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First Records of the Blacktail Triplefin (Perciformes: Tripterygiidae), *Helcogramma aquila*, from Japan, with Notes on its Fresh Coloration

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Eight specimens (33.2–40.8 mm standard length) of *Helcogramma aquila* Williams and McCormick, 1990 (Tripterygiidae), previously known from the Philippines and the Mariana Islands, were collected from Okinoerabu-jima and Okinawa-jima islands in the Ryukyu Islands, Japan. These specimens represent the first records of this species from Japan, and the specimen from Okinoerabu-jima island is the northernmost record for the species. Underwater photographs of male and female individuals and color photographs of a fresh male specimen are given for the first time for *H. aquila*.

Key Words: Ryukyu Islands, *Helcogramma fuscopinna* species group, distribution, fresh coloration.

Introduction

The original description of *Helcogramma aquila* Williams and McCormick, 1990 was based on 13 specimens collected from the Batanes Islands, Philippines. Subsequently, Fricke (1997) redescribed the species on the basis of the type series, four new specimens from the Philippines, and five specimens from Guam. Recently, Myers and Donaldson (2003) listed *H. aquila* from Saipan.

Field and museum collection surveys for tripterygiids in the Ryukyu Islands, Japan, have yielded eight specimens of *H. aquila* from Okinoerabu-jima and Okinawa-jima islands. These specimens are described herein as the first records of *H. aquila* from Japan, and the specimen collected from Okinoerabu-jima island represents the northernmost record for this species. Williams and McCormick (1990) and Fricke (1997) provided morphological descriptions of the species based only on preserved specimens; therefore, no information on the fresh coloration of this species has been available. Underwater photographs of male and female individuals taken at Okinawa-jima island and a color photograph of a fresh male specimen are given here for the first time for *H. aquila*.

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. The description is based on specimens from Japan. The specimens of *H. aquila* examined in this study are deposited at the Australian Museum, Sydney, Australia (AMS); the Kagoshima University Museum, Kagoshima, Japan (KAUM); the Hiwa Museum for Natural History, Hiwa, Hiroshima, Japan (HMNH); and the Museum Support Center of the National Museum of Natural History, Smithsonian Institution, Suitland, MD, USA (USNM).

Helcogramma aquila Williams and McCormick, 1990
[New standard Japanese name: Momiji-hebigimpo]
(Figs 1–4; Table 1)

Helcogramma aquila Williams and McCormick, 1990: 1021, fig. 3A–B (type locality: Batan Island, Batanes Islands, Philippines); Williams and Howe 2003: 158, figs 3–4 (Batanes Islands, Philippines); Allen and Erdmann 2012: 772, unnumbered fig. (color photograph of preserved holotype).

Helcogramma aquilum: Fricke 1997: 409, fig. 81 (Guam, Mariana Islands; Batanes Islands, Philippines); Fricke and Williams 2000: 632 (listed name only); Williams and Fricke 2001: 3534 (listed name only); Myers and Donaldson 2003: 634 (name listed from Saipan, Mariana Islands).

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

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

Material examined. 8 specimens from the Ryukyu Islands, Japan: HMNH-P 8003, male, 37.3 mm SL, Nishihara, Okinoerabu-jima island, Amami Islands, Kagoshima

