

***Halichoeres claudia* sp. nov., a New Indo-Pacific Wrasse (Perciformes: Labridae), the Fourth Species of the *H. ornatissimus* Complex**

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John E. Randall and Luiz A. Rocha (2009) *Halichoeres claudia* sp. nov., a new Indo-Pacific wrasse (Perciformes: Labridae), the fourth species of the *H. ornatissimus* complex. *Zoological Studies* 48(5): 709-718. The labrid fish *Halichoeres ornatissimus* (Garrett), previously reported from the Hawaiian Is. (type locality) and various islands of Oceania to the Great Barrier Reef and Indonesia, as well as Christmas I. and the Cocos-Keeling Is. in the eastern Indian Ocean, is here recognized as endemic to the Hawaiian Is. and Johnston I. It is one of a complex with 3 other species: *H. claudia* sp. nov., from French Polynesia and the Line Is. to the Great Barrier Reef, New Caledonia, Vanuatu, Indonesia, Christmas I., Cocos-Keeling Is., and Cartier Reef, Timor Sea; *H. orientalis* Randall from Japan and Taiwan; and *H. cosmetus* Randall and Smith from the Indian Ocean, including Christmas I. *Halichoeres ornatissimus* is distinguished from *H. claudia* sp. nov. by the green body stripes of adults being broken into a series of spots, by males losing the prominent middle black spot in the dorsal fin, by their attaining a larger size (116 mm standard length, compared to 92 mm for *H. claudia* sp. nov.), and by a 2% mitochondrial DNA sequence divergence. A neotype is designated for *H. ornatissimus* (the holotype was destroyed by the San Francisco fire of 1906). <http://zoolstud.sinica.edu.tw/Journals/48.5/709.pdf>

Key words: Taxonomy, Coral reef fishes, Labridae, New species, Indo-Pacific.

The colorful wrasse *Halichoeres ornatissimus* was described by Andrew Garrett (1863) from a 4.5 inch (11.4 cm) specimen from the island of Hawai'i. He classified it in the genus *Julis* Cuvier, 1814, now regarded as a synonym of the genus *Coris* Lacepède 1801. Jenkins (1901: 47-48, figs. 2, 3) created 2 synonyms when he described *H. iridescens* and *H. lao* from the Hawaiian Is. (the former now known as the male phase, and the latter the female of *H. ornatissimus*). Jenkins believed his *H. iridescens* differed in the number of anal rays (Garrett's anal-ray count II,13; his count III,12) and in coloration, notably the lack of a black spot behind the eye (however, this spot can be green or black in male *H. ornatissimus*). Snyder (1904: 528) pointed out that Garrett must have mistaken an anal spine for a

ray, and placed *H. iridescens* in synonymy. Böhlke (1953: 85) listed the holotype and 2 paratypes of *H. iridescens* and the holotype of *H. lao* in the catalog of type specimens of recent fishes in the Natural History Museum of Stanford Univ., Stanford, CA, USA. The Stanford fish collection was moved to the California Academy of Sciences in San Francisco, CA in 1970. Parenti and Randall (2000: 23) treated *H. lao* as a synonym of *H. ornatissimus*.

Eschmeyer (1998: 1252) reported that Garrett's holotype of *H. ornatissimus* in the California Academy of Sciences, San Francisco, was destroyed by fire in 1906. We herein designate Jenkins' holotype of *H. iridescens*, SU 6131, as the neotype of *H. ornatissimus*. It was well described and illustrated by Jenkins, and it is in good condition (David Catania, pers. comm.).

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Jenkins published the standard length (SL) as 120 mm, but he probably measured the specimen when it was fresh, because it is now 113 mm SL.

Several authors have continued to correctly report *H. ornatissimus* from the Hawaiian Is. and Johnston I. (the first record for the latter locality by Fowler and Ball 1925). The present paper is concerned with records of a labrid fish identified as this species that are extralimital to the Hawaiian Is. and Johnston.

Randall (1973: 196-197) recorded *H. ornatissimus* from French Polynesia in a list of Tahitian fish names. He wrote that it differed slightly in color from the Hawaiian form, adding that it did not seem to be distinct at the species level. Other non-Hawaiian records from the literature include the Great Barrier Reef (Randall et al. 1990: 320, lower left figure.); Cocos-Keeling Is. (Allen and Smith-Vaniz 1994: 14); Mariana Is. (Myers and Donaldson 1996: 341), illustrated in Myers (1999: pl. 124 B), with a record for Palau; New Caledonia (Laboute and Grandperrin 2000: 360, upper left fig.); Marquesas Is. (Randall and Earle 2000: 17); South China Sea (Westneat in Randall and Lim 2000: 629); Western Australia (Hutchins 2001: 39), this record from Cartier I. in the Timor Sea at 12°31'S, 123°29'E; Tonga (Randall et al. 2004: 22); Indonesia (Allen and Adrim 2003: 49); and Wake I. (Lobel and Lobel 2004: 74). The Western Australian record is from Randall and M. Smith (1982: 15, pl. 6, fig. C; pl. 7, figs. A, B), who described *H. cosmetus* from the Maldives (type locality) and many other localities in the western Indian Ocean, noting its close resemblance in color to *H. ornatissimus*, but separating it principally by having 11 instead of 12 dorsal and anal soft rays. Allen and Steene (1987: pl. 92, fig. 5) reported *H. cosmetus* from Christmas I. in the eastern Indian Ocean from an underwater photograph. Although the number of dorsal and anal fin rays cannot be determined from the photograph, the color pattern, particularly the break in the orangish yellow stripe after it passes through the dorsal part of the eye, confirms the identification as *H. cosmetus*.

