Micronesica 25(1): 99–121, 1992

A Review of the Labrid Fishes of the Genus *Cirrhilabrus* from Japan, Taiwan and the Mariana Islands, with Descriptions of Two New Species

JOHN E. RANDALL

Bernice P. Bishop Museum
P.O. Box 19000-A, Honolulu, Hawaii 96817-0916

Abstract—The labrid genus *Cirrhilabrus* is represented by seven species at islands in the northwestern Pacific which include southern Japan, Taiwan, and the Marianas. Five are named species: *cyanopleura, exquisitus, lanceolatus, lunatus, melanomarginatus*, and *temminckii*. Two are described as new: *katherinae* from the Izu and Mariana Islands is characterized by 5 median predorsal scales, 21–23 lateral-line scales, 15–18 gill rakers, body depth 3.4–3.7 in SL, rounded to slightly rhomboid caudal fin, long pelvic fins in the male, small size (largest, 71 mm SL), and a color pattern of red dorsally, abruptly white ventrally, with a middle black band in the dorsal and anal fins and a broad red band distal to it; and *rubrimarginatus* which ranges in the western Pacific from Okinawa south to Fiji and Tonga; it has 5 median predorsal scales, 21–25 lateral-line scales, 17–20 gill rakers, body depth 2.85–3.1 in SL, rounded caudal fin, long pelvic fins in the male, large size (largest, 121.5 mm SL), and a color pattern for which the most distinctive feature is a broad red band in outer part of the dorsal and caudal fins.

Introduction

The labrid fish genus *Cirrhilabrus* Temminck and Schlegel consists of an assemblage of small fishes of the tropical and subtropical Indo-Pacific region which occur in aggregations on coral reefs or rocky substrata. They feed on zooplankton in the water column, taking the individual animals singly, not by any straining technique. With the approach of danger they descend to the shelter of the substratum.

Cirrhilabrus is characterized as follows: dorsal rays XI,9; anal rays III,9; pectoral rays usually 15; pelvic rays I,5; branched caudal rays 11; branchiostegal rays 5, vertebrae 9 + 16; a cirrus just behind tip of each dorsal and anal spine; an interrupted lateral line with 15–18 pored scales in the dorsoanterior part and 4–8 in the peduncular part (discounting one or two pored scales on basal part of caudal fin); three pairs of prominent canine teeth anteriorly in the upper jaw, the posterior two pairs large and recurved, the third pair much the largest and most curved; a single pair of projecting canine teeth anteriorly in lower jaw; sides of

jaws with a row of small conical teeth; no tooth at corner of mouth; posterior margin of preopercle finely serrate; eye with scleral cornification forming a double pupil (Springer & Randall, 1974). The related genera *Paracheilinus, Pseudocheilinus, Pseudocheilinops,* and *Pteragogus* also share this curious double pupil. Juveniles of the species of *Cirrhilabrus* tend to be red, and many, if not all, exhibit a small black spot posteriorly on the upper side of the caudal peduncle; this marking persists in females of some of the species.

Cirrhilabrus was represented by only four species prior to 1974: *C. cyanopleura* Bleeker, *C. temminckii* Bleeker, *C. jordani* Snyder, and *C. exquisitus* Smith. In 1974 Springer & Randall described two new species in the genus from the northern Red Sea, *C. blatteus* and *C. rubriventralis.* Klausewitz (1976) named *Cirrhilabrichthys filamentosus* as a new genus and species from a single specimen from the Java Sea, adding that *Cirrhilabras rubriventralis* seems to belong in *Cirrhilabrichthys.* Randall & Shen (1978) reviewed the four species of *Cirrhilabrus* known from Taiwan, naming one *C. melanomarginatus.* Randall & Carpenter (1980) described three new *Cirrhilabrus* from the Philippines: *C. rubripinnis, C. flavidorsalis,* and *C. lubbocki.* Randall & Lubbock (1982) named three more *C. laboutei, C. lineatus,* and *C. roseafascia* from the southwestern Pacific and referred *Cirrhilabrichthys* to the synonymy of *Cirrhilabrus.* Randall & Emery (1983) described *C. rubrisquamis* from a single juvenile specimen from the Chagos Archipelago (a more complete description will be made by the author from adults recently collected by him in the Maldive Islands). In a book on the fishes of Mauritius, Cornic (1987) provided a fragmentary description of *C. sanguineus* and *C. piscilineatus* without any specimens and only borrowed photographs (the author will describe these more fully from his material from Mauritius). Randall (1988) named *C. balteatus, C. johnsoni, C. luteovittatus,* and *C. rhomboidalis* from the Marshall Islands. Randall & Pyle (1988) described *C. scottorum,* broadly distributed in the southern subtropical Pacific from the Pitcairn Group to the Coral Sea (subsequently recorded from the Great Barrier Reef by Randall et al. 1990), and Randall & Kuiter (1989) named *C. punctatus* from Tonga to Australia and Papua New Guinea. Randall & Masuda (1991) recently named two more new deep-dwelling *Cirrhilabrus* from Japan. Thus a total of 26 species of *Cirrhilabrus* have now been described.

Specimens of two more new species of *Cirrhilabrus* have long waited description at the Bishop Museum. These were to have been named by John W. Shepard and the author, but the former has left the field of ichthyology. The two species are described in the present paper as part of a review of the genus for the northwestern Pacific area, including southern Japan (with the Ryukyu Islands and Ogasawara Islands), Taiwan, and the Mariana Islands.

Type specimens of the new species of *Cirrhilabrus* have been deposited at the following institutions: Academy of Natural Sciences of Philadelphia (ANSP); Academia Sinica Institute of Zoology, Taipei (ASIZP); The Natural History Museum [formerly British Museum (Natural History)], London (BMNH); Bernice P. Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS); National Science Museum, Tokyo (NSMT); Royal Ontario Mu-

Table 1. Meristic Data of Species of *Cirrhilabrus* from the Northwestern Pacific Ocean

	Pectoral rays			Predorsal Scales			Gill Rakers								
	14	15	16	4	5	6	14	15	16	17	18	19	20	21	22
cyanopleura	2	21	1		1	23			5	11	6	2			
exquisitus	2	20	1		23					1	7	8	6	1	
katherinae		8			8			1	5	1	1				
lanceolatus		3		3					1	1	1				
lunatus	1	5			6		2	2	1	1					
melanomarginatus		9			9							1	3	3	2
rubrimarginatus	2	38	1	1	40					9	20	10	1		
temminckii	2	38	2	2	40			4	16	16	5	1			

	Dorsoanterior				Lateral-line Scales Peduncular					Total					
	15	16	17	18	4	5	6	7	8	21	22	23	24	25	26
cyanopleura		8	16			2	5	12	5		5	5	8	6	
exquisitus		3	18	2		1	10	11	1		2	10	9	2	
katherinae		2	6		2	3	3			4	1	3			
lanceolatus		1	2				2	1				3			
lunatus		1	3	2		3	3			1	1	3	1		
melanomarginatus			8	1			3	4	2			3	3	3	
rubrimarginatus	1	14	24	2		7	22	9	3	5	8	19	5	4	
temminckii		8	31	3		2	18	18	4		6	15	16	5	

Table 2. Proportional Measurements of Type Specimens of *Cirrhilabrus katherinae* Expressed as a Percentage of the Standard Length.

	Holotype	Paratypes						
	BPBM 23082	BPBM 6947	CAS 76300	BMNH 1991.9.16.1	NSMT-P 35033	USNM 317972	BPBM 6947	BPBM 6956
Standard length (mm)	53.0	25.3	54.1	55.2	56.3	60.6	63.7	71.0
Sex	♀	juv.	♀	♀	♀	♂	♂	♂
Body depth	27.5	27.2	28.7	29.4	28.1	28.6	29.0	28.5
Body width	13.9	15.0	14.6	14.2	12.8	14.0	15.0	14.1
Head length	32.0	35.5	32.5	31.6	32.0	32.2	30.7	30.8
Snout length	8.6	9.5	8.7	8.5	8.9	8.7	8.9	8.7
Orbit diameter	8.6	11.3	8.2	8.0	8.1	7.5	7.2	7.1
Interorbital width	8.0	10.2	8.0	8.2	7.9	8.3	8.0	8.1
Upper jaw length	7.9	8.9	7.7	8.0	7.7	7.9	7.9	7.8
Caudal peduncle depth	14.2	14.8	14.2	14.4	14.5	14.3	14.3	14.2
Caudal peduncle length	17.2	16.0	16.9	17.1	17.2	16.8	16.9	17.0
Predorsal length	32.5	38.7	32.3	32.2	32.6	32.7	32.1	30.5
Preanal length	59.5	67.2	61.5	58.3	58.5	61.3	58.0	57.7
Prepelvic length	34.8	37.9	32.0	31.6	33.2	32.4	32.3	32.5
Dorsal fin base	57.8	48.3	54.3	58.1	57.8	55.9	58.4	55.7
First dorsal spine	7.6	8.5	8.3	8.2	8.2	8.2	8.3	7.3
Last dorsal spine	14.6	16.7	16.1	15.4	14.7	15.6	16.5	14.3
Longest dorsal ray	16.6	19.0	17.7	17.8	17.8	18.1	18.8	21.0
Anal fin base	26.4	23.7	27.7	27.4	27.7	26.4	26.1	27.6
First anal spine	7.6	aberrant	8.1	8.1	7.7	7.9	7.8	7.4
Second anal spine	11.3	13.0	13.2	14.0	12.0	11.4	12.1	10.2
Third anal spine	12.4	15.3	12.4	13.2	12.6	13.2	13.3	11.7
Longest anal ray	17.0	18.8	17.5	18.8	17.8	19.3	19.0	23.1
Caudal fin length	26.1	28.3	25.4	26.8	25.8	24.6	26.4	24.3
Pectoral fin length	20.8	21.9	21.2	21.6	22.1	22.0	22.2	22.0
Pelvic spine length	11.7	15.2	13.1	13.6	14.2	14.5	13.3	14.3
Pelvic fin length	18.9	20.5	29.6	33.5	27.0	37.8	36.3	51.7

Table 3. Proportional Measurements of Type Specimens of *Cirrhilabrus rubrimarginatus* Expressed as a Percentage of the Standard Length.

