

## *Coris flava*, a new deep water species of wrasse from La Réunion, southwestern Indian Ocean (Teleostei: Labridae)

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### Abstract

The Yellow coris *Coris flava* n. sp. is described from La Réunion, southwestern Indian Ocean, based on two specimens collected in 2006 and 2012 off the northwest coast of the island at 200-250 m depth (only one specimen preserved). The species is characterized by the combination of the following characters: dorsal rays IX,12; anal rays III,12; pectoral rays 13-14; lateral-line scales 71 (+3); no scales on head; gill rakers 15; a single pair of large, strongly projecting, and slightly recurved canine teeth anteriorly in each jaw, the upper pair slightly out-flaring, the lowers fitting between uppers when mouth closed; canine tooth at corner of mouth present; ; body depth 3.52 in SL; caudal fin truncate; anterior part of dorsal fin not elevated; pelvic fins short, 1.7 in head length; body and fins of adults bright yellow, eye orange yellow, anterior dorsal-fin membrane with a dark grey blotch. An identification key to the species of *Coris* is presented.

**Keywords:** Wrasse; Labridae; New species; Mascarenes; Identification key; Geographical distribution.

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### Introduction

The wrasses of the family Labridae Cuvier 1816 are small to large fishes, which occur worldwide in tropical and temperate marine waters on continental and insular slopes (Fricke et al. 2021a). Wrasses are usually protogynous hermaphrodites. They are opportunistic feeders, frequently preying on hard-shelled invertebrates; their larvae are pelagic and may be found near the surface (Leis and Rennis 1973; Gomon et al. 2015). The family is currently arranged in the order Perciformes (Laan et al. 2014; Nelson et al. 2016). It includes 68 valid genera and 561 valid species (Fricke et al. 2020b).

The genus *Coris* is characterised within the family by a combination of the following characters: dorsal-fin rays IX, 11-13; anal-fin rays III, 11-12; pectoral-fin rays 12-15; principal caudal-fin rays 14, the uppermost and lowermost unbranched; scales small and cyloid; lateral line continuous, deflected sharply downward below posterior part of dorsal fin to straight midlateral peduncular portion; pored lateral-line scales on body 47-96; head naked; small scales present on nape; gill rakers small, 15-25; vertebrae 9+16; front of jaws with a pair of strong, slightly recurved; protruding canine teeth; canine at corner of mouth present or absent; snout pointed, 2.5-3.3 in head length (Randall 1999). The Indo-Pacific species of this genus were revised by Randall (1999), who distinguished 24 valid species from the region. The genus is distributed in the eastern Atlantic and Indo-West Pacific and includes a total of 29 valid species (Fricke et al. 2021a): *Coris atlantica* Günther 1862 (Günther 1862: 197 [Sierra Leone; syntypes: BMNH 1851.2.14.14 (1), BMNH 1855.12.26.408-410 (3)]) from the eastern Atlantic, Cape Verde Islands to Angola; *C. auricularis* (Valenciennes 1839) (Valenciennes in Cuvier & Valenciennes 1839: 489 [King George Sound, Western Australia; holotype: MNHN A-9286]; as *Julis auricularis*) from Western Australia; *C. aurilineata* Randall & Kuitert 1982 (Randall and Kuitert 1982: 164, pl. 1, figs. 1B-C, fig. 2 [Keppel Island, 23°08'S 150°56'E, Queensland, Australia, depth 7 metres; holotype: NMV A.1831]) from eastern Australia; *C. aygula* Lacepède [ex Commerson] 1801 (Lacepède 1801: 96, 97, pl. 4, fig. 1 [locality not stated (is Mauritius, Mascarenes, southwestern Indian Ocean; syntypes: MNHN B-2128 (2, dry

