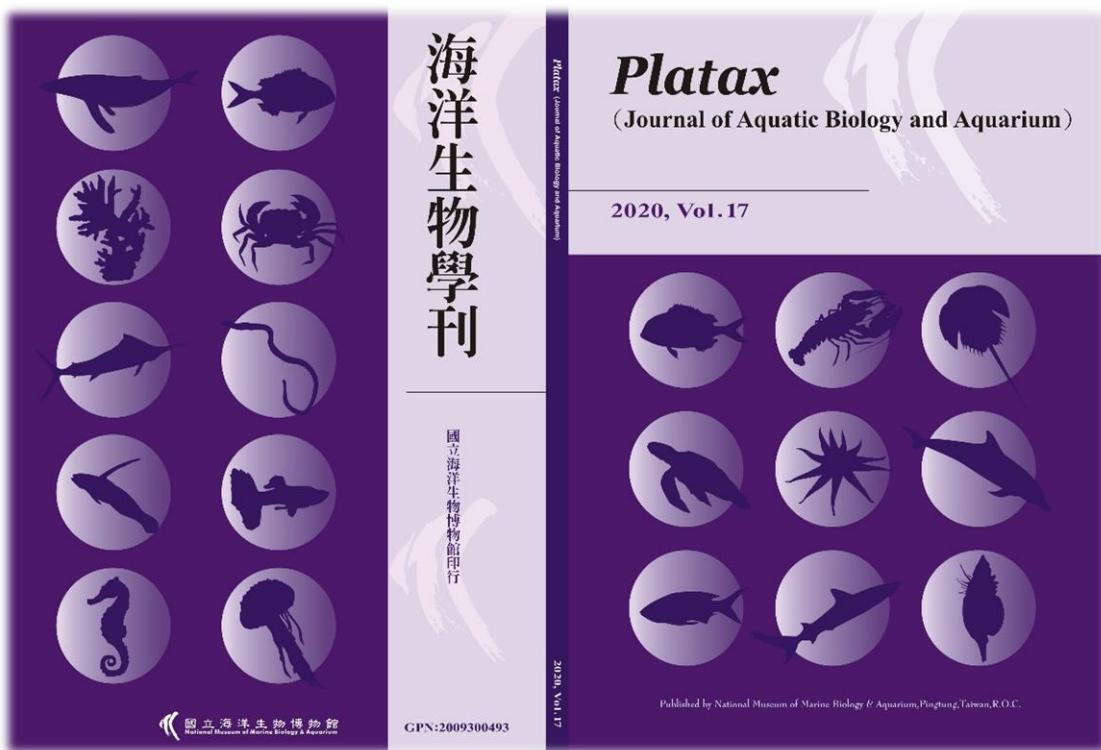


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## Three new records of deep-water coral reef fishes from southern Taiwan

Nok-Wai Lai

Department of Aquaculture, National Taiwan Ocean University, No.2, Bei-ning Road, Keelung 202, Taiwan.

\*Corresponding author. E-mail: nokwaiwai@gmail.com

### Abstract

Three deep-water coral reef fishes *Odontanthias chrysostictus*, *Odontanthias randalli* (Serranidae) and *Chromis tingting* (Pomacentridae) are reported from southern Taiwan for the first time. *Odontanthias chrysostictus* and *Odontanthias randalli* previously described from Indonesia are now extending northward and *Chromis tingting* previously described from Japan is now extending southward, respectively, to southern Taiwan. These results bring the total number of *Odontanthias* to 6 species and *Chromis* to 29 species in Taiwan. Fresh color photographs and detailed descriptions of these species are provided herein.

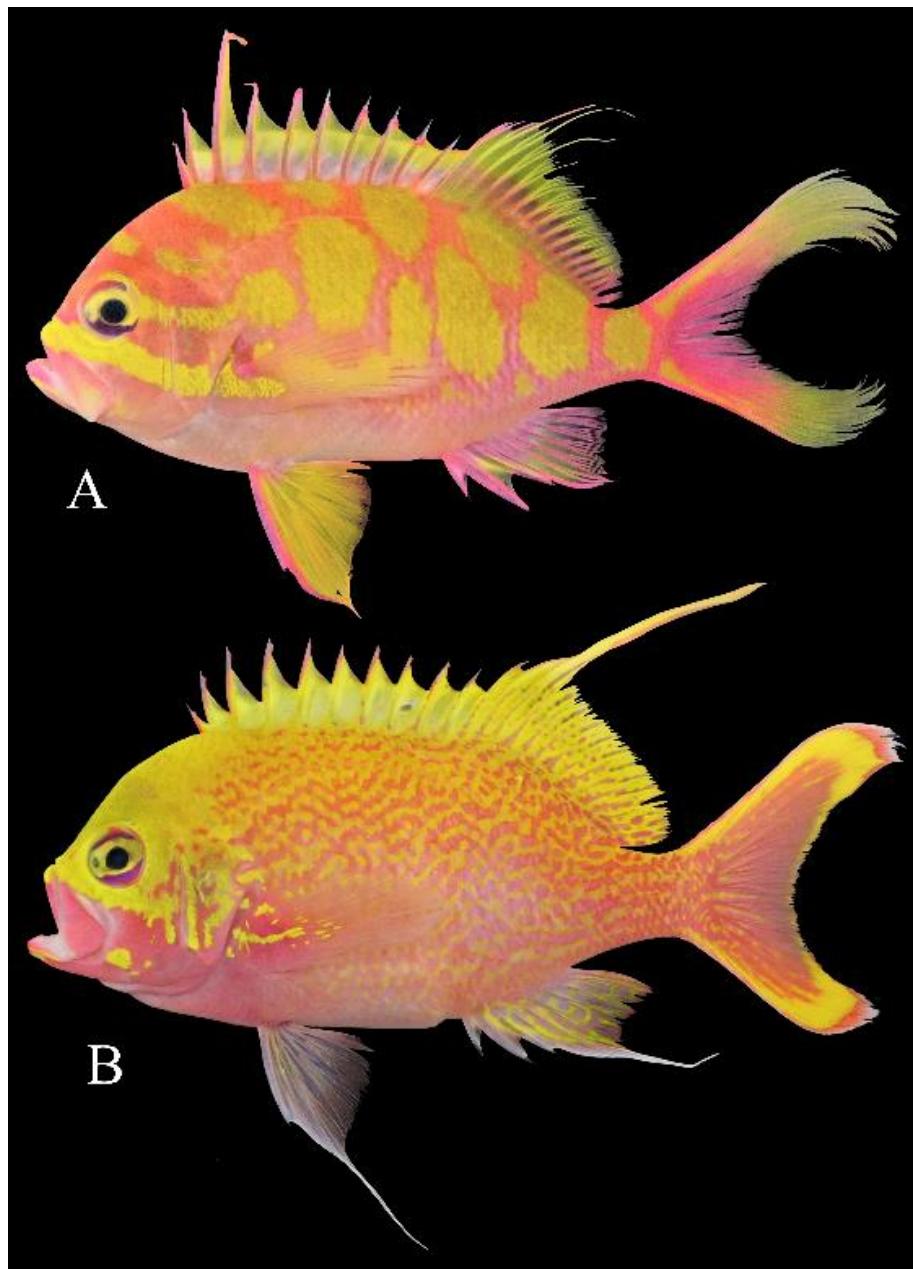
**Key words:** Perciformes, Pomacanthidae, Serranidae, Taiwan, New record

