

***Dascyllus auripinnis*, a New Pomacentrid Fish from Atolls of the Central Pacific Ocean**

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John E. Randall and Helen A. Randall (2001) *Dascyllus auripinnis*, a new pomacentrid fish from atolls of the central Pacific Ocean. *Zoological Studies* 40(1): 61-67. A new damselfish (Pomacentridae) is described from 18 specimens from the Line Islands, one from the Phoenix Islands, and its presence in the northern Cook Islands is revealed by underwater photographs. It is distinctively colored with bright orange-yellow pelvic, anal, and caudal fins. Previously believed to be a color variant of *D. trimaculatus*, it differs, in addition to color, by having modally 1 fewer gill rakers and a shorter average length of the paired fins. There is also an indication that it attains a larger maximum size (largest, 115.2 mm SL).

Key words: Taxonomy, Pomacentridae, *Dascyllus*, Central Pacific.

The Indo-Pacific pomacentrid fish genus *Dascyllus* Cuvier was revised by H. Randall and Allen (1977); they recognized 9 species, 7 of which occur at islands of Oceania. One of these, the wide-ranging *D. trimaculatus* Rüppell (Figs. 1, 2), was noted to exhibit a peculiar variation in the Line Islands, Gilbert Islands (Kiribati), and Fiji. The pelvic, anal, and caudal fins are orange, and this color may extend onto the abdomen, chest, and lower portion of the head. Their black and white figure 5 was cited as an example of this form from Fiji. The same photograph was reproduced in color by Allen (1991: 109). The Fiji fish is orange only basally on the anal and pelvic fins, and the caudal fin is black with longitudinal orange streaks; there is an elongate orange-yellow spot on most interspinous membranes of the dorsal fin. They concluded from Allen's observations that the orange-finned variety is correlated with an environment characterized by relatively turbid water and heavy silting.

We have noted that the only variety of *Dascyllus trimaculatus* in the Line Islands is one with orange-yellow pelvic, anal, and caudal fins, and orange-yellow on the ventral part of the body. Also, it can occur in well-developed reef areas in clear water at these islands. We then suspected that this may be

an insular subspecies of *D. trimaculatus* in the Line Islands or an endemic species closely related to *D. trimaculatus* (like *D. albisella* in the Hawaiian Islands and *D. strasburgi* in the Marquesas); however, we found 1 specimen from Canton Island, Phoenix Islands in the Bishop Museum fish collection with a detailed color note revealing it to be the same as the Line Islands form. Only the typical dark form of *D. trimaculatus* has been observed and collected at the islands of French Polynesia and the Pitcairn Islands. Recently Helmut Debelius sent us underwater photographs of both color forms of *D. trimaculatus* taken at the same reef at Penrhyn Atoll (Tongareva) in the northern Cook Islands. We asked Charles J. Boyle, an aquarium fish collector at Rarotonga in the southern Cook Islands, if he could obtain specimens of the form with orange-yellow fins. However, he informed us that only the dark form occurs at Rarotonga.

Knowing that both forms co-occur in the northern Cook Islands has led us to a careful comparison of specimens in the expectation that the form with orange-yellow fins will prove to be a different and hence undescribed species. Specimens of typical *D. trimaculatus* were selected from Bishop Museum material from the Society Islands, Austral Islands, and Pitcairn Islands in the same adult size range as

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the specimens of the form with orange-yellow fins. In addition to the obvious color differences, we found that the variety with orange-yellow fins has modally 1 less gill raker (Table 1) and shorter paired fins. We therefore have no hesitation in describing it as a new species.

MATERIALS AND METHODS

Specimens of the new species of *Dascyllus* were deposited at the following institutions: Australian Museum, Sydney (AMS); Institute of Zoology, Academia Sinica, Taipei (ASIZP); The Natural History Museum, London (BMNH); Bernice P. Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS); Natural History Museum of Los Angeles County (LACM); Museum National d'Histoire Naturelle, Paris (MNHN); National Science Museum, Tokyo (NSMT); Royal Ontario Museum; Toronto (ROM); US National Museum of Natural History, Washington, DC (USNM), and Raffles Museum of Biodiversity Research, National University of Singapore (ZRC).