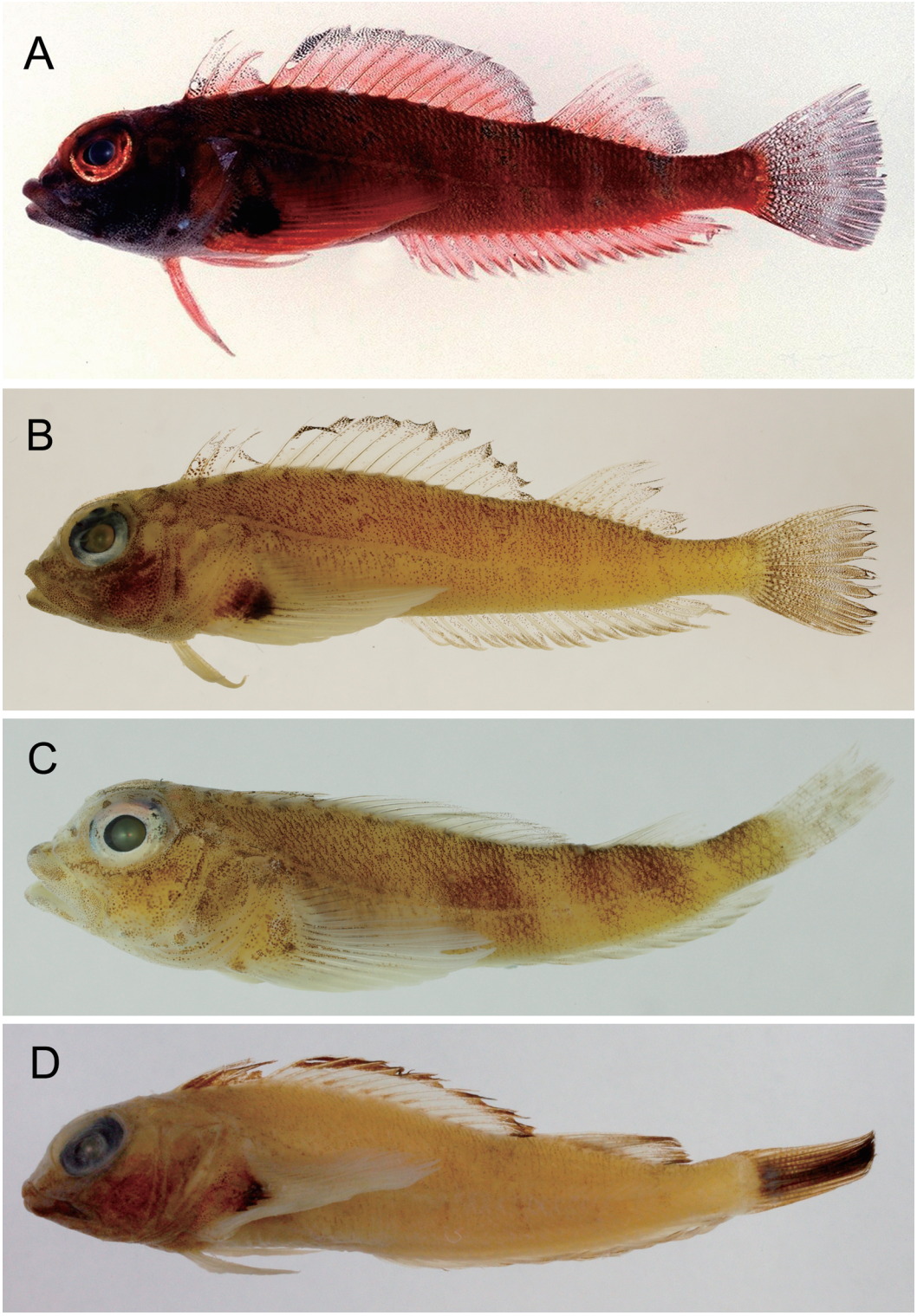

Fig. 1. Color photographs of fresh (A) and preserved (B–D) specimens of *Helcogramma aquila*. A–B, HMNH-P 9144, male, 35.0 mm SL, Okinawa-jima island, Japan; C, HMNH-P 4409, female, 32.5 mm SL, Okinawa-jima island, Japan; D, USNM 298405, holotype, male, 39.7 mm SL, Batan Island, Philippines.

Prefecture, 0.5 m depth, 4 May 2004; HMNH-P 9143, male, 40.8 mm SL, HMNH-P 9144, male, 35.0 mm SL, HMNH-P 9145, male, 36.5 mm SL, HMNH-P 9146, male, 36.4 mm SL, HMNH-P 9147, male, 36.5 mm SL, Ou-jima island, Nanjo, Okinawa-jima island, Okinawa Prefecture, 1.0 m depth, 2 January 2006; HMNH-P 9148, male, 34.4 mm SL; HMNH-P 4409, female, 32.5 mm SL, Giizabanda, Asato, Yaese, Okinawa-jima island, Okinawa Prefecture, 1.0 m depth, 4 January 2002.