### Introduction

Teleost fishes of the genus *Odontanthias* (Bleeker) are usually found over hard substratum at depth about 100–400 m (Randall, 2006) and mainly inhabit deep-sea coral reef. Randall & Heemstra (2006) reviewed the genus with descriptions of two new species and a closely related genus *Meganthias*. Currently, genus comprises 15 Indo-Pacific species and one Atlantic species (Carvalho-Filho et al., 2016) and 4 have been recorded in Taiwan (Shao, 2020) including *Odontanthias borbonius*

(Valenciennes, 1828) (Fig. 1A), *Odontanthias katayamai* (Randall, Maugé & Plessis, 1979) (Fig. 1B), *Odontanthias rhodopeplus* (Günther, 1872) (Fig. 2A), and *Odontanthias unimaculatus* (Tanaka, 1917) (Fig. 2B), previously.

*Odontanthias chrysostictus* was originally described as *Anthias chrysostictus* from two specimens obtained from Northern Sulawesi, Indonesia (Günther, 1872) for which only a simulation drawing existed. Although Kamohara (1934), Katayamai (1960), Lee (1990) and others had reported



**Fig. 1.** A. *Odontanthias borbonius* (Valenciennes, 1828), NMMB-P34706, 116.7 mm SL. B. *Odontanthias katayamai* (Randall, Maugé & Plessis 1979), NMMB-P34707, 137.8 mm SL. Fresh coloration.

*Holanthias chrysostictus* from southern Japan and Taiwan, these specimens were

later found to instead be *Odontanthias katayamai* as *Holanthias chrysostictus* by



**Fig. 2.** A. *Odontanthias rhodopeplus* (Günther, 1872), NMMB-P34708, 173.5 mm SL.  
B. *Odontanthias unimaculatus* (Tanaka, 1917), NMMB-P34709, 138.1 mm SL.  
Fresh coloration.

Randall & Heemstra (2006). Another swallowtail *O. randalli* was originally described based on 11 specimens collected from Lombok, Indonesia (White, 2011)

and had not been found elsewhere until a recent landing off of Kaohsiung, Taiwan, in which not only this species, but also *O. chrysostictus*, were collected and

conclusively identified (described herein). The damselfish genus *Chromis* Cuvier is the largest damselfish genus in the family Pomacentridae, with 104 described species (Arango et al. 2019), at least ten of which are found only on mesophotic coral ecosystems (MCEs), below 60 m (Allen & Erdmann, 2012) and 29 of them were recorded in Taiwan (Shao, 2020). Members of *Chromis* are circum-global planktivores that inhabit a wide range of depths (from shallow coral outcrops to deep reefs below the photic zone). More extensive exploration of reef ecosystems in recent years has led to several new discoveries, particularly in species inhabiting MCEs at 40–150 m (Tea et al. 2019) both *C. mirationis* Tanaka, 1917 (Fig. 3A) and *C. okamurai* Yamakawa & Randall, 1989 (Fig. 3B) which have been found in MCE of Taiwan (Shao, 2020). *Chromis tingting* was recently described from Japan based on four specimens collected from Sagami Bay, and a putative Korean record exists, as well (Tea et al., 2019). A specimen of *C. tingting* was recently collected alongside the other two species mentioned above representing the first record outside the type locality. Because deep-water swallowtails and damselfish are not often collected in trawls (or by other approaches), few museum specimens exist. Therefore, this study has provided detailed

descriptions for each of these three newly recorded deep-water fish of Taiwan.

## Materials and methods

Methods for taking measurements and counts, as well as terminology, mainly followed Hubbs et al. (1964) in general and more specifically Randall (2006) for *O. chrysostictus*, White (2011) for *O. randalli*, and Tea et al. (2019) for *C. tingting*. Scales above and below the lateral line were counts anteriorly to the origin of the dorsal fin and posteriorly to the origin of the anal fin, respectively. Gill raker counts were made on the first gill arch of the right side; the gill raker at angle is included in the lower-limb count. Measurements were taken with calipers and recorded to the nearest 0.1 mm.

Two specimens of *O. chrysostictus* were collected from off Kaohsiung, Taiwan, the first by Mr. Jia-Sian Yan at depth 165–180 m at “Shitientsai”; *O. randalli*, *C. tingting* and another specimen of *O. chrysostictus* were hooked by anglers from Santientsai, off Kaohsiung (Fig. 4) and purchased at Cianjhen fish market, Kaohsiung southern Taiwan. Fresh specimens were fixed in 4% formalin before transfer to 75% alcohol. Specimens have been deposited at the Pisces Collection of the National Museum of Marine Biology and Aquarium, Pingtung (NMMB-P).



**Fig. 3.** A. Fresh photo of *Chromis mirationis* from Taiwan, NMMB-P34682, 114 mm SL; B. fresh photo of *Chromis okamurai* from Taiwan, NMMB-P34710, 102.4

## Results

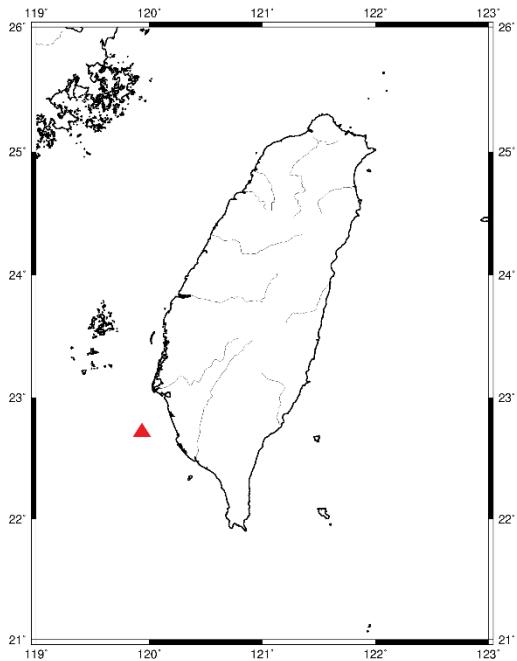
1872)

**Family Serranidae**

金帶粗斑花鱸

*Odontanthias chrysostictus* (Günther,

Figs. 5A, B, Tab. 1



**Fig. 4.** Map of collecting site off Kaohsiung (22°42'55.1"N, 119°55'59.9"E).

*Anthias chrysostictus* Günther, 1872: 655, pl. 56 (type locality: Manado, Sulawesi, Indonesia).