Randall et al. (1997: 45, pl. 11 B, C) included *Halichoeres* sp. in an annotated checklist of fishes of the Ogasawara Is. that had been misidentified as *H. ornatissimus* in southern Japan and Taiwan. Randall (1999: 295, figs. 1-5) described this species as *H. orientalis* from specimens from Okinawa (type locality), the Ogasawara Is., and Taiwan.

The 2nd author also became aware of the color difference of Hawaiian and non-Hawaiian *H.*

ornatissimus from his collections and photographs in the Marquesas Is., Society Is., Line Is., and Christmas Is. in the eastern Indian Ocean. He then made a mitochondrial (mt)DNA comparison.

We describe this new species in the present paper, selecting as the holotype an adult male specimen collected and photographed by the 1st author in Moorea, Society Is. in 1957.

We provide herein a series of color photographs of this complex of 4 species of *Halichoeres*: *H. ornatissimus* from the Hawaiian Is. and Johnston I. (Figs. 1-3); *H. cosmetus* from the Indian Ocean (Figs. 4, 5); *H. orientalis* from Taiwan and southern Japan (Figs. 6, 7); and the new species from islands of French Polynesia and the Line Is. to the western Pacific and the Cocos-Keeling Is., Christmas I., and Cartier I. in the eastern Indian Ocean (Figs. 8-13). The new species lacks the break in the orangish-yellow stripe dorsally on the head after passing just posterior to the eye, as seen in *H. cosmetus*. Instead, the small black spot behind the eye is enclosed in a ring of orangish-yellow (but this color varies to salmon-pink). The occurrence of both *H. cosmetus* and the new species at Christmas I. was surprising, but further confirms their species rank. *Halichoeres cosmetus* might also be expected in southwestern Indonesia.

Gill-raker counts of these 4 similar species of *Halichoeres* (Table 1) provide little separation, with only *H. orientalis* having modally 1 fewer raker.

We are aware that *Halichoeres* is polyphyletic (Barber and Bellwood 2005), but morphological characters are lacking for a practicable division of this genus.

MATERIALS AND METHODS

Type specimens of the new species are deposited in the Academy of Natural Sciences of Philadelphia, PA, USA (ANSP); Australian Museum, Sydney, Australia (AMS); National

Table 1. Gill-raker counts of species of *Halichoeres*

	16	17	18	19	20
<i>H. claudia</i>	2	6	9	3	2
<i>H. cosmetus</i>	-	2	16	9	3
<i>H. orientalis</i>	4	4	2	-	-
<i>H. ornatissimus</i>	-	4	13	5	2

Museum of Natural History, London, UK (BMNH); Bernice P. Bishop Museum, Honolulu, HI, USA (BPBM), California Academy of Sciences, San Francisco, CA, USA (CAS); National Museum of Nature and Science, Tokyo, Japan (NSMT); and the National Museum of Natural History, Washington, DC, USA (USNM).

The length of specimens is given as SL, measured from the median anterior end of the upper lip to the base of the caudal fin (posterior end of the hypural plate); body depth is the greatest depth from the base of the dorsal spines to ventral edge of the abdomen (correcting for



Fig. 4. *Halichoeres cosmetus*, female, Lamu, Kenya. Underwater photo by J.E. Randall.



Fig. 1. *Halichoeres ornatissimus*, juvenile, Hawaiian Is. Underwater photo by J.E. Randall.



Fig. 5. *Halichoeres cosmetus*, male, Maldives Is. Underwater photo by J.E. Randall.



Fig. 2. *Halichoeres ornatissimus*, female, Hawaiian Is. Underwater photo by J.E. Randall.



Fig. 6. *Halichoeres orientalis*, URM-P 5980, female, 75.6 mm SL, Okinawa. Photo by T. Yoshino.



Fig. 3. *Halichoeres ornatissimus*, male, Hawaiian Is. Underwater photo by J.E. Randall.