	Holotype	Paratypes								
	BPBM 19134	BPBM 24456	BPBM 13837	BPBM 22321	BPBM 18430	BPBM 16259	BPBM 30184	BPBM 20960	BPBM 30184	BPBM 31577
Standard length (mm)	53.6	37.0	43.7	56.3	62.6	76.5	89.0	95.4	111.5	121.2
Sex	♀	juv.	♀	♂	♂	♂	♂	♂	♂	♂
Body depth	33.0	34.6	33.5	33.1	34.2	32.3	35.0	33.0	32.3	33.3
Body width	15.3	15.0	14.9	15.9	16.5	14.6	14.7	14.0	14.3	14.2
Head length	34.6	34.7	34.4	34.1	33.0	32.9	33.6	32.6	32.5	32.8
Snout length	9.3	9.5	9.4	9.3	9.0	9.8	9.5	9.8	9.8	9.5
Orbit diameter	9.5	10.5	9.6	8.6	8.2	8.5	7.0	7.1	6.3	5.9
Interorbital width	8.9	8.7	8.7	8.5	8.4	8.6	8.9	8.4	8.3	8.5
Upper jaw length	8.0	8.5	8.7	8.0	8.1	8.2	8.2	8.0	7.9	7.9
Caudal peduncle depth	15.9	16.2	15.8	15.6	15.7	14.4	15.7	14.6	15.7	15.3
Caudal peduncle length	15.1	15.6	14.9	14.8	15.8	16.9	15.5	16.6	16.4	16.2
Predorsal length	35.6	37.6	36.8	34.3	34.0	33.6	33.2	32.3	31.5	32.8
Preanal length	65.5	64.3	63.6	63.0	59.7	61.6	61.8	60.0	61.6	61.2
Prepelvic length	37.7	36.8	36.0	36.4	35.5	36.6	36.0	36.2	35.6	36.4
Dorsal fin base	59.0	54.0	55.5	56.8	60.5	57.2	60.4	59.6	57.2	60.0
First dorsal spine	10.0	8.8	9.2	8.1	9.9	10.1	9.0	9.3	10.1	9.5
Last dorsal spine	14.5	15.2	15.4	14.7	14.4	15.3	15.1	14.5	14.3	14.5
Longest dorsal ray	16.7	18.1	17.1	17.8	18.8	19.8	21.0	22.8	22.5	22.7
Anal fin base	25.4	24.3	24.2	24.8	26.7	24.6	25.0	26.2	25.8	25.0
First anal spine	6.9	8.6	8.4	7.1	8.0	7.2	7.1	6.9	6.8	6.3
Second anal spine	10.0	13.0	13.6	12.1	11.6	10.2	10.1	9.4	9.5	8.6
Third anal spine	12.7	14.2	13.9	12.1	12.8	11.8	12.5	11.8	10.8	10.5
Longest anal ray	17.5	18.7	17.2	17.1	18.5	21.2	23.2	25.5	26.9	26.1
Caudal fin length	26.9	27.4	25.7	26.4	27.0	broken	27.2	27.4	26.4	27.6
Pectoral fin length	22.0	22.5	broken	21.0	23.2	24.6	23.3	24.0	22.2	22.9
Pelvic spine length	13.4	13.5	14.0	13.3	14.1	13.3	13.2	11.7	12.6	12.3
Pelvic fin length	19.0	18.5	19.6	19.8	22.0	49.2	33.2	48.0	52.4	49.4

seum, Toronto (ROM), U.S. National Museum of Natural History, Washington, D.C. (USNM); and Western Australian Museum, Perth (WAM). Bleeker type specimens of *Cirrhilabrus* were examined at the National Natuurhistorische Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden (RMNH) and The Natural History Museum, London. Paratypes of the new species are listed chronologically by the date of collection. Species accounts are presented alphabetically.

Methods of Counting and Measuring

Counts of fin spines are given in Roman numerals and soft rays in Arabic. Pectoral-ray counts include the rudimentary upper ray. The count of pored scales of the dorsoanterior part of the lateral line is given first, followed by the peduncular part; only tubed scales are counted (one or more scales at the anterior end of the peduncular part may be notched or have only a pore; these are not counted). Gill-raker counts are made on the first gill arch and include all rudiments; because of the difficulty deciding which raker is at the angle in specimens of *Cirrhilabrus*, only total counts are given. The pores adjacent to the ventroposterior edge of the orbit are counted by the method given by Randall & Carpenter (1980: 17, fig. 1).

Lengths of specimens are given as standard length (SL), the straight-line measurement from the tip of the snout (front of upper lip or upper canines, whichever is more anterior) to the base of the caudal fin (posterior end of hypural plate). Body depth is the greatest depth to the base of the dorsal fin, and body width is measured just posterior to the opercular flap. Snout length is taken from the front of the upper lip or anterior canines to the fleshy edge of the orbit. Orbit diameter is the greatest fleshy diameter, and interorbital width the least bony width. 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 base of caudal fin. Measurements of fin spines and rays are taken to the extreme bases of these elements. Pectoral-fin length is measured from the tip of the longest ray to the base of this ray. Pelvic-fin length is taken from the base of the spine to the tip of the longest ray.

Table 1 presents meristic data of the species of *Cirrhilabrus* covered in the present paper. Measurements of the type specimens in Tables 2 and 3 are given as percentages of the standard length. Proportional measurements in the descriptions are expressed in terms of the standard length, head length, or in the case of body width, related to the body depth. These step-in measurements are rounded to the nearest 0.05. In the descriptions of the new species, data in parentheses refer to paratypes when different from that of the holotype.

Key to the Species of *Cirrhilabrus* from Japan, Taiwan, and the Mariana Islands

1a. Predorsal scales 6 (rarely 5); rays of median and pelvic fins light blue or blue-green (in life and in preservation); adults usually with deep blue rim on some

scales of body (also persisting in preservative); a diagonal dark brown (deep blue to purple in life) bar at base of pectoral fin and extending below ..... *cyanopleura*

1b. Predorsal scales 4 or 5; color not as in 1a 2

2a. Predorsal scales 4; caudal fin of adults lanceolate, the fin of males long (to 1.8 in SL); females orange-red, white ventrally, with a red band from corner of mouth to pectoral base; males light orange, pale yellow ventrally, with a diffuse yellow band from mouth through eye to upper caudal-fin base, this band broadly bordered above by red ..... *lanceolatus*

2b. Predorsal scales 5 (rarely 6) caudal fin lunate to rhomboid (central ray prolonged to a point in large *melanomarginatus*, but fin not longer than 2.5 in SL); color not as in 2a 3

3a. Caudal fin of adult males lunate, the caudal concavity 1.4–1.7 in head (fin slightly rounded in females); membranes of spinous portion of dorsal fin of males extending well above spine tips (up to one-third spine length higher); pelvic fins of males not prolonged, 1.25–2.0 in head; gill rakers 14–17; females yellow on head and thorax, orange-red on body, with longitudinal red-edged lavender lines dorsally on head and body; males becoming dusky to blackish dorsally on body (and ventrally for some), the median and pelvic fins black except posteriorly on dorsal and caudal fins and margin of anal fin which are bluish white ..... *lunatus*

3b. Caudal fin of males not lunate; membranes of spinous portion of dorsal fin not extending well above spine tips; pelvic fins of males prolonged, usually extending posterior to anal-fin origin; gill rakers 15–22; color not as in 3a 4

4a. Caudal fin of adults double emarginate; a large oval black spot posteriorly on caudal peduncle just above a midlateral blue line which may extend anteriorly to beneath pectoral fin ..... *exquisitus*

4b. Caudal fin round to rhomboid; no large oval black spot on caudal peduncle 5

5a. Caudal fin of adults rhomboid, the central ray (and to a lesser extent the adjacent rays) of adult males prolonged to a point; gill rakers 19–22; pelvic fins of males not very long, at most 3.1 in head; entire length of dorsal fin with a broad black margin ..... *melanomarginatus*

5b. Caudal fin rounded to slightly rhomboid, without a prolonged central ray; gill rakers 15–20 (rarely 20); pelvic fins of males very long, often nearly half the SL; no black margin on all of dorsal fin (there may be a short black margin anteriorly) 6

