

# The Validity of *Helcogramma ishigakiensis* (Aoyagi, 1954) and a Synopsis of Species of *Helcogramma* from the Ryukyu Islands, Southern Japan (Perciformes: Tripterygiidae)

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(Received 18 July 2014; Accepted 18 October 2014)

*Helcogramma ishigakiensis* (Aoyagi, 1954), originally described as *Lepidoblennius marmoratus ishigakiensis* from the Ryukyu Islands, southern Japan, and subsequently regarded as a junior synonym of *Helcogramma inclinata* (Fowler, 1946), is redescribed here as a valid species. *Helcogramma ishigakiensis* is characterized by the following combination of characters: 13–15 (modally 14) second dorsal-fin spines; 28–39 pored lateral-line scales; 4–5+1+4–6 (typically 4+1+4) mandibular pores; anterior nostril tentacle unbranched; orbital tentacle simple; nape without scales; and bases of dorsal fins and entire caudal fin reddish in mature male. A synopsis of the other species of *Helcogramma* occurring in the Ryukyu Islands and a key to the Ryukyu species of the genus are provided.

**Key Words:** *Helcogramma aquila*, *Helcogramma fuscipectoris*, *Helcogramma inclinata*, *Helcogramma rhinoceros*, *Helcogramma striata*.

## Introduction

The triplefin genus *Helcogramma* McCulloch and Waite, 1918 is characterized by having a single lateral line, the first dorsal fin with three spines, the anal fin with a single spine, the pelvic fin with a single spine and two soft rays, and no scales on the head, pectoral-fin base, and ventral surface of the body (Hansen 1986; Fricke 1997; Holleman 2007). Species of *Helcogramma* are widely distributed in the tropical to temperate waters of the Indo-Pacific Ocean (Hansen 1986; Fricke 1997).

A series of field surveys in the Ryukyu Islands, southern Japan, and our examination of numerous museum specimens collected from these islands has shown the nominal subspecies *Lepidoblennius marmoratus ishigakiensis* Aoyagi, 1954 to be a valid species, although it had been regarded by Fricke (1997) as a junior synonym of *Helcogramma inclinata* (Fowler, 1946). It is redescribed here as *Helcogramma ishigakiensis*. Underwater photographs of males and females taken off Okinawa-jima island are provided. A synopsis of and a key to all species of *Helcogramma* known from the Ryukyu Islands is also provided, based on our examination of specimens collected from the islands.

## Materials and Methods

Counts and measurements follow Fricke (1997) and Holleman and Bogorodsky (2012), with the mandibular-pore

formula following Hansen (1986). Measurements were made to the nearest 0.1 mm with needle-point calipers under a dissecting microscope. Standard length is abbreviated as SL. Synonymies in the synopsis species of *Helcogramma* from the Ryukyu Islands are limited to original descriptions and literature related to the Ryukyu Islands and, in one case, southernmost Kyushu. Curatorial procedures for newly collected specimens followed Motomura and Ishikawa (2013). The specimens examined in this study are deposited in the Academy of Natural Sciences of Drexel University, Philadelphia (ANSP), Bishop Museum, Honolulu (BPBM); Hiwa Museum of Natural History, Shobara (HMNH); Kagoshima University Museum, Kagoshima (KAUM); Kanagawa Prefectural Museum of Natural History, Odawara (KPM); National Museum of Nature and Science, Tsukuba (NSMT); Churashima Research Center, Okinawa Churashima Foundation, Motobu (transferred from University of the Ryukyus: URM); and Yokosuka City Museum, Yokosuka (YCM). Comparative materials examined in this study are as follows—*Helcogramma ellioti* Herre, 1944: BPBM 27637, 6 males, 4 females, 28.9–39.1 mm SL, Kovalam, Kerala, India, 0–2 m depth, 10 February 1980, J. Randall and W. Smith-Vaniz; BPBM 27684, 4 males, 5 females, 28.0–37.2 mm SL, Kovalam, Kerala, India, 0–2 m depth, 12 February 1980, J. Randall and W. Smith-Vaniz. *Helcogramma habena* Williams and McCormick, 1990: USNM 300194 (holotype), male, 34.7 mm SL, approximately 0.5 km southeast of Diojo Point, Batan Island, Batanes, Philippines, 20°27'55"N, 121°57'12"E, 3–6 m depth, G. Johnson and W. Smith-Vaniz. *Helcogramma rhinoceros* Hansen, 1986: USNM 222370 (ho-

lotype), male, 27.9 mm SL, northwest of Putic Island, Palawan Province, Philippines, 10°55'N, 121°02'E, V. G. Springer *et al.*, 22 May 1978. *Helcogramma striata* Hansen, 1986: USNM 221667 (holotype), male, 42.3 mm SL, Miyake-jima island, Izu Islands, Japan, 34°07'N, 139°30'E, 1–3 m depth, P. Hadley, 10 December 1977.

***Helcogramma ishigakiensis*** (Aoyagi, 1954)  
[Standard Japanese name: Benimon-hebigimpo]  
(Figs 1–4, 6D; Tables 1–2)

*Lepidoblennius marmoratus ishigakiensis* Aoyagi, 1954: 241, 242, fig. 3 (fig. 4 erroneously quoted) (type locality: Ishigaki-jima island, Ryukyu Islands); Matsubara, 1955: 732 (Ishigaki-jima island, Ryukyu Islands).



Fig. 1. Photograph of holotype of *Lepidoblennius marmoratus ishigakiensis*, YCM-P 31283, male, 46.5 mm SL, Ishigaki-jima island, Ryukyu Islands, Japan.

*Helcogramma* sp.: Masuda, *et al.* 1975; 85, 262, fig. F on p. 85 (Ishigaki-jima island, Ryukyu Islands, Japan).

*Helcogramma ellioti* (not of Herre, 1944): Yoshino, 1984; 281, pl. 264, fig. B (Ishigaki-jima island, Ryukyu Islands).

*Helcogramma inclinata* (not of Fowler, 1946): Fricke, 1997: 446 (name only).

**Holotype.** YCM-P 31283, male, 46.5 mm SL, Ishigaki-jima island, Ryukyu Islands, Japan, I. Okada and H. Aoyagi, 1938.

**Non-type material examined.** 41 specimens, 26.1–53.3 mm SL, all from the Ryukyu Islands. **AMAMI-OSHIMA ISLAND:** KAUM-I. 17519, male, 50.0 mm SL, KAUM-I. 17520, female, 51.9 mm SL, tidepool at Tsuchihama, Kasari, 28°24'34"N, 129°40'31"E, 0.5–1 m depth, M. Meguro and T. Yoshida, 28 March 2009; NSMT-P 75401, male, 29.0 mm SL, Kaitsu Point, 9 m depth, S. Yokoyama, 15 November 2006; YCM-P. 34175, male, 36.6 mm SL, YCM-P. 34160, male, 32.9 mm SL, Hamasaki, Setouchi, Sagami Bay Marine Biological Research Club, 28 August 1994. **YORON-JIMA ISLAND:** KAUM-I. 40381, male, 43.3 mm SL, off Maehama Beach, 27°01'13"N, 128°24'29"E, 2–10 m depth, M. Masatoshi and E. Katayama, 17 August 2011; KAUM-I. 45894, male, 33.0 mm SL, off Maehama Beach, 27°01'13"N, 128°24'29"E, 2–10 m depth, KAUM Fish Team, 17 April

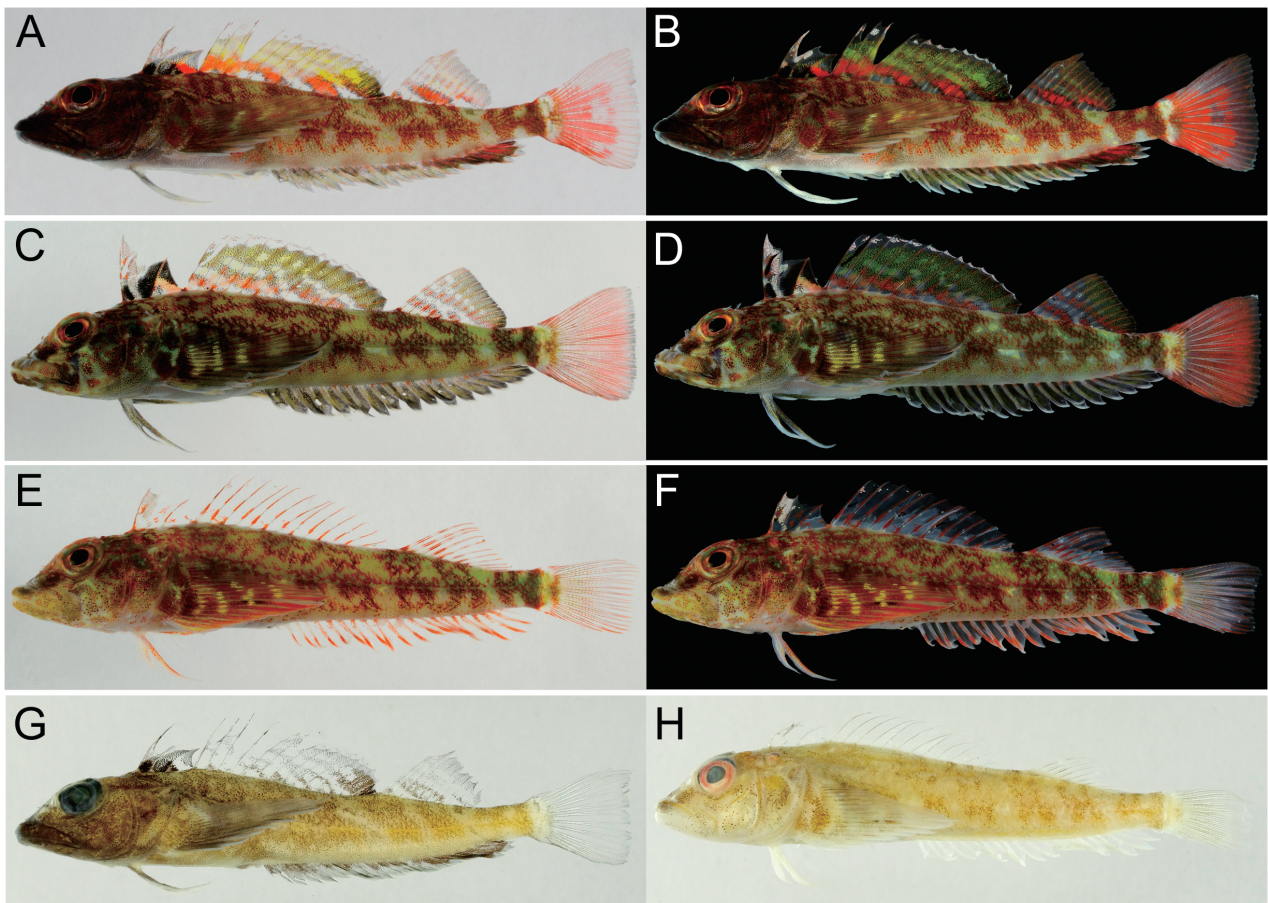


Fig. 2. Color photographs of fresh and preserved specimens of *Helcogramma ishigakiensis*. A–B, KAUM-I. 40381, male, 43.3 mm SL, Yoron-jima island; C–D, KAUM-I. 17519, male, 50.0 mm SL, Amami-oshima island; E–F, KAUM-I. 17520, female, 51.9 mm SL, Amami-oshima island; G, preserved specimen, same as A–B; H, preserved specimen, same as E–F.