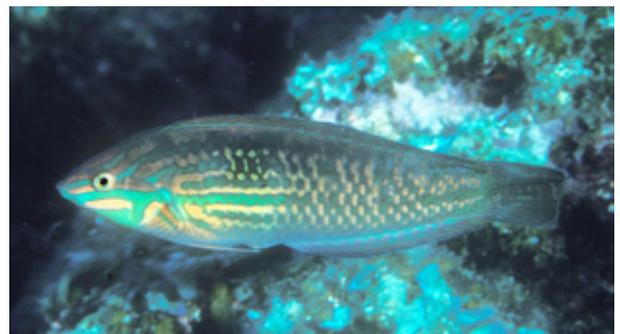


Fig. 7. *Halichoeres orientalis*, male, Ogasawara Is. Underwater photo by J.E. Randall.

any malformation due to preservation); body width was measured just posterior to the gill opening; head length was taken from the front of the upper lip to the posterior end of the opercular flap; orbit diameter is the greatest fleshy diameter, and interorbital width the least bony width; snout length was measured from the median anterior point of the upper lip to the nearest fleshy edge of the orbit; upper-jaw length is from the same anterior point to the posterior end of the maxilla; caudal-peduncle depth is the least depth, and caudal-peduncle length the horizontal distance between verticals at the rear base of the anal fin and the caudal-fin base; lengths of spines and rays were measured to their extreme bases; caudal-fin and pectoral-fin lengths are the length of the longest ray; and pelvic-fin length was measured from the base of the pelvic spine to the tip of the longest soft ray.

Morphometric data are presented in table 2

as percentages of SL. Proportional measurements in the text are rounded to the nearest 0.5. Lateral-line scale counts include a last pored scale on the caudal-fin base. The count of gill rakers was made on the 1st gill arch and includes rudiments. Morphometric data in parentheses refer to paratypes.

For the genetic analysis, individuals from Cocos-Keeling ($n = 6$), Moorea ($n = 5$), the Marquesas ($n = 6$), the Big I. of Hawaii ($n = 5$), and Midway Atoll ($n = 5$) were sequenced. DNA extraction, polymerase chain reaction (PCR), and sequencing followed methods described in detail by Rocha (2004). PCR products were sequenced in the forward and reverse directions, and resulting mtDNA cytochrome oxidase I (COI) sequences were deposited in GenBank with accession numbers FJ629378, FJ629381 and FJ629382 for *H. claudia* and FJ629379 and FJ629380 for *H.*

Table 2. Proportional measurements of type specimens of *Halichoeres claudia* as percentages of the standard length

	Holotype				Paratypes			
	BPBM 9090 male	BPBM 12431 female	USNM 333212 female	BPBM 12431 male	BPBM 12431 male	BPBM 12431 male	BPBM 9106 male	BPBM 11784 male
Standard length (mm)	80	48	56	63	79	86	88	92
Body depth	28.2	31.1	31.8	28.7	30.5	28.4	28.7	29.5
Body width	12.5	13.3	13.4	12.7	12.3	13.2	13.4	12.0
Head length	31.5	31.2	31.6	31.7	31.6	31.5	31.3	31.4
Snout length	11.0	11.1	9.9	10.9	11.3	11.2	10.3	11.4
Orbit diameter	6.5	7.9	7.6	6.9	6.5	6.0	6.2	6.0
Interorbital width	8.2	8.4	8.3	8.0	7.9	7.8	7.8	8.0
Upper-jaw length	7.7	7.8	7.9	8.0	7.5	8.9	8.8	9.0
Caudal-peduncle depth	15.5	16.0	15.9	15.9	16.5	16.2	15.9	15.3
Caudal-peduncle length	8.2	7.9	8.0	8.3	8.2	8.5	8.1	8.2
Predorsal length	30.3	31.0	31.0	29.2	30.3	30.4	30.6	30.8
Preanal length	55.2	55.7	56.3	56.1	55.4	55.2	56.2	56.6
Prepelvic length	31.1	32.9	31.5	31.7	31.9	32.0	33.0	31.8
Base of dorsal fin	64.1	64.8	66.0	63.7	63.9	65.1	65.4	64.3
First dorsal spine	7.1	8.2	7.5	7.8	7.6	7.0	7.3	6.8
Ninth dorsal spine	12.1	12.5	12.3	12.0	12.3	12.4	12.5	12.3
Longest dorsal ray	16.8	15.2	16.9	15.8	14.8	16.2	15.8	16.3
Base of anal fin	38.4	37.7	39.1	39.0	39.7	38.6	38.3	38.7
First anal spine	5.1	4.7	5.4	5.5	5.1	4.9	4.8	5.5
Third anal spine	9.2	9.1	9.1	9.1	9.2	8.8	9.0	9.1
Longest anal ray	15.2	15.9	16.2	15.2	15.1	15.0	16.0	16.3
Caudal-fin length	24.8	24.6	24.5	24.4	23.3	24.5	23.8	24.4
Pectoral-fin length	22.0	20.2	22.3	20.7	20.6	20.4	21.1	21.8
Pelvic-spine length	13.8	12.5	12.4	13.5	14.5	14.1	13.9	14.0
Pelvic-fin length	22.6	20.3	21.1	21.4	22.1	24.0	24.3	24.8