6a. Body moderately deep, the depth 2.9–3.1 in SL; gill rakers 17–20; caudal fin with a broad red posterior margin (submarginal to a narrow blue margin in adult males) ..... *rubrimarginatus*, **n. sp.**

6b. Body not moderately deep, the depth 3.0–3.7 in SL; gill rakers 15–19, caudal fin without a red posterior margin 7

7a. Body slender, the depth 3.4–3.7 in SL; total lateral-line scales 21–23; a distinct wedge-shaped black bar at pectoral-fin base .....*katherinae*, **n. sp.**
7b. Body not slender, the depth 3.0–3.3 in SL; total lateral-line scales 22–25; no wedge-shaped black bar at pectoral-fin base (there may be a narrow red or indistinct dusky bar) .....*temminckii*

Cirrhilabrus cyanopleura

Plate 3 A; Table 1

Cheilinoïdes cyanopleura Bleeker 1851: 72 (type locality, Batavia = Jakarta).
Cirrhilabrus solorensis Bleeker 1853: 88 (type locality, Lawajong, Solor, Indonesia).
Cirrhilabrus heterodon Bleeker 1871: 326, fig. 1 (type locality, Ambon).
Cirrhilabrus lyukyuensis Ishikawa 1904: 12, pl. 4, fig. 1 (type locality, Naha, Okinawa) (error for *ryukyuensis*).

DIAGNOSIS. Predorsal scales 6 (rarely 5); lateral-line scales 15–17 + 5–8 (modally 16 or 17 + 7); gill rakers 16–19; pores at ventroposterior edge of orbit usually 14 or 15; body depth 2.9–3.4 in SL; head length 3.1–3.4 in SL; snout somewhat obtuse and short, its length 3.8–4.4 in head; rows of scales on cheek 2; caudal fin rounded in young and females, rhomboid in large males; pelvic fins of adult males long, to 2.3 in SL. Spines and rays of median and pelvic fins light blue or green in preservative. Small females red to reddish, shading to whitish ventrally on head and abdomen, with a small black spot posteriorly on upper side of caudal peduncle and a blackish bar at pectoral-fin base and extending slightly below; reddish to blue dots often present on postorbital head, nape, and dorsoanteriorly on body; larger females lose the red color, first becoming gray in and above pectoral region, then olivaceous (though may still be reddish posteriorly), with deep purple edges developing on scales of side posterior to pectoral fins; caudal peduncular spot small to absent, but diagonal pectoral-base bar now black and extending conspicuously below the base. Males with region of pectoral fin and above dark bluish gray (blackish in preservative), some fish with a large bright yellow or orange area beneath pectoral fin; body reddish posteriorly with dark purple edges on a few to many scales (purple scale markings dark blue-green in preservative); head greenish; lower fourth of head and body abruptly white.

REMARKS. The holotype (BMNH 1864.5.15.12, 103 mm SL), was examined by the author. It still has some faint blue-green markings on the scales of the middle of the body. The total length is 130 mm (the length given by Bleeker in his original description) which is larger than any specimens of the 30 lots in the Bishop Museum from the Ryukyu Islands, Taiwan, Philippines, Palau, Indonesia, and Similan Islands, Andaman Sea. Allen & Steene (1988) recorded the species from Christmas Island, Indian Ocean, and Randall et al. (1990) from the Great Barrier Reef. Specimens have been collected in the depth range of 2 to 30 m. This fish is found more often over rubble, sea grass, or sandy areas with low patch reefs than on well-developed coral reefs.

The color notes given for the species above are for specimens taken in the Philippines, Palau Islands, Taiwan, and the Ryukyu Islands. There is a different color form in Indonesia, but variable there as well. The purple edges of the scales of the male form are broader on Indonesian fishes, and the scales with these dark edges are often more broadly distributed on the body than in the northern form. The ventral part of the body usually varies from lavender to magenta. The dorsal part of the head and the nape are green to greenish; the back varies from reddish to yellow. The bar at the base of the pectoral fin is not deep purple to black as on the northern form and is only faintly developed below the fin base. Specimens from Sulawesi, however, have a darker bar at the pectoral base which extends a short distance below the base, and the ventral part of the body is yellowish to white. Thus the color is somewhat intermediate between the southern Indonesian and Philippine forms. Comparison of the counts of predorsal scales, lateral-line scales, and gill rakers of large samples of the northern form with the Indonesian fail to show even modal differences, and other characters that are often diagnostic for the species of *Cirrhilabrus*, such as the shape of the caudal fin, the length of the pelvic fins of males, and the number of pores around the ventroposterior edge of the orbit are the same for both forms.

Randall & Shen (1978) discussed two synonyms of *Cirrhilabrus cyanopleura, C. solorensis* Bleeker and *C. lyukyuensis* Ishikawa (error for *ryukyuensis*). A third synonym is *C. heterodon* (Bleeker) (holotype, RMNH 6548, 55 mm SL, examined).

Cirrhilabrus cyanopleura has been illustrated in color by Randall & Shen (1978), Schroeder (1980), Shen (1984), Masuda and Allen (1987),Allen & Steene (1988), Masuda et al. (1988), Myers (1989), and Randall et al. (1990).

Cirrhilabrus exquisitus

Table 1

Cirrhilabrus exquisitus Smith 1957: 109, fig. 4, pl. II E (type locality, Pinda, Mozambique).

Cirrhilabrus sp. Kamohara & Yamakawa 1968: 79 (Koniya, Amami O Shima, Ryukyu Islands).

DIAGNOSIS. Medial predorsal scales 5; lateral-line scales 16–18 + 5–8 (modally 17 + 6 or 7); gill rakers 17–21; body depth 3.2–3.5 in SL; head length 2.9–3.2 in SL; snout short, its length 3.8–4.4 in head; caudal fin of small individuals slightly rounded to truncate, of adults double emarginate, the lobes somewhat prolonged in large males; caudal-fin length 3.5–4.3 in SL; pelvic fins not long, 4.6–5.9 in head. A large horizontally elliptical black spot on side of caudal peduncle just above lateral line (greatest diameter of spot as large or larger than eye of adults); females olive to reddish brown, often with a pattern of indistinct pale stripes along scale rows; a blue line on side of caudal peduncle at lower edge of oval black spot, this line sometimes extending forward to beneath pectoral fin; a pale blue line from corner of mouth below eye to end of opercle; a black bar

preceded by a narrow blue band at pectoral-fin base; males variable in color, but common to all is a diagonal red to blue line from mouth through upper edge of eye to nape, a diagonal black band preceded by a white zone beneath lower part of pectoral fin parallel to blue-edge black band at pectoral base, dorsal fin with a middle black stripe with blue spots posteriorly (similar black stripe sometimes present in anal fin), and a red edge to pectoral fins.

REMARKS. *Cirrhilabrus exquisitus* has the broadest distribution of the genus, East Africa to the Tuamotu Archipelago. Bishop Museum has specimens from Kenya, Mauritius, Chagos Archipelago, Maldive Islands, Indonesia, Papua New Guinea, Solomon Islands, Ryukyu Islands, Palau Islands, and the Tuamotus. Allen & Steene (1979, 1988) recorded it from Christmas Island, Indian Ocean, and Randall et al. (1990) from the Great Barrier Reef. It has been collected in the depth range of 2 to 32 m, but is generally found in less than 10 m. It is most often seen over rubble bottoms in regions of current.

The following authors are among those who have illustrated this species in color: Smith (1957), Randall & Shen (1978), Masuda & Allen (1987), Allen & Steene (1988), Masuda et al. (1988), and Randall et al. (1990).

Cirrhilabrus katherinae, new species

Plate 3 B, C; Tables 1, 2

Cirrhilabrus sp. Myers & Shepard 1980: 324 (Cocos Island, Guam).
Cirrhilabrus sp. Amesbury & Myers 1982: 97, pl. 96 A (Guam).
Cirrhilabrus sp. Myers 1988: 155 (Mariana Islands).
Cirrhilabrus n. sp. 1 Myers 1989: 181, pl. 94 B (Guam).

HOLOTYPE. BPBM 23082, female, 53.0 mm SL, Izu Islands, Miyake-jima, Igaya Bay, 23 m, J.W. Shepard, 2 October 1976.

PARATYPES. BPBM 6947, 2: 25.3–63.7 mm SL, Mariana Islands, Guam, Cocos Island, NW side, outside reef, 23–30.5 m, rotenone, J.E. Randall, R.S. Jones, H.T. Kami, A.J. Stark, and G.E. Fosse, 30 June 1968; BMNH 1991.9.16.I, 55.2 mm SL, BPBM 6956, 71.0 mm SL, CAS 76300, 54.1 mm SL, NSMT-P35033, 56.3 mm SL, and USNM 317972, 60.6 mm SL, Guam, S of Uruno Point (about 10 miles NE of Agana), reef in 18.5–21.5 m, spear, J.E. Randall and H.T. Kami, 1 July 1968.

