



## ***Cirrhilabrus cyanogularis*, a new species of fairy wrasse from the Philippines and Indonesia (Teleostei: Labridae)**

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### **Abstract**

*Cirrhilabrus cyanogularis*, **sp. nov.**, is described on the basis of the holotype and three paratypes from Banguingui Island, Sulu Archipelago, Philippines, and a paratype from Sulawesi, Indonesia. The new species belongs to a complex consisting of *C. filamentosus* (Klausewitz), *C. rubripinnis* Randall & Carpenter, and *C. tonozukai* Allen & Kuitert. Aside from similar nuptial male coloration, the four species share the following character combination: a single row of cheek scales; dorsal-fin spines taller than dorsal-fin rays (slightly incised between spinuous and soft dorsal fin in *C. rubripinnis* and *C. cyanogularis*; last three dorsal-fin spines converging to form a single filament in *C. tonozukai* and *C. filamentosus*); relatively long pelvic fins (reaching past anal-fin origin); and isthmus and breast blue. The new species differs from the other members of the complex in lacking a dorsal filament, as well as possessing six predorsal scales, more extensive blue coloration on the isthmus, lower head and breast, and a soft dorsal fin with narrow black, medial stripe. The status of Klausewitz's *Cirrhilabrichthys* is briefly discussed.

**Key words:** taxonomy, ichthyology, Banguingui Island, Sulu Archipelago, coloration

### **Introduction**

The Indo-Pacific labrid genus *Cirrhilabrus* Temminck & Schlegel (1845) consists of small, planktivorous fishes found mostly on rubble slopes. Allen *et al.* (2015) listed 51 valid species in the genus. Seven other species have subsequently been described: *Cirrhilabrus isosceles* Tea *et al.* (2016), *C. hygroxerus* Allen & Hammer (2016), *C. rubeus* Victor (2016), *C. africanus* Victor (2016), *C. efatensis* Walsh *et al.* (2017), *C. shutmani* Tea & Gill (2017) and *C. greeni* Allen & Hammer (2017) bringing the valid species count to 58.

Klausewitz (1976) erected the genus *Cirrhilabrichthys* to accommodate the placement of his new species, *C. filamentosus*. In his original description, Klausewitz made reference to the close relationship that *C. filamentosus* might have to *Cirrhilabrus rubriventralis* Springer & Randall (1974), based in part on the presence of a single row of cheek scales (versus the usual two). This apomorphic character is now known from several additional *Cirrhilabrus* species: *C. rubripinnis* Randall & Carpenter (1980), *C. condei* Allen & Randall (1996), *C. morrisoni* Allen (1999), *C. tonozukai* Allen & Kuitert (1999), *C. joanallenae* Allen (2000), *C. walshi* Randall & Pyle (2001), *C. naokoae* Randall & Tanaka (2009), *C. humanni* Allen & Erdmann (2012), *C. marinda* Allen, Erdmann & Dailami (2015), *C. africanus* Victor (2016), *C. rubeus* Victor (2016), *C. hygroxerus* Allen & Hammer (2016), and *C. greeni* Allen & Hammer (2017). Further study is required to determine whether this feature is synapomorphic, and thus diagnostic for *Cirrhilabrichthys*. Pending that investigation, we follow Randall & Lubbock (1982) in recognizing *Cirrhilabrichthys* as a synonym of *Cirrhilabrus* (discussed in further detail below).

Herein we describe an additional species of *Cirrhilabrus* with a single row of cheek scales on the basis of five specimens collected for the aquarium trade, four from Banguingui Island, Sulu Archipelago, Philippines, and one from Sulawesi, Indonesia.

## Materials and methods

Methods of counting and measuring follow Randall & Masuda (1991). Gill raker counts follow Tea & Gill (2017), and are presented as upper (epibranchial) + lower (ceratobranchial); the angle raker is included in the second count. In the description that follows, data are presented for all type specimens, followed where variation was noted by data for the holotype in parentheses. Where counts were recorded bilaterally for the holotype, both counts are given and separated from each other by a slash; the first count presented is the left count. Type specimens are deposited in the Australian Museum, Sydney (AMS), Kanagawa Prefectural Museum of Natural History (KPM), National Museum of the Philippines (PNM), Scripps Institution of Oceanography (SIO), and the Zoological Reference Collection of the Lee Kong Chian Natural History Museum at the National University of Singapore (ZRC).

### *Cirrhilabrus cyanogularis* n. sp.

Blue-throated Fairy-wrasse

Figures 1–6, 8, 9A, 10A; Tables 1–3

**Holotype.** PNM 15354, 44.5 mm SL male, Philippines, Sulu Archipelago, Banguingui Island (6°0'N 121°52'E), 30 m, rubble slopes, collected by Rolando Dungog, 17 July 2016.