ornatissimus. Sequences were aligned and edited with Sequencher vers. 3.0 (Gene Codes Corp., Ann Arbor, MI, USA). The computer program MODELTEST vers. 3.06 (Posada and Crandall 1998) was used to determine the substitution model that best fit the data through a hierarchical likelihood ratio test (HLRT). The Tamura-Nei model (Tamura and Nei, 1993) with a gamma distribution shape parameter of 0.4 was chosen. A network of relationships between *H. ornatissimus* and *H. claudia* sp. nov. was constructed using the maximum parsimony criterion; support for the resulting network was evaluated using 500 bootstrap replicates with the software PAUP* vers. 4.0b10 (D.L. Swofford, Sinauer, Sunderland, MA, USA, 2002, unpubl.).

***Halichoeres claudia* sp. nov.**

(Figs. 8-13. Tables 1, 2)

Halichoeres sp. 2 Kuitert, 2002: 126, figs. A-C (West Pacific).

Holotype: BPBM 9090, ♂, 80 mm, Society Is., Moorea, outside barrier reef 200 m west of Tareu Pass, 21 m, rotenone, J.E. Randall, 15 May 1957.

Paratypes: BPBM 8655, 82 mm, Society Is., Moorea, outside barrier reef, 1.5 miles west of Tareu Pass, 15 m, spear, J.E. Randall, 24 Mar. 1957; CAS 73712, 4: 46-59 mm, Wake I., lee side; south of wreck of ship, pool on top of reef, rotenone, J. Oetzel, 17 Apr. 1957; CAS 75544, 56 mm, Wake I., end of Peale I., top of reef, rotenone, J. Oetzel, 29 Apr. 1957; BPBM 9103, 88 mm, Tuamotu Archipelago, Tikahau Atoll, outside reef just north of pass, 24 m, spear, J.E. Randall, 15 June 1957; BPBM 9106, 89 mm, Marquesas Is., Nuku Hiva, Anaho Bay, 6 m, spear, J.E. Randall, 17 July 1957; AMS I.44660-001, 82 mm, Society Is., Tahiti, Papara, outside barrier reef, 100 m southeast of Teavaraa Pass, coral and rubble, 21 m, multiprong spear, J.E. Randall, 4 Sept. 1967; BPBM 7127, 2: 43, 45 mm, Minami-Tori-Shima (Marcus I.), off balloon building, outer edge of reef flat, 0.3 m, rotenone, J.E. Randall, 3 Sept. 1968; BPBM 13676, 80 mm; Austral Is., Tubuai, outside barrier reef, 1 mile southwest of anchorage off pass, 15 m, spear, J.E. Randall, 26 Feb. 1971; BMNH 2008.7.7.1, 52 mm, Society Is., Huahine, outside reef off Teffa'ao Point (north of Baie Fare), 24-30 m, rotenone, J.E. Randall, D.B. Cannoy, R. McNair, and D.M. Devaney, 19