DIAGNOSIS. Median predorsal scales 5; lateral-line scales 16–17 + 4–6; gill rakers 15–18; body moderately elongate, the depth 3.4–3.7 in SL; head length 2.8–3.25 in SL; snout length 3.45–3.75 in head; caudal fin rounded, its length 3.5–4.1 in SL; pelvic fins of adult males very long, the length of longest 1.95 in SL. Females with upper two-thirds of body red except adjacent to dorsal fin where yellowish, the lower third whitish; top of head yellow, the side red, bordered ventrally by a bluish line, the lower third whitish; a small black spot posteriorly on upper side of caudal peduncle, and a wedge-shaped black bar at pectoral-fin base; a diffuse blackish band in middle of anal fin and anterior two-thirds of

dorsal fin. Males similar in color but lacking black peduncular spot; complete and distinct black bands, edged in blue, in dorsal and anal fins, the margins broadly bright red; caudal fin yellow with orange-red dots.

DESCRIPTION. Dorsal rays XI,9 (all soft rays of adults branched, the last to base); anal rays III, 9 (first soft ray simple, the remaining rays branched, the last to base); pectoral rays 15 (upper two rays simple, the rest branched); pelvic rays I,5; principal caudal rays 13, the uppermost and lowermost unbranched; upper and lower procurrent caudal rays 6, the most posterior segmented; lateral-line scales 17 + 6 (16–17 + 4–6); scales above lateral line to origin of dorsal fin 2; scales below lateral line to origin of anal fin 7; median predorsal scales 5; median preventral scales 6; scale rows on cheek 2; circumpeduncular scales 16; gill rakers 17 (15–18).

Body elongate for the genus, the depth 3.65 (3.4–3.7) in SL, and compressed, the width 2.0 (1.8–2.2) in depth; dorsal profile of head nearly straight; head length 3.1 (2.8–3.25) in SL; snout length 3.7 (3.45–3.75) in head; orbit diameter 3.7 (3.2–4.35) in head; interorbital space convex, the least bony width 4.0 (3.5–4.05) in head; caudal peduncle depth 2.25 (2.15–2.4) in head.

Mouth small, terminal, and oblique, the maxilla extending to a vertical at posterior nostril, the upper jaw length 4.05 (3.8–4.2) in head; dentition typical of the genus with three pairs of prominent canine teeth anteriorly in upper jaw, the second and third pairs progressively larger and more recurved; side of jaws with a row of small conical teeth, 16 on side of upper jaw and 17 on side of lower jaw of holotype. Gill rakers short, the longest on first arch about half length of longest gill filament on that arch.

Free ventral margin of preopercle extending slightly anterior to a vertical at front edge of pupil; posterior margin of preopercle free to above level of center of eye, its edge with 31 (20–36) serrae; anterior nostril a small pore with a short pointed posterior flap located on a line from upper edge of orbit to front of upper lip; posterior nostril about twice as large as anterior, at level of upper edge of orbit, slightly anterior to a vertical at front edge of orbit; ventroposterior margin of orbit with 16 (12–16) pores; number of pores along free margin of preopercle 8, linking with 4 more along mandible to front of chin; a series of 11 pores from above upper end of preopercular margin to front of anterior nostril; a series of 9 pores from anterior end of lateral line to front of first median predorsal scale.

Scales cycloid; head scaled except for snout, interorbital space, and ventrally; naked ventral membranous part of preopercle 3.5 (2.7–3.5) in distance from corner of preopercle to edge of orbit; base of dorsal and anal fins with a row of large elongate scales, one per membrane, those anteriorly and on middle of fins extending more than half distance to margin; elongate scales at base of soft portion of fins progressively shorter; a vertical series of three very large scales the most posterior on caudal fin, their distal ends reaching to about two-thirds length of fin; pectoral fins without scales; pelvic fins with two midventral scales extending posteriorly from between fin bases, the posterior scale elongate, nearly reaching tip of spine of adpressed fin; axillary scale of each pelvic fin nearly two-thirds length of pelvic spine.

Origin of dorsal fin over base of third lateral-line scale; first dorsal spine about two-thirds as long as second spine, its length 4.2 (3.7–4.25) in head; remaining dorsal spines progressively longer, the last 2.2 (1.85–2.2) in head; seventh or eighth dorsal soft ray usually longest, 1.95 (1.45–1.85) in head; origin of anal fin below base of tenth dorsal spine; first anal spine 4.2 (3.9–4.15) in head; third anal spine usually slightly longer than second, 2.55 (2.3–2.6) in head; seventh or eighth anal soft ray longest, 1.85 (1.3–1.85) in head; caudal fin rounded to slightly rhomboid, 3.8 (3.55–4.1) in SL; third pectoral ray longest, 1.55 (1.4–1.6) in head; origin of pelvic fins below lower pectoral-fin base; second soft ray of pelvic fins longest, 5.3 (1.95–4.9) in SL (fin of males longer than females).

Color of female holotype in alcohol entirely pale except for a diagonal wedge-shaped dark brown bar at pectoral-fin base and a faint small irregular dark spot posteriorly on upper side of caudal peduncle. Color of holotype when fresh: upper two-thirds of body dusky red except for a narrow zone along back at base of dorsal fin and dorsally on caudal peduncle which is yellow; lower third of body abruptly whitish (somewhat yellowish on abdomen and dusky above anal fin and on adjacent ventral part of audal peduncle), an indistinct dark gray line separating red upper part of body and posterior whitish part; ventral part of thorax and abdomen pale blue; an irregular black spot smaller than pupil posteriorly on upper side of caudal peduncle; dorsal part of head yellow, shading into red on side (more orange on side of snout), the red ending in a bluish gray line from corner of mouth passing below eye to end posteriorly on operculum at level of pectoral-fin base; lower side of head pinkish white with a patch of pale blue on region of subopercle; underside of chin and midventral head bluish gray; iris light red; dorsal fin yellow on base with a blackish band extending down middle of fin to end in anterior soft portion; a broad red band above and adjacent to the black; tips of spinous membranes of fin pale blue, the cirri red; posterior soft portion of fin indistinctly branded with yellow, dull red, and bluish gray; anal fin similar to dorsal but less strongly colored; caudal fin red basally and in central part, bluish elsewhere, the entire fin with numerous irregular vertical yellow lines; a scattering of small pale blue spots along upper and lower margins of fin; pectoral fins pale with a wedge-shaped black bar at base, preceded by a dusky red line and followed by a narrow zone of yellow; pelvic fins with clear membranes and bluish pink rays.

Color note made of 71-mm male paratype (BPBM 6956) shortly after being collected: yellowish green on back with a broad red band on side which narrows as it passes anteriorly onto head and posteriorly onto caudal peduncle and caudal-fin base; red band bordered by bluish violet and containing some dots of this color; a yellowish band below red band on head and anterior part of body; below this, the head and thorax blackish and abdomen and ventroposterior part of body half blackish above and white below; a large double dark green spot on top of head; dorsal fin yellowish green basally, red distally (except for a very narrow blue margin), with a middle black stripe bordered above by bright blue; anal fin similar but whitish at base, and black stripe edged below as well as above by bright blue; pectoral fins faintly pink with a narrow triangular black bar at base;

pelvic fins reddish and dusky blue; caudal fin dusky violet, shading to red distally, with dark-edged vertical yellowish lines.

REMARKS. This species is named *katherinae* in honor of Katherine A. Meyer, the late wife of John W. Shepard, at his request.

Amesbury & Myers (1982: pl. 96 A) illustrated a terminal male in color from an underwater photograph taken at Guam. Myers (1989: pl. 94 A) reproduced the same photograph in color and showed initial-phase fish in color as well.

Cirrhilabrus katherinae is a small species; the largest specimen measures only 71 mm SL.

This species is common in the Mariana Islands. It is known from depths of 10 to at least 40 m, more often in exposed outer reef areas than lagoons or harbors. Like others of the genus, it occurs in aggregations. Curiously, it is the only species of the genus yet known from the Marianas. Also it is odd that this fish was collected at Miyake-jima in the Izu Islands, but the author and associates failed to see any during two dive trips to the Ogasawara Islands which lie intermediate to the Marianas and the Izu Islands.

Cirrhilabrus katherinae is closely related to *C. balteatus* Randall from the northern Marshall Islands. The two share the same small size, much the same meristic and morphometric data, and the initial-phase fish of both are very similar in color. The only apparent difference in meristic data is the lower count of peduncular pored scales for *katherinae* (4–6, compared to 5–9 for *balteatus*). The only apparent difference of any significance in morphometric data is the length of the snout of adults: 8.8–9.9% SL for *baleatus*, compared to 8.5–8.9% for *katherinae*. It is in the color of the terminal male where an obvious difference can be found: male *balteatus* have a broad blackish band on the upper side of the body which is interrupted by a very broad bright pink collar-like bar in the pectoral region (see Randall 1988: pl. I D and pl. III F).

Cirrhilabrus katherinae is also related to *C. temminckii*. The two species are sympatric at least at Miyake-jima. As noted in the Key above, these fish can be distinguished by the deeper body, higher average number of lateral-line scales, and lack of a distinct triangular black bar at the pectoral-fin base in *temminckii*. Also, *C. temminckii* attains larger size. Bishop Museum has a specimen from Luzon which measures 99 mm SL.