**Paratypes.** AMS I.47440-001, 44.5 mm SL male (collected with holotype); ZRC 56451, 44.1 mm SL male (collected with holotype); SIO 17-27, 54.8 mm SL male, Philippines, Sulu Archipelago, Banguingui Island, 30 m, rubble slopes, collected by Rolando Dungog, 2017; KPM-NI 16299, 61.6 mm SL male, Indonesia, Sulawesi, collected by aquarium fish collectors, purchased from an aquarium store 13 October 2005.

**Diagnosis.** *Cirrhilabrus cyanogularis* differs from congeners in having the following combination of characters: single row of cheek scales; six predorsal scales; dorsal-fin spines taller than segmented rays; no filament on middle of dorsal fin; pelvic fins long, reaching past anal-fin origin; males in life with broad blue area covering isthmus, lower part of head and breast to at least pelvic origin, and soft dorsal fin with narrow black, medial stripe.

**Description.** Dorsal-fin rays XI,9; anal-fin rays III,9; dorsal and anal-fin soft rays branched except first ray unbranched; last dorsal and anal-fin ray branched to base; pectoral-fin rays 14–15 (15/15), upper two unbranched; pelvic-fin rays I,5; principal caudal-fin rays 7+6, uppermost and lowermost unbranched; upper procurrent caudal-fin rays 6, lower procurrent caudal-fin rays 6; lateral line interrupted, with dorsoanterior series of pored scales 13–16 (16/13) and midlateral posterior peduncular series 4–7 (6/7); scales above lateral line to origin of dorsal fin 2; scales below lateral line to origin of anal fin 6–7 (6/6); median predorsal scales 6; median prepelvic scales 6; rows of scales on cheek 1; circumpeduncular scales 16; gill rakers 5 + 8 = 13; pseudobranchial filaments 10–11 (11); vertebrae 9+16; epineurals 13.

Body moderately elongate and compressed, depth 3.1–3.4 (3.3) in SL, width 5.8–7.8 (6.0) in SL; head length 2.9–3.3 (3.1) in SL; snout pointed, its length 3.1–3.8 (3.7) in HL; orbit diameter 3.4–4.0 (3.5) in HL; depth of caudal peduncle 2.2–2.6 (2.3) in HL. Mouth small, terminal, and oblique, with maxilla almost reaching vertical at front edge of orbit; dentition typical of genus with three pairs of canine teeth present anteriorly at side of upper jaw, first forward-projecting, next two strongly recurved and outcurved, third longest; an irregular row of very small conical teeth medial to upper canines; lower jaw with a single stout pair of canines anteriorly which protrude obliquely outward and are slightly lateral to medial pair of upper jaw; no teeth on roof of mouth. Gill rakers small, longest on first branchial arch less than half length of longest gill filaments.

Posterior margin of preoperculum with 27–32 (27) very fine serrae; margins of posterior and ventral edges of preoperculum free to about level of middle pupil. Anterior nostril in short membranous tube, located nearer to orbit than snout tip; posterior nostril larger, roughly ovoid to rectangular, located just medial and anterior to upper edge of eye. Scales cycloid; head scaled except snout and interorbital space; 5–6 (6) large scales on opercle; a broad naked zone on membranous edge of preopercle; a row of large, elongate, pointed scales along base of dorsal fin, one per element, longest about two-fifths length of spines, scales progressively shorter posteriorly on soft portion of fin; anal fin with a similar basal row of scales; last pored scale of lateral line (posterior to hypural plate) enlarged and pointed; one scale above and below last pored scale also enlarged; a horizontal series of greatly enlarged scales extend two-thirds distance to central posterior margin of caudal fin; pectoral fins naked except for a few small scales at extreme base; a single large scale at base of each pelvic fin, about three-fourths length of pelvic spine.