Mar. 1971; NSMT-P 91096, 53 mm, Marquesas Is., Fatu Hiva, northeast of Matahumu Point, 6-12 m, rotenone, J.E. Randall, D.B. Cannoy, and R. McNair, 19 Apr. 1971; BPBM 11784, 92 mm, Marquesas Is., Fatu Hiva, Hanau'u Bay, north side, 12-18 m, rotenone, J.E. Randall, D.B. Cannoy, and R. McNair, 21 Apr. 1971; BPBM 12431, 5: 48-86 mm, Marquesas Is., Ua Huka, west side, bay 0.4 miles northeast of Motu Takatai, north side of bay, rotenone, J.E. Randall, J.R. Haywood, and R. McNair, 7 May 1971; ANSP 134586, 5: 29-54 mm, Cocos-Keeling Is., West I., off north end, 12°7'50"S, 96°48'55"E, outside breakers, 7-8 m, W.F. Smith-Vaniz et al., 24 Feb. 1974; ANSP 134583, 58 mm, Cocos-Keeling Is., West I., northwest corner, 12°9'20"S, 96°49'5"E, inside barrier reef, 0.15-0.3 m, W.F. Smith-Vaniz et al., 26 Feb. 1974; ANSP 134580, 8: 27-51 mm, Cocos-Keeling I., West I., north end, 12°7'48"S, 96°45'5"E, outside barrier reef, 9 m, W.F. Smith-Vaniz et al., 28 Feb. 1984; ANSP 134585, 20 mm, Cocos-Keeling Is., North Keeling I., west shore, 11°49'40"S, 96°49'12"E, dropoff at landing site, 21-24 m, P.L. Colin and W.E. Chapman, 6 Mar. 1974; BPBM 17540, 52 mm, American Samoa, Tutuila, Aunu'u I., west side, 15 m, spear, J.E. Randall, 10 May 1974; USNM 243957, 2: 40-52 mm, Fiji, Malolo I., northwest end, 17°45'S, 177°4'E, south side of channel, sand with rock walls, 0-18 m, V.G. Springer et al., 25 May 1982; USNM 333212, 56 mm, Tonga, Tongatapu, northeast of Atata I., reef near ship channel, 21°2'8"S, 175°12'22"W, vertical wall with sand and rubble at base and good coral growth, 15-20 m, rotenone, J.T. Williams, D.G. Smith, C. Baldwin, and M. Lang, 22 Oct. 1993; USNM 333211, 74 mm, Tonga, Eua, northwest shore, 21°18'15"S, 174°26'20"W, fringing reef at base of cliff, spur and groove in surge zone, 0-11 m, rotenone, J.T. Williams, B.B. Collette, G.D. Johnson, C. Baldwin, E.O. Wiley, E.A. Powers, and M.A. McCormick, 3 Nov. 1993; USNM 338413, 19 mm, Tonga, Vava'u, west side, Port Refuge, 18°38'23"S, 174°4'1"W, steeply sloping rocky bottom with some rubble, 26-35 m, rotenone, J.T. Williams, G.D. Johnson, B.B. Collette, D.G. Smith, E.A. Powers, and C. Baldwin, 18 Nov. 1993; BPBM 37501, 3: 43-78 mm, Line Is., Kiritimati (Christmas I.), 6-18 m, spear, D.R. Robertson, Sept. 1996; CAS 220179, 2: 40-44 mm, Fiji, Vanua Levu, north shore, southwest of Kia I. off Nukubati, 16°18.795'S, 178°57.631'E, spur and groove on reef slope, heavy coral cover, 11-12.5 m, rotenone, D.W. Greenfield, K. Longenecker, R.C. Langston,

and K. Tang; CAS 221200, 43 mm, Fiji, Vanua Levu, Kakuniba Bay, outside barrier reef, about 0.25 mile (0.4 km) east of boat pass, 16°45.995'S, 179°50.301'E, spur and groove, coral, 10.5-17 m, rotenone, D.W. Greenfield, T.A. Greenfield, K. Longenecker, and T. Castleforte, 27 May 2003.

Diagnosis: Dorsal rays IX,12; anal rays III,12; pectoral rays 13; lateral-line scales 28 (including 1 on base of caudal fin); median predorsal scales 9; near-vertical rows of scales on chest 9; no scales on cheek or opercle; gill rakers 16-20; body depth 3.15-3.55 in SL; a pair of large projecting canine

teeth anteriorly in each jaw, and a strong canine at corner of mouth; 9th dorsal spine longest, 2.5-2.65 in head length; color in life pink to orangish yellow, the body with 7 green to bluish green stripes, the 1st, 4th, and 6th containing enlarged lighter green spots; 2nd and 3rd green stripes dotted, merging below posterior part of dorsal fin; 6th green stripe initially curving downward from pectoral-fin base and continuing above anal fin to caudal-fin base; 7th stripe curving across chest onto abdomen; 1st green stripe continuing anteriorly onto head above eye, ending narrowly on snout; middle green

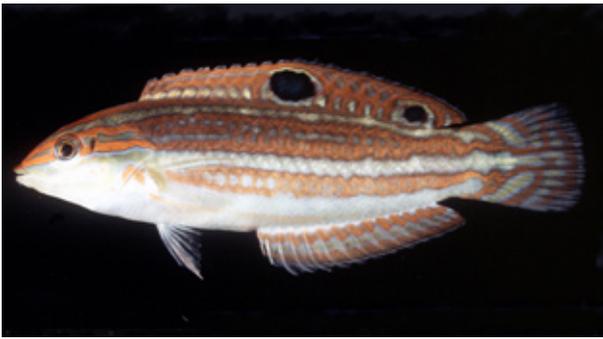


Fig. 8. Paratype of *Halichoeres claudia* sp. nov., female, 45 mm SL, Minami-Tori-Shima (Marcus I.). Photo by J.E. Randall.



Fig. 11. Holotype of *Halichoeres claudia* sp. nov., BPBM 9090, male, 80 mm SL, Moorea, Society Is. Photo by J.E. Randall.



Fig. 9. *Halichoeres claudia* sp. nov., large juvenile, Fiji. Underwater photo by G.R. Allen.