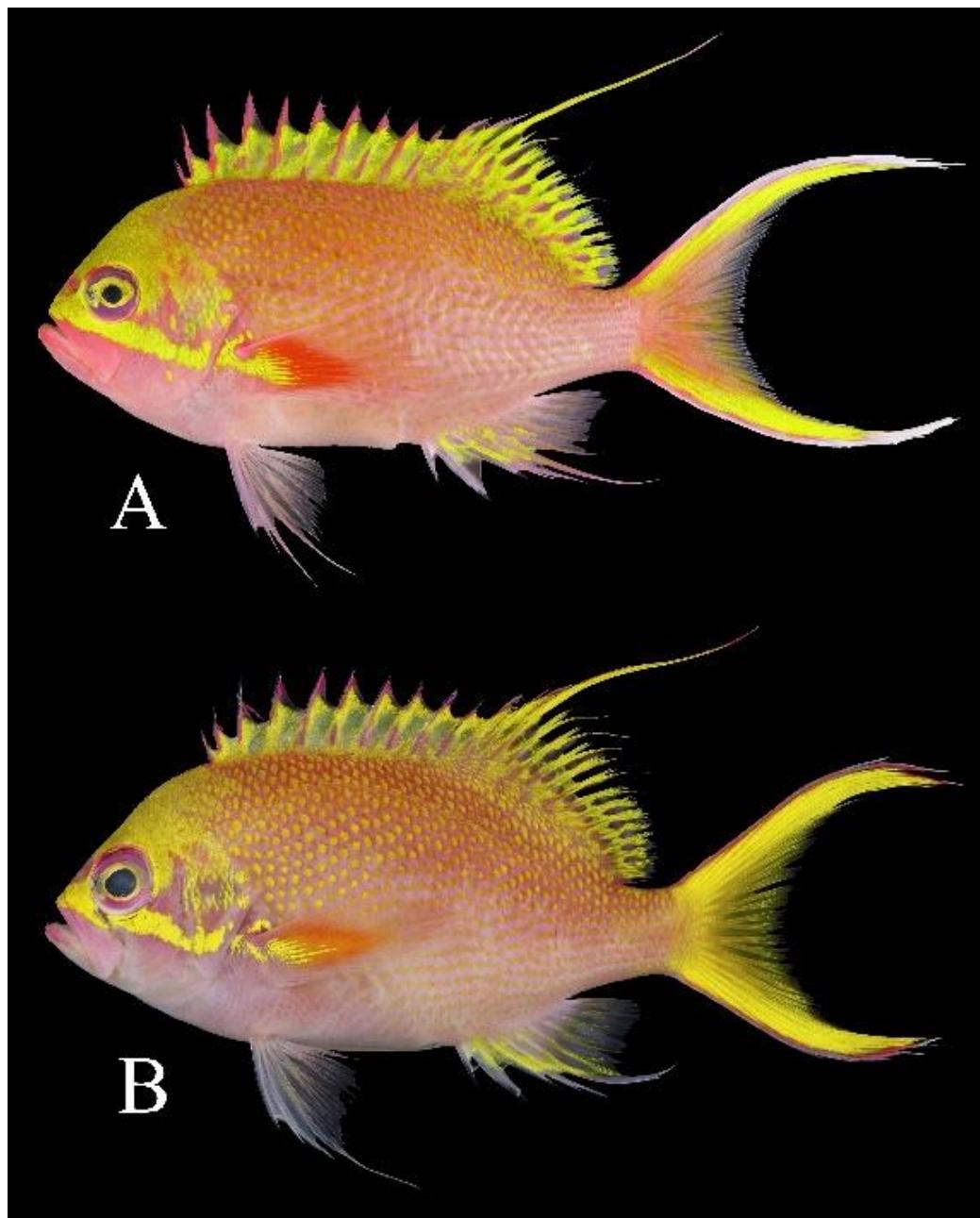
*Odontanthias chrysostictus* (Günther, 1872): Randall & Heemstra, 2006:11. White, 2011:22. Anderson, 2018:22.

**Materials examined.** NMMB-P34671, 116.1 mm, female, Cianjen fish market, Kaohsiung, southern Taiwan, 20 Oct. 2020. NMMB-P34651, 112.3 mm, male, off Kaohsiung, southern Taiwan, 26 Jul. 2020, coll. Jia-Sian Yan.

**Description.** Dorsal-fin elements X, 16; anal-fin elements III, 7; pectoral-fin

rays 16–17; pelvic-fin elements I, 5; principal caudal-fin rays 10+9; upper/lower procurent caudal-fin rays 5/5; lateral-line scales 36 (NMMB-P34651) and 39 (NMMB-P34671); scale rows between lateral line and dorsal-fin origin 8; full size scales above the highest point of lateral line to base of middle dorsal-fin spines (7th) 3; scale rows between lateral line and anal-fin origin 20 (NMMB-P34651) and 21 (NMMB-P34671); circumpeduncular scales 19–22; gill rakers 11–12+26–28=37–40; vertebrae 10+15=25.

Body moderately deep and compressed, its depth 2.2 in SL and width 2.7–2.9 in body depth; head length 2.8–2.9 in SL; eye relatively large, orbit diameter



**Fig. 5.** Fresh coloration of *O. chrysostictus*. A. NMMB-P34671, 116.1 mm SL, female; B. NMMB-P34651, 112.3 mm SL, male, photo by C. N. Tang.

**Tab. 1.** Morphometric measurements, expressed as percentage of standard length (SL) and head length (HL), of two *Odontanthias* species.