Cirrhilabrus lanceolatus

Plate 2 D; Table 1

Cirrhilabrus lanceolatus Randall & Masuda, 1991: 57, figs. 6–8 (type locality, Okinawa).

DIAGNOSIS. Median predorsal scales 4; lateral-line scales 16–17 + 6–7; scale rows on cheek 2; gill rakers 16–18; body depth 3.2–3.4 in SL; head length 2.9–3.1 in SL; snout length 3.6–3.8 in head; caudal fin lanceolate and long, 2.75–2.9 in SL of females and 1.8 in the one male specimen; pelvic fins short, not reaching anus, 1.6–2.0 in head. Females light orange-red, shading to white ventrally; a

narrow rose red band from behind corner of mouth, passing below eye, and curving to front of pectoral-fin base, this band separating orange-red dorsal part of head from white ventral part; caudal fin rose red on basal scaled part, shading to yellowish posteriorly except upper and lower corners which are broadly bluish, the blue most evident proximally; a blue spot on first membrane of dorsal fin; pectoral fins edged in red, including base. Males light orange with a yellow band, broadly edged in lavender, from corner of mouth, through eye, broadening on opercle, and continuing more narrowly from upper end of gill opening, enclosing dorsoanterior lateral line, and ending at upper caudal-fin base; a broad red band on back adjacent to yellow band, continuing around base of caudal fin; ventral part of head, thorax, and abdomen light yellow; a broad submarginal blue band in dorsal fin and upper and lower corners of caudal fin; margin of anal fin blue; margin and base of pectoral fins red.

REMARKS. This species is known from only three specimens, a female collected by the author in Okinawa in 1977 at a depth of 42 m and a second female and one male collected in 1990 by H. Masuda and associates in 60 m at Oshima Island, Honshu. The male is the largest specimen, measuring 88.7 mm SL.

Cirrhilabrus lanceolatus was named for the distinctive shape of the caudal fin, particularly in the male. It seems most closely related to *C. blatteus* from the Gulf of Aqaba, Red Sea which has the same unique caudal-fin shape. The latter is also a species of moderate depths (greater than 40 m).

Cirrhilabrus lunatus

Plate I C; Table 1

Cirrhilabrus lunatus Randall & Masuda 1991: 53, figs. 1–5 (type locality, Okinawa).

DIAGNOSIS. Median predorsal scales 5; lateral-line scales 16–18 + 5–6; scale rows on cheek 2; gill rakers 14–17; body depth 3.05–3.55 in SL; head length 2.85–3.1 in SL; snout length 3.7–4.0 in head; caudal fin of females slightly rounded, the fin 3.5–3.6 in SL, of males strongly lunate, the central part slightly rounded, the fin length 2.35–2.75 in SL, the caudal concavity 1.4–1.7 in head; membranes of spinous portion of dorsal fin extending above spine tips by a distance as great as one-third spine length; pelvic fins long, 1.25–2.0 in head, reaching beyond origin of anal fin in males. Females yellow on head and thorax, orange-red on body, with longitudinal red-edged lavender lines dorsally on head and body and a red reticulum on thorax and ventrally on head; a small dusky spot posteriorly on upper side of caudal peduncle; median fins yellowish. Males orange-yellow, the lower part of head and body of fish from Okinawa blackish, including nearly all of caudal peduncle (only dusky above anal fin and part of caudal peduncle of fish from the Ogasawara Islands); irregular diagonal red lines on snout and postorbital head extending onto anterodorsal part of body; median and pelvic fins black (dorsal fin suffused with blue) except posteriorly on dorsal fin, centroposteriorly on caudal fin, and margin of anal fin which are bluish white.

REMARKS. This species was first collected in 1975 by the author in Okinawa from a depth of 32 m on a dead coral and rubble substratum; three specimens were taken, all males (one sent to a Japanese institution was lost). It was not until 1990 in the Ogasawara Islands that female specimens were obtained, along with two more males. These were collected on a sloping rubble bottom in 35–45 m.

Cirrhilabrus lunatus was named for the lunate caudal fin of the male, a shape unique to the genus. The extraordinary elevation of the membranes of the spinous part of the dorsal fin of the male is also striking, but it occurs as well in *C. blatteus, C. melanomarginatus, C. rubripinnis,* and *C. scottorum.*

Cirrhilabrus melanomarginatus

Table 1

Cirrhilabrus melanomarginatus Randall & Shen 1978: 14, 18, pl. II B (type locality, Mao Pi Tou, southern Taiwan).

DIAGNOSIS. Median predorsal scales 5; lateral-line scales 17–18 + 6–8; scale rows on cheek 2; gill rakers 19–22; body moderately deep, the depth 2.9–3.2 in SL; dorsal profile of head moderately convex; head length 3.2–3.4 in SL; snout length 3.55–3.85 in head; caudal fin rounded in young, rhomboid in adults, the central ray and to a lesser extent the rays adjacent to it prolonged as a filament which in large males can be as long as one-third head length; membranes of spinous portion of dorsal fin extending above spine tips in large males; pelvic fins 3.1–5.2 in head, may reach slightly posterior to origin of anal fin in large males. Adult females bluish to greenish gray on upper two-thirds of head and body, bluish white on lower third, with a violet stripe midventrally; dark upper part of body finely speckled with blackish dots except posteriorly; dorsal fin bluish gray with a broad black margin (except for cirri which are pale bluish); an irregular red stripe in middle of soft portion of fin except anteriorly; anal fin red with a bluish gray band at base and a narrow black margin which broadens posteriorly in fin; caudal fin dusky basally, the broad outer part of fin with dusky pink rays and pale membranes, each with a longitudinal row of faint dark dots; pectoral fins pale except for a narrow dark edge dorsally and distally and a blackish streak at base; pelvic fins pale with a dark bluish gray lateral margin and a dull pink submarginal band. Large males greenish anteriorly, shading to yellowish posteriorly and ventrally; caudal fin greenish; dorsal fin similar in color to that of female, but base greenish except posteriorly where the red band covers most of the basal part of the fin.

REMARKS. The broad black margin of the dorsal fin of this species is its most characteristic marking; it may be seen in specimens at least as small as 56 mm SL.

Color illustrations of *C. melanomarginatus* have been published by Randall & Shen (1978), Shen (1984), and Shao (1990).

This species is known from southern Taiwan, Luzon, and the Macclesfield Bank, South China Sea. It has been collected in the depth range of 6–40 m, usually over rocky substrata. It is the largest species of the genus. Shen (1984) reported a specimen 130 mm in SL.

Cirrhilabrus melanomarginatus is closely related to *C. scottorum* of southern Oceania. Randall & Pyle (1989) differentiated the two primarily by color pattern.

Cirrhilabrus rubrimarginatus, new species

Plate 2 A–C; Tables 1,3

HOLOTYPE. BPBM 19134, female, 53.6 mm, Japan, Ryukyu Islands, Okinawa, Sesoko Island, W side, rubble and rock bottom with *Padina*, 30 m, quinaldine, J. E. Randall, 31 May 1975.

PARATYPES: BPBM 13837, 2: 43.7–50.6 mm, Palau Islands, Augulpelu Reef, dropoff in 38–46 m, rotenone, W.A. Starck II, G.R. Allen, and J. Condit, 26 January 1972; WAM P.24800, 2: 81.0–83.5 mm, Vanuatu (New Hebrides), Espiritu Santo, spear, G.R. Allen, W.A. Starck II, and D. Popper, 27 June 1973; BPBM 16259, 76.5 mm, Fiji, Viti Levu, Suva Harbor, fore-reef on E side of main passage, silt-covered rubble, some coral, and much *Padina*, 43 m, spear, B.A. Carlson, 11 August 1973; CAS 76299, 63.0 mm, same locality, 30.5 m, spear, B.A. Carlson, P.L. Colin, and B. Goldman, 13 February 1974; BMNH 1991.9.16.2, 67.0 mm, same locality and depth, 30.5 m, spear, B.A. Carlson, 2 March 1974; ANSP 140502, 3: 71.0–81.4 mm, Cocos Keeling Islands, West Island, about 1.5 km S of N end of island on ocean side (12°8′45′S, 96°48′45″E), 46–49 m, spear, W.F. Smith-Vaniz and P.L. Colin, 18 March 1974; ANSP 140503, 88.4 mm, Cocos-Keeling Islands, Turk Reef, N side (12°6′30″S, 96°49′35″E), dropoff, 46 m, spear, W.F. Smith-Vaniz and P.L. Colin, 23 March 1974; NSMT-P 35032, 58.2 mm, same data as holotype; BPBM 18430, 62.6 mm, Philippines, Cebu, Mactan Island, off marine station of University of San Carlos, base of vertical dropoff, rock and rubble in 40 m, quinaldine, J.E. Randall, 27 June 1975; BPBM 20960, 95.4 mm, Fiji, Viti Levu, Suva Harbor entrance, outer reef dropoff, 46 m, spear, B.A. Carlson and B. Goldman, July 1975; BPBM 22321, 56.3 mm, Ryukyu Islands, Okinawa, Sesoko Island, W side, rocky bottom in 41 m, spear, J.E. Randall, T. Yoshino, and T. Yasumoto, 14 September 1977; BPBM 22436, 60.8 mm, Philippines, Luzon, Batangas, Caban Island, S side, rubble, *Fungia* and soft coral bottom, 32 m, spear, J.E. Randall, 11 August 1978; BPBM 24456, 2: 37–59.2 mm, Taiwan, S end of Nan Wan, middle of bay directly E of boat harbor at Hou-Pi-Hu, 30–32 m, spear and rotenone, J.E. Randall, 20 July 1978; BPBM 24457, 92.0 mm, same locality and depth, base of rock pinnacle, bottom mainly rubble, spear, J.E. Randall, 22 July 1978; USNM 317971, 41.2 mm, Fiji, Totoya Island (18°58′57″S, 179°52′12″W), SW end, lagoon side, bottom mainly sand, 30.5 m, rotenone, V.G. Springer et al., 27 April 1982; USNM 317970, 8: 33.7–79.0 mm, Fiji, Lau Group, Navutu-I-Ra Island (18°55′S, 178°33′W), NW corner of barrier reef, rock and sand, 33.5–37 m, rotenone, V.G. Springer et al., 3 May