Fig. 12. *Halichoeres claudia* sp. nov., female, Line Is. Underwater photo by J.E. Randall.



Fig. 10. *Halichoeres claudia* sp. nov., male, Christmas I., Indian Ocean. Underwater photo by L.A. Rocha.



Fig. 13. *Halichoeres claudia* sp. nov., male, Banda Sea, Indonesia. Underwater photo by J.E. Randall.

stripes of body merging anteriorly onto operculum and branching broadly, the upper branch passing below eye to chin, the lower curving ventrally on head to chin; a green spot containing a small, vertically elongate, black spot behind eye; a narrow median dorsal green stripe on head continuing as a series of spots basally on dorsal fin; dorsal fin of females with a large black spot anteriorly on soft portion, a smaller black spot posteriorly (lost in males), and blackish pigment on 1st 2 membranes of fin; caudal fin with 2 large semicircular green bands, in addition to green posterior border. Largest specimen, 92 mm.

Description: Dorsal rays IX,12; anal rays III,12; all dorsal and anal rays branched, the last to base; pectoral rays 13, upper 2 unbranched; pelvic rays I,5; principal caudal rays 14, upper and lower ones unbranched; upper procurrent caudal rays 6 (5 or 6), posterior-most one segmented; lower procurrent caudal rays 5, posterior-most 1 segmented; lateral-line scales 27, plus 1 pored scale on caudal-fin base; scales above 1st lateral-line scale to base of 1st dorsal spine 4; scales above lateral line to base of middle of dorsal fin 2; scales below lateral line to base of 1st anal spine 9; circumpeduncular scales 20; gill rakers 17 (16-20, modally 18); brachioistegal rays 5; vertebrae 25.

Body depth 3.55 (3.15-3.5) in SL; body moderately compressed, width 2.25 (2.15-2.5) in body depth; head length 3.2 (3.15-3.2) in SL; snout length 2.85 (2.8-3.2) in head length; orbit diameter 4.85 (3.95-5.25); interorbital space convex, least width 3.95 (3.7-4.05) in head length; caudal-peduncle depth 2.05 (1.9-2.05) in head length; caudal-peduncle length 3.85 (3.7-3.95) in head length.

Mouth terminal to slightly inferior, and slightly oblique, forming an angle of about 15° to horizontal axis of body; mouth small, maxilla reaching a little posterior to a vertical at anterior nostril, upper-jaw length 4.1 (3.5-4.2) in head length; a pair of strong, forward-projecting, canine teeth anteriorly in jaws, about as long as pupil diameter, buttressed posteriorly by a pair of incisiform teeth about 1/3 as long; side of jaws with a row of 8 teeth, the 1st canine about 2/3 length of anterior canines, remaining teeth progressively shorter and more nodular, only 1st 2 with inner small incisiform teeth at inner base; corner of mouth with a curving forward-projecting canine, its base at posterior end of maxilla. Pharyngeal dentition of 82-mm paratype (dissected as needed): each upper pharyngeal plate with 16 teeth in 4 anterior to posterior rows, 1st row of 3 stoutly conical teeth,

remaining teeth nodular, except 3 teeth of inner row as large molars; median limb of T-shaped lower pharyngeal plate with 12 bluntly conical teeth (1st tooth more conical, remaining teeth as pairs except for 3 teeth in last row; median posterior tooth a very large subtriangular molar, its basal length equivalent to base of 3 largest remaining teeth; 12 or 13 nodular teeth on each side of median molar, those in posterior row largest; tongue slender, triangular, with rounded tip, reaching forward to rear base of mandible; lips large and fleshy; gill rakers short, the longest at an angle about 2/5 length of longest gill filaments.

Anterior nostril a very small membranous tube 1/2 distance on a line from top of fleshy edge of orbit to median base of groove behind upper lip; posterior nostril dorsoposterior to anterior nostril, larger than sensory pores of head, but largely covered by anterior flap; internarial distance 2/3 pupil diameter; sensory pores (double pores counted as 1) in series beginning at front of snout, passing above nostrils, and encircling orbit 19 (21 in largest paratype); pores of preopercular-mandibular series 16 (15 on largest paratype).

Scales cycloid; lateral line continuous, deflected downward below 9th-11th dorsal soft rays to straight peduncular part; lateral-line scales with 3 branching tubules ending in a pore, except a few in descending and peduncular parts with 2 branches; lateral-line scale on caudal-fin base with 1 pore; head naked; scales on nape small, progressively smaller anteriorly, reaching forward to a vertical over posterior fleshy edge of orbit; scales on chest small, about 1/3 height of body scales; base of dorsal and anal fin with 2 rows of very small scales; caudal fin with progressively smaller scales extending nearly halfway to posterior margin; no scales on pectoral fins; a midventral scaly process at base of pelvic fins consisting of a pointed scale about 1/2 eye diameter in length in adults, with a smaller, rounded scale at its base.