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

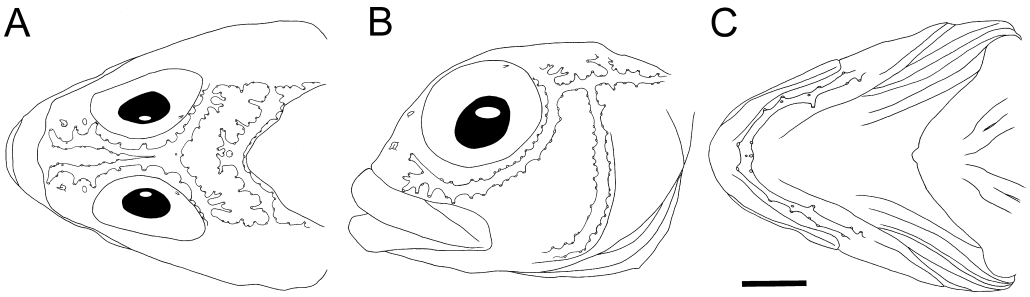

Fig. 2. Cephalic sensory pore system of *Helcogramma aquila*. Dorsal (A), lateral (B), and ventral (C) views of head (HMNH-P 9148, male, 34.4 mm SL). Scale bar 2 mm.

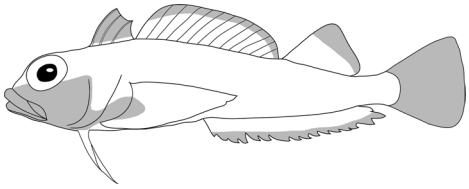

Fig. 3. Schematic depiction of melanophore distribution pattern of mature males of *Helcogramma aquila*, based on seven male specimens from the Ryukyu Islands.

mandibular pores; nape in front of dorsal fin 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 to preopercular margin through ventral margin of orbit; dorsal fins black distally; central part of pectoral fin base black; and entire caudal fin black (all color diagnosis applying only to mature males).

Description. Counts and measurements are given in Table 1. Japanese specimens are shown in Fig. 1A–C and Fig. 4. Cephalic sensory pore systems are illustrated in Fig. 2.

General morphology. Body moderately elongate, slightly laterally compressed anteriorly, progressively more compressed posteriorly. Dorsal profile of snout moderately steep. Anterior nostril a short membranous tube with an unbranched, thin tentacle; anterior nostril located at mid-level of eye; posterior nostril opening elliptical. Eyes oriented dorsolaterally; one minute, simple tentacle on upper posterior part of each eye. Interorbital space very narrow, width less than pupil diameter. Mouth slightly oblique; posterior margin of maxilla extending beyond a vertical through middle of pupil. Uppermost anterior margin of upper jaw approximately level with lowermost margin of orbit. Lateral line continuous, with pored scales; pored scale series ending below base of fourth to sixth ray of third dorsal fin. Body covered with ctenoid scales; sizes of scales above and below lateral line subequal. No scales on head (including maxilla, interorbital space, preopercle, and opercle), pectoral fin base, or ventral surface of body. No scales on nape in front of first spine of first dorsal fin. No scales on fin membranes, except basally on caudal fin. Origin of first dorsal fin at vertical between preopercular and opercular margins; first spine longest, third spine shortest. Origin of second dorsal fin above fourth or fifth pored lateral-line scale; third to fifth spine longest, longer than first spine of first dorsal fin. Origin of third dorsal fin above 23rd or 24th pored lateral-line scale; first soft ray longest. Origin of pelvic fin slightly anterior to vertical from origin of first dorsal fin. Base of uppermost pectoral fin ray below third spine of first dorsal fin; pectoral fin pointed posteriorly, posterior tip of longest ray below base of 13th or 14th spine of second dorsal fin. Origin of anal fin below seventh spine of second dorsal fin; posterior margin of caudal fin slightly rounded.