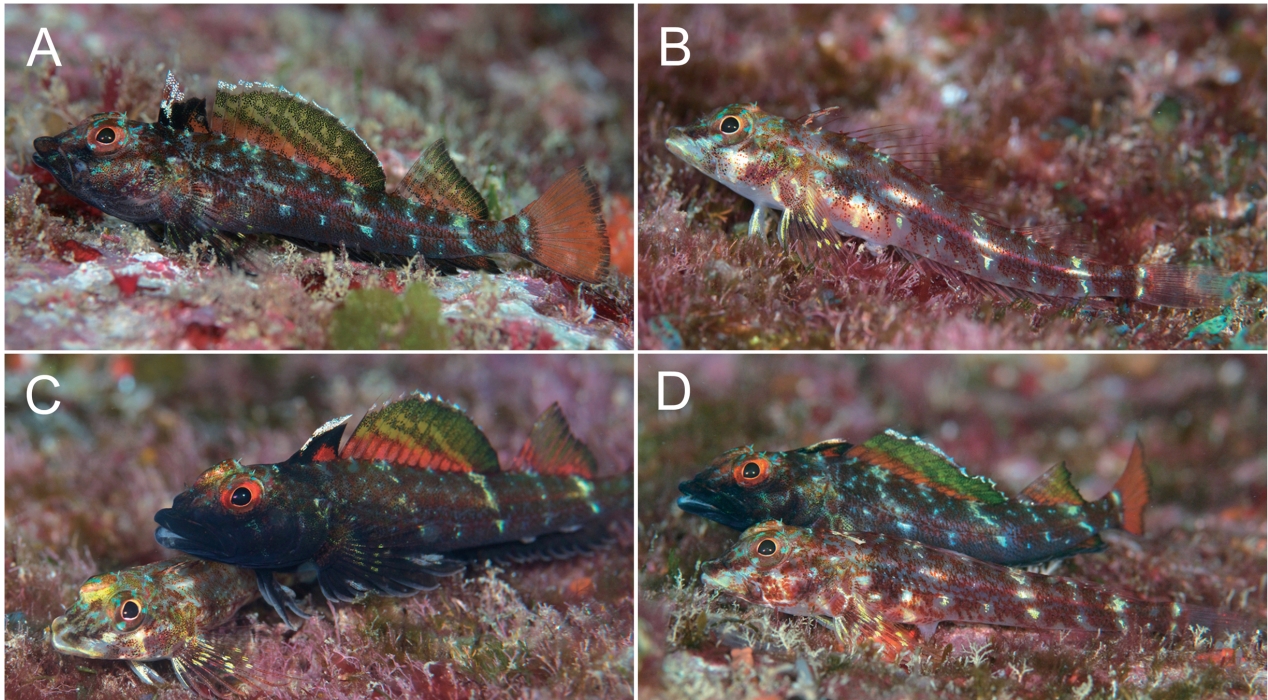


Fig. 3. Underwater photographs of *Helcogramma ishigakiensis*. A, male; B, female; C, female (left) and male (right); D, female (front) and male (back), north of Ho-Syuu, Onna, Okinawa-jima island, Ryukyu Islands, 3–7 m, 13 (A), 19 (C–D) May 2013. Photos by T. Katano.

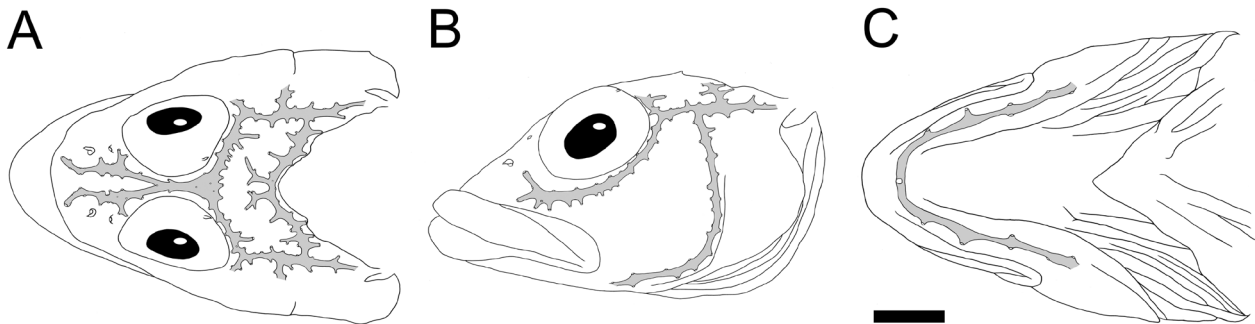


Fig. 4. Cephalic sensory pore system of *Helcogramma ishigakiensis*, as seen in dorsal (A), lateral (B), and ventral (C) views of head (KAUM-I. 17519, male, 50.0 mm SL). Scale bar 2 mm.

2012; KAUM-I. 47814, male, 49.0 mm SL, off Maehama Beach, 27°01'13"N, 128°24'29"E, 2–8 m depth, KAUM Fish Team, 13 August 2012; KAUM-I. 47863, female, 33.2 mm SL, KAUM-I. 47864, male, 32.7 mm SL, KAUM-I. 47865, male, 32.1 mm SL, KAUM-I. 47879, female, 29.5 mm SL, Chabana, 27°03'40"N, 128°25'02"E, 8 m depth, KAUM Fish Team, 13 August 2012; KAUM-I. 51566, female, 27.6 mm SL, off Maehama Beach, 27°01'13"N, 128°26'26"E, 2–5 m depth, KAUM Fish Team, 29 October 2012; KAUM-I. 51335, male, 30.5 mm SL, off Ritcho, 27°01'20"N, 128°25'47"E, 10 m depth, KAUM Fish Team, 24 October 2012. **OKINAWA-JIMA ISLAND:** HMNH-P 8502, male and female, 43.6–46.0 mm SL, Hentona Beach, Kunigami, 15 December 2004; URM-P 6856, female, 42.0 mm SL, Minatogawa, 2 m depth, 30 November 1977; URM-P 6857, male, 46.5 mm SL, Minatogawa, 14 May 1979; URM-P 6858, female, 40.2 mm SL, Minatogawa, 24 April 1981; URM-P 6859, female, 44.1 mm SL, tidepool at Chibishi, 5 May 1981;

URM-P 11273, 2 females, 30.1–42.2 mm SL, Maeda Point, H. Senou and T. Yoshino, 22 July 1985; URM-P 34814, female, 53.3 mm SL, Minatogawa, H. Yoshigou, 9 December 1995; URM-P 36751, 2 females, 39.1–42.4 mm SL, Sunabe, 27 November 1996; URM-P 36945, female, 37.5 mm SL, Minatogawa, 14 December 1996; URM-P 37540, 2 females, 36.3–42.3 mm SL, Akasaki, H. Yoshigou, 27 December 1996; URM-P 37651, male and female, 39.8–50.6 mm SL, Giyan Point, H. Yoshigou *et al.*, 8 February 1997; URM-P 37827, 3 males, 46.7–47.9 mm SL, URM-P 37829, 2 females, 42.4–50.9 mm SL, Giizabanda, Asato, Yaese, H. Yoshigou, 10 April 1997. **IE-JIMA ISLAND:** KPM-NI 8519, male, 27.7 mm SL, 19 September 2001. **ISHIGAKI-JIMA ISLAND:** NSMT-P 49448, male, 30.8 mm SL, female, 31.3 mm SL, off Maesato, 24°19'30"N, 124°11'10"E, 10 m depth, K. Matsuura *et al.*, 7 December 1995; NSMT-P 49493, male, 26.1 mm SL, Urazoko Bay, 9 m depth, K. Matsuura *et al.*, 12 December 1995; URM-P 6855, male, 41.4 mm SL, Oohama, 3 June 1974.

Table 1. Counts and measurements, expressed as percentages of standard length, of *Helcogramma ishigakiensis*. Means in parentheses.

