Chaetodon flavocoronatus, a New Species of Butterflyfish (Chaetodontidae) from Guam[1]

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A single specimen of an undescribed *Chaetodon* was collected in 36 m off Orote Peninsula, Guam. It is closely related to *Chaetodon tinkeri* Schultz from the Hawaiian and Marshall Islands, differing mainly in details of coloration which appear to link that species with *C. burgessi* Allen and Starck from Palau and *C. mitratus* Günther from the Indian Ocean. It represents the fifth known member of the *tinkeri* complex of the subgenus *Roa*, a relatively poorly known group of allopatric deep-dwelling Indo-West Pacific chaetodontids.

Methods follow Randall (1975). The holotype is deposited in the Bernice P. Bishop Museum (BPBM).

Chaetodon flavocoronatus, n. sp.
Yellow-crowned butterflyfish
Figs. 1, 2

HOLOTYPE: BPBM 24790, 74.0 mm SL, Guam, Mariana Islands, about 1 km south of Orote Point, 36 m, shelf adjacent to vertical dropoff to deep water, handnet, R. Myers, 30 July 1980.

DESCRIPTION: Dorsal fin rays XIII, 20; anal fin rays III, 16; pectoral fin rays 15; including upper rudimentary ray, the upper two and lower-most unbranched; pelvic fin rays I, 5; principle caudal rays 17, the median 15 branched; lateral-line pores 35 (38 on the right side); scales above lateral line to origin of dorsal fin 8; scales below lateral line to origin of anal fin 14; circumpeduncular scales 26; gill rakers 18.

Body moderately deep, the depth 1.8 in SL and compressed, the greatest width about 3.9 in depth; head 3.1 in SL; snout slightly produced, its length 2.5 in head; profile of head from snout to nape slightly concave except for a slightly convex area in front of eye, the slope forming an angle of approximately 57° to the horizontal; eye 2.8 in head; bony interorbital width 3.4 in head; least depth of caudal peduncle 9.5 in SL; length of caudal peduncle approximately two-thirds least depth of peduncle; predorsal length 2.3 in SL; prepelvic length 2.5 in SL.

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Mouth small, slightly oblique, the maxilla about 3.4 in head; teeth setiform, in about 7 close-set rows in front of upper jaw, about 8 in front of lower jaw, the longest about 4.3 in eye; nostrils close-set, the anterior with a fleshy rim and posterior flap, the posterior larger and elliptical, located a distance about equal to its greatest diameter from edge of orbit; a small bony prominence on each side of snout formed by the anteriormost point of nasal bones.

Posterior corner of opercle slightly angular; preopercle serrated along its posterior edge, edges of remaining opercular bones smooth.

Origin of dorsal fin slightly anterior to a vertical through posterior corner of bony opercle; dorsal fin base 1.4 in SL; base of spinous portion longer than base of soft-ray portion, the spinous base 2.3 in SL, the soft-ray base 3.0 in SL; first dorsal spine 9.3 in SL; second dorsal spine 4.8 in SL; third dorsal spine the longest, 3.3 in SL; longest dorsal soft ray 5.7 in SL; anal fin base 3.0 in SL, first anal spine 7.4 in SL, second anal spine the longest, 3.4 in SL, third anal spine 4.0 in SL, longest anal soft ray 3.9 in SL; anterior interspinous dorsal and anal fin membranes deeply incised; posterior portions of dorsal and anal fins broadly rounded, their anteriormost soft rays the longest, slightly longer than posterior-most spines; pectoral fins slightly pointed, the fourth ray the longest, 3.9 in SL; origin of pelvic fins below lower base of pectorals; pelvic fins about 3.5 in SL, reaching anus; pelvic fin spine about 4.3 in SL; caudal fin slightly rounded, the longest rays 5.2 in SL.

Lateral line continuous, describing a moderate arc with the highest point below base of seventh and eighth dorsal spines and ending beneath base of third from last dorsal soft ray.

Scales ctenoid, covering body and head except lips and adjacent portions of snout and chin; anteriormost scales on sides of body the largest, about four-fifths an eye diameter in height, becoming progressively smaller posteriorly, dorsally and ventrally; scales on head small, about one-sixth the height of the largest body scales; median fins scaled nearly to margins on soft-ray portions, progressively less scaled anteriorly on spinous portions until naked on anteriormost spines and interspinous membranes; paired fins scaled basally; scaled axillary process of pelvic fins slightly greater than one-half eye diameter.