Lengths given for specimens are standard length (SL), the straight-line distance from the front of the upper lip (when not protruded) to the base of the caudal fin (distal end of the hypural plate). Head length is measured from the same median anterior point to the end of the opercular membrane, and snout length from the same point to the fleshy edge of the orbit. Body depth is the maximum depth from the base of the dorsal spines, and body width the greatest width just posterior to the gill opening. Orbit diameter is the greatest fleshy diameter, and interorbital width the least fleshy width. Caudal-peduncle depth is the least depth, and caudal-peduncle length is measured horizontally from the rear base of the anal fin to the caudal-fin base. Lengths of fin spines and soft rays are taken to their extreme base. Caudal concavity is the horizontal distance from a vertical at the tips of the shortest and longest caudal rays.

The anterior series of lateral-line scales are all tube-bearing; posterior midlateral lateral-line scales include tubed, pored, and deeply pitted scales, all of which are counted. Gill-raker counts were made on the 1st gill arch and include the rudiments; the upper-limb count is given first, and the raker at the angle is contained in the lower-limb count.

Proportional measurements are presented in table 2 as percentages of the standard length. Proportions in the text are step-in measurements rounded to the nearest 0.05. Data in parentheses in the description refer to paratypes if different from

those of the holotype. The one small paratype was not used for proportional measurements, and a gill-raker count was not made from it.

Dascyllus auripinnis, sp. nov.

(Figs. 3, 4; Tables 1, 2)

Dascyllus trimaculatus (in part), H Randall and Allen, 1977: 362-363 [Line Islands].

Holotype: BPBM 7537, ♂, 106.2 mm, Line Is., Tabuaeran (Fanning I.), lagoon side of English Harbor, coral head (mostly *Millepora*) and white sand, 6 m, spear, JE Randall, 26 Oct. 1968.

Paratypes: AMS I.39964-001, 102.5 mm, and CAS 211523, 105.5 mm, same data as holotype; BPBM 7703, 3: 72.4-108.8 mm, Line Is., Palmyra, SE of Sand I., 3.5 m, spear, JE Randall and JP McVey, 13 Nov. 1968; BPBM 19941, 2: 83.1-96.1 mm SL, BMNH 2000.3.1.1, 108.3 mm, LACM 54140-1, 106.1 mm, MNHN 2000-0515, 100.8 mm, NSMT-P 59286, 107.2 mm, ROM 72216, 101.5 mm, Line Is., Tabuaeran (Fanning I.), lagoon near Buoy 1 off plantation, 4-6 m, spear, RC Wass and G Peterson, 15-17 Dec. 1969; USNM 360267, 107.7 mm, Tabuaeran, patch reef in lagoon, 4.5 m, spear, EH Chave and DB Eckert, July 1972; BPBM 16260, 2: 78.0-91.2 mm, Phoenix Is., Canton I., lagoon just E of Spam I., *Pocillopora* head in 1.5 m, spear, RS Henderson, 7 Dec. 1973; BPBM 19575, 24.5 mm, Tabuaeran, lagoon, quinaldine, EH Chave, early Aug. 1975; ASIZP 60474, 115.2 mm, Line Is., Kiritimati (Christmas I.), NW side off North London Resettlement Area, isolated reef, 30 m, rotenone, JE Randall and JB Culp, 2 Aug. 1987.

Diagnosis: Dorsal rays XII,14-15; anal rays II, 14-15 (usually 14); upper and lower spiniform procurrent caudal rays 2; pectoral rays 19-20 (usually 20); tubed lateral-line scales 18-19 (usually 19); gill rakers 7-9 + 17-20 (total, 24-27); body depth 1.5-1.65 in SL; body bluish gray dorsally, the scale edges black to dark brown, shading to orange-yellow ventrally; a small white blotch often present in middle of body just above lateral line; pelvic, anal, and caudal fins bright orange-yellow, the margins black. Largest specimen, 115.2 mm SL.