	<i>Helcogramma ishigakiensis</i>		
	Holotype of <i>Lepidoblennius marmoratus ishigakiensis</i>	Non-type specimens	
	Male	Males	Females
	<i>n</i> =1	<i>n</i> =22	<i>n</i> =19
Standard length (mm)	46.5	26.1–50.6	29.5–53.3
Counts			
Second and third dorsal-fin rays	XIV+11	XIII–XV+11–12	XIII–XV+11–12
Pectoral-fin rays (left side)	2+7+7=16	1–3+5–8+7=15–16	1–4+5–8+7–8=15–17 (16)
Pectoral-fin rays (right side)	2+8+7=17	1–4+5–8+7–8=16	1–3+5–8+7–8= 12–17 (16)
Anal-fin rays	I, 21	I, 20–22 (21)	I, 20–22 (21)
Pored lateral-line scales (left side)	35	30–39	29–38 (33)
Pored lateral-line scales (right side)	35	28–39	29–37 (33)
Total lateral-line scales (left side)	40	40–41	39–41
Total lateral-line scales (right side)	39	39–41	39–41
Mandibular pore formula	4+1+5	4–5+1+4–6 (4+1+4)	4–5+1+4 (4+1+4)
Pre-dorsal-fin scales	absent	absent	absent
Measurements (% of SL)			
Body depth	17.0	17.6–19.8 (18.6)	16.8–19.8 (18.5)
Body width	15.9	16.3–19.9 (18.2)	17.4–20.2 (18.8)
Head length	31.1	30.0–34.5 (32.0)	30.1–34.5 (31.1)
Snout length	10.5	9.0–13.3 (10.9)	9.6–11.9 (11.0)
Orbit diameter	9.7	8.2–12.2 (10.0)	8.4–11.3 (9.9)
Interorbital width	2.3	1.6–2.5 (2.0)	1.6–2.5 (2.0)
Upper-jaw length	15.4	14.6–16.4 (15.5)	14.7–16.1 (15.3)
Postorbital length	13.2	12.3–14.2 (13.3)	12.3–14.0 (13.2)
Pre-1st dorsal-fin length	24.7	23.7–28.5 (26.1)	24.3–27.8 (26.3)
Pre-2nd dorsal-fin length	35.1	34.7–38.9 (36.5)	34.4–38.0 (36.5)
Pre-3rd dorsal-fin length	72.5	69.1–77.3 (72.0)	69.1–74.1 (72.0)
Pre-anal-fin length	48.7	46.2–51.2 (48.7)	47.2–52.2 (50.1)
Pre-pectoral-fin length	31.2	29.3–34.2 (32.3)	30.1–34.3 (32.6)
Pre-pelvic-fin length	23.1	21.0–25.2 (22.6)	21.7–25.5 (23.4)
Caudal-peduncle length	10.1	8.6–12.2 (10.1)	9.2–12.8 (10.5)
Caudal-peduncle depth	7.1	6.6–8.2 (7.3)	6.3–7.8 (7.1)
1st spine length of 1st dorsal fin	damaged	9.4–13.7 (11.5)	8.2–12.5 (10.3)
2nd spine length of 1st dorsal fin	damaged	6.4–11.9 (9.4)	8.1–10.2 (9.1)
3rd spine length of 1st dorsal fin	8.2	6.9–9.8 (8.1)	7.0–9.2 (7.8)
Longest spine length of 2nd dorsal fin	damaged	13.0–16.1 (14.7)	13.2–15.8 (14.4)
Longest ray length of 3rd dorsal fin	damaged	14.7–17.7 (16.1)	13.6–17.8 (15.8)
Pectoral-fin length	29.6	28.6–32.3 (29.9)	27.5–32.4 (29.9)
2nd ray length of pelvic fin	20.2	19.9–22.9 (21.3)	17.8–22.0 (20.3)

**Diagnosis.** A species of *Helcogramma* with the following combination of characters: 13–15 (modally 14) second dorsal-fin spines; 28–39 pored lateral-line scales; 4–5+1+4–6 (typically 4+1+4) mandibular pores; anterior nostril tentacle unbranched; orbital tentacle simple; nape without scales; basal dorsal fins and caudal fin reddish in mature males.

**Description.** In following text, data for holotype presented first, followed by other specimen data (if different) in parentheses. Counts and measurements of holotype and other specimens given in Tables 1–2. Cephalic sensory pore systems illustrated in Figs 4A–C, 6D.

Body moderately elongate, slightly laterally compressed anteriorly, progressively more compressed posteriorly. Dorsal profile of snout weakly concave. Anterior nostril located at

level of ventral margin of eye, shaped as short, membranous tube with unbranched, thin tentacle. Posterior nostril located at level of middle of eye, its opening elliptical. Eyes oriented dorsolaterally; minute, simple tentacle on posterodorsal part of eye. Interorbital space very narrow, its width less than pupil diameter. Mouth slightly oblique; posterior margin of maxilla extending beyond vertical drawn through middle of pupil. Anterior tip of upper jaw not reaching as high as ventral margin of orbit. Lateral line continuous, with pored scales. Body covered with ctenoid scales; sizes of scales above and below lateral line subequal. No scales on pectoral-fin base, ventral surface of body, or head, including maxilla, interorbital space, preopercle, and opercle. No scales on nape anterior to first spine of first dorsal fin. No scales on fin membranes except for basal part of caudal fin. Origin of





Table 2. Continued.

		Total mandibular pores																									
		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
<i>H. aquila</i>	n=8									2	2	2	1		1												
<i>H. fuscipectoris</i>	n=46	46 <sup>H</sup>																									
<i>H. inclinata</i>	n=103								1	1	4	9	13 <sup>H</sup>	14	16	9	11	9	4	4	3	1	2		1		
<i>H. ishigakiensis</i>	n=41	37	3 <sup>H</sup>		1																						
<i>H. rhinoceros</i>	n=12	12																									
<i>H. striata</i>	n=29	17	4	8																							

<sup>H</sup>Including data for holotype. <sup>1</sup>Probable deformity.

first dorsal fin at vertical drawn between preopercular and opercular margins; spines of this fin damaged in holotype (first spine longest, third spine shortest in non-types). Origin of second dorsal fin above fourth (or fifth) pored lateral-line scale; spines of this fin also damaged in holotype (second to fourth spine longest, longer than first spine of first dorsal fin). Origin of third dorsal fin above 22nd (22nd to 24th) pored lateral-line scale; soft rays of this fin damaged in holotype (first or second soft ray longest). Origin of pelvic fin slightly anterior to vertical drawn through base of first dorsal-fin spine. Base of uppermost pectoral-fin ray at level of vertical drawn between third spine of first dorsal fin and first spine of second dorsal fin; pectoral fin pointing posteriorly, with posterior tip of its longest ray at vertical drawn through base of 11th (11th to 13th) spine of second dorsal fin. Origin of anal fin at level of vertical drawn through sixth (sixth or seventh) spine of second dorsal fin. Posterior margin of caudal fin slightly rounded.

Coloration in life of mature males (Fig. 3A, C–D)—Head dark brown to black with irregular bluish stripes and blotches. Body blackish with 6 poorly defined dark brown saddles, and irregular vertical to oblique blue bands between saddles. First dorsal fin black, except for white anterior margin and reddish membrane posterior to third spine. Second dorsal fin mostly green, with white margin and with posteriorly tapering reddish band along base, also with 2 or 3 oblique, pale yellowish-green bands across middle of fin. Third dorsal fin greenish centrally, reddish basally, black marginally. Pectoral fin blackish with 2 to 4 short, irregular, yellowish bands. Anal fin blackish, except for reddish posterior part and white distal margin. Caudal fin red with dusky posterior margin; 2 bright yellowish blotches at base of caudal fin.

Fresh coloration of mature males (based on color photographs of KAUM-I 17519, 40381; Fig. 2A–D)—Similar to coloration in life, but bluish or yellowish stripes, blotches, and saddles significantly faded.

Coloration of preserved male specimens (Figs 1, 2G)—Head blackish. Body dusky with 6 distinct saddles (saddles not evident in long-term preserved specimens). First dorsal fin blackish. Second and third dorsal fins semi-transparent with 3 to 4 dark oblique streaks. Pectoral, pelvic, and anal fins blackish. Caudal fin semi-transparent with dusky posterior margin.

Coloration of females in life (Fig. 1B, C–D)—Head and body semi-transparent, mottled with dark red, yellow, and blue streaks, bands, spots, blotches, and saddles. First dorsal

fin transparent, with scattered reddish spots and white distal part. Second and third dorsal fins transparent with reddish and whitish rays. Pectoral fin transparent with bright yellow blotches forming 3 or 4 vertical bands; rays reddish. Pelvic-fin rays yellowish white. Anal fin transparent with reddish and whitish rays. Caudal fin transparent; rays reddish; 2 bright yellow blotches at base of caudal fin.

Fresh coloration of female (based on color photographs of KAUM-I 17520; Fig. 2E–F)—Head and body pale green with 6 distinct brown saddles; dark brown band extending from anterior part of upper lip to anteroventral margin of orbit. First dorsal fin transparent with scattered reddish spots; upper membrane between first and second spines white; rays reddish. Second and third dorsal fins transparent with scattered white spots; rays reddish. Pectoral-fin membrane transparent, rays reddish, 4–5 bright yellow blotches or bands on fin. Pelvic fin white, second ray reddish but white distally. Anal-fin membrane transparent; rays reddish but white distally. Caudal-fin membrane transparent; rays reddish; fin base with bright yellow blotch.

Coloration of preserved female specimens (Fig. 2H). Similar to coloration in life, but blue or yellow stripes, blotches, and saddles significantly faded.

**Distribution.** Known from the Ryukyu Islands, southern Japan; specimens collected from Amami-oshima, Yoron-jima, Okinawa-jima, and Ishigaki-jima islands there. Occurring in rocky reef areas in depths of 3–11 m, and frequently observed adjacent to or sheltering under large rocks.

**Remarks.** *Helcogramma ishigakiensis* (Aoyagi, 1954) was originally described as a subspecies, *Lepidoblennius marmoratus ishigakiensis*. Subsequently, Matsubara (1955) regarded it as a valid species. *Lepidoblennius marmoratus* is currently regarded as an Australian endemic (Fricke 1994, 1997).

Fricke (1997) regarded *Lepidoblennius m. ishigakiensis* as a junior synonym of *Helcogramma inclinata* (Fowler, 1946). However, comparisons of its holotype and a large number of non-type specimens considered herein to be *H. ishigakiensis* with specimens of *H. inclinata* revealed significant differences. *Helcogramma ishigakiensis* has a single symphyseal mandibular pore (*vs* 5–10 in *H. inclinata*); no scales on the nape (*vs* scales present); no stripe extending from the anterior part of the upper lip to the preopercular margin (*vs* a bright blue stripe present); and, in mature males, basally reddish membranes in the anterior part of the first dorsal fin, in the second and third dorsal fins, and in the caudal fin (*vs* all fins



blackish).