	<i>O. chrysostictus</i>			<i>O. chrysostictus</i>			<i>O. randalli</i>		
	NMMB-34651	NMMB-34671	NMMB-34122	NMMB-34651	NMMB-34671	NMMB-34122	NMMB-34651	NMMB-34671	NMMB-34122
Standard length (mm)	112.3	%SL	%HL	116.1	%SL	%HL	109.6	%SL	%HL
% SL									
Body depth	51.3	45.7	127.0	52.3	45.0	129.1	50.3	45.9	120.3
Body width	17.4	15.5	43.1	19.2	16.5	47.4	20.5	18.7	49.0
Head length	40.4	36.0	100.0	40.5	34.9	100.0	41.8	38.1	100.0
Snouth length	7.6	6.8	14.8	8.2	7.1	15.7	8.9	8.1	21.3
Orbit diameter	13.2	11.8	25.7	12.9	11.1	24.7	13.3	12.1	31.8
Interorbital width	10.1	9.0	19.7	11.0	9.5	21.0	12.1	11.0	28.9
Upper-jaw length	17.1	15.2	33.3	18.4	15.8	35.2	20.7	18.9	49.5
Caudal-peduncular depth	14.7	13.1	28.7	15.7	13.5	30.0	24.8	22.6	59.3
Caudal-peduncular length	19.3	17.2	37.6	18.6	16.0	35.6	19.8	18.1	47.4
Predorsal length	37.3	33.2	72.7	36.5	31.4	69.8	16.5	15.1	39.5
Preanal length	75.9	67.6	148.0	72.4	62.4	138.4	72.9	66.5	174.4
Prepelvic length	41.6	37.0	81.1	43.9	37.8	83.9	42.5	38.8	101.7
Dorsal-fin base	73.5	65.4	143.3	77.9	67.1	148.9	73.7	67.2	176.3
First dorsal-fin spine	6.5	5.8	12.7	6.4	5.5	12.2	7.0	6.4	16.7
Second dorsal-fin spine	9.6	8.5	18.7	11.6	10.0	22.2	11.9	10.9	28.5
Third dorsal-fin spine	9.9	8.8	19.3	15.8	13.6	30.2	26.0	23.7	62.2
Fourth dorsal-fin spine	15.5	13.8	30.2	17.1	14.7	32.7	17.2	15.7	41.1
Tenth dorsal-fin spine	9.9	8.8	19.3	15.1	13.0	28.9	14.2	13.0	34.0
First dorsal-fin ray	19.0	16.9	37.0	20.9	18.0	40.0	20.6	18.8	49.3
Longest dorsal-fin ray	60.0	53.4	117.0	62.4	53.7	119.3	56.7	51.7	135.6
Last dorsal-fin ray	7.5	6.7	14.6	9.6	8.3	18.4	9.5	8.7	22.7
Anal-fin base	21.1	18.8	41.1	24.2	20.8	46.3	22.1	20.2	52.9
First anal-fin spine	7.8	6.9	15.2	8.8	7.6	16.8	8.8	8.0	21.1
Second anal-fin spine	15.2	13.5	29.6	17.8	15.3	34.0	17.5	16.0	41.9
Third anal-fin spine	17.8	15.9	34.7	18.1	15.6	34.6	26.9	24.5	64.4
Longest anal-fin ray	38.2	34.0	74.5	41.3	35.6	79.0	35.3	32.2	84.4
Caudal-fin length	57.7	51.4	112.5	72.7	62.6	139.0	73.5	67.1	175.8
Caudal-fin concavity	36.3	32.3	70.8	51.7	44.5	98.9	51.1	46.6	122.2
Pectoral-fin length	39.0	34.7	76.0	44.3	38.2	84.7	46.9	42.8	112.2
Pelvic-spine length	47.3	42.1	92.2	40.8	35.1	78.0	20.6	18.8	49.3

2.7–3.1 in HL; snout blunt and short, its length 4.9–5.3 in HL; interorbital space convex, least bony width 3.7–4.0 in HL; caudal-peduncular depth 2.6–2.7 and length 2.6–2.7 in HL.

Dorsal fin with a long base, its length 1.5 in SL, base of spinous part slightly longer than the soft-ray part; origin of dorsal fin at a vertical through middle of gill cover, well in front of pectoral and pelvic fins. First dorsal-fin spine slightly longer than half length of second spine; fourth dorsal-fin spine longest, its length 2.4–2.6 in HL; third dorsal-fin ray filamentous and much longer than others, its length 1.9 in SL. Pectoral fin moderately long, pointed, ninth ray longest anal fin; length of pectoral fin 2.6–2.9 in SL; pectoral-fin base oblique, its upper end origin of below base of third dorsal-fin origin below middle of pectoral-fin base; second pelvic-fin ray filamentous, longest and pointed, its length 2.4–2.8 in SL. Anal fin small with a short base, its base 1.7–1.9 in HL, much shorter than that of soft-ray spine. Pelvic fin rhombus and pointed, its part of dorsal fin; origin of anal fin below base of first dorsal-fin ray; first anal-fin spine about half length of second; second anal-fin spine strongest and longest, its length 2.3–2.7 in HL; third spine longest, its length 1.6 in HL; second anal-fin ray longest, its length 2.2–2.3 in HL. Caudal fin lunate, lobes filamentous, its length 1.6–1.9 in SL; caudal-fin concavity 2.2–

3.1 in SL.

**Coloration.** When fresh (Figs. 5A, B), body orange pink, light pink ventrally, with a yellow spot on each scale, except those on the chest and abdomen, forming regular oblique rows; a broad yellow stripe from tip of snout, passing below lower margin of eye to base of pectoral fin where it join a large reddish spot; jaws and chin pinkish; dorsal fin bright yellow with pink pigmentation on each spine, some pink spots on fin ray part; anal fin pale to light pink, with yellow pigment; caudal fin bright yellow, upper and lower margins lavender-pink; pelvic fin pale to light pink. When preserved: body and fin pale, with yellow spots on body, head pale with a broad yellow stripe from tip of snout, passing below lower margin of eye to base of pectoral fin.

**Distribution.** Previously only known from the type locality off Sulawesi, Indonesia; newly collected from off Kaohsiung, Southern Taiwan.

**Remarks.** These specimens represent the first record in Taiwan, resulting in a dramatic increase in the range across the South China Sea. Even in the aquarium trade, this species was not noted outside of Indonesia until 2013 according to reports made on the aquarium trade website [www.reefbuilders.com](http://www.reefbuilders.com); until then, it could only be seen in the Bali-Aquarich aquarium (as of 2011).

Although Kamohara (1934),

Katayamai (1960) and Lee (1990) mention that species distributed from Indonesia to Taiwan and Japan, their specimens were misidentifications of *O. katayamai* (Randall & Heemstra, 2006).

*Odontanthias chrysostictus* was highly similar to *O. katayamai* (Fig. 1B) in having pinkish bodies with yellow spots. However, caudal fin of *O. chrysostictus* is mainly yellow, fin lobes tapering and not broad, whereas that of *O. katayamai* is mainly red, fin lobes broad and untapered. The Taiwanese specimen also presents.

These specimens were having some slightly differences compared to the original description of Günther (1872), original description data were mentioned in brackets below: villiform teeth on vomer in an asymmetry cruciform-like patch (vs. kite-shape); lateral line scales 36 and 39 (vs. ca. 42). Some other variations were also observed in these specimens compared to the description in Randall & Heemstra (2006), original description data were mentioned in brackets below: lateral-line scales 39 (vs. 36–38); gill rakers 11+26 (vs. 12+27–28); orbit diameter 3.0–3.1 in HL (vs. 2.9); length of fourth dorsal-fin spine 2.4–2.6 in HL (vs. 1.9–2.3); length of third anal-fine spine 2.6 in HL (vs. (vs. 2.1–2.3)).