1982; ROM 50124, 6: 24.4–49.5 mm, Fiji, Great Astrolabe Reef, just S of S side of Herald Pass, consolidated coral slope with rubble at bottom, 30 m, rotenone, R. Winterbottom, A.R. Emery, J. Payne, and J. McKinnon, 5 April 1983; BPBM 28884, 4: 43.2–94.2 mm SL, Tonga, Vava'u, SW side off Mo'ungalafa Mountain, isolated small coral patches on sloping sand bottom at base of dropoff, 46–52 m, spear and quinaldine, J.E. Randall, 20 March 1983; BPBM 30184, 2: 89.0–121.5 mm, Indonesia, Bali, small bay NE of Padangbai, base of reef front, 27 m, sodium cyanide and spear, J.E. Randall, 28 February 1984; BPBM 31577, 6: 64.8–121.5 mm, same locality, sloping silty sand bottom with patches of coral and sponge, 25–28 m, spear and powerhead blast, J.E. Randall, 19 October 1986; BPBM 34199, 48.2 mm, Indonesia, off Sulawesi, Tukanbesi Group, Moromaho Island, N side, 48 m, spear, J.E. Randall, 2 October 1988; ASIZP 56606, 10: 25.8–92.4 mm, Taiwan, Hsiao-liu-chiu, coral rubble, 32 m, dip net, J.P. Shen, 10 July 1991.

DIAGNOSIS. Median predorsal scales 5 (rarely 4); lateral-line scales 15–18 + 5–8 (modally 17 + 6); gill rakers 17–20 (rarely 20); body moderately deep for the genus, 2.85–3.1 in SL; head length 2.9–3.1 in SL; snout length 3.3–3.8 in head; rows of scales on cheek 2; caudal fin rounded, 3.6–3.9 in SL; pelvic fins of adult males very long, usually reaching well beyond origin of anal fin, 1.9–3.0 in SL; females lavender-pink; snout and dorsal part of head yellowish; irregular broken yellow lines on head extending onto nape; dorsal and caudal fins with a broad red distal margin, the dorsal with a submarginal blackish band anteriorly; males pink, the head, thorax, and ventral part of body blue with yellow lines and dots, the top of head with a broad yellow patch; side of body of large males with orange-red dots and short lines; broad red zones in outer part of dorsal and caudal fins proximal to a narrow blue margin and submarginal black line.

DESCRIPTION. Dorsal rays XI,9; anal rays III,9 (all dorsal and anal soft rays branched except the first occasionally simple, especially in smaller specimens); pectoral rays 14 (one of 40 paratypes with 14, one with 16, the rest with 15); uppermost two pectoral rays simple, the remaining rays branched; pelvic rays I,5; principal caudal rays 13, the upper and lower unbranched; upper and lower procurrent caudal rays 6, the most posterior segmented; lateral-line scales 17 + 6 (15–18 + 5–8) (one pored scale on caudal-fin base not counted); scales above lateral line to origin of dorsal fin 1.5; scales below lateral line to origin of anal fin 6.5; median predorsal scales 5 (one of 40 paratypes with 4); median preventral scales 6; rows of scales on cheek 2; circumpeduncular scales 16; gill rakers 18 (17–20).

Body moderately deep, the depth 3.0 (2.85–3.1) in SL, and compressed, the width 2.15 (2.05–2.4) in depth; dorsal profile of head slightly convex; head length 2.9 (2.9–3.1) in SL; snout moderately pointed, its length 3.7 (3.3–3.8) in head; orbit diameter 3.65 (3.3–5.65) in head; interorbital space convex, the least bony width 3.9 (3.85–4.0) in head; depth of caudal peduncle 2.2 (2.05–2.3) in head.

Mouth small, terminal to slightly inferior, and oblique, the maxilla nearly reaching a vertical at front edge of orbit, the upper jaw length 4.3 (3.95–4.25) in head; dentition typical of the genus,with three pairs of canine teeth anteriorly in

upper jaw, the third pair much the largest and strongly recurved; lower jaw with a single pair of forward-projecting canines at front; side of upper jaw of holotype with 17 small conical teeth, and side of lower jaw with 20 (same counts on largest paratype). Gill rakers small, the longest on first gill arch less than half length of longest gill filament on that arch.

Ventral margin of preopercle free slightly anterior to a vertical at front edge of pupil; posterior margin of preopercle free to level of upper edge of pupil; posterior margin of preopercle of holotype with 21 serrae (number of serrae increasing with growth, 48 on largest paratype). Anterior nostril small, in line between upper edge of eye and front of upper lip, with a small dorsoposterior membranous flap; posterior nostril about twice diameter of anterior, with a low rim, slightly anterior to a vertical at front edge of orbit; pores of cephalic lateralis system adjacent to ventroposterior half of eye 17 (15–20); a series of 9 pores along margin of preopercle continuous with 4 on mandible to front of chin; a series of 10 pores from above upper end of preopercular margin to front of anterior nostril; a series of 12 pores from anterior end of lateral line to front of first median predorsal scale; 2 median predorsal pores anterior to this series.

Scales cycloid; head scaled except snout, interorbital space, and ventrally; width of unscaled membranous ventral zone of preopercle about 3.5 (2.5–3.5) in distance from corner of preopercle to edge of orbit; base of dorsal and anal fins with a row of large elongate scales, those anteriorly and in middle of fins reaching nearly three-fourths distance to spine and ray tips; scales posteriorly at base of fins progressively shorter; a vertical series of three very large scales the most posterior on caudal fin, reaching about three-fourths distance to end of fin; pectoral fins scaleless; pelvic fins with 2 midventral scales extending posteriorly from between base of fins, the posterior scale elongate, nearly or just reaching tips of pelvic spines; axillary scale of each pelvic fin about two-thirds length of pelvic spine.

Origin of dorsal fin above second to third lateral-line scale; first dorsal spine 3.45 (3.2–4.2) in SL; remaining spines progressively longer, the last 2.4 (2.15–2.3) in head; membranes of spinous portion of dorsal fin not extending above spine tips except for terminal cirrus of each; third to fourth dorsal soft rays longest in holotype (seventh to eighth in adult males), 2.05 (1.45–2.0) in head; origin of anal fin below base of last dorsal spine; first anal spine 5.0 (4.05–5.2) in head; third anal spine usually longer than second, 2.7 (2.45–3.1) in head; seventh or eighth anal soft rays usually longest, 2.0 (1.25–2.0) in head; caudal fin rounded at all ages, 3.7 (3.6–3.9) in SL; third or fourth pectoral rays longest, 1.55 (1.35–1.6) in head; origin of pelvic fins below middle to lower base of pectoral fins; pelvic fins short in females, 5.25 in SL of holotype, to very long in adult males,the second ray prolonged as a filament, to 1.9 in SL.

Color of female holotype in alcohol uniformly pale (even the blackish submarginal zone of the first few membranes of dorsal fin faded). Color of holotype when fresh dusky orangish dorsally on body, shading to lavender-pink on sides, and progressively paler ventrally on thorax and abdomen; a series of four well-spaced pairs of very small faint whitish spots on back, the pairs vertically aligned

except the last which is oblique; interorbital space and dorsal part of snout yellow; rest of head lavender-pink with irregular broken yellow lines which extend to nape and faintly onto dorsoanterior part of body; ventral part of head pale lavender-pink with faint yellow spots; iris red; median fins yellow, the soft portions faintly spotted with blue, the dorsal and caudal with a broad red distal margin; a blackish submarginal band in dorsal fin, broadest and more heavily pigmented on first two membranes; margin of anal fin narrowly blue; paired fins pale, the edges of the pectoral rays orange-red; an indistinct wedge-shaped red bar at base of pectoral fins. Some females faintly show narrow bluish stripes on the body following scale rows.

Juveniles similar in color to females but with a pupil-size black spot on upper side of caudal peduncle near caudal-fin base; yellow upper part of head of juveniles very evident in life, but broad red margins of the dorsal and caudal fins not well developed.