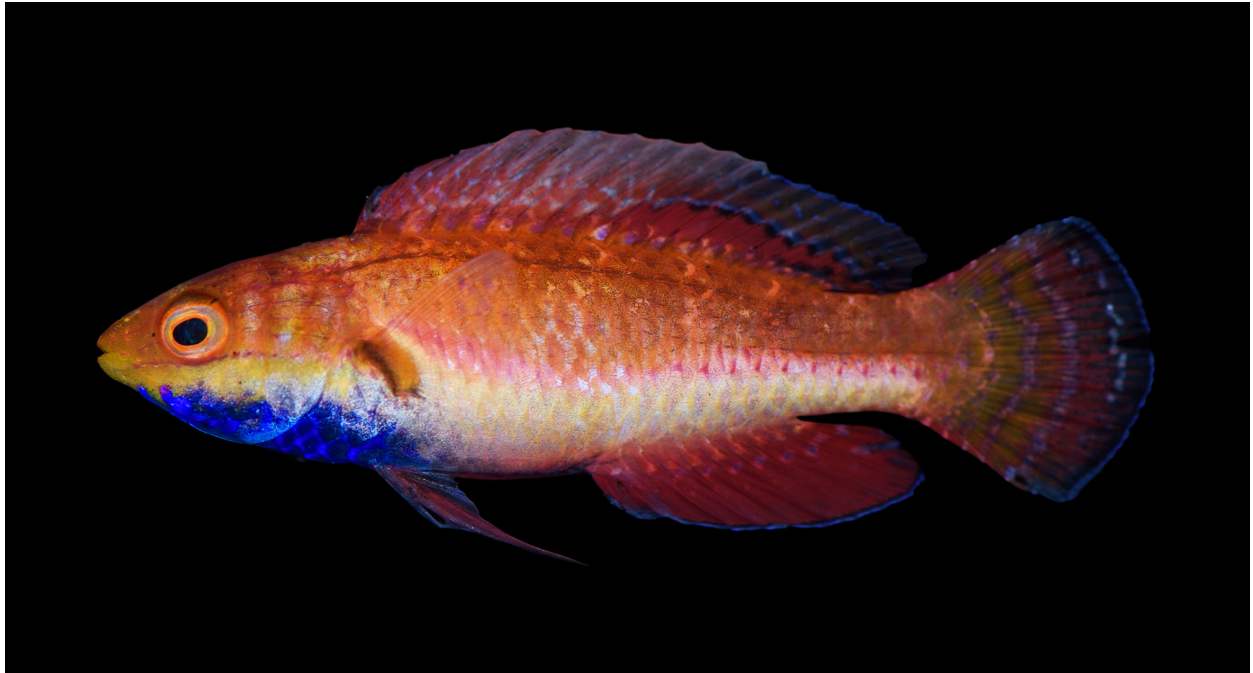
**TABLE 1.** Proportional measurements of type specimens of *Cirrhilabrus cyanogularis* expressed as percentages of standard length.

	Holotype		Paratypes		
	PNM 15354	ZRC 56451	AMS I.47440-001	SIO 17-27	KPM-NI 16299
Sex	male	male	male	male	male
Standard length (mm)	44.5	44.1	44.5	54.8	61.6
Body depth	30.1	29.7	30.6	29.3	32.5
Body width	13.5	13.6	13.0	12.8	15.6
Head length	32.1	32.0	33.3	33.5	29.9
Snout length	8.8	8.6	8.8	8.5	9.7
Orbit diameter	9.2	9.3	9.7	8.1	7.5
Interorbital width	8.8	7.7	7.6	7.6	8.1
Upper jaw length	7.0	7.3	7.6	6.6	8.3
Caudal-peduncle depth	13.7	13.4	13.0	14.3	13.5
Caudal-peduncle length	16.9	19.0	16.6	20.1	17.4
Predorsal length	33.5	33.3	33.3	34.6	32.3
Preanal length	60.9	56.2	58.0	57.0	56.8
Prepelvic length	36.0	32.9	38.0	36.2	34.4
Dorsal-fin base	58.4	59.6	56.2	55.1	60.4
First dorsal spine	6.4	7.9	7.4	8.5	5.7
Second dorsal spine	10.3	12.5	11.7	15.0	10.2
Longest dorsal spine	15.5	17.5	15.3	20.4	15.4
Longest dorsal ray	19.3	21.8	19.3	16.9	19.2
Anal-fin base	27.2	28.6	27.4	22.6	28.4
First anal spine	5.6	4.8	5.2	5.9	5.2
Second anal spine	8.3	7.7	7.6	7.7	8.3
Third anal spine	9.4	10.0	9.0	8.4	10.4
Longest anal ray	19.3	22.7	18.2	21.3	19.7
Caudal-fin length	30.8	29.7	27.0	22.9	27.0
Pectoral-fin length	19.6	18.8	18.2	18.2	21.9
Pelvic spine length	11.0	11.8	8.1	15.9	12.3
Pelvic fin length	37.5	42.6	35.9	46.7	37.8

Origin of dorsal fin above third lateral-line scale, predorsal length 2.9–3.2 (3.2) in SL; first 1–4 dorsal-fin spines progressively longer, fourth to fifth subequal, sixth to eighth longest, 1.6–2.3 (2.3) in HL; interspinous membranes of dorsal fin in males extend beyond dorsal-fin spines, with each membrane extending in a pointed filament beyond spine; first dorsal-fin soft ray longest, 1.5–1.7 (1.7) in HL, remaining rays progressively shorter; origin of anal fin below base of tenth dorsal-fin spine; third anal-fin spine longest, 2.9–3.4 (3.4) in HL; interspinous membranes of anal fin extended as on dorsal fin; anal-fin soft rays relatively uniform in length, fifth longest, 1.4–1.8 (1.7) in HL; dorsal and anal-fin rays barely reaching caudal-fin base; caudal fin of males rounded, length 1.0–1.2 (1.0) in HL; pectoral fins short, reaching a vertical between bases of sixth or seventh dorsal-fin spines, longest ray 1.4–1.8 (1.6) in HL; origin of pelvic fins below lower base of pectoral fins; pelvic fins relatively long, reaching past anal fin origin, longest ray 0.8–0.9 (0.9) in HL.