Origin of dorsal fin above 2nd lateral-line scale, predorsal length 3.3 (3.2-3.4) in SL; dorsal spines progressively longer, the 1st 4.45 (4.1-4.6) in head length, and the 9th 2.6 (2.5-2.65) in head length; 10th and 11th dorsal soft rays longest, 1.85 (1.85-2.05) in head length; origin of anal fin below base of 1st dorsal soft ray, preanal length 1.8 (1.75-1.8) in SL; 1st anal spine very slender, 6.2 (5.7-6.65) in head length; 3rd anal spine 3.4 (3.35-3.6) in head length; penultimate anal soft ray longest, 2.1 (1.9-2.1) in head length; caudal fin rounded, 1.25 (1.25-1.35) in head length, 4.05 (4.05-4.3) in SL; 3rd pectoral ray longest, 1.45

(1.4-1.55) in head length; pelvic fins nearly or just reaching anus in adult males, 1.25 (1.25-1.3) in head length; in females, 1.5-1.55 in head length.

Color of male holotype in alcohol: body uniform light brown; head light yellowish brown, nape and preopercular region light brown; a vertically elongate, dark brown spot as high as pupil diameter behind eye; fins translucent pale yellowish, soft portion of dorsal fin with a large dark brown spot between 1st and 3rd rays; an indistinct dark brown spot on each of 1st 2 membranes of dorsal fin. Color of holotype when fresh as in figure 1. Females and most males with a small dark brown spot near base of penultimate dorsal-fin membrane, usually at least in part on preceding membrane. Middle and posterior black spots on dorsal fin of females and juveniles large and ocellated (Fig. 9).

Genetics: The mtDNA analysis revealed that *H. claudia* sp. nov. and *H. ornatissimus* form reciprocally monophyletic groups separated by a minimum of 1% sequence divergence. Similar divergences were encountered between recently described species of this genus (Rocha 2004, Luiz Jr. et al. 2009). Sequence divergences between populations outside Hawaii (Cocos-Keeling, Moorea, and Marquesas) were below 0.1%, and those within Hawaii (Big I. and Midway) were below 0.05%, indicating that the only significant

genetic break that occurs in this species complex is between Hawaii and the remaining populations.

Etymology: This wrasse is named in honor of the 2nd author's wife, also a marine biologist, for her continued support and help with lab work. The species name is treated as a noun in apposition.

Remarks: Specimens and photographs of *H. claudia* sp. nov. have long been identified as *H. ornatissimus*, even when differences in life color were noted. Juveniles of *H. ornatissimus* (Fig. 1, estimated 27 mm SL) and juveniles and small females *H. claudia* sp. nov. (Fig. 8, large juvenile, estimated 40 mm SL) have longitudinal green stripes on the body. The stripes break into a series of green spots, except for the dorsalmost stripe, in females of *H. ornatissimus* (Fig. 2), whereas only the 2nd and 3rd stripes are replaced by spots (5th stripe may be partially spotted) in adults of *H. claudia* sp. nov. (45 mm female of Fig. 10). The color differentiation is most marked in the male phase; the green stripes of male *H. ornatissimus* (Fig. 3) are completely broken into series of well-isolated, small, rectangular spots. Also, the black spots disappear on the dorsal fin. The middle black spot is retained in the male of *H. claudia* sp. nov. (Figs. 10-13), a mark that persists in preserved specimens.

No meristic or morphometric characters were found to separate *H. claudia* sp. nov. from *H.*