Description: Dorsal rays XII,15 (2 paratypes with 14, 15 with 15, and 1 with 16); anal rays II,14 (14-15, only 2 of 18 paratypes with 15); 1st dorsal and anal soft rays unbranched, the remaining rays branched, the last to base; principal caudal rays 8 + 7, the median 13 branched; upper and lower procurrent caudal rays 4, the anterior 2 spiniform, the posterior 2 segmented; pectoral rays 20 (5 paratypes with 19, 13 with 20), the upper 2 unbranched, the lower 1 or 2

unbranched and very slender; pelvic rays I,5; tubed lateral-line scales 18 (5 of 16 paratypes with 18, the rest with 19; two with tubed scales missing from spear damage); posterior midlateral scales with a pore or tube 8 (5-10); rows of large scales above lateral line to origin of dorsal fin 3; rows of large scales below lateral line to origin of anal fin 10; circum-peduncular scales 16; gill rakers 8 + 18 (7-9 + 17-20); total gill rakers 24-27; pseudobranchial filaments 19 (11 in 24.5-mm paratype, 20 in 115.2-mm paratype); branchiostegal rays 6; supraneural (predorsal) bones 3; vertebrae 11 + 15.

Body moderately deep, the depth 1.65 (1.5-

1.65) in SL, and compressed, the width 3.1 (3.15-3.4) in body depth; head length 3.45 (3.2-3.4) in SL; snout short, its length 3.2 (3.1-3.4) in head length; eye moderately large, the orbit diameter 2.9 (2.5-2.95) in head; interorbital space convex, the least width 2.8 (2.6-2.9) in head; caudal-peduncle depth 1.65 (1.55-1.7) in head; caudal-peduncle length 2.1 (2.1-2.35) in head.

Mouth small, the maxilla reaching posterior to a vertical at anterior nostril, the upper-jaw length 3.2 (2.65-3.2) in head length; mouth terminal when jaws fully closed, and strongly oblique, the gape forming an angle of about 45° to horizontal axis of head and



Fig. 1. *Dascyllus trimaculatus*, BPBM 20477, 94 mm SL, Port Sudan, Red Sea.



Fig. 3. Holotype of *Dascyllus auripinnis*, BPBM 7537, 106.2 mm SL, Tabuaeran (Fanning Island), Line Islands.



Fig. 2. Underwater photograph of *Dascyllus trimaculatus*, male at nest site, Tahiti, Society Islands.



Fig. 4. Underwater photograph of *Dascyllus auripinnis*, about 105 mm total length, Tabuaeran (Fanning Island), Line Islands.

body; an outer row of stout conical teeth in jaws, with 4 on each side at front of jaw much larger than remaining teeth which diminish gradually in size posteriorly, 22 on each side of jaws of holotype; an inner band of villiform teeth in jaws, in about 5 to 6 rows anteriorly in upper jaw and 2 to 3 in lower, the bands narrowing posteriorly. Tongue thick, broadly triangular, with rounded tip, the upper surface papillate. Gill rakers slender, the longest on lower limb of 1st arch about 3/4 length of longest gill filaments and nearly 1/2 orbit diameter in holotype. Anterior nostril round with a low rim, about a pupil diameter in front of orbit at level of lower edge of pupil; posterior nostril about 1/2 size of anterior nostril, with a slight rim, a little in front of orbit at level of center of eye, the internarial distance in holotype about 5 in orbit diameter. Pores of lateralis system of head small and difficult to detect.

Bony edge of opercle ending posteriorly in a flat spine that nearly forms a right angle; margin of preopercle finely serrate, the serrae increasing in size toward the rounded corner; posterior margin of preopercle free to or slightly above level of center of

eye, and lower margin free to below posterior end of maxilla; lower edge of suborbital finely serrate, free nearly to a vertical at posterior edge of orbit.

Scales finely ctenoid; head fully scaled except lips, isthmus, and a narrow zone around anterior nostril, continuing as a naked band to orbit just below posterior nostril; a scaly sheath at base of dorsal and anal fins, with smaller scales extending outward as a narrowing band on each membrane; very small scales on caudal fin nearly reaching posterior edge of fin; small scales on about basal 1/3 of pectoral fins; a pointed scaly process extending posteriorly from between bases of pelvic fins, its length nearly

Table 1. Total gill rakers of *Dascyllus auripinnis* and *D. trimaculatus*

	Gill rakers				
	24	25	26	27	28
<i>D. auripinnis</i>	3	10	4	1	
<i>D. trimaculatus</i>		1	10	6	2

Table 2. Proportional measurements of type specimens of *Dascyllus auripinnis* expressed as percentages of the standard length