Coloration of mature males when alive (Figs 3, 4A). Upper half of head reddish with irregular bluish stripes and blotches. Lower half of head black with bright blue stripe, its width equal to or slightly narrower than pupil diameter, extending from anterior part of upper lip through ventral margin of orbit to preopercular margin; and blue blotches scattered on lower and under sides of head. Body reddish with six poorly defined dark red saddles and irregular vertical blue bands between saddles. Pectoral fin red with distinct black blotch, subequal in size to orbit diameter, on central part of fin base and bright blue blotches in and around black blotch. First dorsal fin black except for reddish basal membranes. Second and third dorsal fins red with black margins. Anal fin red with dusky margin. Caudal fin black.

Coloration of females when alive (Fig. 4A, B). Head and body whitish, mottled with dark red, yellow, and blue streaks, bands, spots, blotches, and saddles; indistinct blue stripe extending from snout to preopercular margin; two bright yellow saddles behind second and third dorsal fins, respectively. Dorsal fin membranes transparent with reddish and bluish rays. Pectoral fin membranes transparent; rays yellowish basally and remaining parts pale red; central part of fin base with indistinct black blotch. Anal fin membranes transparent; rays reddish with white marginally. Caudal fin transparent with three poorly defined vertical, narrow, reddish-brown bands.

Coloration of mature males when fresh (based on color photographs of HMNH-P 8003 and 9144; Fig. 1A). Similar to coloration when alive, but blue stripes, blotches, and saddles lost.

Coloration of preserved male specimens (Fig. 1B, D). Lower half of head, including lips, blackish. First dorsal fin black anteriorly. Second and third dorsal fins black distally. Anal fin dusky distally. Caudal fin dusky to black. Melanophores scattered on body.

Coloration of preserved female specimen (Fig. 1C).

Fig. 4. Underwater photographs of *Helcogramma aquila*. A, female (left) and male (right); B, female (same female individual as in A), Maeda, Onna, Okinawa-jima island, Japan, 3–5 m, 13 May 2012. Photos by T. Katano.

Melanophores scattered on head and body, including base of pectoral fin; body with four distinct saddles. Dorsal fins without black margin. Anal fin with dusky margin. Caudal fin mottled with dusky blotches.

Distribution. This species is currently known from the Batanes Islands in the Philippines (Williams and McCormick 1990), Guam (Fricke 1997) and Saipan (Myers and Donaldson 2003) in the Mariana Islands, and Okinawa-jima and Okinoerabu-jima islands in the Ryukyu Islands (this study). All the Japanese specimens were collected from tide pools outside the barrier reef edges in depths of 0.5–1.0 m.

Remarks. The features of the eight specimens from Okinoerabu-jima and Okinawa-jima islands agree well with those of *H. aquila* given by Williams and McCormick (1990) and Fricke (1997); *i.e.*, the Japanese specimens have 13 (rarely 14) second dorsal-fin spines; 24–31 pored lateral-line scales; 5–7 symphyseal mandibular pores; a pre-first-dorsal-fin region without scales; the lower half of the head (the area bounded by the snout, ventral margin of the orbit, and the preopercular margin) black in mature males; the dorsal fins black distally in mature males; and the central part of pectoral fin base and the entire caudal fin black in mature males. There are some differences between the meristics for *H. aquila* given here and these in previous studies (Williams and McCormick 1990; Fricke 1997): 10 or 11 soft rays in the third dorsal fin (7 rays in one deformed specimen; see Table 1) *vs* 11 rays in the latter; and i+8+vii–viii pectoral fin rays *vs* 0–i+8–9+vii. The slight differences in ray counts probably reflect the limited number of specimens available in the previous studies.

Some morphometric data for *H. aquila* given herein differ from those of Fricke (1997); no morphometric data for this species were given by Williams and McCormick (1990) and Williams and Howe (2003). Fricke (1997) gave the snout length as 5.5–6.4% of SL (*vs* 9.5–10.4% herein), and the upper-jaw length as 10.0–12.8% of SL (*vs* 13.2–15.0%) (Table 1). The holotype and one paratype of the species (both males) from the Philippines were examined by both Fricke (1997) and this study, and our data for these two type specimens were consistent with those of the specimens of *H. aquila* from Japan reported herein. We consider Fricke's (1997) morphometric data to be inaccurate.