Color of large males in alcohol: head and dorsal half of body brown, becoming abruptly pale midlaterally on body and shading to dusky on lower abdomen, thorax, and isthmus; entire body except darker lower part stippled with pale and dark dots and some short irregular dark lines; dorsal fin with outer half of first six membranes black (more than half black on first two), the outer half of rest of fin pale; lower half of fin light brown with a blackish line separating it from pale distal part; anal fin brown with irregular dark brown markings; caudal fin dark brown on basal two-thirds with irregular vertical broken black lines, the outer third abruptly pale; pectoral fins pale; pelvic fins with spine, rays, and first two membranes dark brown, remaining three membranes hyaline.

Large males beautifully colored in life, the body pink, shading through lavender to light blue ventrally, with numerous orange-red dots and short irregular lines, the dots becoming yellow ventrally; head blue, suffused with pink on opercle, with yellow dots and lines and a solid yellow patch dorsally which extends to tip of snout; iris pink with an inner ring of yellow; dorsal fin with a narrow bright blue margin and black submarginal line and an outer broad bright red band; basal part of fin deep blue anteriorly, soon shading to purple; posterior basal part of fin orange with yellow spots and some irregular blue markings; anal fin irregularly lined with blue and yellow, the margin narrowly bright blue with a black submarginal line; caudal fin with a bright blue posterior margin, black submarginal line, very broad red band, and bluish at base with irregular vertical yellow lines; pectoral fins pale yellowish; pelvic fins dark orangish, streaked longitudinally with bright blue (including lateral margin) and black.

REMARKS. This species is named *rubrimarginatus* in reference to the broad red margins of the dorsal and caudal fins.

Cirrhilabrus rubrimarginatus is broadly distributed in the western Pacific from the Ryukyu Islands through the Philippines, Palau, and Indonesia to Vanuatu, Fiji, and Tonga, hence a latitudinal range from 26°30′N to 18°40′S. Specimens have been collected in the depth range of 25 to 52 m. The species is not usually seen on well-developed coral reefs but on more open rubble or sand bottoms with small isolated patch reefs of low profile.

Of the known species of *Cirrhilabrus, rubrimarginatus* seems closest to *temminckii* with which it coexists in southern Japan, Taiwan, and the Philippines. The two share the same caudal fin shape and the long pelvic fins of the male, and they show some similarity in fin coloration. *C. rubrimarginatus* has a slightly deeper body, more gill rakers, and different head and body color.

Cirrhilabrus rubrimarginatus is one of the two largest species of the genus (the other being *C. melanomarginatus*). The largest specimen (BPBM 31577) measures 121.5 mm SL; it was collected northeast of Padangbai, east coast of Bali, from an area of unexpectedly cool sea temperature due to upwelling.

Cirrhilabrus temminckii

Plate I A,B; Table 1

Cirrhilabrus sp. Temminck & Schlegel 1845: 167, pl. 86, fig. 3 (Nagasaki, Japan).
Cirrhilabrus Temminckii Bleeker 1853: 17 (after Temminck and Schlegel).

DIAGNOSIS. Median predorsal scales 5 (rarely 4); lateral-line scales 16–18 + 5–8; scale rows on cheek 2, gill rakers 15–19; body depth 3.0–3.3 in SL; head length 2.9–3.3 in SL; snout length 3.5–4.2 in head; caudal fin rounded, 3.5–4.0 in SL; pelvic fin length varying from 1.7–5.7 in SL (short in juveniles and females, very long in large males, extending well posterior to anal-fin origin). Small females orange-red on about dorsal two-thirds of body, bluish whitish on lower head and abdomen and yellowish posteriorly; fins pale, the pectorals with an orange bar at base; larger females are brighter red on the dorsal half of the body, abruptly white below with a broken irregular blue line or row of small blue spots separating the two color zones (blue markings more evident posteriorly); larger females and males developing a blue-edged black stripe in middle of dorsal and anal fins, the fins broadly red above the stripe with a narrow blue margin; caudal fin yellowish with numerous vertical wavy blue lines and small blue spots; paired fins pale with a narrow red bar at base of pectorals; large males may become more dusky over much of the head and body; one from Miyake-jima, Izu Islands was blackish except for a broad red band from snout through upper part of eye, across nape, and continuing broadly on back adjacent to dorsal fin and a second red band passing from the corner of the mouth to pectoral-fin base; lower abdomen and zone of body above anal fin dusky white; caudal fin dark yellowish gray with two transverse blue lines in outer part of fin and blue dots clustered basally near margins; the long pelvic fins blue with a longitudinal streak of dull yellow. The following color note was made of a 53-mm immature fish collected by the author at Okinawa: upper half of body brownish yellow, the lower half whitish with some tones of light blue and pale salmon, the two areas separated by an indistinct blue line; a blue line from snout through lower part of eye and 3 narrow blue lines passing posteriorly from middle of eye; caudal fin mainly yellowish with a broad indistinct zone of olive-gray dotted with dull yellow in outer middle part of fin; dorsal and anal fins yellowish basally, reddish distally, the two zones separated by a dusky band which is edged in violet in anal fin; paired fins pale, the rays light salmon.

REMARKS. This species of *Cirrhilabrus* was named *temminckii* by Bleeker in honor of Coenraad Jacob Temminck, the senior author of the volume on fishes of Siebold's monumental *Fauna Japonica* which included 358 species of fishes. Temminck & Schlegel (1845) had two specimens of the *Cirrhilabrus* from Nagasaki; they named the genus and provided a long description and an excellent drawing of the species but declined to name it.

Cirrhilabrus temminckii is known from southern Japan to Western Australia. Jordan & Snyder (1902) reported it from Wakanoura, Japan. Kamohara (1958) gave the range as Sagami Bay to the Philippines. Allen & Swainston (1988) recorded it from northwestern Australia. Bishop Museum has 15 lots of this species from Izu Islands, Okinawa, Taiwan, Luzon, and Western Australia; these fish were collected in the depth range of 3–35 m. The largest specimen is BPBM 22435 from Batangas, Luzon; it measures 99 mm SL.

Color illustrations of *C. temminckii* have been provided by Tomiyama & Abe (1958), Masuda et al. (1975), Randall & Shen (1978), Schroeder (1980), Masuda & Allen (1987), Masuda et al. (1988), Allen & Swainston (1988), and Masuda (1989). The last-mentioned includes an underwater photograph of a male in courtship coloration. The two red bands described above for the Miyake-jima fish are now brilliant light blue in the displaying fish, the zones adjacent to these bands red.

It is apparent from these illustrations, color notes, and photographs by the author and others that there is considerable variation in color of this species, both as individual variation and geographically. A comprehensive study of this species throughout its range would be of interest.

The fish from the Great Barrier Reef illustrated in color by Burgess & Axelrod (1976) which they identified as *Cirrhilabrus temmincki* is *C. punctatus.*

Acknowledgments

I thank foremost The Charles Engelhard Foundation for providing funds for the color plates herein. Special thanks are due the following persons for supplying specimens for this study: Gerald R. Allen, Bruce A. Carlson, Patrick L. Colin, John L. Earle, Harry T. Kami, Hajime Masuda, Richard L. Pyle, Kwang-Tsao Shao, J.P. Shen, John W. Shepard, William F. Smith-Vaniz, Victor G. Springer, and Richard Winterbottom. Jane B. Culp, Richard L. Pyle, Helen A. Randall, and Arnold Suzumoto assisted in curating specimens, etc. John W. Shepard took the photograph of the holotype of *Cirrhilabrus katherinae.* Rudie H. Kuiter and Robert F. Myers reviewed the manuscript.

References

Allen, G. R. & R. C. Steene. 1979. The fishes of Christmas Island, Indian Ocean. Spec. Publ. Austral. Natl. Parks & Wildl. Serv. 2: v + 81 pp.

Allen, G. R. & R. C. Steene. 1988. Fishes of Christmas Island, Indian Ocean. Christmas Island Natural History Association, Christmas Island, 197 pp.

Allen, G. R. & R. Swainston. 1988. The Marine Fishes of Northwestern Australia. Western Australian Museum, Perth, vi + 201 pp.

Amesbury, S. S. & R. F. Myers. 1982. Guide to the Coastal Resources of Guam: Volume I. The Fishes. University of Guam Press, 141 pp.

Bleeker, P. 1851. Cheilinoïdes, een nieuw geslacht van gladshubbige Labroïden van Batavia. Nat. Tijdschr. Ned. Indië 2: 71–72.

Bleeker, P. 1853. Bijdrage tot de kennis der ichthyologische fauna van Solor. Nat. Tijdschr. Ned. Indië 5: 67–96.

Burgess, W. E. & H. R. Axelrod. 1976. Fishes of the Great Barrier Reef. Pacific Marine Fishes, Book 7. T.F.H. Publications, Neptune City, New Jersey, pp. 1655–1925.

Cornic, A. 1987. Poissons de l'ile Maurice. Editions de l'Océan Indien, Stanley, Rose-Hill, Mauritius, 335 pp.

Ishikawa, C. 1904. Notes on some new or little known fishes of Japan. Proc. Nat. Hist. Tokyo Mus. 1: 1–17.

Jordan, D. S. & J. O. Snyder. 1902. A review of the labroid fishes and related forms in the waters of Japan. Proc. U.S. Natl. Mus. 24(1266): 595–662.