	Holotype	Paratypes							
	BPBM 7537	BPBM 7703	BPBM 16260	BPBM 19941	BPBM 16260	BPBM 19941	BPBM 7703	BPBM 7703	ASIZP 60474
Sex	male	male	male	male	male	female	male	female	female
Standard length (mm)	106.2	72.4	78.0	83.1	91.2	96.1	102.4	108.8	115.2
Body depth	61.1	60.8	60.0	66.5	63.8	63.2	62.6	62.6	62.9
Body width	19.7	17.9	18.8	19.5	18.7	19.2	19.3	18.4	20.0
Head length	28.9	30.0	30.3	31.4	29.3	29.4	30.2	29.7	29.3
Snout length	9.0	9.4	9.4	9.3	9.3	9.3	9.5	9.6	8.8
Orbit diameter	9.9	11.9	11.1	11.4	10.0	10.0	10.5	10.1	10.2
Interorbital width	10.3	11.3	11.5	11.8	11.6	10.9	10.8	11.0	11.1
Caudal-peduncle depth	17.5	17.7	18.1	20.4	18.5	18.7	17.8	17.5	17.9
Caudal-peduncle length	13.7	13.7	13.8	13.9	13.3	13.9	12.9	14.2	13.9
Upper-jaw length	9.1	10.8	10.4	10.8	9.7	9.7	9.6	9.4	9.1
Predorsal length	43.2	44.5	45.0	47.4	45.3	42.6	45.4	43.5	44.6
Preanal length	67.6	67.7	67.9	68.7	67.7	66.5	64.3	65.7	65.8
Prepelvic length	38.4	38.6	38.0	39.8	39.2	37.5	38.5	37.1	38.8
Dorsal-fin base	64.5	70.5	66.4	70.6	68.3	68.5	67.9	67.4	69.7
Spinous dorsal base	43.1	47.9	46.8	48.2	46.4	48.5	47.0	44.7	48.6
First dorsal spine	11.9	12.0	11.6	12.6	12.2	11.4	11.7	11.6	12.1
Second dorsal spine	26.4	30.4	26.2	26.4	26.0	23.3	25.9	28.2	26.2
Longest dorsal ray	24.5	25.3	25.5	27.6	26.4	26.9	26.3	24.9	25.7
First anal spine	11.4	12.7	11.8	12.6	12.1	12.2	11.5	12.1	12.1
Second anal spine	23.6	25.3	23.4	25.4	23.9	23.5	24.6	24.7	23.2
Longest anal ray	26.6	29.8	28.7	28.3	28.7	27.3	28.3	27.2	27.6
Caudal-fin length	30.4	33.6	33.0	32.0	32.4	31.2	33.5	30.4	30.8
Caudal concavity	4.5	4.5	4.7	4.9	4.8	4.7	4.4	4.6	4.3
Pectoral-fin length	29.2	33.2	30.8	33.9	30.9	32.2	32.7	32.5	32.8
Pelvic-spine length	19.8	23.5	21.8	21.7	21.6	20.7	22.8	22.5	21.3
Pelvic-fin length	31.9	39.9	34.0	38.3	32.6	35.6	35.0	33.9	33.9

1/2 length of pelvic spines; a slender axillary scale above base of each pelvic fin, about 3/5 length of pelvic spine. Anterior portion of lateral line ending below middle of base of soft portion of dorsal fin.

Origin of dorsal fin above tip of opercular spine, the predorsal distance 2.3 (2.2-2.3) in SL; base of soft portion of dorsal fin 1.5 (1.4-1.5) in base of fin; membranes of spinous portion of dorsal fin not incised except the 1st; 1st dorsal spine 2.45 (2.4-2.6) in head length; 2nd dorsal spine longest, 3.8 (3.3-4.3) in SL; 5th dorsal soft ray usually longest, 4.1 (3.6-4.0) in SL; origin of anal fin below base of 9th dorsal spine, the preanal distance 1.5 (1.45-1.55) in SL; 1st anal spine 2.55 (2.35-2.6) in head; 2nd anal spine 4.25 (3.95-4.3) in SL; 5th anal soft ray usually longest, 3.75 (3.35-3.7) in head; caudal fin slightly emarginate with broadly rounded lobes, the upper longer than lower, the fin length 3.3 (3.0-3.3) in SL, the caudal concavity 6.4 (6.4-6.85) in SL; pectoral fins pointed, the 3rd or 4th rays longest, 3.4 (2.95-

3.25) in SL; origin of pelvic fins slightly anterior to base of pectoral fins, the prepelvic distance 2.6 (2.5-2.7) in SL; pelvic spine 1.45 (1.3-1.4) in head; 2nd pelvic soft ray longest, 3.15 (2.5-3.1) in SL.

