two stripes joint to upper part of caudal peduncle and behind soft portion of dorsal fin; body and fins below middle stripe otherwise white. Head with reddish brown stripes running from snout passing eye to large black spot on operculum. Dorsal fin white with broad black submarginal stripe about $\frac{3}{4}$ of fin. Pectoral, pelvic and anal, caudal and fins whitish; caudal fin yellowish. Other color illustrations of this species were two stripes on dorsal reddish brown with black markings confined to irregular zigzag pattern on sides behind head; body and fins below middle stripe otherwise white. Largest specimen examined with two dorsal stripes broad, black and well defined.

Distribution – The type locality of *Bodianus izuensis* is Izu Oceanic Park, Shizuoka Prefecture, Japan. Later on it is recorded in Taiwan (Shao, 1986), Australia (Yearsley et al., 1997), New Caledonia (Gomon, 2006), Papua New Guinea (Werner and Allen, 1998), Taiwan (Shao, 1997 in

Froese and Pauly, 2006), and herein recorded in Kema, North Sulawesi, Indonesia.

Remark – *Bodianus izuensis* resembles *B. bimaculatus* in having a less pointed snout and a smaller maximum size (Masuda et al., 1975) and differs from *B. bimaculatus* by having prominent black stripes on the body. Based on the size and color of the specimens examined, these two species from Bitung and Kema, North Sulawesi are categorized to terminal-phase adult. No accurate data on handline depth of this species, however judging the method used by fishermen collecting the specimen, *B. izuensis* possibly were collected from shallow waters rocky reef. The same species has been reported from off Shizuoka Prefecture, Japan was collected at depths of about 30–35 m on deep rocky reefs (Masuda et al., 1975).

***Bodianus masudai* Araga et Yoshino, 1975,**

Pig fish

(Fig. 2; Tabel 2)

Bodianus masudai Araga and Yoshino, 1975 in Masuda et al., (1975): 297, pl. 103-H; Masuda et al. (1984): 203, pl. 195-O; Shao, 1986: p. 182, fig. 1;

Materials – Three specimens; LBRCF 000871, 118.72 mm SL, 30 June 2009, Girian Fish Market; LBRCF 000870, 123.27 mm SL, 04 March 2009, Girian Fish Market; LBRCF 000869, 135.05 mm SL, 21 June 2009, Kema, Minahasa, North Sulawesi.



Figure 2. *Bodianus masudai* Araga and Yoshino, 1975; terminal-phase adult, SL 118.72 mm (LBRC-F 000871).

Table 2. Counts and measurements of *Bodianus masudai* Araga and Yoshino, 1975.

Counts and Measurements		Indonesian Specimens		
		<i>Bodianus masudai</i> *)		
		n = 3	n = 4	
Standard length (mm)		118.72 - 135.05	84.5–145	
Counts	Dorsal-fin rays	XII, (9-10)	XII, 10	
	Anal-fin rays	III, (11-12)	III, 12	
	Pectoral-fin rays	ii (14 - 15)	15	
	Caudal-fin rays	(19 - 20)	20	
	Scales on lateral line	(32 -33)	31	
	Scales above lateral line	(4 - 5)	4½	
	Scales below lateral line	11	11	
	Predorsal-scales	10-11	11–12	
Measurements (%SL)	Body depth	28.79-31.16 (30.12)	25.7–30.8	
	Body width	14.13-15.29 (14.65)	-	
	Predorsal length	37.41-39.14 (38.32)	-	
	Preanal length	64.86-68.05 (66.33)	-	
	Prepelvic length	39.70-40.26 (39.94)	-	
	Head length	37.66-39.50 (38.63)	36.0–37.9	
	Caudal-peduncle depth	14.12-15.28 (14.89)	14.6–16.7	
	Caudal-peduncle length	13.89-16.62 (15.08)	-	
	Dorsal-fin base	48.32-50.59 (49.74)	49.6–53.5	
	First dorsal spine	5.21-5.76 (5.51)	5.6–6.3	
	Second dorsal spine	6.65-6.95 (6.75)	6.8–7.5	
	Third dorsal spine	7.59-7.92 (7.75)	-	
	Fourth dorsal spine	8.07-9.11 (8.74)	-	
	Fifth dorsal spine	9.15-9.66 (9.42)	-	
	Longest dorsal ray	15.42-16.47 (16.02)	-	
	Anal-fin base	22.37-24.92 (24.02)	22.6–27.7	
	First anal spine	4.73-5.01 (4.87)	5.1–5.6	
	Second anal spine	7.12-7.42 (7.28)	-	
	Third anal spine	9.97-10.49 (10.21)	10.0–12.4	
	Longest anal ray	12.06-14.86 (13.56)	-	
	Caudal-fin length	20.24-22.13 (20.95)	-	
	Pectoral-fin length	19.88-21.61 (20.46)	18.6–21.9	
	Pelvic spine length	12.81-13.97 (13.41)	-	
	Pelvic-fin length	17.28-18.4 (17.42)	17.6–19.0	
	Measurements (%HL)	Snout length	32.10-32.81 (32.55)	11.1–13.5 **)
		Orbit diameter	18.22-20.21 (19.02)	6.1–7.7 **)
		Interorbital width	19.40-20.75 (20.16)	6.2–6.5 **)
		Upper-jaw length	29.94-32.48 (30.99)	-