skins)) from the Red Sea and Indo-West Pacific; *C. bailleui* Vaillant & Sauvage 1875 (Vaillant and Sauvage 1875: 285 [Hawaiian Islands, holotype: MNHN 0000-8898]) from Johnston Atoll and Hawaiian Islands; *C. batuensis* (Bleeker 1856) (Bleeker 1856: 240 [Batu Islands, Sumatera Utara, Indonesia; holotype: BMNH 1864.5.15.34 (poor condition); as *Julis (Halichoeres) batuensis*]) from the Indo-West Pacific; *C. bulbifrons* Randall & Kuitert 1982 (Randall and Kuitert 1982: 168, pl. 2, figs. A-C; figs. 3-5 [reef south of Phillip Point, Lord Howe Island, Australia, southwestern Pacific; holotype: BPBM 14869])) from the southwestern Pacific; *C. caudimacula* (Quoy & Gaimard 1834) (Quoy and Gaimard 1834: 710, pl. 15, fig. 2 [Mauritius, Mascarenes, southwestern Indian Ocean; holotype: MNHN A-9282; as *Julis caudimacula*]) from the Red Sea and Indian Ocean; *C. centralis* Randall 1999 (Randall 1999: 21, pls. 5 C, D, 17 D [outside reef about 200 metres northwest of entrance to English Harbor, Tabuaeran (= Fanning Island), Line Islands, central Pacific, depth 4.5 metres; holotype: BPBM 7796]) from Line Islands, central Pacific; *C. cuvieri* (Bennett 1831) (Bennett 1831: 128 [Mauritius, Mascarenes, southwestern Indian Ocean; holotype: BMNH 1855.12.26.416; as *Julis cuvieri*]) from the Red Sea and the Indian Ocean; *C. debueni* Randall 1999 (Randall 1999: 26, pls. 6, 7, 17, 18 [off southern end of Hanga Roa, western coast of Easter Island, depth 12 metres; holotype: BPBM 6714]) from Easter Island, southeastern Pacific; *C. dorsomacula* Fowler 1908 (Fowler 1908: 436, fig. 8 [Victoria, Australia (may be in error); holotype: ANSP 33126 (dry, caudal damaged, head missing)]) from the eastern Indian Ocean and western Pacific; *C. flavovittata* (Bennett 1828) (Bennett 1828: 36 [Hawaiian Islands. Holotype: BMNH 1855.12.26.? (missing); as *Julis flavo-vittatus*]) from the Hawaiian Islands; *C. formosa* (Bennett 1830) (Bennett 1830: unnumbered. p., pl. 16 [south coast of Sri Lanka no types known; lectotype selected by Fricke 1999: 409 as the specimen illustrated in Bennett's Pl. 16; as *Labrus formosus*]) from the Indian Ocean; *C. frerei* Günther 1867 (Günther in Playfair and Günther 1867: 101, pl. 13 [Zanzibar, Tanzania, western Indian Ocean; holotype: ?BMNH 1869.5.14.4]) from the Red Sea and the western Indian Ocean; *C. gaimard* (Quoy & Gaimard 1824) (Quoy and Gaimard 1824: 265, pl. 54 (fig. 1) [Maui, Hawaiian Islands; holotype : MNHN A-9272; as *Julis gaimard*]) from the eastern Indian Ocean and the western and central Pacific; *C. hewetti* Randall 1999 (Randall 1999: 43, fig. 5; pls. 10, 11, 20 [reef, head of Anaho Bay, Nuku Hiva, Marquesas Islands, depth 1.8 metres; holotype: BPBM 9105]) from the Marquesas Islands, South Pacific Ocean; *C. julis* (Linnaeus 1758) (Linnaeus 1758: 284 [Genoa, Venice, Rome, and Naples (Italy), Marseille (France), and Crete (Greece), Mediterranean Sea; based on multiple historical sources; no types known; as *Labrus julis*]) from the Mediterranean Sea and the adjacent eastern Atlantic off southern Spain; *C. latifasciata* Randall 2013 (Randall 2013: 2, figs. 1-3 [Peros Banhos Atoll, Isle Poule/Isle Montpartet, 5°24'25"S, 70°45'58"E, Chagos Archipelago, depth 20 metres; holotype: ROM 37498]) from the Maldives and Chagos Archipelago in the Indian Ocean; *C. marquesensis* Randall 1999 (Randall 1999: 48, pls. 11 B, D, 20 G [point at southern end of Marquesienne Bay, Nuku Hiva, Marquesas Islands, depth 12 metres; holotype: BPBM 12471]) from the Marquesas Islands, South Pacific Ocean; *C. melanura* (Lowe 1839) (Lowe 1839: 85 [off Madeira; holotype: whereabouts unknown; as *Julis melanurus*; treated by authors as junior synonym of *C. julis* (Linnaeus 1758), but will be reestablished by Ordines et al., in preparation]) from the eastern Atlantic; *C. musume* (Jordan & Snyder 1904) (Jordan and Snyder 1904: 236, pl. 61 [off Izu, Japan; holotype: CAS-SU 8384; as *Julis musume*]) from the northwestern Pacific; *C. nigrotaenia* Mee & Hare 1995 (Mee and Hare 1995: 248, figs 1-3 ["caught near Muscat" (but probably central or southern Oman), Muttrah fish market, Oman; holotype: CAS 73319]) from the Persian Gulf to Oman, northwestern Indian Ocean; *C. pictoides* Randall & Kuitert 1982 (Randall and Kuitert 1982: 160, pl. 1 (fig. A), fig. 1 [western side off Bunut, 2°47'50"N, 104°07'40"E, Tioman Island, Malaysia, depth 9 metres; holotype: BPBM 26421]) from the western Pacific; *C. pictus* (Bloch & Schneider 1801) (Bloch and Schneider 1801: 251, pl. 55 [New South Wales, Australia; based on a specimen sent by J. F. Latham; no types known]) from the southwestern Pacific; *C. roseoviridis* Randall 1999 (Randall 1999: 59, Pls.13 C, D, 14 A [southwestern side of Karapoto Iti

Islet, Rapa, depth 15 metres; holotype: BPBM 13021) from the Cook Islands to Pitcairn, South Pacific; *C. sandeyeri* (Hector 1884) (Hector 1884: 323 [Tiritiri Island, Auckland, New Zealand; holotype: NMNZ P.247, as *Cymolutes sandeyeri*) from the southwestern Pacific; *C. variegata* (Rüppell 1835) (Rüppell 1835: 14, pl. 4, fig. 2 [Massawa, Eritrea, Red Sea; lectotype: SMF 1343; as *Halichoeres variegatus*; lectotype established by Dor 1984: 201]) from the Red Sea; and *C. venusta* Vaillant & Sauvage 1875 (Vaillant & Sauvage 1875: 285 [Hawaiian Islands; lectotype: MNHN 0000-8028; lectotype selected by Randall 1976: 4) from the Hawaiian Islands, central Pacific Ocean.

Fricke et al. (2009) recorded 4 valid species of *Coris* that occur in the western Mascarenes at La Réunion and Mauritius in the southwestern Indian Ocean: *C. aygula*, *C. caudimacula*, *C. cuvieri*, and *C. frerei*. During an exploration of slope fishes off the west coast of La Réunion, two fish specimens were procured in 2006 and 2012 that turned out to represent an undescribed species of *Coris* (unfortunately, only the 2012 specimen was preserved). The new species is described in the present paper.

### Materials and Methods

Biometrical counts and measurements follow Randall (1999). The standard length (SL) is measured from the middle of the anterior tip of the premaxilla to the end of the caudal-fin base. The genus and species classification follows Fricke et al. (2021); citation of references follows Fricke (2021). The identification key is based on Randall (1999), supplemented by data on eastern Atlantic species subsequently discovered Indo-West Pacific species. The specimen is deposited in the fish collection of the Staatliches Museum für Naturkunde in Stuttgart (SMNS). Other museum abbreviations follow Fricke and Eschmeyer (2021).

**Comparative materials:** *Coris atlantica* Günther 1862: SMNS 21949 (4), Eastern Atlantic, Cape Verde Islands, São Tiago.

*Coris auricularis* (Valenciennes in Cuvier & Valenciennes 1829): SMNS 2778 (1), Southeastern Indian Ocean, Western Australia, King George Sound. – SMNS 3088 (1), Southeastern Indian Ocean, Western Australia, Albany.

*Coris aurilineata* Randall & Kuiter 1982: SMNS 14641 (1), Eastern Indian Ocean, Western Australia, Point Quobba.

*Coris aygula* Lacepède 1801: SMNS 1608 (1), Red Sea, Egypt, Al-Qusayr. – SMNS 1759 (2), Red Sea, Egypt, Al-Qusayr. – SMNS 3567 (5), Red Sea, Egypt, Al-Qusayr. – SMNS 8631 (1), Western Indian Ocean, Kenya, Mombasa. – SMNS 9242 (1), Western Pacific, Philippines, Mindanao. – SMNS 13629 (1), Red Sea, Gulf of Aqaba, Israel. – SMNS 19842 (1), Southwestern Pacific, Loyalty Islands, Maré. – SMNS 20678 (2), Southwestern Indian Ocean, La Réunion. – SMNS 20749 (1), Southwestern Indian Ocean, La Réunion. – SMNS 20784 (1), Southwestern Indian Ocean, La Réunion. – SMNS 23612 (1), Southwestern Pacific, Loyalty Islands, Lifou. – SMNS 26011 (1), Red Sea, Egypt, Al-Qusayr. – SMNS 26021 (1), Red Sea, Egypt, Al-Qusayr.