Yoshino (1984) reported *Helcogramma ellioti* from the Ryukyu Islands on the basis of a color photograph of a fresh specimen. This specimen is re-identified herein as *Helcogramma ishigakiensis* on the basis of its having reddish parts on the dorsal and caudal fins (*vs* first dorsal fin and middle of second dorsal fin yellow, and third dorsal and caudal fins pale blue to grey in *H. ellioti*) and no stripe extending from the posterior part of the upper lip to the preopercular margin (*vs* a bright blue stripe in *H. ellioti*). That said, *H. ishigakiensis* is likely to be closely related to *H. ellioti* because both have a large number of pored lateral-line scales; however, *H. ishigakiensis* differs in having 20–22 (usually 21) anal-fin soft rays (*vs* 18–19 in *H. ellioti*); 1 symphyseal

mandibular pore (*vs* 3–5); and 39–41 total-lateral line scales [*vs* 35–38 (modally 36)] [data for *H. ellioti* from Holleman (2007) and this study].

**Synopsis of Species of *Helcogramma* from the Ryukyu Islands**

***Helcogramma aquila*** Williams and McCormick, 1990  
 [Standard Japanese name: Momiji-hebigimpo]  
 (Figs 5A–B, 6A; Table 2)

*Helcogramma aquila* Williams and McCormick, 1990: 1021, fig. 3A–B (type locality: Batan Island, Batan Islands, Philippines); Tashiro and Motomura 2013: 10, figs 1–4

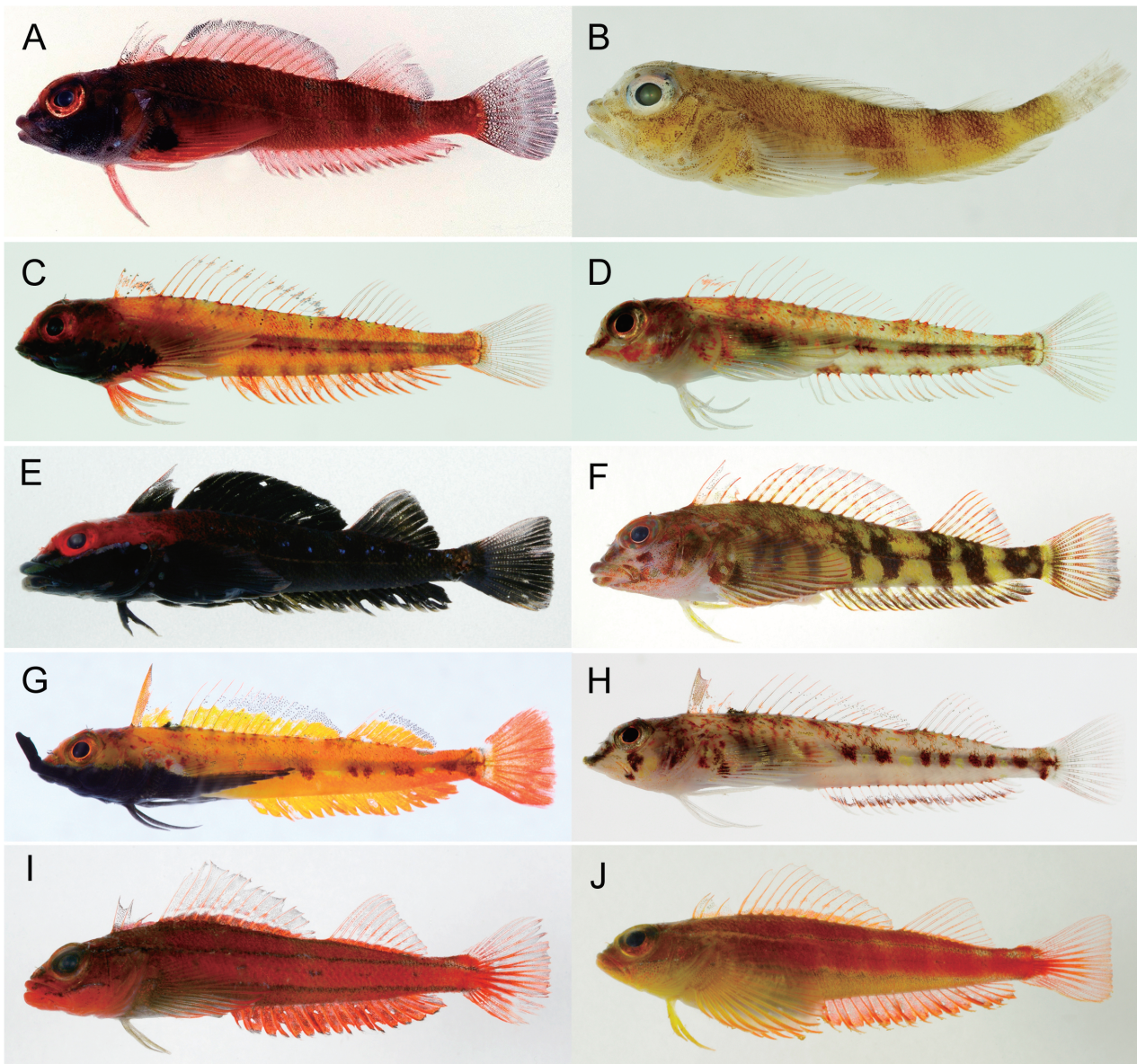


Fig. 5. Color photographs of fresh (A, C–J) and preserved (B) specimens of *Helcogramma* in the Ryukyu Islands. *Helcogramma aquila*, A, HMNH-P 9144, male, 35.0 mm SL, B, HMNH-P 4409, female, 32.5 mm SL; *H. fuscipectoris*, C, KAUM-I. 63398, male, 22.6 mm SL, D, KAUM-I. 63399, female, 24.2 mm SL; *H. inclinata*, E, KAUM-I. 29669, male, 42.5 mm SL, F, KAUM-I. 30625, female, 49.2 mm SL; *H. rhinoceros*, G, KAUM-I. 51381, male, 27.2 mm SL; H, KAUM-I. 63467, female, 29.4 mm SL; *H. striata*, I, KAUM-I. 37748, male, 38.5 mm SL, J, KAUM-I. 29515, female, 33.5 mm SL.

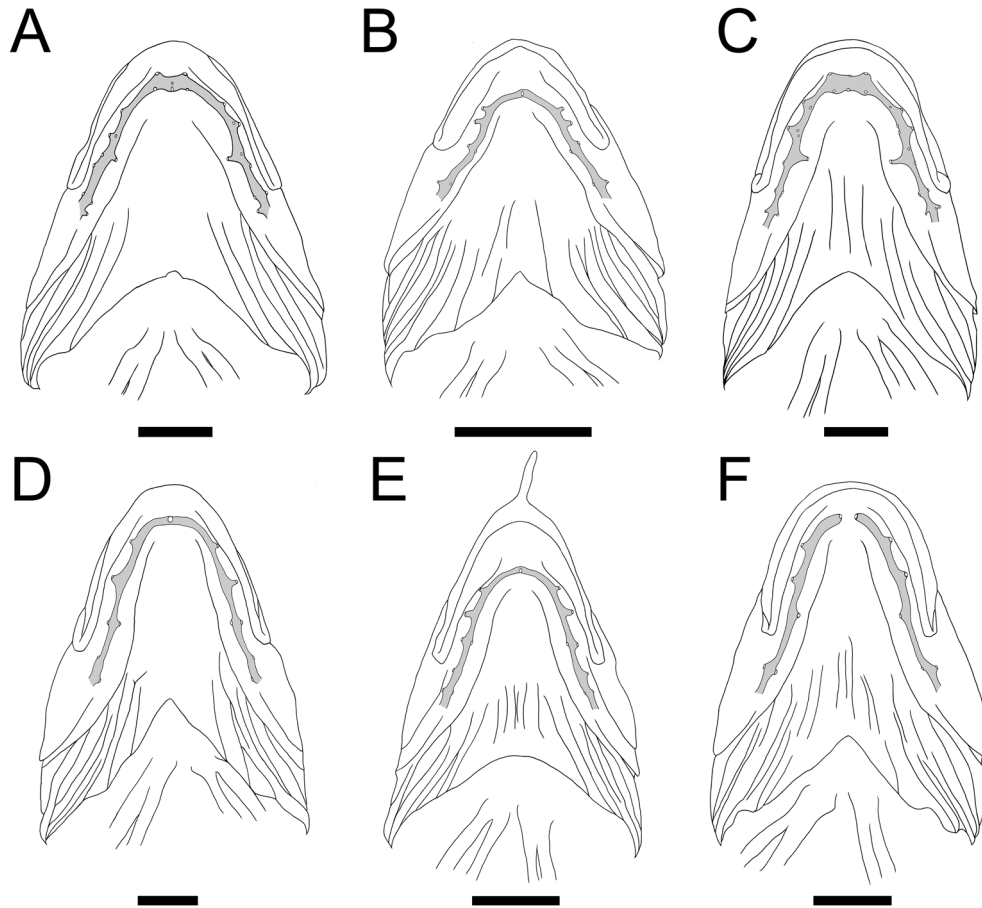


Fig. 6. Mandibular sensory pore system of species of *Helcogramma* in the Ryukyu Islands. A, *Helcogramma aquila* (HMNH-P 9148, male, 34.4 mm SL); B, *H. fuscipectoris* (KAUM-I. 24444, male, 28.7 mm SL); C, *H. inclinata* (KAUM-I. 6522, male, 50.9 mm SL); D, *H. ishigakiensis* (KAUM-I. 17519, male, 50.0 mm SL); E, *H. rhinoceros* (KAUM-I. 32332, male, 26.9 mm SL); F, *H. striata* (KAUM-I. 30110, male, 37.1 mm SL). Scale bars 2 mm.

(Okinoerabu-jima and Okinawa-jima islands, Ryukyu Islands).

*Helcogramma inclinata* (not of Fowler, 1946): Yoshigou and Nakamura 2008: 70 (in part; HMNH-P 4409 and 9143–9148 from Okinawa-jima island, Ryukyu Islands).