Color in life: ground color white anteriorly, slightly dusky on front of head and nape, becoming abruptly black posterodorsally along a line extending from base of fourth dorsal spine to tip of second anal soft ray; tip of snout, pectoral axil and ocular bar yellow, the latter extending from edge of opercle at a point directly below posterior margin of orbit to interorbital space where each slant forward and meet; nape with a yellow band about an eye diameter in width extending diagonally from a point immediately anterior of first dorsal spine to a point horizontal with dorsal margin of iris and vertical with posteroventral edge of pectoral axil; centers of scales of white area of body behind pectoral axil dusky, forming several horizontal rows of blackish spots; dorsal fin the same as ground color basally, becoming yellow distally, the yellow area covering most of naked portion of spinous part of fin and extending as a submarginal band about one-third an eye diameter in width along soft part and

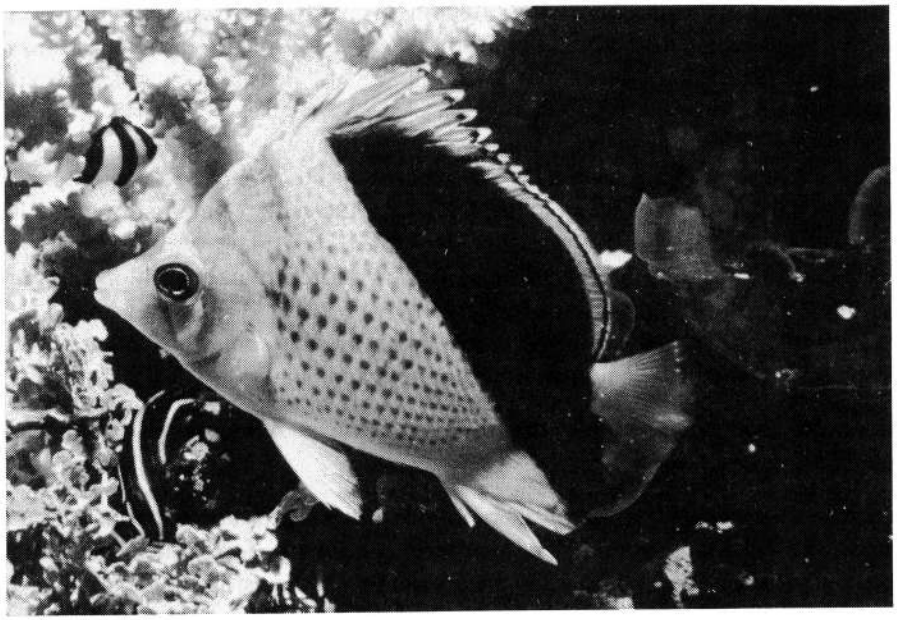

Fig. 1. Holotype of *Chaetodon flavocoronatus*, 74.0 mm SL, Guam, Mariana Is., BPBM 24790, living in an aquarium.