*Coris ballieui* Vaillant & Sauvage 1875: SMNS 3886 (1), Central Pacific, Hawaiian Islands, Hawaii Island. – SMNS 3887 (1), Central Pacific, Hawaiian Islands, Hawaii Island.

*Coris caudimacula* (Quoy & Gaimard 1834): SMNS 14206 (1), Eastern Indian Ocean, Western Australia, Exmouth Gulf. – SMNS 14216 (1), Eastern Indian Ocean, Western Australia, South Murion Island. – SMNS 16829 (1), Southwestern Indian Ocean, Mauritius. – SMNS 16947 (1), Southwestern Indian Ocean, Mauritius.

*Coris gaimard* (Quoy & Gaimard 1824): SMNS 8582 (1), Western Pacific, Philippines, Mindanao. – SMNS 8587 (1), Western Pacific, Philippines, Mindanao. – SMNS 8625 (6), Western Pacific, Philippines, Mindanao. – SMNS 8629 (2), Central Pacific, Hawaiian Islands, Oahu. – SMNS 8657 (2), Eastern Indian Ocean, Indonesia, Java. – SMNS 15884 (1), Western Pacific, Indonesia, North Sulawesi. – SMNS 21716 (1), Southwestern Pacific,

Loyalty Islands, Maré. – SMNS 22024 (3), Western Pacific, Philippines, Mindanao. – SMNS 26674 (1), Western Pacific, Palau.

*Coris julis* (Linnaeus 1758): SMNS 51 (1), Mediterranean Sea, France. – SMNS 401 (1), Adriatic Sea, Croatia, Hvar Island. – SMNS 419 (2), Adriatic Sea, Croatia, Hvar Island. – SMNS 721 (1), Mediterranean Sea, France, Nice. – SMNS 963 (2), Adriatic Sea, Italy, Trieste. – SMNS 4810 (3), Mediterranean Sea, France, Villefranche-sur-Mer. – SMNS 4811 (3), Mediterranean Sea, France, Villefranche-sur-Mer. – SMNS 8597 (2), Mediterranean Sea, Spain, Balears, Mallorca. – SMNS 8640 (2), Mediterranean Sea, Spain, Balears, Mallorca. – SMNS 8647 (1), Adriatic Sea, Croatia, Istria. – SMNS 8649 (3), Adriatic Sea, Croatia, Istria. – SMNS 8656 (1), Adriatic Sea, Croatia, Istria. – SMNS 9370 (1), Mediterranean Sea, Spain, Balears, Menorca. – SMNS 9379 (1), Mediterranean Sea, Spain, Balears, Menorca. – SMNS 9386 (4), Mediterranean Sea, Spain, Balears, Menorca. – SMNS 9587 (1), Mediterranean Sea, Greece, Varkisa. – SMNS 9611 (2), Mediterranean Sea, Greece, Varkisa. – SMNS 9863 (24), Mediterranean Sea, Greece, Varkisa. – SMNS 11609 (12), Mediterranean Sea, Greece, Varkisa. – SMNS 12000 (1), Mediterranean Sea, Italy, Giglio Island. – SMNS 12448 (2), Mediterranean Sea, Spain, Balears, Formentera. – SMNS 12449 (2), Mediterranean Sea, Spain, Balears, Formentera. – SMNS 12454 (1), Mediterranean Sea, Spain, Balears, Formentera. – SMNS 14720 (1), Adriatic Sea, Croatia, Cres Island. – SMNS 16688 (2), Mediterranean Sea, Turkey, Adana. – SMNS 21365 (1), Mediterranean Sea, Italy, Ischia Island. – SMNS 25986 (1), Mediterranean Sea, Italy, Genoa. – SMNS 26008 (1), Mediterranean Sea, Monaco. – SMNS 26010 (1), Mediterranean Sea, Monaco.

*Coris melanura* Lowe 1839: SMNS 16792 (1), Eastern Atlantic, Spain, Canary Islands, Fuerteventura. – SMNS 16968 (1), Eastern Atlantic, Portugal, Madeira. – SMNS 22618 (1), Eastern Atlantic, Canary Islands, La Palma.

*Coris musume* (Jordan & Snyder 1904): BPBM 20978 (1), Northwestern Pacific, Japan, Izu Peninsula. – BPBM 23002 (1), Northwestern Pacific, Japan, Izu Islands.

*Coris picta* (Bloch & Schneider 1801): AMS I.5151 (1), Southwestern Pacific, Australia, Lord Howe Island. – AMS I.7229 (1), Southwestern Pacific, New South Wales, Sydney.

*Coris pictoides* Randall & Kuitert 1982: SMNS 14641 (1), Eastern Indian Ocean, Western Australia, Point Quobba.

*Coris sandeyeri* (Hector 1884): AMS I.5415 (1), Southwestern Pacific. Australia, Norfolk Island.

## Results

### Systematic ichthyology

The present paper follows the classifications provided by Nelson et al. (2016) and Laan et al. (2014):

Superclass Gnathostomata

Class Actinopterygii

Subclass Neopterygii

Division Teleostei

Order Perciformes

Family Labridae Cuvier 1816

Genus *Coris* Lacepède [ex Commerson] 1801

***Coris flava*** new species

(Figs. 1-4)

**Common name:** Yellow coris

**Holotype:** SMNS 27151, holotype, initial phase, 224.8 mm SL, La Réunion, Baie de Saint-Paul, ca. 21°01'00"S



**Figure 1.** *Coris flava* n. sp., SMNS 27151, holotype, initial phase, 224.8 mm SL, southwestern Indian Ocean, La Réunion, Baie de Saint-Paul, 250 m depth. Lateral view of preserved specimen.



**Figure 2.** *Coris flava* n. sp., SMNS 27151, holotype, initial phase, 224.8 mm SL, southwestern Indian Ocean, La Réunion, Baie de Saint-Paul, 250 m depth. Detail of head.



**Figure 4.** *Coris flava* n. sp., SMNS 27151, holotype, initial phase, 224.8 mm SL, southwestern Indian Ocean, La Réunion, Baie de Saint-Paul, 250 m depth. Colouration immediately after collection. Photograph: Patrick Durville.