*Helcogramma* sp.: Yoshigou and Nakamura 2008: 71 (in part; HMNH-P 8003 from Okinoerabu-jima island, Ryukyu Islands).

**Material examined.** 8 specimens, 32.5–40.8 mm SL, as listed in Tashiro and Motomura (2013).

**Diagnosis.** A species of *Helcogramma* with the following combination of characters: 13 (rarely 14) second dorsal-fin spines; 24–31 pored lateral-line scales; 5–7 symphyseal mandibular pores; anterior nostril tentacle unbranched; orbital tentacle simple; nape without scales; lower half of head (area bounded by snout, ventral margin of orbit, and preopercular margin) black; bright blue stripe extending from anterior part of upper lip, through ventral margin of orbit, to preopercular margin; dorsal fins black distally; central part of pectoral-fin base black; entire caudal fin black (all color descriptions for mature males only).

**Distribution.** *Helcogramma aquila* is distributed in the western Pacific Ocean, where it ranges from the Ryukyu

Islands to north of the Philippines, and east to the Mariana Islands (Fricke 1997; Myers and Donaldson 2003; Williams and Howe 2003; Tashiro and Motomura 2013). In the Ryukyu Islands, this species has been collected from Okinoerabu-jima and Okinawa-jima islands.

**Remarks.** *Helcogramma aquila* belongs to the *H. fuscipinna* species group, as is shown by the bright blue stripe on the head extending from the anterior part of the upper lip, through the ventral margin of the orbit, to the preopercular margin in mature males (Williams and Howe 2003). A detailed description and comparisons with other species of the group were given by Tashiro and Motomura (2013).

***Helcogramma fuscipectoris*** (Fowler, 1946)

[Standard Japanese name: Kuromasuku]

(Figs 5C–D, 6B; Table 2)

*Enneapterygius fuscipectoris* Fowler, 1946: 187, figs 50–51 (type locality: Aguni-jima island, Ryukyu Islands).

*Enneapterygius personatus* Fowler, 1946: 185, figs 48–49 (type locality: Aguni-jima island, Ryukyu Islands).

*Enneapterygius quadrimaculatus* Fowler, 1946: 189, fig. 54 (type locality: Aguni-jima island, Ryukyu Islands).

*Helcogramma obtusirostris* (not of Klunzinger, 1871): Han-



sen 1986: 341 (Okinawa-jima island, Ryukyu Islands); Hayashi 1993: 946 (southern Japan).

*Helcogramma fuscipectoris*: Fricke 1997: 430, fig. 86 (Okinawa-jima island, Ryukyu Islands); Hayashi 2000: 1080 (southern Japan); Watai *et al.* 2009: 129 (Tokashiki-jima island, Ryukyu Islands); Hayashi 2013: 1283, 2098 (Yaku-shima and Okinawa-jima islands, Ryukyu Islands).

*Helcogramma obtusirostre* (not of Klunzinger, 1871): Motomura *et al.* 2010: 189, fig. 435 (Yaku-shima island, Ryukyu Islands).

**Type material examined.** *Enneapterygius fuscipectoris*: ANSP 72060 (holotype), male, 22.2 mm SL, ANSP 72061 (paratype), male, 21.6 mm SL, Aguni-jima island, Ryukyu Islands, E. Tinkham, 27 July 1945. *Enneapterygius personatus*: ANSP 72057 (holotype), male, 20.0 mm SL, same data as for holotype of *Enneapterygius fuscipectoris*. *Enneapterygius quadrimaculatus*: ANSP 72066 (holotype), female, 18.9 mm SL, same data as for holotype of *Enneapterygius fuscipectoris*.

**Non-type material examined.** 42 specimens, 14.3–28.7 mm SL, all from the Ryukyu Islands. **YAKU-SHIMA ISLAND**: KAUM-I. 11240, male, 18.6 mm SL, KAUM-I. 11241, male, 14.8 mm SL, KAUM-I. 11764, male, 22.3 mm SL, KAUM-I. 11765, male, 22.3 mm SL, KAUM-I. 11766, female, 21.3 mm SL, south of Kamazeno-hana, Kurio, 30°15'57"N, 130°24'52"E, 3 m depth, KAUM Fish Team, 10 August 2008; KAUM-I. 11361, male, 27.9 mm SL, KAUM-I. 11432, male, 23.3 mm SL, KAUM-I. 11433, female, 21.8 mm SL, KAUM-I. 11739, male, 24.1 mm SL, KAUM-I. 11740, male, 21.3 mm SL, KAUM-I. 11741, female, 20.8 mm SL, KAUM-I. 11742, female, 22.1 mm SL, west of Kamazeno-hana, Kurio, 30°16'03"N, 130°24'47"E, 3 m depth, KAUM Fish Team, 12 August 2008; KAUM-I. 23543, female, 21.6 mm SL, KAUM-I. 24444, female, 28.7 mm SL, KAUM-I. 24445, female, 21.4 mm SL, KAUM-I. 24446, female, 21.9 mm SL, KAUM-I. 24447, male, 15.9 mm SL, west of Kamazeno-hana, Kurio, 30°16'03"N, 130°24'47"E, 3 m depth, KAUM Fish Team, 30 July 2009. **NAKANO-SHIMA ISLAND**: KAUM-I. 63398, male, 22.6 mm SL, KAUM-I. 63399, female, 24.2 mm SL, KAUM-I. 63400, male, 15.2 mm SL, west side of Nakano-shima Port, 29°50'29"N, 129°50'39"E, 2 m depth, S. Tashiro, 1 September 2014. **YORON-JIMA ISLAND**: KAUM-I. 39909, male, 23.8 mm SL, KAUM-I. 39910, female, 20.3 mm SL, KAUM-I. 39915, female, 17.9 mm SL, KAUM-I. 39922, male, 19.4 mm SL, KAUM-I. 39923, female, 14.3 mm SL, KAUM-I. 39925, male, 17.0 mm SL, Mugiya, 27°01'18"N, 128°26'21"E, 0.5–1 m depth, M. Matsunuma, 12 August 2011; KAUM-I. 45932, female, 14.3 mm SL, tidepool near Yoron Port, 27°03'40"N, 128°25'02"E, 0.5 m depth, S. Tashiro *et al.*, 18 April 2012; KAUM-I. 46094, female, 28.0 mm SL, tidepool near Yoron Port, 27°03'40"N, 128°25'02"E, 0.5 m depth, KAUM Fish Team, 21 April 2012; KAUM-I. 47824, male, 21.8 mm SL, off Maehama Beach, 27°01'13"N, 128°24'29"E, 2–8 m depth, KAUM Fish Team, 13 August 2012; KAUM-I. 50840, male, 23.1 mm SL, KAUM-I. 50846, male, 20.2 mm SL, KAUM-I. 50847, male, 20.5 mm SL, Chabana, 27°03'40"N,

128°25'02"E, 3 m depth, KAUM Fish Team, 20 August 2012; KAUM-I. 51242, male, 22.0 mm SL, Chabana, 27°03'40"N, 128°25'02"E, 2 m depth, KAUM Fish Team, 23 October 2012. **OKINAWA-JIMA ISLAND**: KAUM-I. 10102, male, 26.3 mm SL, KAUM-I. 10103, male, 28.7 mm SL, tidepools at Minatogawa, Yaese, 26°07'10"N, 127°45'21"E, KAUM Fish Team, 23 May 2008. **TOKASHIKI-JIMA ISLAND**: KPM-NI 22673, male, 28.2 mm SL, KPM-NI 22675, male, 28.2 mm SL, off Tokashiku Beach, 23 February 2007. **ISHIGAKI-JIMA ISLAND**: KAUM-I. 53873, male, 27.5 mm SL, KAUM-I. 53875, male, 27.1 mm SL, tidepool, Yonehara Beach, 24°26'57"N, 124°10'41"E, T. Yoshida and H. Nishiyama, 9 April 2013. **MINAMIDAITO-JIMA ISLAND**: KAUM-I. 49922, male, 24.3 mm SL, KAUM-I. 49923, female, 22.6 mm SL, KAUM-I. 49949, male, 25.0 mm SL, coast of Honba, 27°03'40"N, 128°25'02"E, 4–7 m depth, K. Kuriwa, 25 June 2012.

**Diagnosis.** A species of *Helcogramma* with the following combination of characters: 14–15 (rarely 15) second dorsal-fin spines; 9–11 (usually 10) third dorsal-fin rays; 19–25 pored lateral-line scales; 4+1+4 mandibular pores; anterior nostril tentacle branched (unbranched in smaller specimens); orbital tentacle simple; nape without scales; bright blue stripe extending from posterior part of upper lip, through ventral margin of orbit, to preopercular margin; pectoral-fin base black; lower 7 or 8 pectoral-fin rays dusky (all color descriptions pertaining to mature males only).

**Distribution.** *Helcogramma fuscipectoris* is distributed in the western Pacific Ocean, where it ranges from southern Japan to Indonesia, and also Vanuatu (Fricke 1997). In the Ryukyu Islands, this species was collected in the present study from Yaku-shima, Nakano-shima, Yoron-jima, Okinawa-jima, Tokashiki-jima, Ishigaki-jima, and Minamidaito-jima islands. It mainly inhabits rock surfaces at depths of 0.5–3 m.

**Remarks.** *Enneapterygius fuscipectoris* was originally described by Fowler (1946) from Aguni-jima island in the Ryukyu Islands. In the same paper, Fowler (1946) also described *Enneapterygius personatus* and *E. quadrimaculatus* as new species from this island. Fricke (1997) regarded these three nominal species as identical, and *E. fuscipectoris* as the senior synonym of the latter two names. Hansen (1986) redescribed *Helcogramma obtusirostre* (Klunzinger, 1871), originally described from Al-Qusair, Egypt, the Red Sea, as a senior synonym of *E. fuscipectoris*, and reported it as occurring in the Indo-Pacific Ocean. Subsequently, Fricke (1997) redescribed *Helcogramma fuscipectoris* as a valid species restricted to the western Pacific, and *H. obtusirostre* as a western Indian Ocean species. Mature males of *H. fuscipectoris* can be easily distinguished from *H. obtusirostre* by their usually having 14 second dorsal-fin spines (*vs* 12–13 in the latter species) and a pale reddish body except for the black pectoral-fin base (*vs* a dusky or blackish body except for a reddish area around the pectoral-fin base and abdomen) [data for *H. obtusirostre* from Holleman (2007) and this study].