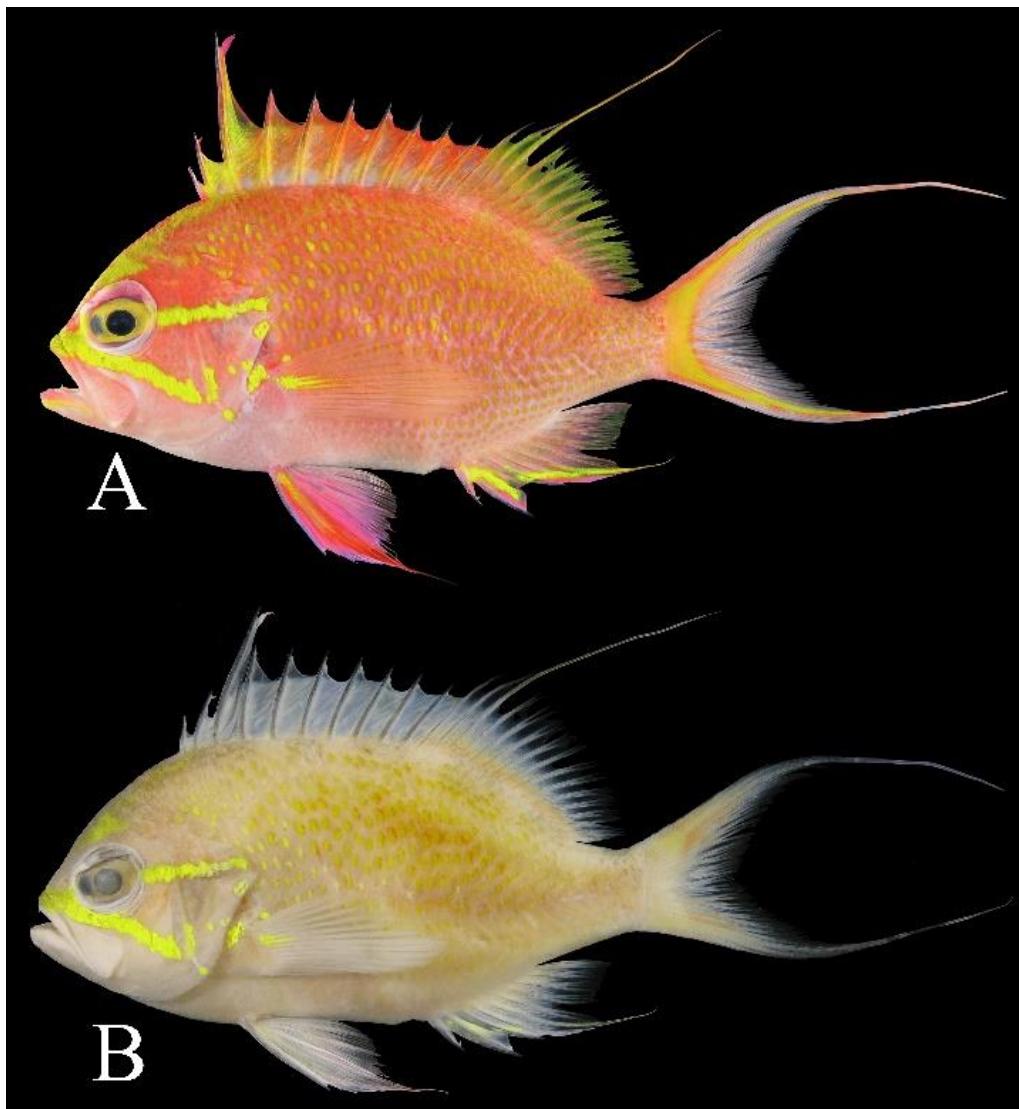
***Odontanthias randalli* White, 2011**

蘭道氏牙花鮨

Figs. 6A, B, Tab. 1

**Material examined.** NMMB-P34122, 109.7 mm SL, Cianjhen fish market, Kaohsiung, southern Taiwan, 28 Jun. 2020.

**Description.** Dorsal-fin elements X, 16; anal-fin elements III, 7; pectoral-rays 16; pelvic-fin elements I, 5; principal caudal-fin rays 9+8; upper/lower procurent caudal-fin rays 6/5; lateral-line scales 35; scale rows between lateral line origin 6; 1.9–2.3); length of caudal fin 1.6–1.9 in SL and dorsal-fin full size scales above the highest point of lateral line to base of middle dorsal-fin spines (5th) 1; scale rows between lateral line and anal-fin origin 16; circumpeduncular scales 18; gill rakers 12+26=38; vertebrae 10+15=25. Body moderately deep and compressed, its depth 2.2 in SL and width 2.5 in body depth; head length 2.6 in SL; eye relatively large, orbit diameter 3.1 in HL; snout blunt and short, its length 4.7 in HL; interorbital region convex, least bony width 3.5 in HL; caudal-peduncular depth 1.7 and length 2.1 in HL. Dorsal fin with a long base, its length 1.5 in SL, base of spinous part slightly longer than the soft-ray part; origin of dorsal fin at a vertical through middle of gill cover, well in front of pectoral and pelvic fins. First dorsal-fin spine slightly longer than half length of second spine; third dorsal-fin spine longest, its length 1.6 in HL; third dorsal-fin ray filamentous and much longer than others,



**Fig. 6.** *Odontanthias randalli* White, 2011, NMMB-P34122, 109.7 mm SL. A. Fresh coloration. B. Preserved coloration.

its length 1.9 in SL. Pectoral fins moderately long, pointed, ninth ray longest and reaching vertical through origin of anal fin; length of pectoral fin 2.3 in SL; pectoral-fin base oblique, its upper end below base of fourth dorsal-fin spine. Pelvic fin rhombus and pointed, its origin below pectoral-fin base origin; second pelvic-fin ray filamentous, longest and pointed, its length 2.3 in HL. Anal fin small with a short base, its base 1.9 in HL, much shorter than that of soft-ray part of dorsal fin; first anal-fin spine about half length of second; second anal-fin spine strong, its length 2.4 in HL; third spine longest, its length 1.6 in HL; second anal-fin ray longest, its length 1.2 in HL. Caudal fin lunate, lobes filamentous, its length 1.5 in SL; caudal concavity-fin 2.1 in SL.