55°09'00"E, 250 m depth, sand near rocky reef, Patrick Durville, 1 May 2012.

**Diagnosis:** Characterized within the genus *Coris* by a combination of the following characters: Dorsal rays IX, 12; anal rays III, 12; pectoral rays 14; lateral-line scales 71 (+3); no scales on head; gill rakers 15; a single pair of large, strongly projecting, and slightly recurved canine teeth anteriorly in each jaw, upper pair slightly out-flaring, lowers fitting between uppers when mouth closed; canine tooth at corner of mouth present; body depth



**Figure 4.** *Coris flava* n. sp., terminal phase, ca. 250 mm SL, southwestern Indian Ocean, La Réunion, Baie de Saint-Paul, 250 m depth (specimen not preserved). Colouration immediately after collection. Photograph: Patrick Durville.

3.52 in SL; caudal fin truncate; anterior part of dorsal fin not elevated; pelvic fins short, 1.7 in head length; body and fins of adults bright yellow, eye orange yellow, anterior dorsal-fin membrane with a dark grey blotch.

**Description:** Measurements and proportions of the holotype are given in Table 1. D IX, 12; A III, 12; P1 ii, 11 (left side), ii, 12 (right side), first rudimentary, second unbranched; P2 I, 5; C (iv), i,12,i,(iv). Gill rakers 5 + 10 (totally 15). Branchiostegal rays 6. Lateral-line scales 71 + 3. Scales above lateral line 4. Scales below lateral line 24. Predorsal scales 22. Circumpeduncular scales 66. Branchiostegal rays 6. Vertebrae 9 + 16.

Body depth 3.52 in SL; head length 3.36 in SL; body width in body depth 2.4; dorsal profile of head nearly straight on snout, forming angle of about 40° to horizontal axis of body, and slightly convex on nape (Fig. 2); snout pointed, its length 3.1 in head length; orbit diameter 6.3 in head length; interorbital space straight, width 4.2 in head length; caudal-peduncle depth 2.06 in head length; caudal-peduncle length 2.05 in head length.

Mouth terminal, slightly oblique, maxilla reaching a vertical through anterior nostril; a pair of large, strongly projecting, and slightly recurved canine teeth anteriorly in each jaw, upper pair slightly out-flaring, lowers fitting between uppers when mouth closed; small, additional canine tooth at corner of mouth present. Gill rakers short, longest at angle about one-third length of longest gill filaments. Ventral edge of preopercle free to a vertical slightly anterior to front of orbit; vertical free margin of preopercle ending a half pupil diameter below ventral edge of orbit. Anterior nostril a slender pointed tubule in line with upper margin of orbit, a pupil diameter anterior to front of orbit; posterior nostril a small aperture nearly a half pupil diameter directly posterior to anterior nostril, covered by a membranous flap except for a transverse slit.

Scales thin and cycloid; largest scales on chest less than half size of smallest scales on body; no scales on head; small scales dorsally on nape extending forward to a vertical above level of pupil; no scales on base of dorsal and anal fins; small scales basally on caudal fin extending one-sixth distance to posterior margin of fin. Lateral line approximately paralleling dorsal contour of body to below base of fifth dorsal soft ray, then angling downward to midlateral peduncular portion. Origin of dorsal fin slightly before level of base of pectoral fin, predorsal length 3.53 in SL; anterior part of dorsal fin not elevated; dorsal spines progressively longer, first and second equal in length, 3.8 in head length; ninth dorsal spine 2.8 in head length; dorsal soft rays nearly equal in length; origin of anal fin below base of second dorsal soft ray, the preanal length 1.8 in SL; first anal spine slender and flexible, 9.6 in head length; third anal spine 3.5 in head length; first six anal soft rays subequal; caudal fin slightly rounded, 2.2 in head length; first pectoral ray rudimentary, second and third rays longest, 1.5 in head length; origin of pelvic fin opposite third dorsal-fin spine; pelvic fins of adult nearly or just reaching anus, 1.7 in head length.

**Colour when fresh:** Initial phase (Fig. 3). Body white, dorsal one-third bright yellow, with margins of scales in central and posterior regions grey; mid-lateral sides of body with 13 faint, horizontal, bluish lines; scale margins on lower posterior portion of body grey. Eye bright orange, surrounded by yellow. Upper distal portion

**Table 1.** Meristics and morphometrics of the holotype of *Coris flava* n.sp. from La Réunion (SMNS 27151, initial phase, 224.8 mm SL).

	Measurement (mm)	Proportion (% of SL)
Total length	257.0	110.3
Standard length (SL)	224.8	100.0
Head length	66.9	29.8
Snout length	21.6	9.6
Maximum orbit diameter	10.6	4.7
Interorbital width	15.9	7.1
Body width	26.6	11.8
Body depth	63.7	28.3
Caudal-peduncle length	32.7	14.5
Caudal-peduncle depth	32.4	14.4
Predorsal length	63.7	28.3
Dorsal-base length	146.2	65.0
Dorsal-fin length	160.2	71.3
Dorsal-fin spine 1	17.5	7.8
Dorsal-fin spine 2	17.5	7.8
Dorsal-fin spine 9	24.0	10.7
Preanal length	122.8	54.6
Preanus length	114.2	50.8
Anal-base length	81.4	36.2
Anal-fin length	101.2	45.0
Anal-fin spine 1	7.0	3.1
Anal-fin spine 3	19.2	8.5
Pectoral-fin length	43.3	19.3
Pelvic-fin length	39.9	17.8
Caudal-fin length (top)	32.2	14.3
Caudal-fin length (middle)	30.7	13.7