*Helcogramma inclinata* (Fowler, 1946)  
[Standard Japanese name: Aya-hebigimpo]  
(Figs 5E–F, 6C; Table 2)

- Enneapterygius inclinatus* Fowler, 1946: 191, fig. 55 (type locality: Aguni-jima island, Ryukyu Islands).
- Helcogramma habena* Williams and McCormick, 1990: 1020, figs 2, 6A–B, 8 (type locality: Batan Island, Batan Islands, Philippines).
- Helcogramma ellioti* (not of Herre, 1944): Hayashi 1993: 944 (Ryukyu Islands); Hayashi 2000: 1079 (Ryukyu Islands); Kato 2011: 222, unnumbered fig. (Yaku-shima island, Ryukyu Islands).
- Helcogramma fuscopinna* (not of Holleman, 1982): Aizawa 1997: 560, unnumbered fig. (Iriomote-jima island, Ryukyu Islands).
- Helcogramma inclinatum*: Fricke 1997: 446, fig. 91 (Ishigaki-jima island, Ryukyu Islands); Hayashi 2013: 1282, unnumbered fig. (Yaku-shima and Aguni-jima islands, Ryukyu Islands).
- Helcogramma inclinata*: Williams and Howe 2003: 164 (Aguni-jima island, Ryukyu Islands); Senou *et al.* 2006: 84 (Ie-jima island, Ryukyu Islands); Motomura *et al.* 2006: 107, figs 2–4 (Satsuma Peninsula, Kyushu; Yaku-shima island, Ryukyu Islands); Yoshigou and Nakamura 2008: 70 (in part; HMNH-P 5739, 7425, 7426, 8625, and 9023 from Kume-jima and Okinawa-jima islands, Ryukyu Islands); Motomura *et al.* 2010: 188, fig. 434 (Yaku-shima island, Ryukyu Islands); Tashiro 2013: 294, unnumbered figs (Iou-jima and Take-shima islands, Ryukyu Islands).
- Helcogramma nesion* (not of Williams and Howe, 2003): Yoshigou and Nakamura 2008: 71 (in part; HMNH-P 7945 from Okinawa-jima island, Ryukyu Islands).
- Helcogramma* sp.: Yoshigou and Nakamura 2008: 71 (in part; HMNH-P 7910 from Okinoerabu-jima island, Ryukyu Islands).
- Type material examined.** *Enneapterygius inclinatus*: ANSP 72067 (holotype), male, 26.1 mm SL, Aguni-jima island, Ryukyu Islands, E. Tinkham, 27 July 1945.
- Non-type material examined.** 107 specimens, 13.5–51.5 mm SL. **SATSUMA PENINSULA, KYUSHU:** KAUM–I. 4246, female, 50.0 mm SL, Kurose Beach, Kasasa, Minamisatsuma, 31°22'29"N, 130°10'09"E, 2 m depth, M. Ito, 28 May 2007; KAUM–I. 6522, male, 50.9 mm SL, KAUM–I. 6576, male, 43.0 mm SL, Kurose Beach, Kasasa, Minamisatsuma, 31°22'29"N, 130°10'09"E, 2 m depth, M. Ito, 9 September 2007. **TAKE-SHIMA ISLAND:** KAUM–I. 29668, male, 43.9 mm SL, KAUM–I. 29669, male, 42.5 mm SL, KAUM–I. 29683, male, 13.8 mm SL, KAUM–I. 29684, female, 15.2 mm SL, off south coast of Ombozaki, 30°48'32"N, 130°24'33"E, 5–20 m depth, KAUM Fish Team, 29 May 2010; KAUM–I. 37989, male, 45.6 mm SL, off south coast of Ombozaki, 30°48'32"N, 130°24'33"E, 5–20 m depth, KAUM Fish Team, 18 May 2011. **IOU-JIMA ISLAND:** KAUM–I. 29529, male, 13.5 mm SL, off west coast, 30°47'04"N, 130°15'42"E, 5–20 m depth, KAUM Fish Team, 25 May 2010; KAUM–I. 29592, male, 17.9 mm SL, off west coast, 30°47'04"N, 130°15'42"E, 5–20 m depth, KAUM Fish Team, 28 May 2010; KAUM–I. 30625, female, 49.2 mm SL, KAUM–I. 30626, male, 31.3 mm SL, off west coast, 30°47'04"N, 130°15'42"E, 2–22 m depth, KAUM Fish Team, 27 June 2010; KAUM–I. 37834, male, 44.2 mm SL, Harumase, 30°46'19"N, 130°16'51"E, 10–15 m depth, KAUM Fish Team, 16 May 2011. **YAKU-SHIMA ISLAND:** KAUM–I. 34, male, 44.3 mm SL, Isso, 30°27'26"N, 130°29'18"E, 3 m depth, S. Harazaki, 20 January 2006; KAUM–I. 11189, male, 43.1 mm SL, KAUM–I. 11190, female, 42.7 mm SL, KAUM–I. 11242, female, 44.0 mm SL, KAUM–I. 11243, female, 41.0 mm SL, KAUM–I. 11763, male, 32.3 mm SL, south of Kamazzenohana, Kurio, 30°16'03"N, 130°24'52"E, 0–3 m depth, KAUM Fish Team, 10 August 2008; KAUM–I. 11424, male, 50.8 mm SL, KAUM–I. 11425, female, 50.3 mm SL, KAUM–I. 11426, male, 34.4 mm SL, KAUM–I. 11427, female, 36.5 mm SL, KAUM–I. 11428, female, 24.9 mm SL, KAUM–I. 11731, female, 28.0 mm SL, KAUM–I. 11732, female, 46.6 mm SL, KAUM–I. 11733, female, 36.5 mm SL, KAUM–I. 11734, female, 32.2 mm SL, KAUM–I. 11735, female, 42.7 mm SL, KAUM–I. 11736, female, 51.5 mm SL, KAUM–I. 11737, female, 26.5 mm SL, KAUM–I. 11738, female, 25.5 mm SL, KAUM–I. 24443, male, 21.7 mm SL, west of Kamazzenohana, Kurio, 30°15'57"N, 130°24'47"E, 0–3 m depth, KAUM Fish Team, 12 August 2008; KAUM–I. 11472, female, 26.1 mm SL, KAUM–I. 11473, female, 22.9 mm SL, KAUM–I. 11474, male, 29.9 mm SL, KAUM–I. 11478, male, 23.9 mm SL, Isso, 30°27'23"N, 130°29'59"E, 1–5 m depth, KAUM Fish Team, 13 August 2008; KAUM–I. 20192, male, 28.8 mm SL, KAUM–I. 20209, male, 34.8 mm SL, tide pool at west of Yudomari Port, Yudomari, 30°13'58"N, 130°28'19"E, 0–3 m depth, KAUM Fish Team, 29 October 2008; KAUM–I. 20348, male, 28.0 mm SL, KAUM–I. 20350, male, 30.6 mm SL, KAUM–I. 20351, male, 39.7 mm SL, southeast of Cape Yahazu, Isso, 30°27'27"N, 130°30'02"E, 1–3 m depth, KAUM Fish Team, 31 October 2008; KAUM–I. 21857, male, 24.8 mm SL, KAUM–I. 21858, female, 23.3 mm SL, west of Kamazzenohana, Kurio, 30°15'57"N, 130°24'47"E, 0–4 m depth, KAUM Fish Team, 30 July 2009; KAUM–I. 38696, male, 41.9 mm SL, south of Yudomari Port, Yudomari, 30°13'55"N, 130°28'19"E, 1–5 m depth, KAUM Fish Team, 11 June 2011. **NAKANO-SHIMA ISLAND:** YCM-P 26990, tidepool at Funakura, M. Hayashi, 3 May 1992. **TAKARA-JIMA ISLAND:** KAUM–I. 2037, male, 39.4 mm SL, 25 March 1965. **AMAMI-OSHIMA ISLAND:** KAUM–I. 4126, male, 35.1 mm SL, 4 May 1965; KAUM–I. 17495, male, 44.1 mm SL, KAUM–I. 17496, female, 44.1 mm SL, tidepool at Tsuchihama, Kasari, 28°24'34"N, 129°40'31"E, 0.5–1 m depth, M. Meguro and T. Yoshida, 27 March 2009. **OKINOERABU-JIMA ISLAND:** HMNH-P 7910, male, 41.1 mm SL, female, 37.8 mm SL, Okidomari Beach, Tina, 2 May 2004; KAUM–I. 2002, male, 49.1 mm SL, July 1962. **YORON-JIMA ISLAND:** KAUM–I. 40069, male, 20.1 mm SL, off Udonosu Beach, 27°03'43"N, 128°25'02"E, 0.3–1 m depth, M. Matsunuma, 14 August 2011; KAUM–I. 40103, male, 20.9 mm SL, KAUM–I. 40397, male, 41.5 mm SL, KAUM–I. 44370, male, 32.3 mm SL, KAUM–I. 44371,