**Coloration.** When fresh (Fig. 6A), body pinkish, light pink ventrally; most scales on body bearing a brown-edged bright yellow spot; two bright yellow stripes originating from tip of snout, one runs from tip of snout, through lower margin of eye and ends at an angle at the preopercle, another runs from the posterior margin of the eye to the primary spine of the opercle; interorbital space bright yellow; with few small yellow patches on gill cover and pectoral fin base; dorsal fin mostly yellow, with pink membranes between fourth dorsal-fin spine and first dorsal-fin ray; dorsal-fin ray mostly

yellow with pinkish on base; anal fin pinkish with yellow pigments on spinous part joining the longest anal-fin ray, anterior edges of those yellow pigment with pink margin; caudal-fin mostly pink with yellow pigments on base and extending along the center of filamentous lobes, pigments surrounded with pink frame; pectoral fin pinkish, with yellow pigment on base of sixth and seventh rays; pelvic fin bright pink, tip of longest ray reddish. When preserved (Fig. 6B): body and fin pale, with yellow spots on body; head pale with a bright yellow V-shaped marking originating from snout tip with the lower stripe running posteroventrally below the eye (terminating at the front edge of the preopercle); the upper stripe running posterodorsally through the middle of the eye to the edge of the opercle above the primary opercular spine.

**Distribution.** Previously only known from East Lombok in the Nusa Tenggara region of Indonesia; newly collected from off Kaohsiung, southern Taiwan.

**Remarks.** This specimen represents the first record in Taiwan and the distribution range of *O. randalli* now extends across the South China Sea. Its sex could not be determined due to poor preservation condition. It is worth noting that specimens of *O. rhodopeplus* (Fig. 2A) and *O. katayamai* (Fig. 1B) were collected at the same time. Most swallowtails are

colorful predominantly pink and bright yellow, making them popular in the aquarium trade (juvenile *O. borbonius* being among the most common), they command a high price, though, since supply cannot often meet demand given the difficulty of safely bringing the fish up from the great depths at which they reside.

Some variation was observed in our specimen compared to the original description in White (2011), original description data were mentioned in brackets below: scale row between the lateral line and dorsal-fin origin 6 (vs. 5); vertebrae 10+15 (vs. 10+16); length of third dorsal-fin spine, 1.6 in HL (vs. 1.4).

#### Key to the genus *Odontanthias* in Taiwan (follow Randall & Heemstra, 2006)

- 1a. Dorsal-fin rays 12–14; body depth 2.4–2.9 in SL.....2
- 1b. Dorsal-fin rays 15–19; body depth 1.9–2.4 in SL.....3
- 2a. Dorsal-fin rays 12 or 13; lateral-line scales 30–33; base of caudal fin with a black bar, often bordered with white.....*O. rhodopeplus*
- 2b. Dorsal-fin rays 14; lateral-line scales 35–44; no black bar at base of caudal fin.....*O. unimaculatus*
- 3a. Third dorsal-fin spine not longer than other spines.....5

- 3b. Third dorsal-fin spine longer than other spines (except for females of *O. borbonius*) .....4
- 4a Body depth 1.9–2.3 in SL; dorsal-fin rays 16–18 (modally 17); body pink to red with 9–11 distinct dark brown or yellow blotches on lateral side of body .....*O. borbonius*
- 4b Body depth 2.2–2.5 in SL; dorsal-fin rays 16–17 (modally 16); color not as above.....*O. randalli*
- 5a Caudal fin mainly yellow; caudal fin lobes tapering; lateral line scales 36–38.....*O. chrysostictus*
- 5b Caudal fin mainly red; caudal fin lobes broad and blunt; lateral line scales 38–42.....*O. katayamai*

#### Family Pomacentridae

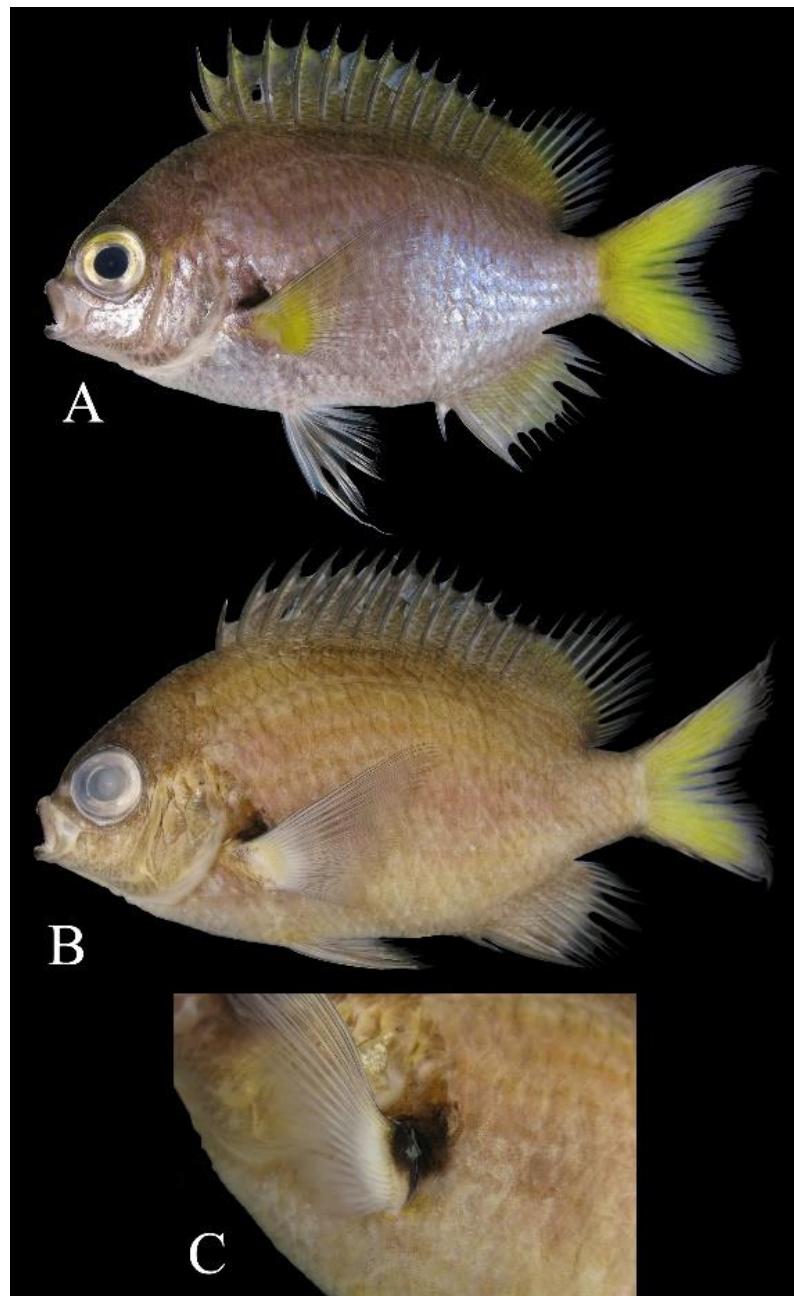
*Chromis tingting* Tea, Gill & Senou, 2019