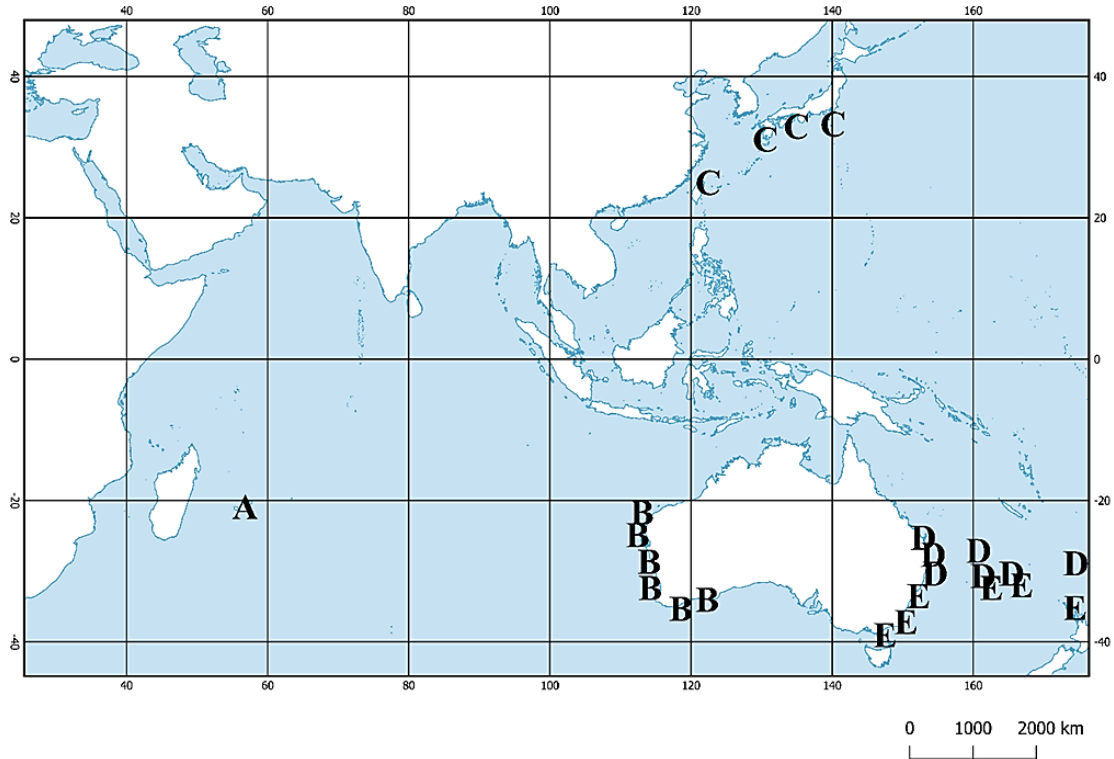
of opercle rose. Dorsal and anal fins yellowish, distal margins grey, first dorsal fin membrane dark grey. Pectoral fin translucent, upper base rose, upper distal portion dark grey. Pelvic fins basally white, distally yellowish. Terminal phase (Fig. 4). Head and body golden yellow; sides of body with a rose band, reaching from behind tip of opercle to mid of caudal-fin base. Jaws bright orange. Cheeks and lower portions of opercle rose; eye bright orange. Portion around anus rose-pink. Dorsal and anal fins orange-yellow; caudal fin yellow with distal grey margin; pectoral fins reddish orange, pelvic fins yellowish orange.

**Colour in preservative:** Initial phase (Fig. 1). Head, body and fins uniform pale beige, eye orange, and first dorsal-fin membrane with a black blotch.

**Etymology:** *Flavus* (Latin) means golden yellow; the name refers to the characteristic yellow colouration of both phases of this species. The species name has a feminine ending (*flava*) when in genus *Coris*.

**Distribution:** La Réunion (Mascarene Islands). Only known from two specimens which were collected off the northwest coast of the island.

**Comparisons:** The new species is member of the *Coris picta* species complex that has 12 dorsal- and anal-fin soft rays, a high number of lateral line-scales (68-96), forehead in adults without a bulbous prominence, pectoral-fin rays usually 14, and anterior part of dorsal fin not elevated; this groups also includes the species *C. auricularis*, *C. musume*, *C. picta*, and *C. sandeyeri*. All the other species do not share this combination of characters; either the anterior part of the dorsal fin is elevated (*C. cuvieri*, *C. flavovittata*, *C. frerei*, *C. gaimard*, *C. marquesensis*), they have fewer (47-67) lateral-line scales (*C. aurilineata*, *C. aygula*, *C. ballieui*, *C. bulbifrons*, *C. caudimacula*, *C. centralis*, *C. debueni*, *C. dorsomacula*, *C. hewetti*, *C. nigrotaenia*,



**Figure 5.** Geographical distribution of species in the *Coris picta* species group in the Indo-West Pacific. **A)** *C. flava* n. sp., **B)** *C. auricularis*, **C)** *C. musume*, **D)** *C. picta*, **E)** *C. sandeyeri*

*C. pictoides*, *C. roseoviridis*, *C. venusta*), or 11 dorsal-fin soft rays and anal-fin soft rays (*C. batuensis*, *C. variegata*). The new species is unique within the genus *Coris* in its colour pattern of the initial phase (head and body white, dorsal one-third yellow, eye orange, anterior membrane of dorsal fin and upper pectoral-fin membranes dark grey) and terminal phase (head and body yellow, pink lower parts of head and lateral stripe, orange vertical dorsal and anal fins, orange-red tip of mouth, pectoral and pelvic fins). The initial phase looks most similar to that of *C. auricularis*, but is distinguished by the absence of a bright red streak behind the eye (versus present in the initial phase of *C. auricularis*). In addition, it is distinguished from *C. auricularis* by having 15 gill rakers (versus 18-22 in *C. auricularis*), 71 lateral-line scales on the body (versus 75-86), and the presence of a canine tooth at the corner of the mouth (versus canine tooth absent); it differs from *C. musume* by having 15 gill rakers (versus 17-19 in *C. musume*), 71 lateral-line scales on the body (versus 76-82), and the absence of a black stripe on the sides of the body (versus present); from *C. picta* by having 15 gill rakers (versus 18-21 in *C. picta*), 71 lateral-line scales on the body (versus 77-92), and the absence of a black stripe on the sides of the body (versus present); and from *C. sandeyeri* by 15 gill rakers (versus 16-19 in *C. sandeyeri*), 71 lateral-line scales on the body (versus 86-97), and the presence of a canine tooth at the corner of the mouth (versus canine tooth absent). It is compared with the species of the *C. picta* species-group in Table 2. For an easier identification, a revised key to the Indo-Pacific species of the genus *Coris* is provided below.

**Remarks:** This interesting deep water specimen (initial phase) was collected in 2012 during deep fishing tests for the aquarium in Saint-Gilles-les-Bains, La Réunion. A second specimen was collected in 2006 in the same area, at 200-250 m depth (Fig. 4); unfortunately, the specimen was not preserved, but the photograph provides a record of the fresh colouration of the terminal phase. The species has not been seen since; as the former aquarium vessel is no longer available, there seems to be no chance to obtain additional specimens. The habitat is also difficult to sample, below diving depth, and between large rocks that make it nearly impossible to use



**Table 2.** Comparison of species in the *Coris picta* species-group. Characters differing from those of *C. flava* n. sp. are printed in bold face.