Helcogramma aquila is a member of the *H. fuscopinna* species group, which is characterized by the presence of a bright blue stripe extending from the anterior part of the upper lip to the preopercular margin through the ventral margin of the orbit in mature males (Williams and Howe 2003). This group comprises 11 species (Williams and Howe 2003): *H. albimacula* Williams and Howe, 2003; *H. aquila*; *H. cerasina* Williams and Howe, 2003; *H. desa* Williams and Howe, 2003; *H. fuscopinna* Holleman, 1982; *H. inclinata* (Fowler, 1946); *H. lacuna* Williams and Howe, 2003; *H. nesion* Williams and Howe, 2003; *H. nigra* Williams and Howe, 2003; *H. randalli* Williams and Howe, 2003; and *H. vulcana*

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

	This study				Williams and McCormick (1990)	Fricke (1997)
	Okinoerabu-jima and Okinawa-jima islands		Batan Island, Philippines		Philippines	Philippines and Guam
	Non-types	Non-types	Holotype	Paratype	Holotype and paratypes	Holotype, paratypes, and non-types
	Males	Female	Male	Male	Males and females	Males and females
	n=7	*n*=1	*n*=1	*n*=1	*n*=13	*n*=22
Standard length (mm)	34.4–40.8	33.2	39.7	37.0	26.6–40.1	13.1–40.5
Counts						
Second and third dorsal-fin rays	XIII–XIV+10–11	XIII+7[1]	XIII+11	XIII+11	XIII–XIV+11	XIII–XV+11
Pectoral fin rays	i+8+vii–viii	i+8+vii	i+8+vii	i+8+vii	0–i+8–9+vii	0–i+8–9+vii
Anal fin rays	I, 19–20	I, 20	I, 20	I, 19	I, 19–20	I, 19–20
Pored lateral-line scales	24–29	31	25	31	24–31	24–31
Mandibular pore formula	6–8+5–7+6–8	5+6+7	8+6+7	8+6+8	5–8+5–8+6–8	5–8+5–8+5–8
Pre-dorsal scales	absent	absent	absent	absent	absent	absent
Measurements (% of SL)						
Body depth	21.1–23.2 (21.9)	23.0	19.9	21.1	—	21.4–22.0
Body width	20.0–22.8 (21.6)	22.2	20.6	20.5	—	19.4–20.1
Head length	29.5–32.5 (31.1)	32.7	29.5	30.6	—	26.1–28.0
Snout length	9.5–10.4 (9.9)	10.4	9.3	9.3	—	5.5–6.4
Orbit diameter	9.6–10.4 (10.0)	10.5	10.8	11.1	—	9.8–11.7
Interorbital width	2.9–3.6 (3.1)	3.2	3.6	3.0	—	2.5–3.5
Upper-jaw length	13.2–14.7 (13.9)	15.0	14.7	15.0	—	10.0–12.8
Postorbital length	12.5–13.6 (13.2)	13.3	13.0	13.1	—	—
Pre-1st-dorsal-fin length	24.9–26.7 (25.9)	28.0	23.4	25.6	—	23.3–24.8
Pre-2nd-dorsal-fin length	35.7–36.9 (36.5)	39.0	34.8	35.8	—	34.3–36.1
Pre-3rd dorsal-fin length	69.2–73.4 (71.5)	73.6	68.7	71.3	—	68.1–70.9
Pre-anal-fin length	48.9–52.6 (50.6)	53.4	47.1	50.6	—	48.0–51.0
Pre-pectoral-fin length	30.1–32.5 (31.6)	34.2	31.3	32.7	—	31.8–33.8
Pre-pelvic-fin length	22.3–26.7 (23.9)	27.0	22.0	22.7	—	20.0–22.3
Caudal peduncle length	9.5–11.8 (10.7)	10.5	9.7	8.8	—	12.1–13.8
Caudal peduncle depth	7.0–8.0 (7.6)	7.8	7.9	7.9	—	7.7–8.2
1st spine length of 1st dorsal fin	10.6–12.7 (11.7)	10.5	11.8	12.2	—	10.2–11.1
2nd spine length of 1st dorsal fin	8.8–10.4 (9.6)	9.1	10.7	10.8	—	8.3–9.5
3rd spine length of 1st dorsal fin	7.4–8.6 (8.0)	7.9	9.9	8.4	—	7.5–9.0
Longest spine length of 2nd dorsal fin	13.4–15.4 (14.4)	15.0	14.2	14.4	—	13.1–15.8
Longest ray length of 3rd dorsal fin	15.2–16.9 (16.3)	15.8	17.8	16.7	—	15.8–17.7
Pectoral fin length	27.9–30.3 (28.9)	30.5	30.1	28.8	—	23.5–36.8
2nd ray length of pelvic fin	19.7–21.6 (20.6)	21.9	21.1	22.1	—	16.7–18.8