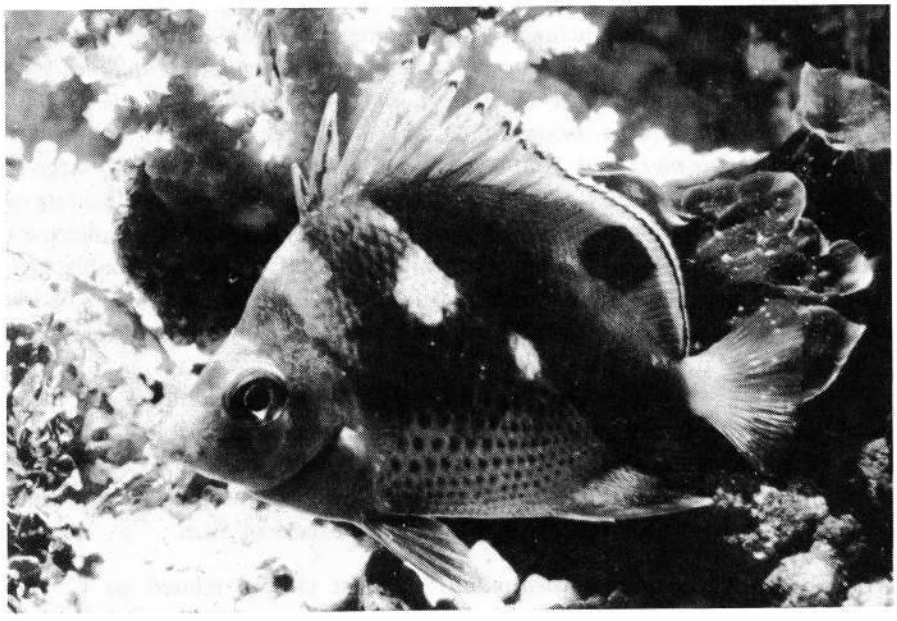

Fig. 2. Nocturnal coloration of holotype of *Chaetodon flavocoronatus* while living in an aquarium.

separated from a white marginal band extending from tip of third spine to last soft ray by a thin black line; coloration of anal fin an extension of ground coloration, the extreme outer margin of black part white and barely visible; caudal fin yellow, becoming hyaline distally; pelvic fins white; pectoral fins clear.

Nocturnal coloration as observed in captivity (Fig. 2): as above except white area of body somewhat dusky with two prominent white blotches remaining, each adjacent to dark posterodorsal area, the first larger and centered along the lateral line, the second at a level horizontal with last dorsal ray; dark posterodorsal area somewhat lighter distally with a prominent dark blotch remaining along its outer margin between third and tenth dorsal soft rays.

Color after a few days in preservative: as in life but somewhat faded with the black blotch of nocturnal coloration becoming prominent.

ETYMOLOGY: Named *flavocoronatus* from the Latin in reference to the crownlike yellow band on the nape.

ECOLOGY: *Chaetodon flavocoronatus* is found in deep reef areas characterized by extensive vertical discontinuities. The type locality consists of a relatively flat current-swept shelf jutting approximately 250 meters out from a limestone cliff shoreline. The 40 m contour coincides closely with the edges of the shelf which are vertical, in places slightly over-hanging, to depths of well over 100 m at its most seaward point where the 200 m contour lies less than 400 m from shore. The seaward edge of the shelf was covered in places by extensive beds of *Millepora dichotoma*, scattered heads of *Acropora* spp. and *Pocillopora* spp. and several species of gorgonians. Planktivorous fishes were abundant and included large aggregations of *Anthias pascalus, A. pleurotaenia, A. taeniatus, Pomachromis guamensis* and *Cirrhilabrus* sp., and smaller groups or scattered individuals of *Malacanthus brevirostris, Chromis xanthura, Dascyllus reticulatus, Naso hexacanthus, Nemateleotris magnificus, Ptereleotris heteropterus, Odonus niger* and *Xanthichthys auromarginatus*. Occasional large trees of the black coral *Antipathes dichotoma* were scattered along the wall along with several other antipatharians and gorgonians. The solitary holotype was collected in a bed of *Millepora dichotoma* a few meters from the dropoff, and had probably strayed from deeper water. A few months earlier a pair of *Chaetodon flavocoronatus* had been observed along the wall at a depth of approximately 45 m by commercial aquarists Don Baker and Mark Eberl.

The facts that such a colorful and potentially highly-prized aquarium fish had remained undiscovered for so long despite the activities of numerous aquarium fish collectors for the past several years, that it has been seen only in areas adjacent to much deeper water and that its closest relatives are deep-dwelling suggest that its preferred habitat is in deep reef areas, probably in excess of 50 m.