	<i>C. flava</i> n. sp.	<i>C. auricularis</i>	<i>C. musume</i>	<i>C. picta</i>	<i>C. sandeyeri</i>
Gill rakers	14	<b>18-22</b>	<b>17-19</b>	<b>18-21</b>	<b>16-19</b>
Lateral-line scales on body	71	<b>75-86</b>	<b>76-82</b>	<b>77-92</b>	<b>86-97</b>
Canine tooth at corner of mouth	Present	<b>Absent</b>	<b>Absent</b>	Present	Present
Broad black stripe with ventral extensions on sides of body	Absent	Absent	<b>Present</b>	<b>Present</b>	Absent
Initial phase; red or orange stripe behind eye	Absent	<b>Present (red)</b>	Absent	Absent	<b>Present (orange)</b>
Terminal phase: blue blotch over pectoral-fin base	Absent	<b>Present</b>	Absent	Absent	<b>Present</b>
Terminal phase: pink stripe along sides of body	Present	Absent	Absent	Absent	Absent
Terminal phase; vertical stripe on sides of body	Absent	<b>Present (red)</b>	Absent	Absent	<b>Present (black)</b>
Distribution	SW Indian Ocean: La Réunion	SE Indian Ocean: Western Australia	NW Pacific Ocean: Taiwan to Japan	SW Pacific Ocean: E Australia to Kermadec Islands	SW Pacific Ocean: SE Australia to New Zealand
Depth range (m)	200-250	<b>0-45</b>	<b>1-50</b>	<b>5-84</b>	<b>2-60</b>

**Table 3.** Depth distribution of species of *Coris* (arranged by increasing mean depth).

	Depth range (m)	0	1	2	3	4	5	6	7	8	9	10	11-15	16-20	21-25	26-30	31-35	35-40	41-45	46-50	51-60	61-70	71-100	101-150	151-200	200-250	
<i>C. aurilineata</i>	3-10				X	X	X	X	X	X	X	X															
<i>C. variegata</i>	1-10		X	X	X	X	X	X	X	X	X	X															
<i>C. venusta</i>	2-10			X	X	X	X	X	X	X	X	X															
<i>C. bulbifrons</i>	0-20			X	X	X	X	X	X	X	X	X	X	X													
<i>C. atlantica</i>	1-20	X	X	X	X	X	X	X	X	X	X	X	X	X													
<i>C. nigrotaenia</i>	1-20	X	X	X	X	X	X	X	X	X	X	X	X	X													
<i>C. marquesensis</i>	0-30	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
<i>C. aygula</i>	1-30		X	X	X	X	X	X	X	X	X	X	X	X	X												
<i>C. dorsomacula</i>	1-32		X	X	X	X	X	X	X	X	X	X	X	X	X	X											
<i>C. batuensis</i>	1-34		X	X	X	X	X	X	X	X	X	X	X	X	X	X											
<i>C. pictoides</i>	9-33										X	X	X	X	X	X											
<i>C. hewetti</i>	1-40		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
<i>C. auricularis</i>	0-45	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
<i>C. centralis</i>	4-46					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
<i>C. musume</i>	1-50		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
<i>C. cuvieri</i>	2-50			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
<i>C. frerei</i>	2-50			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
<i>C. caudimacula</i>	0-57			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
<i>C. debueni</i>	0-60	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
<i>C. sandeyeri</i>	2-60			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
<i>C. gaimard</i>	1-78		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X		
<i>C. picta</i>	5-84			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
<i>C. flavovittata</i>	15-98												X	X	X	X	X	X	X	X	X						
<i>C. julis</i>	0-120	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	
<i>C. melanura</i>	0-120	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	
<i>C. ballieui</i>	20-146													X	X	X	X	X	X	X	X						
<i>C. flava</i> n. sp.	200-250																										X

fishing gear. As it is highly unlikely to collect additional material, we decided to go ahead with the description of this previously undescribed species.

It is interesting that although the new species occurs in the western Mascarenes, it is apparently not closely related to other species of *Coris* occurring in this region (see Fricke et al. 2009); it is most similar to species of the *Coris pictus* species-group that otherwise occurs antiequatorial in the southeastern Indian Ocean and western

Pacific (Fig. 5).

The occurrence in a depth range of 200-250 m is very unusual; otherwise the genus *Coris* is known from much shallower water (Table 3). However, due to difficult collecting and observation, deep (mesophotic) reef habitats are very poorly known throughout the Indo-Pacific. We therefore expect that other deep-living species of *Coris* will be discovered with an intensified exploration of the biodiversity of mesophotic reefs. The habitat corresponds to the ancient sea level, with large underwater cliffs.

It is unusual that at a depth of 200-250 m, this species has an elaborate colour pattern of yellow, orange and pink. Neither of those colours would be visible at the depth, where only different shades of blue can be seen. The colouration may have historical reasons; the initial phase is very similar to that of *C. auricularis* from Western Australia, and the two species seem to be closely related. The colour pattern of *C. flava* n. sp. may indicate that the species moved into deep water relatively recently, possibly due to competition with other *Coris* species in shallower reef habitats, so there was not enough time to make the colouration disappear.

After the discovery of this new species, the total number of species in genus *Coris* adds to 30, and of labrid fish species to 562. At La Réunion, 5 species of *Coris* are known to occur. It is likely that *C. flava* n. sp. is endemic to La Réunion or the western Mascarenes, although due to the poorly known deep reef fauna difficult to prove. Several other species of *Coris* are local endemics (*C. auricularis*, *C. aurilineata*, *C. ballieui*, *C. centralis*, *C. debueni*, *C. flavovittata*, *C. hewetti*, *C. latifasciata*, *C. marquesensis*, *C. nigrotaenia*, *C. variegata*, *C. venusta*), together with *C. flava* n. sp. totalling 40% of the species, while the other 60% of the species are more widespread.