Coloration of males in life (based on colour photographs of the holotype and paratype when freshly dead, and aquarium photos of live individuals; Figures 1, 3–6, 9A & 10A): head and body orange to orange-red; lower part of head white, overlaid with metallic blue-green; lower part of operculum, isthmus and breast extensively overlaid with metallic blue-green; upper part of nape, interorbital and upper part of snout orange to orange-red, with a series

of fine white stripes; iris bright orange, with yellow ring around pupil; lower part of body yellowish orange to white, delimited from upper body by a red medial stripe starting from pectoral fin base to caudal peduncle; dorsal fin reddish-orange, often with whitish sinuous markings anteriorly; posterior dorsal fin hyaline yellow to reddish-yellow, with a large medial stripe, dark red, black distally, often with blue spots; distal margin of posterior dorsal fin narrowly bright blue; anal fin dark red, washed with magenta, sometimes with blue spots basally; caudal fin hyaline yellow to yellowish-green, washed with magenta, slightly metallic, with diffused black margin and with three to five metallic blue vertical bands, often broken into spots; pelvic fins dark red, narrowly bright blue on leading edge; pectoral fins reddish hyaline.



**FIGURE 1.** *Cirrhilabrus cyanogularis*, PNM 15354, freshly euthanized male holotype, 44.5 mm SL, Banguingui Island, Sulu Archipelago, Philippines. Photo by Y.K. Tea.

Coloration of females in life (based on colour photographs and aquarium photos of live individuals): similar to male, but body uniformly orange to orange-red, fading to pale whitish ventrally, and with three to four fine white stripes dorsally; upper part of caudal peduncle with small black spot; dorsal and anal fins hyaline red without any obvious markings; pelvic fins hyaline red; caudal fin hyaline red with indistinct spots; pectoral fins hyaline.

Coloration in preservative (Figure 2): similar to colour in life; metallic blue and black markings become dusky grey; red markings become pale tan; white markings become whitish-grey; dorsal fin greyish hyaline, posterior black markings remain; anal and pelvic fins greyish hyaline; caudal fin greyish hyaline, vertical bands become whitish-grey, distal black margin remain; pectoral fins hyaline.

**Etymology.** The specific epithet is a combination of the Greek *kyanos*, blue, and Latin, *gularis*, throated, alluding to the extensive blue throat coloration of males of the species. Gender is masculine.

**Distribution and habitat.** *Cirrhilabrus cyanogularis* is known from the type locality from Banguingui Island, Sulu Archipelago, Philippines and from an unknown locality in Sulawesi, Indonesia (Figure 8). The species has also been collected regularly for the aquarium trade at Sarangani Island, off the southern tip of Mindanao, Philippines (B. Shutman, pers. comm.). Photographs in the Image Database of Fishes, Kanagawa Prefectural Museum of Natural History (KPM) indicate that the species ranges to Sabah, Malaysia (Kapalai Island, KPM-NR71060; Mabur Island, KPM-NR71181). The species has also been photographed in Indonesia at Derawan, Eastern Kalimantan, and Bali (Figures 9A, 10A). Like other species in the genus, it favors rubble slopes with little structure, at depths of about 30 m, though has been photographed in as little as 4 m.



**FIGURE 2.** *Cirrhilabrus cyanogularis*, PNM 15354, preserved male holotype, 44.5 mm SL, Banguingui Island, Sulu Archipelago, Philippines. Photo by Y.K. Tea.



**FIGURE 3.** *Cirrhilabrus cyanogularis*, SIO 17-27, 54.8 mm SL, paratype, x-radiograph. Radiograph by B.W. Frable.

**Comparisons.** *Cirrhilabrus cyanogularis* most closely resembles *Cirrhilabrus rubripinnis* from the Philippines, *C. tonozukai* from Indonesia, Timor-Leste and Palau, and *C. filamentosus* from Indonesia (Figures 9 & 10). The four species share the following combination of characters: a single row of cheek scales; males with dorsal-fin spines taller than dorsal-fin rays (slightly incised between spinous and soft dorsal fin in *C. rubripinnis* and *C. cyanogularis*; last three dorsal-fin spines converging to form a single filament in *C. tonozukai* and *C. filamentosus*); relatively long pelvic fins (reaching past anal-fin origin), and isthmus blue in life. Differences in live coloration and characters distinguishing *C. cyanogularis*, *C. rubripinnis*, *C. tonozukai* and *C. filamentosus* are summarized in Tables 2 and 3, and illustrated in Figures 9 and 10.