月石光鰓雀鯛

Fig. 7; Tab. 2

**Material examined.** NMMB-P34142, 101.3 mm SL, Cianjen fish market, Kaohsiung, southern Taiwan, 28 Jun. 2020.

**Description.** Dorsal-fin elements XIV, 14; anal-fin elements II, 12; pectoral-fin rays 20, upmost and lowest two unbranched; pelvic-fin elements I, 5; principal caudal-fin rays 8+7; upper/lower procurent caudal-fin rays 4/4; lateral-line scales 18; scale rows between lateral line and dorsal-fin origin 3; full size scales



**Fig. 7.** *Chromis tingting* Tea, Gill & Senou, 2019, NMMB-P34142, 101.3 mm SL; A. Fresh coloration; B. Preserved coloration; C. Black spot on the base of pectoral-fin axil.

**Tab. 2.** Measurements of *Chromis tingting* collected from Taiwan.

	<i>C. tingting</i> NMMB-34142		
	SL (mm)	% SL	% HL
SL (mm)	101.3		
% SL			
Greatest body depth	49.0	48.4	140.8
Body depth at anal origin	44.6	44.0	128.2
Body width	19.0	18.8	54.6
Head length	34.8	34.4	183.2
Snout length	9.0	8.9	47.4
Orbit diameter	13.3	13.1	70.0
Bony interorbital width	11.9	11.7	62.6
Caudal-peduncular depth	13.8	13.6	72.6
Caudal-peduncular length	10.6	10.5	55.8
Upper jaw length	10.0	9.9	52.6
Predorsal length	40.1	39.6	211.1
Dorsal-fin base	64.5	63.7	339.5
Soft dorsal-fin base	16.1	15.9	84.7
1st dorsal-fin spine	8.6	8.5	45.3
2nd dorsal-fin spine	14.8	14.6	77.9
3rd dorsal-fin spine	17.1	16.9	90.0
4th dorsal-fin spine	18.3	18.1	96.3
5th dorsal-fin spine	18.7	18.5	98.4
6th dorsal-fin spine	18.6	18.4	97.9
14th dorsal-fin spine	12.7	12.5	66.8
1st dorsal-fin ray	13.9	13.7	73.2
Longest dorsal-fin ray	18.5	18.3	97.4
Preanal length	73.2	72.3	385.3
Anal-fin base	23.3	23.0	122.6
1st anal-fin spine	7.3	7.2	38.4
2nd anal-fin spine	19.5	19.2	102.6
1st anal-fin ray	18.4	18.2	96.8
Longest anal-fin ray	18.6	18.4	97.9
Caudal-fin length	27.9	27.5	146.8
Caudal-fin concavity	10.8	10.7	56.8
Longest pectoral ray	34.3	33.9	180.5
Prepelvic length	48.2	47.6	253.7
Pelvic-spine length	16.9	16.7	88.9
1st pelvic-fin soft ray	30.3	29.9	159.5

above the highest point of lateral line to base of middle dorsal-fin spines 1; scale rows between lateral line and anal-fin origin 10; circumpeduncular scales 14; gill rakers 7+21=28; pseudobranches 22; vertebrae 24. Body moderately deep and

compressed, its depth 2.1 in SL and width 2.6 in body depth; head length 2.9 in SL; shorter than orbit diameter, its length 3.9 in HL; interorbital width 2.9 in HL; mouth small and oblique, upper jaw forming an angle of about 45° to horizontal axis of

head and body; upper jaw length 3.5 in HL; caudal-peduncular depth 2.5 and length 3.3 in HL. eye large, orbit diameter 2.6 in HL; snout

Dorsal fin with a long base, its length 1.6 in SL, base of spinous part slightly longer than the soft-ray part; pre-dorsal length 2.5 in SL; origin of dorsal fin above the second lateral-line scale; first dorsal-fin spine shortest, slightly longer than half length of second spine, its length 4.0 in HL; second dorsal-fin spine 2.4 in HL; third dorsal-fin spine 2.2 in HL; fifth dorsal-fin spine longest, its 1.9 in HL; fifth dorsal-fin ray longest, its 1.9 in HL, fourth dorsal-fin ray about same length. Anal fin small with a short base, its base 1.5 in HL, much shorter than that of soft-ray part of dorsal fin; pre-anal length 1.4 in SL; anal fin base 4.3 in SL; first anal-fin spine 4.8 in HL; second anal-fin spine 1.8 in HL; fifth anal-fin ray longest, its 1.8 in HL, third and fourth anal-fin ray about same length. Caudal fin moderately short, its length 3.6 in SL; longest pectoral-fin ray 3.0 in SL; pelvic-fin spine 2.1 in HL.

*Coloration.* When fresh (Fig. 7A): head and body dark grey; a yellow patch in front of eye; scales between anal fin and lateral line flashy blue; pectoral fin base bright yellow with a large black patch on its inner axis; dorsal fin and pectoral fin greyish yellow; anal fin lightly yellowish grey; caudal fin bright yellow with white

margins. When preserved (Fig. 7B): head and body light brown; caudal fin light yellow with white margin; pectoral-fin base light white, inner axis with large black spot (Fig. 7C).

**Distribution.** Previously only known from Japan and probably Korea (Tea et al., 2019). Newly collected from Kaohsiung, Taiwan represents the southernmost record within its currently distributed range.

**Remarks.** Base on some underwater photographs from fish image database curated by the Kanagawa Prefectural Museum of Natural History (KPM), the species frequents deep reefs with some sponge and coral cover, at depths reaching 86 m, though it has been infrequently recorded at shallower depths of 25 m. It is frequently seen in the company of *Sacura* spp., *Pseudanthias* spp., *Tosanoides* spp. and *Pseudolabrus* spp. (Tea et al., 2019). The Taiwan specimen was caught alongside males of *Sacura margaritacea*, *O. rhodopeplus*, *O. katayamai*, males and females of *Selenanthias analis* and *Plectranthias sheni*. Although the fisherman stated that these specimens were collected at depths around 140–180 m, this is much deeper than the noted in original description and thus needs to be verified. Deep water demselfishes like *C. tingting*, *C. mirationis* and *C. okamurae* were not common at fish market, they mainly being a bycatch with others small anthias fishes,

it is not easy for researchers to collect specimens.