### Key to the species of the genus *Coris* Lacepède [ex Commerson] 1801

- |   |                        |
|---|------------------------|
| 1a. Dorsal-fin soft rays 11; anal-fin soft rays 11; a narrow black bar across pectoral-fin base.....  | 2                      |
| 1b. Dorsal-fin soft rays 12; anal-fin soft rays 12; no black bar across pectoral-fin base.....  | 4                      |
| 2a. Body depth 3.1-3.55 in SL; males without numerous small black spots on body.....  | 3                      |
| 2b. Body depth 2.95-3.1 in SL; males with numerous irregular small black spots on body (Red Sea).....   | <i>C. variegata</i>    |
| 3a. Eye diameter 6.7-7.35% of SL; gill rakers 19-22; lateral-line scales 50-52 (Maldives and Chagos Archipelago).....   | <i>C. latifasciata</i> |
| 3b. Eye diameter 5.75-6.75% of SL; gill rakers 16-21; lateral-line scales 52-55 (central Indian Ocean to western Pacific).....  | <i>C. batuensis</i>    |
| 4a. Lateral-line scales 47-57.....  | 5                      |
| 4b. Lateral-line scales 59-96.....  | 15                     |
| 5a. Pectoral-fin rays 14.....   | 6                      |
| 5b. Pectoral-fin rays 15.....   | 7                      |
| 6a. Whitish with a narrow black stripe dorsally on head and body, and a broad one from front of snout through eye, along upper side, and ending on caudal fin (southeastern Indian Ocean and western Pacific).....  | <i>C. pictoides</i>    |
| 6b. Pale blue or green with narrow yellow to orange stripes and an ocellated black spot at upper base of caudal fin (eastern Australia).....  | <i>C. aurilineata</i>  |
| 7a. Adults dull yellow with oblique blue lines following scale rows on back and rows of blue spots (one per scale) ventrally; a broad black bar on upper side of body at tip of pectoral fin (reduced in terminal phase); a small black spot on upper base of caudal fin (lost in terminal phase); gill rakers 21-25; gill rakers with 2 series of prominent, inwardly directed, small branches; lateral-line scales 47-51 (southern Oman)..... | <i>C. nigrotaenia</i>  |
| 7b. Colouration not as in 6a; gill rakers 16-24; gill rakers without prominent small branches; lateral-line scales 49-57.....   | 8                      |
| 8a. Lateral-line scales 52-57; body depth 4.0-4.7 in SL; anterior part of dorsal fin elevated in terminal phase, the first 2 spines nearly twice length of third spine; a narrow black stripe from snout through eye to base of caudal fin just above lateral line (stripe usually broken into a series of contiguous spots on body) (Line Islands).....  | <i>C. centralis</i>    |

- 8b. Lateral-line scales 48-54; body depth 3.0-4.5 in SL; anterior part of dorsal fin not elevated in terminal phase (except in *C. ballieui* and *C. caudimacula*); no narrow black stripe from snout to caudal-fin base (except juvenile of *C. debueni*).....9
- 9a. No canine tooth at corner of mouth at any stage; first dorsal-fin spines of adults longer than third spine (in terminal phase generally more than 3 times longer); initial phase with longitudinal pink lines on body following scale rows (lines blue on male and more irregular); terminal phase with small black spot at base of first dorsal-fin membrane (Hawaiian Islands).....*C. ballieui*
- 9b. A canine tooth present in corner of mouth of adults, at least in terminal phase; first dorsal-fin spines of adults not longer than third spine (except in terminal phase of *C. caudimacula* and slightly in terminal phase of *C. dorsomacula*); colouration not as in 9a.....10
- 10a. Gill rakers 20-24; dorsal-fin of terminal phase very elevated, highest part in middle, longest ray 1.25-1.5 in head length; centres of scales on body darker (at least dorsally), resulting in a linear pattern; a vertically oval blue to black spot on opercular flap; no black spot at rear base of dorsal fin (Marquesas Islands).....*C. hewetti*
- 10b. Gill rakers 16-20; dorsal-fin of terminal phase not elevated, longest ray 1.9-2.3 in head length; no distinct linear pattern on body resulting from dark scale centres; a dark spot on opercular flap present or absent; a dark spot often present at rear base of dorsal fin.....11
- 11a. Anterior part of dorsal fin elevated, first dorsal-fin spine in terminal phase as much as 2 times longer than third spine; adults with a large, horizontally oval, blackish spot on caudal-fin base; outer part of first 2 membranes of dorsal fin broadly black (Red Sea and Indian Ocean).....*C. caudimacula*
- 11b. Anterior part of dorsal fin not elevated (except slightly in *C. dorsomacula*); no blackish spot on caudal-fin base; outer part of first 2 membranes of dorsal fin not black (a black spot present on those membranes in *C. dorsomacula*, but well below margin).....12
- 12a. Lateral-line scales 51-54 (modally 52); anterior part of dorsal fin in terminal phase slightly elevated; a black spot on first 2 membranes of dorsal fin; a dark blue to black spot at upper base of pectoral fins (western Pacific).....*C. dorsomacula*
- 12b. Lateral-line scales 49-52 (modally 50 or 51); anterior part of dorsal fin in terminal phase not elevated; no black spot on first 2 membranes of dorsal fin; no dark spot at upper base of pectoral fins.....13
- 13a. Lateral-line scales 49-51 (modally 50); adults with numerous chevron-shaped dark bars on lower side of body (more evident in terminal phase) (Hawaiian Islands).....*C. venusta*
- 13b. Lateral-line scales 51-52 (modally 51); adults without numerous chevron-shaped dark bars on lower side of body.....14
- 14a. Body depth of adults 26.4-29.6% of SL (mean 28.5%); gill rakers 16-19 (mean 17.8); females yellowish to green with 3 narrow, red-edged, blue or pink stripes on body that continue anteriorly onto head; juveniles with rows of large white blotches or a midlateral black stripe (Easter Island).....*C. debueni*
- 14b. Body depth of adults 25.0-28.6% of SL (mean 26.7%); gill rakers 15-18 (mean 16.7); initial phase pink dorsally, white to lavender ventrally, with a broad, red-edged, yellow stripe from eye to base of caudal fin just above lateral line (a second narrower yellow stripe slightly ventral to first in larger initial-phase specimens); juveniles without white blotches or mid-lateral body stripe (southern Cook Islands to Pitcairn).....*C. roseoviridis*
- 15a. Lateral-line scales 59-67; forehead of adults with a bulbous prominence; maximum SL at least 470 mm.....16
- 15b. Lateral-line scales 68-96; forehead of adults without a bulbous prominence; maximum SL 397 mm.....17
- 16a. Adults with a canine tooth at corner of mouth; caudal rays of adults exerted (ends of rays extending posteriorly without interradiation membrane); front of dorsal fin of terminal phase strongly elevated, the first spine 2 or more times longer than third spine in large individuals; adults dark green to dark blue-green, often with 1 or more pale bars near centre of body; juveniles whitish with dark spots on head and anterior body and 2 large orange-red spots dorsally on body with an ocellated black spot above each in dorsal fin (Indo-West Pacific).....*C. aygula*
- 16b. No canine tooth at corner of mouth; posterior margin of caudal fin smooth; front of dorsal fin of terminal phase not elevated; adults purplish grey with a large blackish area covering caudal peduncle, the rounded front part extending anterior to peduncle; a large blackish spot on opercular flap; juveniles black with 2 longitudinal rows of large white spots and a few scattered small irregular white spots (southeastern Australia to Norfolk Island).....*C. bulbifrons*