**FIGURE 4.** *Cirrhilabrus cyanogularis*, KPM-NI 16299, freshly euthanized male paratype, 61.6 mm SL, from Sulawesi, Indonesia. Photo by H. Senou.



**FIGURE 5.** *Cirrhilabrus cyanogularis*, aquarium specimen, approximately 75 mm TL, from Banguingui Island, Sulu Archipelago, Philippines. Image reversed, specimen not retained. Note the extensive blue coloration reaching the bases of the pectoral, pelvic and anal fins. Photo by Y.K. Tea.

Aside from live coloration, *C. cyanogularis* differs from *C. rubripinnis* in having one more predorsal scale (6 vs 5), a lower number of preopercular serrae (27–32 vs 37), a shorter head (32.0–33.5 vs 33.0–42.2 % SL), a shorter preanal distance (56.2–60.9 vs 59.3–72.7 % SL), and a shorter first anal fin spine (4.8–5.9 vs 7.0–9.7 % SL), and from *C. tonozukai* in having more predorsal scales (6 vs 4–5), a shallower caudal peduncle (13.0–14.3 vs

14.4–15.6 % SL), and a longer first dorsal fin spine (5.7–8.5 vs 4.3–4.7 % SL). *Cirrhilabrus cyanogularis* is readily separated from *C. filamentosus* on the basis of dorsal fin morphology and coloration (Figures 9 and 10). The filamentous dorsal fin character of *C. rubripinnis* and *C. cyanogularis* is discussed in the remarks below.



**FIGURE 6.** *Cirrhilabrus cyanogularis*, aquarium specimen from Sulawesi, Indonesia. Specimen not retained. Photo by K. Endoh.



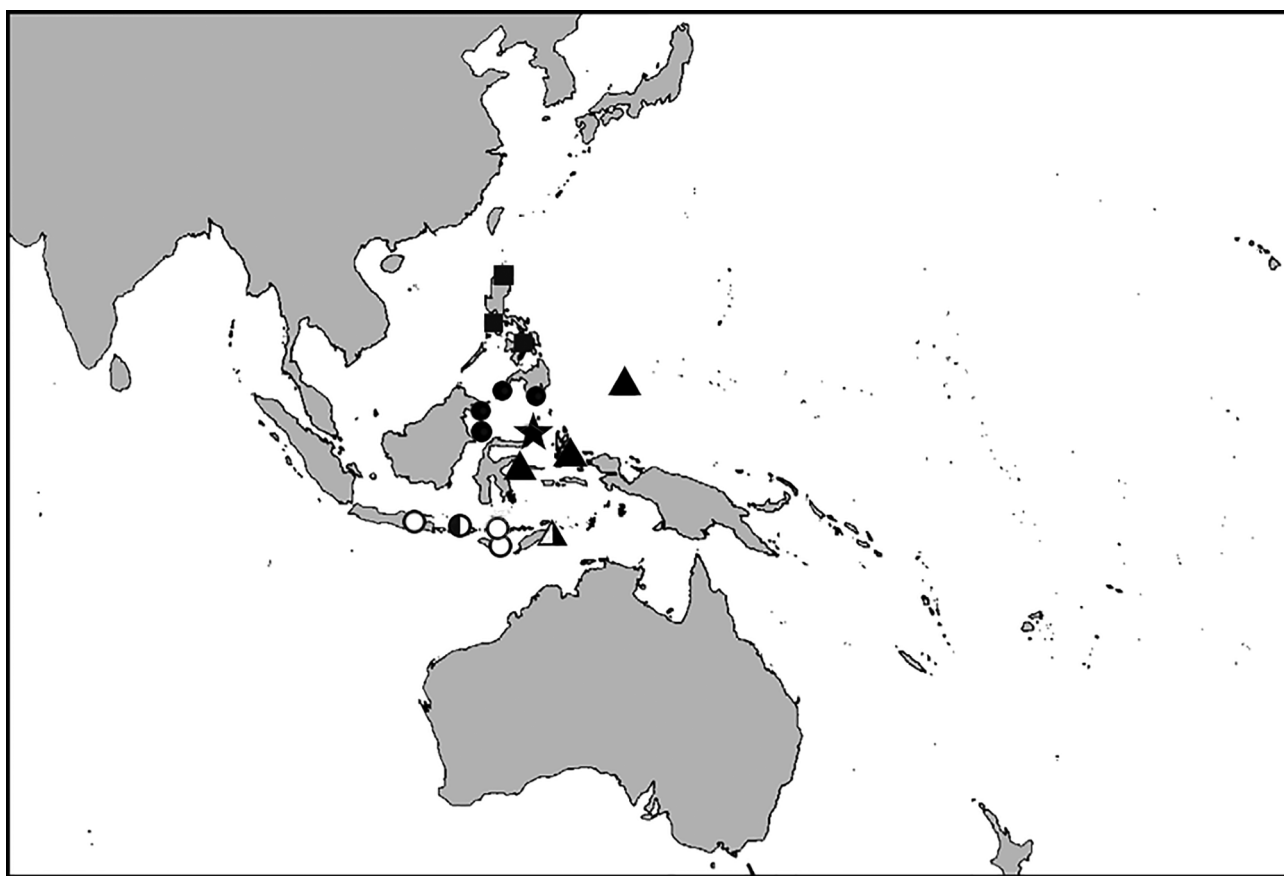
**FIGURE 7.** *Cirrhilabrus rubripinnis*, male holotype, 59.9 mm SL, from Luzon, Philippines. Photo by J.E. Randall.