Color of holotype in alcohol: medium orangish brown dorsally, the scale edges darker, light brownish orange ventrally, the scale centers light brown; head medium orangish brown; scaled basal part of dorsal fin brown like body, the spines dark brown, the naked outer interspinous membranes with a very broad dark brown margin, each membrane with a pale blotch above band of scales; soft portion of dorsal fin with pale yellowish rays and translucent membranes; spinous portion of anal fin brown, the soft portion like that of dorsal fin except for a narrow black margin; caudal fin light brownish orange, the membranes translucent yellowish, with narrow black upper and lower margins and a broader black posterior margin; pectoral fins pale yellowish with a large blackish blotch on upper 1/3 of base and extending

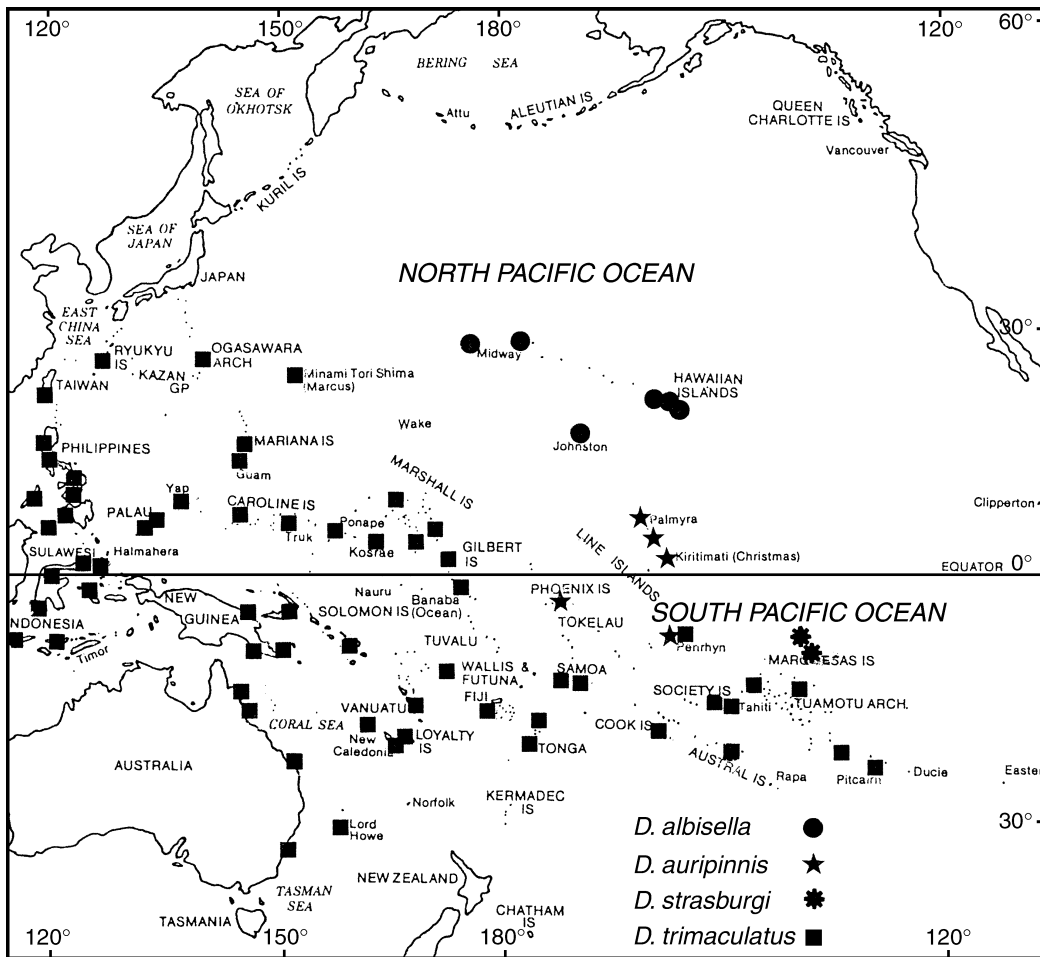


Fig. 5. Distribution of the species of the *Dascyllus trimaculatus* complex in the Pacific.

slightly into axil of fin; pelvic fins with light yellowish brown rays, translucent yellowish membranes, and a black margin.