- 17a. Pectoral-fin rays 13; anterior part of dorsal fin strongly elevated in adults; juveniles orange-red with 5 large, black-edged, white spots dorsally on head and body..... 18
- 17b. Pectoral-fin rays 14; anterior part of dorsal fin not elevated, the first dorsal-fin spine shorter than remaining spines; juveniles not coloured as in 17a.....24
- 18a. Females gray on body with numerous small black spots (mostly on posterior two-thirds of body and scaled basal part of caudal fin); naked part of caudal fin red proximally and abruptly white distally; body of males with 10-11 narrow grey bars; caudal fin purple with bright blue spots; juveniles with a large black spot in middle of dorsal fin (southern Red Sea and western Indian Ocean).....*C. frerei*
- 18b. Females without black spots on body; caudal fin not red and white; males without a series of grey bars; juveniles without a black spot in middle of dorsal fin..... 19
- 19a. Initial phase with horizontal black, brown or yellow stripes; terminal phase either with horizontal orange or red stripe or red, tail black.....20
- 19b. Initial phase red or orange, with ocellate white saddles; terminal phase not as described in 19a.....22
- 20a. Initial phase white, with three horizontal brown stripes; terminal phase green, with 3 zic-zac rose stripes (West Africa).....*C. africana*
- 20b. Colouration not as in 20a..... 21
- 21a. Initial phase with a brown, white and orange stripe extending along upper half of body from behind orbit almost to mid of caudal fin; terminal phase brown, lower portions white, with yellow and grey caudal fin and an orange zic-zac band along sides of body (Mediterranean Sea and adjacent eastern Atlantic off southern Spain).....*C. julis*
- 21b. Initial phase with a clear, thin black line extending along upper half of body from behind orbit almost to mid of caudal fin, terminal phase red with black caudal fin and a longitudinal series of grey (rarely orange) vertically enlarged spots or lines along sides of body (islands in eastern Atlantic).....*C. melanura*
- 22a. Adults reddish to greenish brown with a small green spot or green line on each scale; caudal fin green and brown with red streaks in middle of fin; lateral-line scales 71-84 (Red Sea and Indian Ocean).....*C. cuvieri*
- 22b. Adults orangish brown with bright blue lines or many small bright blue spots that are more numerous posteriorly; naked part of caudal fin bright yellow; lateral-line scales 68-77 (Red Sea and Indian Ocean).....23
- 23a. Initial phase orangish brown with blue spots on body not arranged into longitudinal lines; dorsal and anal fins with a longitudinal blue line; juveniles without a large black spot posteriorly on dorsal fin; gill rakers 16-19 (eastern Indian Ocean, western and central Pacific).....*C. gaimard*
- 23b. Initial phase orange to orangish brown with blue spots on body arranged to form longitudinal lines; dorsal and anal fins with oblique blue lines (mainly posteriorly); juveniles with a large black spot posteriorly on dorsal fin; gill rakers 15-18 (Marquesas Islands).....*C. marquesensis*
- 24a. Adults with anterior part of dorsal fin elevated (slight in initial phase; first dorsal-fin spine of terminal phase about twice as long as third spine); initial phase pale yellow to whitish with 2 black stripes dorsally on head and body, the narrower upper stripe merging with the lower posteriorly; caudal fin white with a large black crescent; terminal phase greenish, the head with irregular dull pink spots, the ventral part of body with a dark reticulum (sometimes interrupted by a broad pink bar above middle of anal fin); juveniles black with 5 longitudinal yellowish white lines (Hawaiian Islands).....*C. flavovittata*
- 24b. Anterior part of dorsal fin not elevated, the first dorsal-fin spine shorter than more posterior spines; colouration not as in 24a.....25
- 25a. A black stripe on upper side of body extending anteriorly through eye to front of snout; stripe becoming yellow posteriorly in fin of adults; lower edge of black stripe of adults with a series of about 20 narrow ventral extensions, thus forming a comb-like pattern.....26
- 25b. No black stripe on side of body.....27
- 26a. Posterior three-fourths of stripe on caudal fin of adults yellow; lateral-line scales 77-92; gill rakers 18-21 (eastern Australia to Kermadec Islands).....*C. picta*
- 26b. Posterior fourth of stripe on caudal fin of adults yellow; lateral-line scales 76-82; gill rakers 17-19 (Taiwan to Japan).....*C. musume*

- 27a. Lateral-line scales 75-86; gill rakers 18-22; initial phase whitish with red to reddish grey longitudinal lines following scale rows and a red stripe from front of snout through eye, continuing progressively narrower along upper side of body; body of terminal phase red with a white bar extending dorsally from abdomen, followed by a dark red bar; juveniles black dorsally with 2 narrow white stripes, white ventrally (Western Australia).....*C. auricularis*
- 27b. Lateral-line scales 86-97; gill rakers 15-19; colouration not as in 27a.....28
- 28a. Gill rakers 15; an additional canine tooth at corner of mouth; initial phase white, dorsal one-third bright yellow, mid-lateral sides of body with 13 faint, horizontal, bluish lines, eye bright orange, surrounded by yellow, upper distal portion of opercle rose; terminal phase golden yellow, sides of body with a rose band, reaching from behind tip of opercle to mid of caudal-fin base, jaws bright orange, cheeks and lower portions of opercle rose, eye bright orange, portion around anus rose-pink (La Réunion).....*C. flava* n. sp.
- 28b. Gill rakers 16-19; no canine tooth at corner of mouth; initial phase pink to lavender brown with a series of indistinct dark bars on side of body and a large pale area over and above abdomen; terminal phase purplish to reddish brown with a pale bar extending and narrowing dorsally from posterior two-thirds of abdomen, this bar broadly bordered by a dark purple to black bar (eastern Australia to New Zealand and Kermadec Islands).....*C. sandeyeri*

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