Kamohara, T. 1958. A review of the labrid fishes found in the waters of Kochi Prefecture, Japan. Rep. Usa Mar. Biol. Sta. 5(2): 1–20.

Kamohara, T. & T. Yamakawa. 1968. Additional records of marine fishes from Amami (II). Rep. Usa Mar. Biol. Sta. 15(2): 1–17.

Klausewitz, W. 1976. *Cirrhitichthys filamentosus* n. gen., n. sp., aus der Javasee (Pisces: Labridae). Senckenberg. Biol. 57(1/3): 11–14.

Masuda, H. 1989. Sea Fishes of the Izu Ocean. Tokai University Press, Tokyo, 35 pp. (in Japanese).

Masuda, H. & G. R. Allen. 1987. Sea Fishes of the World. Yama-kei Publishers, Tokyo, 526 pp. (in Japanese).

Masuda, H., C. Araga & T. Yoshino. 1975. Coastal Fishes of Southern Japan. Tokai University Press, Tokyo, 382 pp.

Masuda, H., K. Amaoka, C. Araga, T. Uyeno & T. Yoshino (eds). 1988. The Fishes of the Japanese Archipelago. Second edition. Tokai University Press, Tokyo, 2 vols., text of xxi + 456 pp., and plates.

Myers, R. F. 1988. An annotated checklist of the fishes of the Mariana Islands. Micronesica 21: 115–180.

Myers, R.F. 1989. Micronesian Reef Fishes. Coral Graphics, Guam, vi + 298 pp.

Myers, R. F. & J. W. Shepard. 1980. New records of fishes from Guam with notes on the ichthyofauna of the southern Marianas. Micronesica 16: 305–347.

Randall, J. E. 1988. Five new wrasses of the genera *Cirrhilabrus* and *Paracheilinus* (Perciformes: Labridae) from the Marshall Islands. Micronesica 21: 199–226.

Randall, J. E. & K. E. Carpenter. 1980. Three new labrid fishes of the genus *Cirrhilabrus* from the Philippines. Rev. Franç. Aquariol. 7(1): 17–26.

Randall, J. E. & A. R. Emery. 1983. A new labrid fish of the genus *Cirrhilabrus* from the Chagos Archipelago, Indian Ocean. Jour. Aquar. & Aquatic Sci. 3(2): 21–24.

Randall, J. E. & R. H. Kuiter. 1989. *Cirrhilabrus punctatus*, a new species of labrid fish from the southwestern Pacific. Rev. Franç. Aquariol. 16(2): 43–50.

Randall, J. E. & R. Lubbock. 1982. Three new labrid fishes of the genus *Cirrhilabrus* from the southwestern Pacific. Occ. Pap. B.P. Bishop Mus. 25(2): 1–12.

Randall, J. E. & H. Masuda. 1991. Two new labrid fishes of the genus *Cirrhilabrus* from Japan. Rev. Franç. Aquariol. 18(2): 53–60.

Randall, J. E. & R. M. Pyle. 1988. *Cirrhilabrus scottorum*, a new labrid fish from the South Pacific Ocean. Rev. Franç. Aquariol. 5(4): 113–118.

Randall, J. E. & S. -C. Shen. 1978. A review of the labrid fishes of the genus *Cirrhilabrus* from Taiwan, with description of a new species. Bull. Inst. Zool. Academia Sinica 17(1): 13–24.

Randall, J. E., G. R. Allen & R. C. Steene. 1990. Fishes of the Great Barrier Reef and Coral Sea. Crawford House Press, Bathurst, N.S.W., 507 pp.

Schroeder, R. E. 1980. Philippine Shore Fishes of the Western Sulu Sea. Bureau of Fisheries and Aquatic Resources, Manila, xv + 266 pp.

Shao, K. -T. & L. -S. Chen. 1990. Exotic Marine Fishes, Encyclopaedia of Field Guide in Taiwan, vol. 17, part 2. Recreation Press, Taipei, 200 pp. (in Chinese).

Shen, S. -C. 1984. Coastal Fishes of Taiwan. Private Printing, Taipei, 189 pp.

Smith, J. L. B. 1957. List of the fishes of the family Labridae in the western Indian Ocean with new records and five new species. Ichth. Bull. (Rhodes Univ., Grahamstown), no. 7: 98–112.

Springer, V. G. & J. E. Randall. 1974. Two new species of the labrid fish genus *Cirrhilabrus* from the Red Sea. Israel Jour. Zool. 23: 45–54.

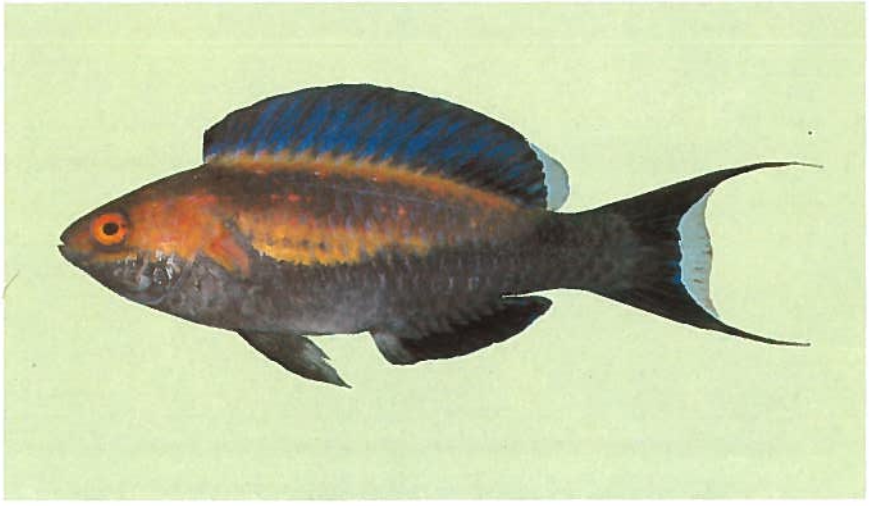
Temminck, C. J. & H. Schlegel. 1842–1850. Pisces in P. F. von Siebold's Fauna Japonica. Lugduni Batavorum, Batavia, 345 pp.

Tomiyama, I. & T. Abe. 1958. Encyclopaedia Zoologica Illustrated in Colours, vol. 2. Pisces. Hokuryukan Co., Tokyo, 342 pp. (in Japanese).

Received 10 Oct. 1991, revised 3 Jan. 1992.

A. *Cirrhilabrus temminckii*, ♀, 52.8 mm SL, BPBM 18975, Miyake-jima.

B. *Cirrhilabrus temminckii*, ♂, 71.5 mm SL, BPBM 18975, Miyake-jima.



C. *Cirrhilabrus lunatus*, holotype, ♂, 67.7 mm SL, BPBM 19196, Okinawa.

A. *Cirrhilabrus rubrimarginatus*, paratype, 37.0 mm SL, BPBM 24456, Taiwan.

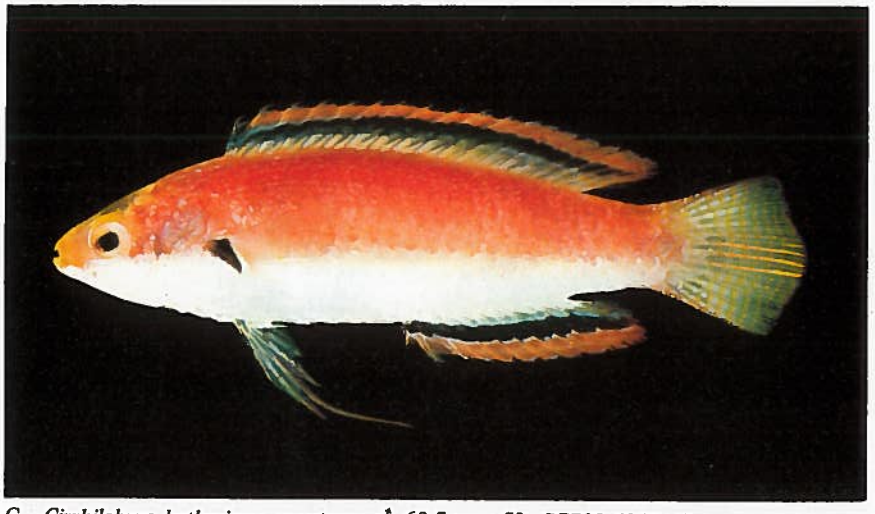
B. *Cirrhilabrus rubrimarginatus*, holotype, ♀, 53.6 mm SL, BPBM 19134, Okinawa.

C. *Cirrhilabrus rubrimarginatus*, paratype, ♂, 92.0 mm SL, BPBM 24457, Taiwan.

D. *Cirrhilabrus lanceolatus*, holotype, ♀, 74.2 mm SL, BPBM 22315, Okinawa.

A. *Cirrhilabrus cyanopleura*, ♂, 74.9 mm SL, BPBM 19108, Okinawa.

B. *Cirrhilabrus katherinae*, holotype, ♀, 53.0 mm SL, BPBM 23082, Miyake-jima, Japan.



C. *Cirrhilabrus katherinae*, paratype, ♂, 63.7 mm SL, BPBM 6947, Guam.