Five of the 19 type specimens have scattered small jet black spots and flecks under the scales of the body; these seem to be more the result of a disease than normal color markings.

Color of holotype when fresh: body bluish gray dorsally, the scale edges black, becoming dark brown on sides, and orange-yellow ventrally (the most ventral scales entirely orange-yellow); a bilobed white spot on upper part of 11th and 12th lateral-line scales and the scales just above; head dark orangish brown; scaled basal part of dorsal fin light bluish gray with blackish edges, each naked interspinous membrane with a pale bluish gray blotch above band of scales; spinous portion of fin with a broad outer black margin; soft portion of dorsal fin with whitish rays and transparent membranes; pelvic, anal, and caudal fins bright orange-yellow, the margins black.

Etymology: This species is named *Dascyllus auripinnis* from the Latin *aureus* meaning golden, and *pinna* for fin, in reference to the bright orange-yellow pelvic, anal, and caudal fins.

Remarks: *Dascyllus auripinnis* is 1 of 4 similar species of the *D. trimaculatus* complex. *D. trimaculatus* (Rüppell) is wide-ranging from the Red Sea and coast of East Africa to the Marshall Islands, islands of French Polynesia, and the Pitcairn Islands. *D. albisella* Gill and *D. strasburgi* Klausewitz are endemic to the Hawaiian Islands and Marquesas, respectively. From our type material, we know *D. auripinnis* only from 3 of the Line Islands and Canton in the Phoenix Islands (Fig. 5). As noted above, underwater photographs (on file at the Bishop Museum) reveal its presence at Penrhyn (Tonga-reeva) in the northern Cook Islands where it is sympatric with *D. trimaculatus*. All of the localities are atolls.

In addition to color and the difference in gill-raker counts, *D. auripinnis* differs from *D. trimacu-*

latus in having shorter pectoral and pelvic fins. The pectoral-fin length of 15 type specimens of *D. auripinnis*, 91.2-115.2 mm, varies from 30.0%-32.8% SL (mean 30.8%), compared to 31.6%-35.0% (mean 33.5%) for 16 specimens of *D. trimaculatus*, 91.5-107.4 mm. For the pelvic fins, the percentages are 29.6%-35.8% (mean 33.1%) for *D. auripinnis*, and 33.0%-37.9% (mean 35.6%) for *D. trimaculatus*.

The fish from Fiji mentioned in the introductory paragraph that was orange basally on the anal and pelvic fins, with streaks of orange in the caudal fin and spinous part of the dorsal fin, is a color variant of *D. trimaculatus*.

Dascyllus auripinnis appears to attain larger maximum size than *D. trimaculatus*. Randall and Allen (1977) examined more than 200 specimens of *D. trimaculatus*, the largest at 110 mm SL. The largest in the Bishop Museum fish collection, from Rurutu, Austral Islands, measures 107.4 mm. In selecting the largest specimens for comparison with adults of *D. auripinnis*, only 6 of 16 exceed 100 mm. Of our 18 adult and subadult specimens of *D. auripinnis*, 13 are longer than 100 mm, the largest being 115.2 mm.

Acknowledgments: We thank Helmut Debelius for sending his underwater photographs of *Dascyllus auripinnis* and *D. trimaculatus* from the northern Cook Islands, and Charles J Boyle for his information that *D. auripinnis* remains unknown from the southern Cooks. We also thank Loreen R O'Hara for radiographs and Gerald R Allen for review of the manuscript.

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金鰭圓雀鯛，記中太平洋環礁產一新種雀鯛

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本文根據十八尾採自 Line 島，一尾採自 Phoenix 島，及在 Cook 島北方海域所攝得海底生態照片描述一新種雀鯛，此雀鯛的特徵為其腹鰭、臀鰭及尾鰭為亮麗的橙黃色。過去將此種誤認為三斑圓雀鯛 (*D. trimaculatus*) 的不同體色的個體，本研究則發現它除體色不同外，它的鰓耙數亦少 1 枚，對鰭的平均長度較短。此種之最大體長亦較大（最大可達 115.5 公分，標準體長）。

關鍵詞：分類學，雀鯛科，圓雀鯛屬（宅泥魚屬），中太平洋。

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