*) data from Gomon (2006)

**) values are expressed as percentage of standard length

Description – Meristic data and proportional measurements are presented in Table 2. Dorsal-fin rays XII, (9–10); caudal-fin rays (19–20); anal-fin rays III, (11–12); pectoral-fin rays ii (14–15); lateral-line scales (32–33); scales above lateral line (4–5); scales below lateral line 11; predorsal scales 10–11. Body slender; caudal peduncle of moderate depth; head and snout elongate. Posterior corner of mouth anterior to a vertical line of orbit. Anterior of upper jaw with a prominent canine, posterior end of jaw with canine smaller than those at anterior upper jaw. Anterior lower jaw with prominent canine. Beginning of pelvic fin base just below posterior part of pectoral-fin base; pelvic-fin distinctly not reaching anus. Body depth 30.12% in SL; fifth dorsal spine length 9.42% of SL, longest dorsal rays 16.02% of SL; snout length 32.55% of HL, orbit diameter 19.02% of HL, slightly longer than interorbital width.

Color in life – Body with 3 broad red stripes on background yellow dorsally, undersurface of body below ventral stripe white; dorsal stripe covering dorsal surface of body from above eye to posterior end of dorsal-fin base; second stripe originating on anterior tip of snout, interrupted by eye, then continuing caudal-fin base just above posterior end of lateral line; third stripe directed posteriorly across dorsal half of fleshy pectoral-fin base onto flanks, terminating on caudal-fin base just below posterior end of lateral line; large black spot superimposed on middle stripe at opercular edge. Dorsal fin red with narrow white dorsal stripe at tip of fin; posterior segmented rays blackish. Anal fin red with narrow white basal stripe and irregular black marginal stripe. Pectoral fin transparent. Pelvic fin black distally.

Distribution – *Bodianus masudai*, initially known only in Japan, Norfolk Island, Taiwan and New Caledonia (Masuda et al., 1975; Shao, 1986; Gomon, 2006; Fourmanoir in Gomon, 2006) can be considered as species with an antitropical distribution. Thus, the present specimen from Bitung, Northern Sulawesi, Indonesia, represents the first record of this species from the tropical region in the Western Pacific. It suggests that the species is widely and continuously distributed to the western Pacific from Japan, i.e. from Indonesia to Southern Hemisphere. The Indonesian specimen was collected at 20–30 m depth, whereas in Japan,

New Caledonia and Norfolk Island this species were collected from 30–113 m and may be more common at greater depths (Gomon, 2006). Further collection of the specimens from Indonesia are required to determine whether the Indonesian population also occurs in deeper water.

Remark – *Bodianus masudai* resembles to *B. neopercularis*, *B. opercularis* and *B. sepiacaudus* in having a prominent red striped color pattern in adults, but differs from them in having the opercular spot reaches below the upper end of the pectoral-fin base and in having fewer lateral-line scales. *B. masudai* also differs from these three species in having the lowermost red body stripe of adults originating on the ventral edge of the eye rather than on the underside of the jaw. Following Gomon (2006), all specimens of *B. masudai* collected from Bitung and Kema, North Sulawesi can be categorized to terminal-phase adult.

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