[1] Probable deformity; — No data were reported.

Randall and Clark, 1993. *Helcogramma aquila* can be separated from all other members of the *H. fuscopinna* species group, except for *H. inclinata* and *H. lacuna*, by having more than five symphyseal mandibular pores (Williams and Howe 2003). *Helcogramma aquila* is distinguished from *H. inclinata* and *H. lacuna* by having 13 s-dorsal-fin spines (*vs* 14 in *H. lacuna*, 15 in *H. inclinata*), no scales on the nape anterior to the origin of the first dorsal fin (*vs* present in *H. inclinata*), and 16 pectoral fin rays (*vs* 17 in *H. lacuna*) (Williams and Howe 2003).

Williams and McCormick (1990), Fricke (1997), and Williams and Howe (2003) provided morphological descriptions of *H. aquila* based on preserved specimens and therefore lacked information on fresh coloration. In this study, underwater photographs of mature male and female individuals (Fig. 4) and color photographs of a fresh mature male specimen (Fig. 1A) are given for the first time for *H. aquila*. These photographs reveal that males of *H. aquila* can be easily distinguished from males of all members of the *H. fuscopinna* species group, except *H. lacuna*, by having both the anal fin and the caudal peduncle red instead of black (Figs 1A, 3, 4). Williams and Howe (2003) described *H. lacuna* on the basis of the preserved holotype and four paratypes and gave color photographs of male (fig. 13) and

female (fig. 14) non-type specimens (without indication of registration numbers) as *H. lacuna*. However, these male and female specimens were not of *H. lacuna*, but were of *H. rosea* Holleman, 2006 (Holleman 2006: 97). Thus, the coloration of *H. lacuna* when fresh or a live is still unknown (Holleman 2006; Allen and Erdmann 2012). Judging from a photograph of the preserved type specimen of *H. lacuna* from the Similan Islands, Thailand, given by Allen and Erdmann (2012: unnumbered fig. on p. 775), *H. aquila* can be distinguished from *H. lacuna* by having a black caudal fin [*vs* a pale caudal fin (=no melanophores) the in preserved specimen of *H. lacuna*].

Helcogramma aquila has previously been recorded from the Batanes Islands in the Philippines and Guam in the Mariana Islands on the basis of collected specimens (William and McCormick 1990; Fricke 1997). Williams and Howe (2003) overlooked the record from Guam by Fricke (1997) and stated that *H. aquila* was endemic to the Batanes Islands. Myers and Donaldson (2003) listed the species from Saipan in the Mariana Islands; this record was probably based on an unpublished underwater photograph of a male individual taken by H. Kimura (R. Myers, pers. comm.). Allen and Erdmann (2012) stated the distribution of *H. aquila* as "Philippines (Batanes Province) and Guam", overlooking the record from Saipan. The present specimens from the Ryukyu Islands represent the first records of *H. aquila* from Japan and, as well, the northernmost record of the species.

A standard Japanese name, Momiji-hebigimpo, is proposed here for *H. aquila*. English (common) names, Blacktail Triplefin and Darktail Triplefin, were proposed by Fricke (1997) and Allen and Erdmann (2012), respectively.

Comparative material examined. *Helcogramma aquila*: USNM 298405, holotype, male, 39.7 mm SL, White Beach, past Mahatae, Batan Island, Batanes Islands, Philippines, 20°24′45″N, 121°55′02″E, 0–6 m depth, D. Johnson and W. Smith-Vaniz, 22 April 1987; AMS I. 29427-001, paratype, male, 37.0 mm SL, same data as holotype.

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