**Remarks.** Klausewitz (1976) erected the genus *Cirrhilabrichthys* for *C. filamentosus* on the basis of two characters: a single row of scales on the cheek, and males with the last three dorsal-fin spines fused into a filamentous prolongation. As noted in the Introduction, there are now 16 species known with a single row of cheek scales. Elongation of the last three dorsal-fin spines into a filament has a more restricted distribution among *Cirrhilabrus* species, and appears to be variable in some species. In describing *C. rubripinnis* from Luzon, Philippines, Randall & Carpenter (1980) noted the presence of a posterior dorsal fin filament on the holotype, but not in the other specimens in the type series (Figure 7). Examination of subsequent specimens and photographs reveal that the species normally lacks a filamentous extension. A similar situation occurs in *C. cyanogularis*. Although none of the specimens in the type series possess dorsal filaments, we are aware of a single aquarium individual of the species with that feature. Unfortunately, that individual was not preserved, and is unavailable for additional study. Aside from *C. filamentosus*, only *C. tonozukai* has males with consistent extension of the

posterior three dorsal-fin spines into a filament. Nonetheless, we believe the four species are closely related, and hereafter refer to them as the *C. filamentosus* complex.

**TABLE 2.** Comparison of coloration and morphological characters of males of selected *Cirrhilabrus* species based on live individuals and color photographs of individuals in aquaria and in the field.

	<i>C. cyanogularis</i>	<i>C. rubripinnis</i>	<i>C. tonozukai</i>	<i>C. filamentosus</i>
Dorsal filament	Absent	Absent	Present	Present
Predorsal scales	6	5	4–5	5
Posterior medial stripe on dorsal fin	Present	Absent	Present	Absent
Blue coloration on isthmus and breast	Very extensive, reaching lower part of head, breast and pectoral-fin base	Present, restricted to isthmus	Present, restricted to isthmus	Present, restricted to isthmus