RELATIONSHIPS: *Chaetodon flavocoronatus* is most closely related to *C. tinkeri* Schultz, differing in details of coloration which appear to provide a link between it and *C. burgessi* Allen and Starck and *C. mitratus* Günther (Fig. 3). In addition, eye

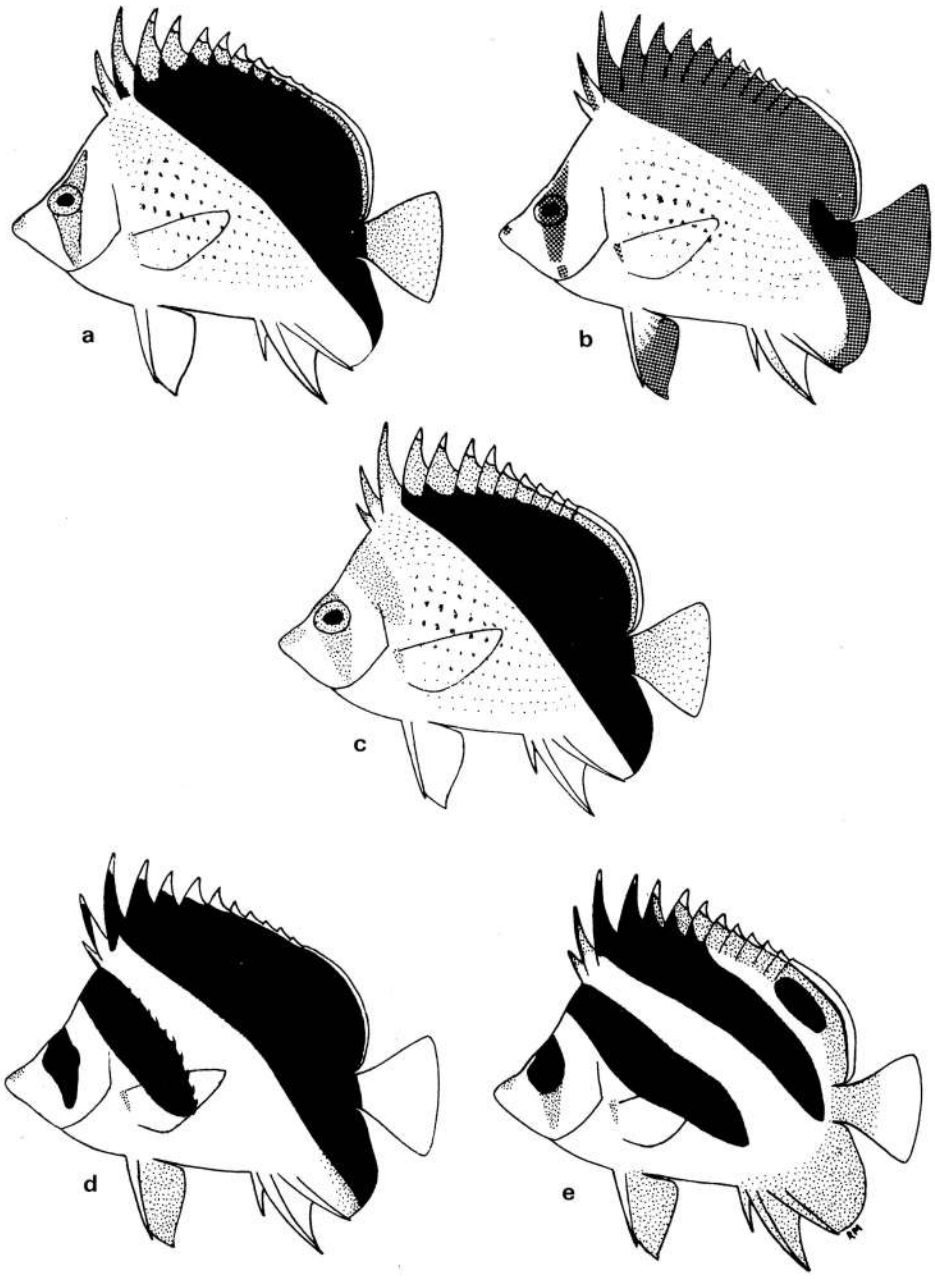

Fig. 3. Color patterns of species in the *Chaetodon tinkeri* complex: (a) *C. tinkeri*, (b) *C. declivis*, (c) *C. flavocoronatus*, (d) *C. burgessi*, (e) *C. mitratus*. Dark stipling indicates yellow-orange or dusky yellow-orange; light stipling indicates yellow. Coloration otherwise white and black, as shown.

Table 1. Selected meristic characters of chaetodontids of the *tinkeri* complex. All counts except those for *Chaetodon flavocoronatus* are from the literature. An asterisk indicates an unspecified number; a double asterisk the usual number. Pectoral fin rays counts consider both fins and include the rudimentary upper ray.