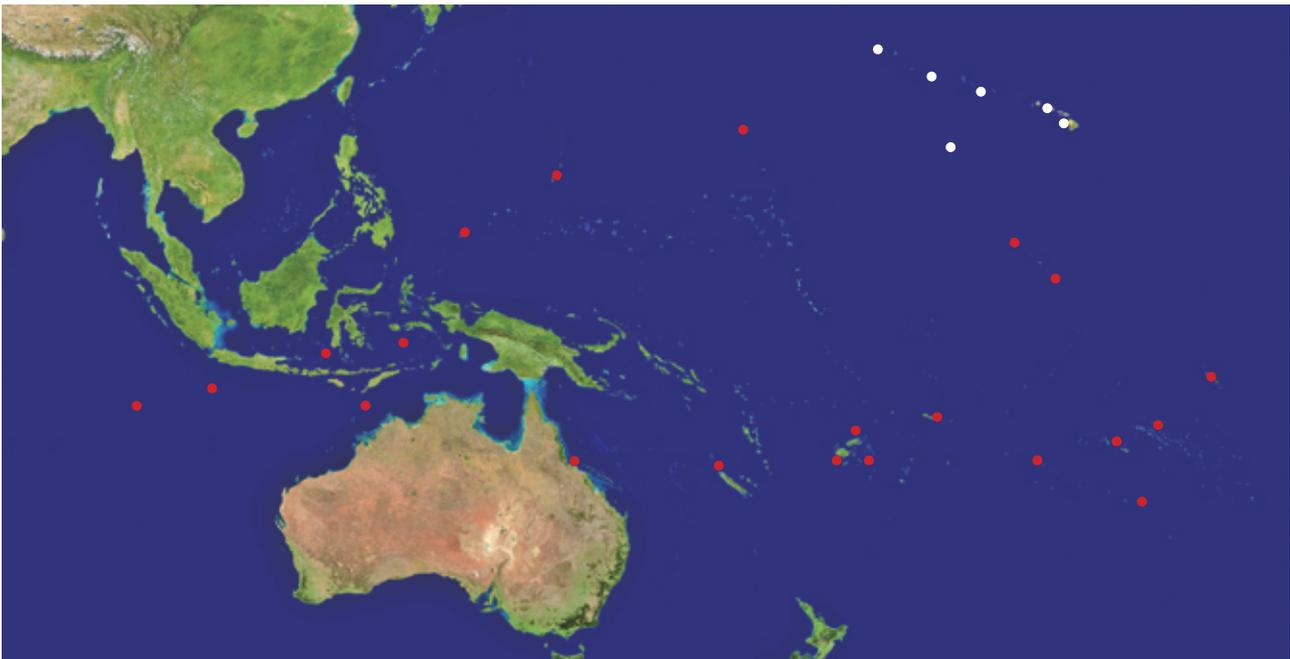


Fig. 14. Distribution of *Halichoeres claudia* sp. nov. (red) and *H. ornatissimus* (white). A single symbol is placed for archipelagos where the islands are too closely grouped to denote separate island localities.

ornatissimus, but the latter attains a significantly larger size. The largest of 48 type specimens of *H. claudia* sp. nov. measures 92 mm SL. Twelve of the 50 specimens of *H. ornatissimus* that we examined measure 92–116 mm SL.

Like its sister species *H. ornatissimus*, *H. claudia* sp. nov. is nearly always found outside barrier reefs or off exposed shores. Specimens were collected from pools on reef flats to depths of up to 35 m; most were taken from a depth range of 1–24 m.

Females of *H. claudia* sp. nov. mature at a surprisingly small size. The 43 mm paratype (BPBM 7127) from Minami-Tori-Shima and another of the same length (BPBM 37501) from the Line Is. are maturing females, and 2 specimens (BPBM 12431) from the Marquesas Is., at 48 and 52 mm SL, are nearly fully mature females. A paratype of 54 mm SL (NSMT-P 91096) is just beginning to change sex from female to male.

As can be seen in the distribution map of figure 14, *H. claudia* sp. nov. is wide-ranging from the Line Is. and islands of French Polynesia to the western Pacific, where it is reported from the Great Barrier Reef, New Caledonia, Vanuatu, and Indonesia (from underwater photographs in Flores and Gunung Api in the Banda Sea, the latter reproduced here as Fig. 12). The species is also found in the eastern Indian Ocean at Christmas I., the Cocos-Keeling Is. (in addition to the paratypes from this locality listed above, 1 nontype specimen is reported here from the Western Australian Museum (WAM P.29064-002, 64 mm SL) and 2 from Cartier I. in the Timor Sea (WAM P.29908-020, 51.5, 52 mm SL)). As mentioned, the similar Indian Ocean species, *H. cosmetus*, is also known from Christmas I. No difference was found in the DNA of specimens of *H. claudia* sp. nov. from French Polynesia and the Line Is. when compared to that of Christmas I. in the Indian Ocean. Their similarity in life color can be seen by comparing an underwater photograph taken at Christmas I. (now Kiritimati) in the Line Is. in the Central Pacific (Fig. 11) and 1 taken at Christmas I. in the Indian Ocean (Fig. 13).

Comparative material

Halichoeres ornatissimus: Hawaiian Is., Hawai'i, ANSP 13421, 3: 78–100 mm. O'ahu, ANSP 80038, 99 mm; ANSP 84711, 109 mm; ANSP 84742, 103 mm; ANSP 93845, 108 mm; BPBM 2089, 101 mm; BPBM 4584, 2: 101, 105 mm; BPBM 4585, 116 mm; BPBM 6466, 2: 92, 99

mm; BPBM 7910, 2: 64, 101 mm; BPBM 8502, 42 mm; BPBM 8503, 4: 39–59 mm; BPBM 15139, 10: 15–79 mm.; CAS 80428, 3: 47–56 mm; CAS 86630, 57 mm; CAS 21168–69, 5: 51–88 mm; CAS 21176–80, 8: 18–75 mm. Johnston I., BPBM 4588, 88 mm; BPBM 7187, 71 mm.

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