*Chromis tingting* has a similar coloration pattern as *C. mamatapara* Shepherd et al. 2020, a species described from Rapa Nui (Easter Island). They can be distinguished from one another in the following characteristic and coloration, data of *C. mamatapara* were mentioned in brackets below: pectoral-fin rays 20 (vs. 18–19); total gill rakers 28 (vs. 30–32); vertebrae 24 (vs. 26); caudal-peduncular dark color with light purple (vs. light yellow).

The Taiwan specimen was slightly different from the type species in having a smaller eye, orbit diameter 2.6 (vs. 2.1–2.4) in HL; a smaller body depth 2.1 (vs. 1.9–2.0) in SL; a shorter upper-jaw length 3.5 (vs. 2.8–3.4) in HL; a shorter caudal-peduncle length 3.3 (vs. 2.7–2.9) in HL; a shorter pre-dorsal length 2.5 (vs. 2.1–2.4) in SL; and a shorter first dorsal-fin spine 4.0 (vs. 3.0–3.9) in HL.

#### Comparative materials

*Odontanthias katayamai*: NMMB-P033929, 95 mm SL, Kanzaiding Fish Market, Keelung, northern Taiwan, 13 Dec. 2019; NMMB-P034670, 90 mm SL, Cianjhen fish market, Kaohsiung, southern Taiwan, 20 Aug. 2020; NMMB-P34707, 137.8 mm SL, Kanzaiding Fish Market, Keelung, 17 Apr. 2020. *Odontanthias borbonius*: NMMB-P34706, 116.7 mm SL,

Kanzaiding Fish Market, Keelung, 23 Mar. 2020. *Odontanthias rhodopeplus*: NMMB-P34708, 173.5 mm SL, Kanzaiding Fish Market, Keelung, 15 Sep. 2020. *Odontanthias unimaculatus*: NMMB-P 34709, 138.1 mm SL, Kanzaiding Fish Market, Keelung, 24 May 2020. *Chromis mirationis*: NMMB-P34682, 114 mm SL, Cianjhen fish market, Kaohsiung southern Taiwan, 20 Aug. 2020. *Chromis okamurai*: NMMB-P34710, 102.4 mm SL, Chen-jien fish market, Kaohsiung, 31 Aug. 2020.

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#### References

- Allen, G. & M. Erdmann. 2012. Reef Fish of the East Indies. Volumes I–III. Tropical Reef Research, Perth, Australia, pp. 1292.  
Carvalho-Filho, A., B. C. L. Macena & D. M. Nunes. 2016. A new species of Anthiadinae (Teleostei: Serranidae) from São Pedro and São Paulo Archipelago, Brazil, Equatorial Atlantic. Zootaxa, 4139(4): 585-592.  
Cuvier, G. & A. Valenciennes. 1828. Histoire naturelle des poissons. Tome second. Livre Troisième. Des poissons de la famille des perches, ou des percoïdes, 2:

- 1–490, pls. 9–40.
- David, L., & T. W. Jeffrey. 2004. Description of a new species of damselfish (Pomacentridae: *Chromis*) from Rapa Island, French Polynesia. *Aqua, Journal of Ichthyology and Aquatic Biology*, 8(3): 97–102.
- Froese, R. & D. Pauly. 2020. Fishbase. WWW electronic publication. [www.fishbase.org](http://www.fishbase.org).
- Günther, A. 1872. Report on several collections of fishes recently obtained for the British Museum. *Proceedings of the Zoological Society of London*, 1871(3) (art. 1): 652–675, pls. 53–70.
- Gripp, R. & J. Adams. 2006. Reef Builders. World Wide Web aquatics publication. [www.reefbuilders.com](http://www.reefbuilders.com).
- Lee, S.-C. 1990. A revision of the serranid fish (family Serranidae) of Taiwan. *Journal of Taiwan Museum*, 43(2): 1–72.
- Nakabo, T., 2002. Fishes of Japan with pictorial keys to the species. Third Edition. Tokai University Press, Hiratsuka, 1032–1040.
- Randall, J. E., A. L. Maugé & Y. B. Plessis. 1979. Two new anthiine fishes of the genus *Holanthias* from the southern and western Pacific. *Japanese Journal of Ichthyology*, 26(1): 15–25.
- Randall, J. E. & P. C. Heemstra. 2006. Review of the Indo Pacific Fishes of the genus *Odontanthias* (Serranidae: Anthiinae), with descriptions of two new species and a related new genus. *Indo-Pacific Fishes* 38: 1–32.
- Randall, J. E. & S. N. Swerdloff. 1973. A review of the damselfish genus *Chromis* from the Hawaiian Islands, with descriptions of three new species. *Pacific Science*, 27: 327–349.
- Shao, K.-T. 2020. Taiwan Fish Database. WWW Wed electronic publication. <http://fishdb.sinica.edu.tw>.
- Shepherd, B., H. T. Pinheiro, T. A. Y. Phelps, E. E. Easton, A. Pérez-Matus & L. A. Rocha. 2020. A new species of *Chromis* (Teleostei: Pomacentridae) from mesophotic coral ecosystems of Rapa Nui (Easter Island) and Salas y Gómez, Chile. *Copeia*, 108(2): 326–332.
- Tanaka, S. 1917. Eleven new species of fish from Japan. *Zoological Magazine Tokyo*, 29(339): 7–12.
- Tanaka, S. 1917. Six new species of Japanese fishes. *Zoological Magazine Tokyo*, 29(345): 198–201.
- Tea, Y. K., A. C. Gill & H. Senos. 2019. *Chromis tingting*, a new species of damselfish from mesophotic coral ecosystems of southern Japan, with notes on *C. mirationis* Tanaka (Teleostei: Pomacentridae). *Zootaxa*, 4586(2): 249–260.
- White, W.T. 2011. *Odontanthias randalli* n. sp., a new anthiine fish (Serranidae: Anthiinae) from Indonesia. *Zootaxa*, 3015(1): 21–28.
- Yamakawa, T. & J. E. Randall. 1989. *Chromis okamurae*, a new damselfish from the Okinawa Trough, Japan. *Japanese Journal of Ichthyology*, 36(3): 299–302.
- Young, S. S., H. J. Kwun, J. K. Kim & S. Hiroshi. 2014. A new record of juvenile *Chromis mirationis* (Perciformes: Pomacentridae) from Korea, revealed by molecular analysis, with a comparison to juvenile *Chromis notate*. *Fisheries and Aquatic Sciences*, 17(2): 263–267.
- Arango, B. G., H. T. Pinheiro, C. R. Rocha, B. D. Greene, R. L. Pyle, J. M. Copus, B. Shepherd & L. A. Rocha. 2019. Three new species of *Chromis* (Teleostei: Pomacentridae) from mesophotic coral ecosystems of the Philippines. *ZooKeys*, 835: 1–15.