male, 26.1 mm SL, KAUM-I. 44372, female, 24.9 mm SL, KAUM-I. 44373, male, 24.6 mm SL, KAUM-I. 44374, female, 21.8 mm SL, off southwest coast, 27°01'48"N, 128°24'37"E, 2–10 m depth, M. Meguro and E. Katayama, 17 August 2011; KAUM-I. 45757, male, 33.1 mm SL, off Tomori Fishing Port, 27°01'54"N, 128°24'29"E, 5–10 m depth, M. Yamashita and T. Yoshida, 15 April 2012; KAUM-I. 45832, male, 34.8 mm SL, off Maehama Beach, 27°01'13"N, 128°24'29"E, 5 m depth, H. Motomura, 16 April 2012; KAUM-I. 45861, male, 36.8 mm SL, KAUM-I. 45895, male, 35.1 mm SL, KAUM-I. 45896, male, 31.3 mm SL, off Maehama Beach, 27°01'13"N, 128°24'29"E, 3–10 m depth, KAUM Fish Team, 17 April 2012; KAUM-I. 47823, male, 42.2 mm SL, off Maehama Beach, 27°01'13"N, 128°24'29"E, 2–8 m depth, KAUM Fish Team, 13 August 2012; KAUM-I. 47878, male, 39.8 mm SL, Chabana, 27°03'40"N, 128°25'02"E, 2 m depth, KAUM Fish Team, 13 August 2012; KAUM-I. 48144, male, 28.5 mm SL, off Maehama Beach, 27°01'13"N, 128°24'29"E, 1 m depth, KAUM Fish Team, 19 August 2012; KAUM-I. 50844, male, 22.8 mm SL, KAUM-I. 50848, male, 26.7 mm SL, KAUM-I. 50850, female, 23.0 mm SL, KAUM-I. 50851, female, 23.0 mm SL, KAUM-I. 50852, male, 20.9 mm SL, Chabana, 27°03'40"N, 128°25'02"E, 2–3 m depth, KAUM Fish Team, 20 August 2012; KAUM-I. 50863, male, 38.0 mm SL, Chabana, 27°03'40"N, 128°25'02"E, 15–17 m depth, KAUM Fish Team, 21 August 2012; KAUM-I. 51239, female, 30.1 mm SL, KAUM-I. 51243, female, 31.3 mm SL, off Maehama Beach, 27°01'13"N, 128°24'29"E, 3–5 m depth, KAUM Fish Team, 23 October 2012; KAUM-I. 51241, male, 37.6 mm SL, Chabana, 27°03'40"N, 128°25'02"E, 2 m depth, KAUM Fish Team, 23 October 2012; KAUM-I. 51339, male, 27.4 mm SL, off Ritcho, 27°01'20"N, 128°25'47"E, 10 m depth, KAUM Fish Team, 24 October 2012; KAUM-I. 51376, female, 29.7 mm SL, Chabana, 27°03'40"N, 128°25'02"E, 8 m depth, KAUM Fish Team, 25 October 2012; KAUM-I. 51399, male, 34.1 mm SL, KAUM-I. 51400, male, 25.5 mm SL, KAUM-I. 51401, male, 24.1 mm SL, Chabana, 27°03'40"N, 128°25'02"E, 8 m depth, KAUM Fish Team, 26 October 2012; KAUM-I. 51455, female, 31.4 mm SL, KAUM-I. 51456, female, 28.6 mm SL, KAUM-I. 51457, female, 27.8 mm SL, KAUM-I. 51458, female, 23.5 mm SL, KAUM-I. 51558, male, 32.8 mm SL, KAUM-I. 51559, male, 36.7 mm SL, KAUM-I. 51560, male, 34.5 mm SL, KAUM-I. 51586, male, 39.0 mm SL, off Maehama Beach, 27°01'13"N, 128°24'29"E, 2–8 m depth, KAUM Fish Team, 29 October 2012; KAUM-I. 51470, female, 30.5 mm SL, Chabana, 27°03'40"N, 128°25'02"E, 8 m depth, KAUM Fish Team, 27 October 2012. **OKINAWA-JIMA ISLAND:** HMNH-P 5515, male, 32.6 mm SL, Giizabanda, Asato, Yaese, 10 August 2002; HMNH-P 7425, female, 42.7 mm SL, HMNH-P 7426, male, 30.0 mm SL, Komesu Beach, Itoman, 27 December 2003; HMNH-P 8625, 2 males, 36.4–45.7 mm SL, 3 females, 32.0–40.5 mm SL, Odo Beach, Itoman, 12 December 2004; HMNH-P 9023, 3 females, 34.3–38.2 mm SL, Akasaki Beach, Kunigami, 31 December 2005. **KUME-JIMA ISLAND:** HMNH-P 5739, male, 22.1 mm SL, beach near Kume Airport, 13 August 2002.

**Diagnosis.** A species of *Helcogramma* with the following combination of characters: 13–16 (rarely 13; usually 15) second dorsal-fin spines; 22–35 pored lateral-line scales; 5–10 symphyseal mandibular pores; anterior nostril tentacle unbranched; orbital tentacle simple; nape scaled; lower half of head (area bounded by snout, ventral margin of orbit, and preopercular margin) black; bright blue stripe extending from anterior part of upper lip, through ventral margin of orbit, to preopercular margin; all fins and body black (all color descriptions for mature males only).

**Distribution.** *Helcogramma inclinata* is distributed in the western Pacific Ocean, where it ranges from southern Japan to the Philippines (Fricke 1997; Williams and Howe 2003). In Japan, this species has been collected from the Satsuma Peninsula in southern Kyushu and from Take-shima, Iou-jima, Yaku-shima, Nakano-shima, Takara-jima, Yoron-jima, Okinawa-jima, and Kume-jima islands in the Ryukyu Islands. In addition, this species has been recorded elsewhere in the central and southern Ryukyu Islands: *i.e.*, Ie-jima (Senou *et al.* 2006), Aguni-jima (Fowler 1946), Ishigaki-jima (Fricke 1997), and Iriomote-jima (Aizawa 1997) islands. *Helcogramma inclinata* usually inhabits rocky reefs at depths of 3–8 m.

**Remarks.** *Helcogramma inclinata*, belonging to the *H. fuscopinna* species group (*sensu* Fricke 1997), is distinguished from all other members of the group by its usually having 15 second dorsal-fin rays, 5–10 symphyseal mandibular pores, and a scaled nape, and by its mature male coloration (*e.g.*, lower head, body, and all fins black).

Motomura *et al.* (2006) reported *H. inclinata* from the southern end of the Satsuma Peninsula, on the basis of an underwater photograph only, as the northernmost record for the species. Two of our specimens (KAUM-I. 4246, 50.0 mm SL; KAUM-I. 6522, 50.9 mm SL) collected from Kasasa, Minamisatsuma, on the west coast of Satsuma Peninsula, represent a northward distributional range extension for *H. inclinata*.

***Helcogramma rhinoceros* Hansen, 1986**

[Standard Japanese name: Tengu-hebigimpo]

(Figs 5G–H, 6E; Table 2)

*Helcogramma rhinoceros* Hansen, 1986: 332, fig. 7 (left), 15 (type locality: Putic Island, Philippines); Aizawa 1997: 560, unnumbered fig. (Iriomote-jima island, Ryukyu Islands); Suzuki *et al.* 1998: 2, figs 1–7 (Nakano-ugan-jima and Iriomote-jima islands, Ryukyu Islands); Motomura *et al.* 2010: 189, fig. 436 (Yaku-shima island, Ryukyu Islands); Kato 2011: 221, unnumbered fig. (Yaku-shima island, Ryukyu Islands); Tashiro 2013: 298, unnumbered figs (Take-shima island, Ryukyu Islands); Hayashi 2013: 1283, 2098 (Yaku-shima, Amami-oshima, and Okinawa-jima islands, Ryukyu Islands).

**Non-type material examined.** 12 specimens, 21.1–30.3 mm SL. **TAKE-SHIMA ISLAND:** KAUM-I. 32332, male, 26.9 mm SL, off south coast of Ombozaki, 30°48'32"N, 130°24'33"E, 5–10 m depth, KAUM Fish Team, 19 Septem-

ber 2010. **NAKANO-SHIMA ISLAND:** KAUM-I. 63252, female, 30.3 mm SL, Nakano-shima Port, 29°50'14"N, 129°50'56"E, 17–19 m depth, S. Tashiro, 30 August 2014; KAUM-I. 63467, female, 29.4 mm SL, south side of Nakano-shima Port, 29°50'13"N, 129°51'03"E, 5 m depth, S. Tashiro, 2 September 2014. **AMAMI-OSHIMA ISLAND:** KAUM-I. 57683, female, 21.2 mm SL, KAUM-I. 57729, female, 21.1 mm SL, 28°07'57"N, 129°21'07"E, 3–15 m depth, Sokaru, Setouchi, S. Tashiro *et al.*, 13 December 2013. **YORON-JIMA ISLAND:** KAUM-I. 51381, 27.2 mm SL, off Yoron Port, 27°3'40"N, 128°25'02"E, 8 m depth, S. Tashiro, 26 October 2012; KAUM-I. 51428, male, 26.8 mm SL, KAUM-I. 51465, male, 26.7 mm SL, KAUM-I. 51466, male, 23.8 mm SL, off Yoron Port, 27°3'40"N, 128°25'02"E, 8 m depth, S. Tashiro, 27 October 2012. **ISHIGAKI-JIMA ISLAND:** NSMT-P 55449, female, 25.2 mm SL, 23°26'60"N, 124°04'80"E, Uganzaki, K. Matsuura *et al.*, 24 February 1998. **NAKANOUGAN-JIMA ISLAND:** KPM-NI 4341, male, 26.1 mm SL, KPM-NI 4342, female, 23.6 mm SL, K. Yano, 28 July 1997.

**Diagnosis.** A species of *Helcogramma* with the following combination of characters: 14–15 (modally 15) second dorsal-fin spines; 19–24 pored lateral-line scales; 10–11 third dorsal-fin rays; 4+1+4 mandibular pores; nape without scales; anterior nostril tentacle unbranched; orbital tentacle present; males with dermal prolongation on tip of snout; lower half of head (area below level of upper lip) black; narrow blue stripe running along upper lip, through ventral margin of orbit, to preopercular margin; pelvic fin, pectoral-fin base, and lower 7 pectoral-fin rays black (all color descriptions for mature males only).

**Distribution.** *Helcogramma rhinoceros* is distributed in the eastern Indian Ocean and western Pacific Ocean, where it ranges from the Andaman Sea to southern Japan, Vietnam, Indonesia, New Caledonia, and Vanuatu (Hansen 1986; Fricke 1997; Suzuki *et al.* 1998). In the Ryukyu Islands, this species was collected from Take-shima, Nakano-shima, Amami-oshima, Yoron-jima, Ishigaki-jima, and Nakano-ugan-jima islands during this study and had been previously recorded from Yaku-shima (Motomura *et al.* 2010) and Iriomote-jima (Aizawa 1997) islands. It was also confirmed from Kume-jima island (KPM-NR 36216, 64513, 64515) on the basis of underwater photographs. *Helcogramma rhinoceros* has been usually observed near the upper or lateral surfaces of rocks, at depths of 6–8 m.