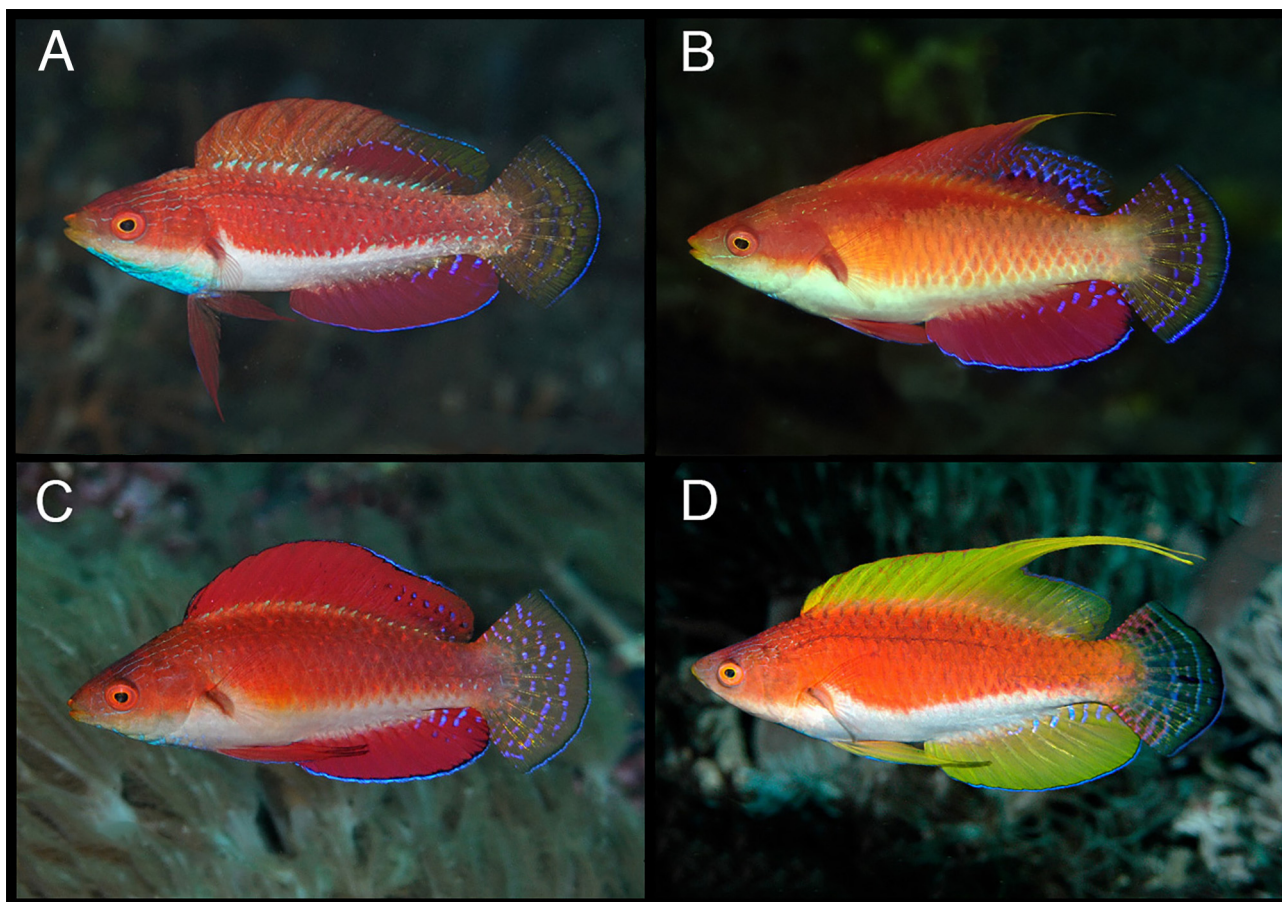


**FIGURE 8.** Distribution records for selected species of *Cirrhilabrus*: closed circle, *C. cyanogularis*; closed square, *C. rubripinnis*; open circle, *C. filamentosus*; half circle, *C. filamentosus* + *C. cyanogularis*; closed triangle, *C. tonozukai*; half triangle, *C. tonozukai* + *C. filamentosus*; closed star, *C. tonozukai* + *C. cyanogularis*.

The remaining species with a single row of cheek scales may be grouped into two complexes. Species of the first of these, the *C. rubriventralis* complex, are characterized by males having the anterior dorsal-fin spines elevated or developed into filaments, and with relatively broad and long pelvic fins. The complex includes *C. rubriventralis*, *C. africanus*, *C. rubeus*, *C. joanallenae*, *C. humanni*, *C. hygroxerus*, *C. morrisoni* and *C. naokoae*. The second complex, the *C. condei* complex, includes species in which the males have long filamentous pelvic fins and sail-like dorsal fins without filaments. The complex includes *C. condei*, *C. walshi* and *C. marinda*. An additional species, *C. greeni*, from the Northern Territory, Australia, also possesses the cheek scale character. Preliminary analysis of mitochondrial *COI* by Allen & Hammer (2017) revealed that it shares haplotypes with *C. rubripinnis* and *C. cyanogularis* (as *C. aff. tonozukai*). However, *C. greeni* lacks blue scaling on the isthmus and breast characteristic of the *C. filamentosus* complex, possessing instead coloration details more similar to that of



the *C. condei* complex. *Cirrhilabrus greeni* is distinguished from *C. cyanogularis* and all other species with a single row of cheek scales in having the central portion of the caudal fin completely hyaline.