Species	Dorsal fin spines			Dorsal fin rays				Anal fin soft rays				Pectoral fin rays		Gill rakers	Lateral line pores	Lateral line scales	Sample size
	XII	XIII	XIV	18	19	20	21	14	15	16	17	14	15				
tinkeri		6	1	1	*	*	*			6	1	12	2	16–17	36–41	38–42	7
declivis[1]	*	*		*	*	*	*		*	*			12	17–19	—	37–41	6
flavocoronatus		1				1				1			2	18	35–38	—	1
burgessi		3		*	*				*	*			6	17–21	35–37	—	3
mitratus[2]		6		*	*	*		*	**			1	11?	18	35	30–38	6

[1] Randall (1975) and Burgess (1978) differ in their counts for the same six specimens. According to Randall, all have XIII, 20 dorsal fin rays.

[2] Includes three specimens reported from Cocos-Keeling by Burgess (1978) and two reported from Réunion by Guézé and Maugé (1976) as well as the holotype. It is not known whether Guézé and Maugé counted both pectoral fins. Lateral line pore counts are for those reported by Guézé and Maugé; gill raker counts for those reported by Burgess. In addition one of the Réunion specimens has IV, 11 anal fin rays.

diameter of *C. flavocoronatus* appears to be proportionately larger than that of both *C. tinkeri* and *C. burgessi* (2.8 in SL vs. 2.9–3.2 and 3.1–3.3, respectively), but this may be an artifact of size in the *tinkeri* comparison since all comparative material of that species is larger (over 99 mm SL). Lateral-line pore counts of *C. flavocoronatus* appear to coincide more closely with those of *C. burgessi* than those of *C. tinkeri* (Table 1).

Chaetodon flavocoronatus along with *C. tinkeri* Schultz from the Hawaiian and Marshall Islands (the latter based on a specimen photographed at Enewetak Atoll by Michael V. Degruy; Randall, MS), *C. declivis* Randall from the Marquesas, *C. burgessi* Allen and Starck from Palau and *C. mitratus* Günther from the Indian Ocean form a closely-knit complex of allopatric species, each with a distinctive color pattern, but for the most part inseparable meristically, and form the bulk of the subgenus *Roa* (Burgess, 1978). All share a distinctive configuration with the second and third dorsal spines the longest and the posterior dorsal rays shortened (Randall, 1975), and have color patterns consisting of white and black, yellow or yellow-orange areas separated by one or more sharp diagonal demarcations. All generally inhabit relatively deep water characterized by steep slopes (as little as 23 m for *C. declivis*; 27 m for *C. tinkeri*, but 36 m or more for *C. flavocoronatus* and 40 to 70 and 80 m for *C. mitratus* and *C. burgessi*, respectively) and are generally found as pairs or solitary individuals (Allen and Starck, 1973; Allen and Steene, 1979; Burgess, 1978). It is thus not surprising that all but one were discovered within the last 30 years and that very few specimens of each exist in museum collections.

An additional species, *Chaetodon nippon* Steindachner and Doderlein, placed by Burgess in the *tinkeri* complex shares fewer morphological and behavioral

characteristics with the aforementioned species and probably does not naturally fall in this complex. Unlike the others, it is an aggregating planktivore found as shallow as 10 m (Masuda, et al., 1975; J. Shepard, pers. com.).

Until additional material is available, particularly from intervening island groups, the precise morphological and zoogeographic limits of these species will remain unclear. The recent discovery of *Chaetodon tinkeri*, long thought to be a Hawaiian endemic, at Enewetak Atoll is a case in point. This suggests that the boundary between the distributions of it and *Chaetodon flavocoronatus*, if they are allopatric, lies between the Marshall and Mariana Islands, a highly unusual situation considering the much greater degree of faunal similarity between those island groups than between the Marshall and Hawaiian Islands. While the possibility remains that *Chaetodon flavocoronatus* may ultimately be considered a Mariana or Western Pacific subspecies of *C. tinkeri*, in light of the limited degree of differentiation between other members of the complex and the limited material available, the author prefers to emphasize the differences by considering the two forms distinct at the species level.

ACKNOLEDGMENTS

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