**Remarks.** Mature males of *Helcogramma rhinoceros* can be distinguished easily from all other species of *Helcogramma* by their having a dermal prolongation on the tip of the snout. Females of *H. rhinoceros* are similar to females of *H. fuscipectoris* in coloration, but *H. rhinoceros* differs from the latter in having a simple anterior nostril tentacle (a branched tentacle in *H. fuscipectoris*).

*Helcogramma striata* Hansen, 1986

[Standard Japanese name: Tatejima-hebigimpo]  
(Figs 5I–J, 6E; Table 2)

*Helcogramma striata* Hansen, 1986: 350, fig. 18 (type locali-

ty: Miyake-jima island, Izu Islands, Japan; paratypes from Tokomasari Reef, Okinawa-jima island, Ryukyu Islands); Aizawa 1997: 559, unnumbered fig. (Iriomote-jima island, Ryukyu Islands); Hayashi 2000: 945 (south of Amami-oshima island, Ryukyu Islands); Sakai *et al.* 2005: 10 (Nakano-shima island, Ryukyu Islands); Watai *et al.* 2009: 129 (Tokashiki-jima island, Ryukyu Islands); Motomura *et al.* 2010: 189, fig. 437 (Yaku-shima island, Ryukyu Islands); Tashiro 2013: 297, unnumbered figs (Iou-jima and Take-shima islands, Ryukyu Islands).

*Helcogramma striatum*: Fricke 1997: 481, fig. 98 (Ryukyu Islands); Senou *et al.* 2006: 84 (Ie-jima island, Ryukyu Islands); Senou *et al.* 2007: 64 (Miyako-jima island, Ryukyu Islands); Hayashi 2013: 1281, unnumbered fig. (Yaku-shima island and south of Amami-oshima island in the Ryukyu Islands).

**Material examined.** 29 specimens, 11.4–38.5 mm SL, from the Ryukyu Islands. **TAKE-SHIMA ISLAND:** KAUM-I. 29720, male, 18.9 mm SL, KAUM-I. 29721, 11.4 mm SL, off south coast of Ombozaki, 30°48'32"N, 130°24'33"E, 5–40 m depth, KAUM Fish Team, 29 May 2010; KAUM-I. 30110, male, 37.1 mm SL, KAUM-I. 30111, male, 31.2 mm SL, KAUM-I. 30112, female, 20.3 mm SL, KAUM-I. 30113, male, 14.8 mm SL, off south coast of Ombozaki, 30°48'32"N, 130°24'33"E, 5–40 m depth, KAUM Fish Team, 27 May 2010; KAUM-I. 37748, male, 38.5 mm SL, KAUM-I. 37749, male, 36.7 mm SL, KAUM-I. 37750, male, 35.8 mm SL, KAUM-I. 37751, 2 males, 30.7–38.5 mm SL, 2 females, 28.8–29.3 mm SL, Take-shima Port, 30°48'59"N, 130°25'06"E, 3–5 m depth, KAUM Fish Team, 11 May 2011. **IOU-JIMA ISLAND:** KAUM-I. 29515, female, 33.5 mm SL, KAUM-I. 29516, male, 20.8 mm SL, off south coast, 30°46'32"N, 130°16'43"E, 10–60 m depth, KAUM Fish Team, 25 May 2010; KAUM-I. 30049, male, 13.6 mm SL, off west coast, 30°47'04"N, 130°15'42"E, 5–20 m depth, KAUM Fish Team, 28 May 2010; KAUM-I. 31713, male, 27.6 mm SL, KAUM-I. 31714, male, 25.7 mm SL, off west coast, 30°47'04"N, 130°15'42"E, 10–15 m depth, KAUM Fish Team, 14 August 2010. **YAKU-SHIMA ISLAND:** KAUM-I. 20174, male, 20.4 mm SL, tide pool at west side Yudomari Port, 30°13'58"N, 130°28'19"E, 0–3 m depth, KAUM Fish Team, 29 October 2008. **NAKANO-SHIMA ISLAND:** KAUM-I. 63256, male, 24.4 mm SL, KAUM-I. 63289, female, 21.7 mm SL, KAUM-I. 63290, male, 20.1 mm SL, KAUM-I. 63291, male, 13.8 mm SL, Nakano-shima Port, 29°50'14"N, 129°50'56"E, 17–19 m depth, S. Tashiro *et al.*, 30 August 2014; KAUM-I. 63265, male, 23.6 mm SL, south side of Nakano-shima Port, 29°50'13"N, 129°51'03"E, 5 m depth, S. Tashiro *et al.*, 2 September 2014. **AMAMI-OSHIMA ISLAND:** YCM-P 26162, male, 25.5 mm SL, Sakinome, Setouchi, Amami Fish Team, 27 August 1991. **IE-JIMA ISLAND:** KPM-NI 4110, male, 34.7 mm SL, east of Nakanose, T. Nomura, 28 July 1997; KPM-NI 27124, male, 26.2 mm SL, male, 36.9 mm SL, Nakanose, T. Nomura, 24 October 2010. **TOKASHIKI-JIMA ISLAND:** KPM-NI 22043, female, 35.4 mm SL, off Tokashiku Beach, H. Gunji, 10 March. 2004; KPM-NI 22057,

female, 33.6 mm SL, off Tokashiku Beach, A. Murase, 10 March 2004.

**Diagnosis.** A species of *Helcogramma* with the following combination of characters: 13–15 (modally 14) second dorsal-fin spines; 3–4+2+3–4 mandibular pores; anterior nostril tentacle unbranched; orbital tentacle absent; nape scaled; three longitudinal stripes running from snout to caudal peduncle; row of 6 or 7 spots between middle and ventral stripes.

**Distribution.** *Helcogramma striata* is distributed in the Indo-West Pacific, where it ranges from Japan to Australia and from the Andaman Sea to Fiji and the Line Islands (Hansen 1986; Fricke 1997; Holleman 2007). In Japan, this species occurs from Shizuoka Prefecture to the Ryukyu Islands, where it was collected from Take-shima, Iou-jima, Yaku-shima, Nakano-shima, Amami-oshima, Ie-jima, and Tokashiki-jima islands during the present study and had been recorded previously from Nakano-shima (Sakai *et al.* 2005), Okinawa-jima (Hansen 1986), Miyako-jima (Senou *et al.* 2007), and Iriomote-jima (Aizawa 1997) islands. It was also confirmed from Yonaguni-jima island (KPM-NR 12127) based on underwater photographs. *Helcogramma striata* usually inhabits the upper surface of rocks or corals, at depths of 3–20 m.

**Remarks.** *Helcogramma striata* is similar to *H. maldivensis* Fricke and Randall, 1992 in coloration and in lacking both the orbital tentacle and scales on the nape anterior to the dorsal fin. *Helcogramma striata* can be easily distinguished from *H. maldivensis* by its having usually 14 second dorsal-fin spines (*vs* usually 13 in *H. maldivensis*) and three longitudinal stripes in both sexes (*vs* three dotted lines). Mature males of *H. striata* have a dark-reddish body whereas females have a pale red body with a pale yellow area below the lowermost stripe.

**Key to the species of *Helcogramma* in the Ryukyu Islands**

- 1a Lateral surface of body with three white (dusky in mature males) longitudinal stripes; orbital tentacles absent ..... ***H. striata***
- 1b Lateral surface of body without longitudinal stripes; orbital tentacles present ..... **2**
- 2a Symphyseal mandibular pores 5 or more ..... **3**
- 2b Symphyseal mandibular pore 1 ..... **4**
- 3a Nape without scales; second dorsal-fin spines usually 13 ..... ***H. aquila***
- 3b Nape with scales; second dorsal-fin spines usually 15 ..... ***H. inclinata***
- 4a Pored lateral-line scales 28–39; no longitudinal row of reddish or dark blotches on middle of lateral surface of body; largest specimen of more than 50 mm SL ..... ***H. ishigakiensis***
- 4b Pored lateral-line scales 17–25; longitudinal row of reddish or dark blotches in middle of lateral surface of body (indistinct in mature males); largest specimen of less than 35 mm SL ..... **5**

- 5a Males with dermal prolongation on tip of snout; second dorsal-fin spines usually 15; anterior nostril tentacle unbranched ..... ***H. rhinoceros***
- 5b No dermal prolongation on tip of snout; second dorsal-fin spines usually 14; anterior nostril tentacle branched ..... ***H. fuscipectoris***

**Acknowledgments**

We are especially grateful to T. Katano (Okinawa Diving Center) for providing underwater photographs of *H. ishigakiensis*, and to J. Williams (USNM) for providing information on *H. ishigakiensis* and opportunities to examine specimens deposited in his museum. We thank M. Sabaj (ANSP), A. Suzumoto and L. O’ Hara (BPBM), H. Yoshigou (HMNH), G. Shinohara and M. Nakae (NSMT), H. Senou (KPM), K. Miyamoto (URM), and K. Hagiwara (YCM) for opportunities to examine specimens. We thank S. N. Chiba and E. Katayama (NSMT) as well as Y. Haraguchi, volunteers, and students of KAUM for their kind assistance with collecting and curating specimens, and G. Yearsley (Ellipsis Editing) for checking an early version of this manuscript. This study was supported in part by Grants-in-Aid for Scientific Research (A: 26241027, B: 24370041 and C: 23580259 and 26450265) from the Japan Society for the Promotion of Science, Tokyo, Japan (JSPS); the JSPS Asian Core Program, “Establishment of Research and Education Network on Coastal Marine Science in Southeast Asia”, the JSPS International Training Program “Protect Diversity of Bioresources in the Tropical Area”; the “Coastal Area Capability Enhancement in Southeast Asia Project” of the Research Institute for Humanity and Nature, Kyoto, Japan; and the “Biological Properties of Biodiversity Hotspots in Japan” project of the National Museum of Nature and Science, Tsukuba, Japan.

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