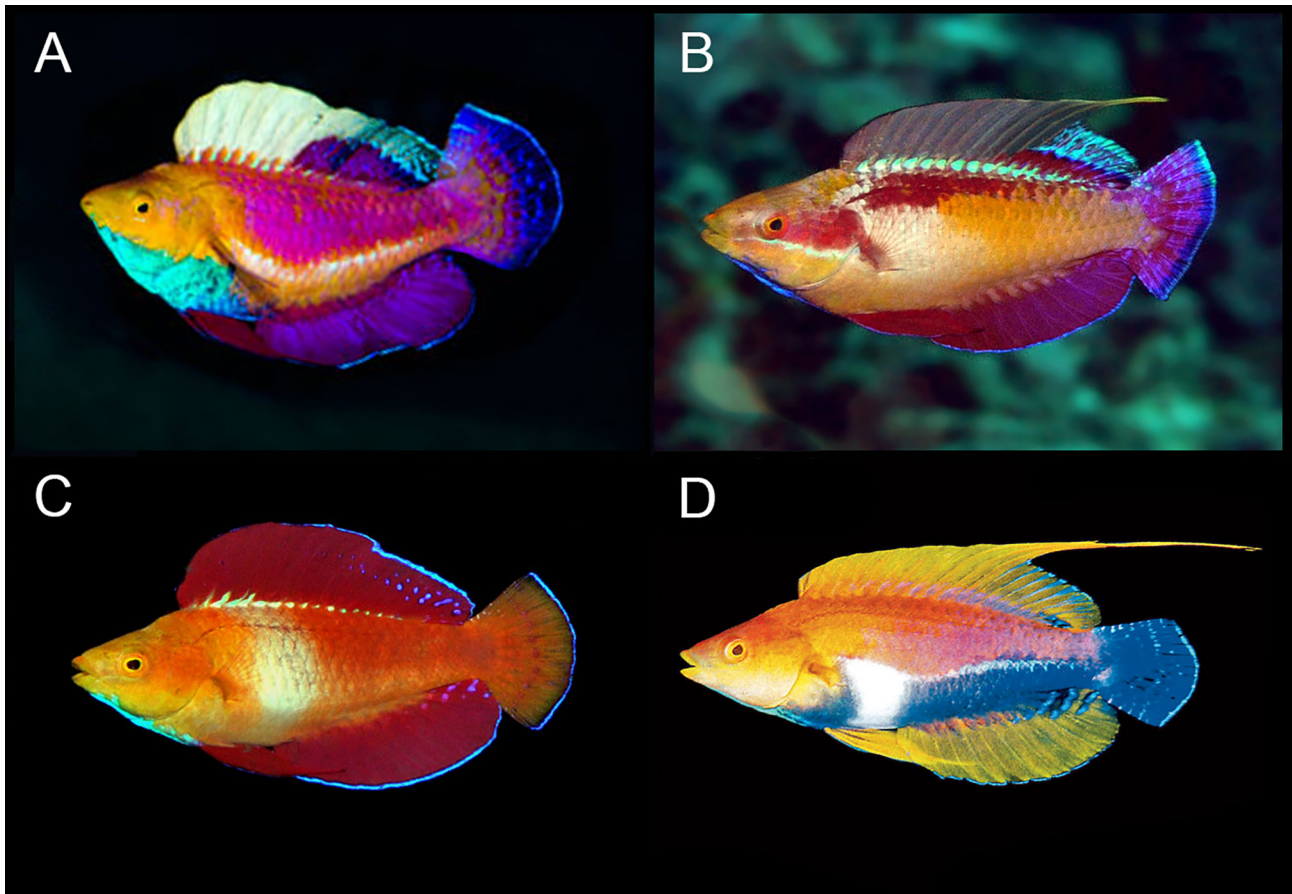


**FIGURE 9.** Males of selected *Cirrhilabrus* species: A) *C. cyanogularis* from Bali, Indonesia (photo by K. Nishiyama); B) *C. tonozukai* from Lembah, Sulawesi, Indonesia (photo by G. Allen); C) *C. rubripinnis* from Anilao, Luzon, Philippines (photo by G. Allen); D) *C. filamentosus* from Nusa Penida, Bali, Indonesia (photo G. Allen).

Victor's (2016) phylogenetic analysis of *Cirrhilabrus* mtDNA (*COI*) sequences retrieved a sister-group relationship between sampled members of the *C. rubriventralis* and *C. condei* complexes, but did not include members of the *C. filamentosus* complex. Whether the three complexes form a monophyletic group—which might justify resurrection of Klausewitz's *Cirrhilabrichthys* from synonymy—will require more extensive sampling and analysis.

**TABLE 3.** Comparison of nuptial coloration of males of selected *Cirrhilabrus* species based on live individuals and color photographs of individuals in aquaria and in the field.

	<i>C. cyanogularis</i>	<i>C. rubripinnis</i>	<i>C. tonozukai</i>	<i>C. filamentosus</i>
Dorsal fin color	White anteriorly	Red entirely	Whitish-hyaline anteriorly	Yellow entirely
White saddle behind pectoral fin	Absent	Present	Present	Present
Medial body stripe	Present	Absent	Absent	Present
Facial and dorsal markings	Absent	Absent	Red markings on upper part of operculum and dorsum	Absent



**FIGURE 10.** Males of selected *Cirrhilabrus* species in nuptial display: A) *C. cyanogularis* from Derawan, Indonesia (photo by H. Chan); B) *C. tonozukai* from East Timor (photo by G. Allen); C) *C. rubripinnis* from Anilao, Philippines (photo by G. Allen); D) *C. filamentosus* from Bali, Indonesia (photo R. Kuiter).

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