

Three New Species of Deep-dwelling Damselishes (*Pomacentridae*) from the South-West Pacific Ocean

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ABSTRACT

Three new species of damselfishes are described which were collected during 1971-1972 while conducting ichthyological investigations aboard the research vessel *El Torito* at Madang, New Guinea; Fergusson Island, D'Entrecasteaux Group; Osprey Reef, Coral Sea; and the Great Barrier Reef. These species were taken in depths ranging from 31 to 50 metres. *Abudefduf starcki* and *A. caeruleolineatus* appear to have no close relatives. The remaining species, *Pomacentrus nigromarginatus*, belongs to the complex which include *P. melanocheir*, *P. melanopterus*, *P. nigromanus* and *P. philippinus*. It is most closely related to the latter species, but differs on the basis of habitat preference and counts for the gill rakers and tubed lateral line scales.

INTRODUCTION

The use of SCUBA (self-contained underwater breathing apparatus) by marine scientists has become increasingly popular. However, in spite of its widespread application, there are few ichthyologists who regularly employ this equipment below 100 feet, primarily because of the physiological hazards involved. During the period extending from November 1971 to June 1972, I had the opportunity to work with Dr. Walter A. Starck II aboard his 65-foot research vessel *El Torito*. This ship was designed by Dr. Starck for support of deep-diving and is equipped with both conventional SCUBA and closed circuit, electronically controlled, mixed gas apparatus. Other equipment includes air compressors, two decompression chambers, and a host of accessories designed for probing the deeper reefs. Our itinerary included the following localities: Palau Archipelago, Western Caroline Islands; Madang, Cape Nelson and Samarai Island, along the north-east coast of Papua New Guinea; Goodenough, Fergusson and Normanby Islands, D'Entrecasteaux Group; Egum Atoll, Solomon Sea; Osprey Reef, Coral Sea; portions of the Great Barrier Reef off Cairns, Queensland. A significant amount of our collecting effort was expended between depths of 100 and 250 feet. The collections were made with rotenone, quinaldine, dipnets and small multi-prong spears. They contain at least 20 new species including three species of deep-dwelling pomacentrids which are described below.

METHODS OF COUNTING AND MEASURING

The methods of counting and measuring are the same as those described in Allen (1972) except the length of the dorsal and anal spines are measured proximally at the base of the spine rather than the point at which the spine emerges from the scaly sheath. Measurements were made with needlepoint dial calipers to the nearest one-tenth millimetre (mm). Standard length is abbreviated as SL. The fraction $\frac{1}{2}$ which appears in the dorsal and anal fin ray formulae refers to a bifurcate conditon of the last ray.

The counts and proportions which appear in parentheses under the description section for each species apply to the paratypes when differing from the holotype. A summary of counts for the dorsal, anal and pectoral fin rays, gill rakers on the first gill arch, and tubed lateral line scales are presented in Tables 1 and 2.

Type material has been deposited at the following institutions: Australian Museum, Sydney (AMS); Bernice P. Bishop Museum, Honolulu (BPBM); British Museum (Natural History), London (BMNH); Museum National d'Histoire Naturelle, Paris (MNHN); United States National Museum, Washington, D.C. (USNM).

DESCRIPTIONS

Abudefduf starcki, new species

Figure 1

Holotype — AMS I.16477-001, 44.7 mm SL, collected with multi-prong spear on outer slope of Osprey Reef, Coral Sea ($13^{\circ}58'S$, $146^{\circ}41'E$; U.S.H.O. Chart No. 2002) in 37 metres by G. R. Allen on June 22, 1972.

TABLE 1

Dorsal and Anal Fin Ray Counts for New Pomacentrids from Papua New Guinea and the Coral Sea

SPECIES	DORSAL RAYS										ANAL RAYS					
	XIII	XIV	11	11½	12	12½	13	13½	14	14½	15	II	13	13½	14	14½ 15
<i>Abudefduf starcki</i>	2								2			2			1	1
<i>A. caeruleolineatus</i>		10		1		8	1					10	2	6	2	
<i>Pomacentrus nigromarginatus</i>	5								1	2	2	5			1	2 2

TABLE 2

Pectoral Ray, Gill Raker, and Tubed Lateral Line Scale Counts for New Pomacentrids from Papua New Guinea and the Coral Sea.

SPECIES	Pecoral Rays			Gill Rakers				Tubed Lateral Line Scales					
	15	16	17	20	21	22	23	12	13	14	15	16	
<i>Abudefduf starcki</i>			1 1		1	1							2
<i>A. caeruleolineatus</i>	1	9		1	4	4	1	2	1	4	2		
<i>Pomacentrus nigromarginatus</i>		2	3	1	4					1	4		

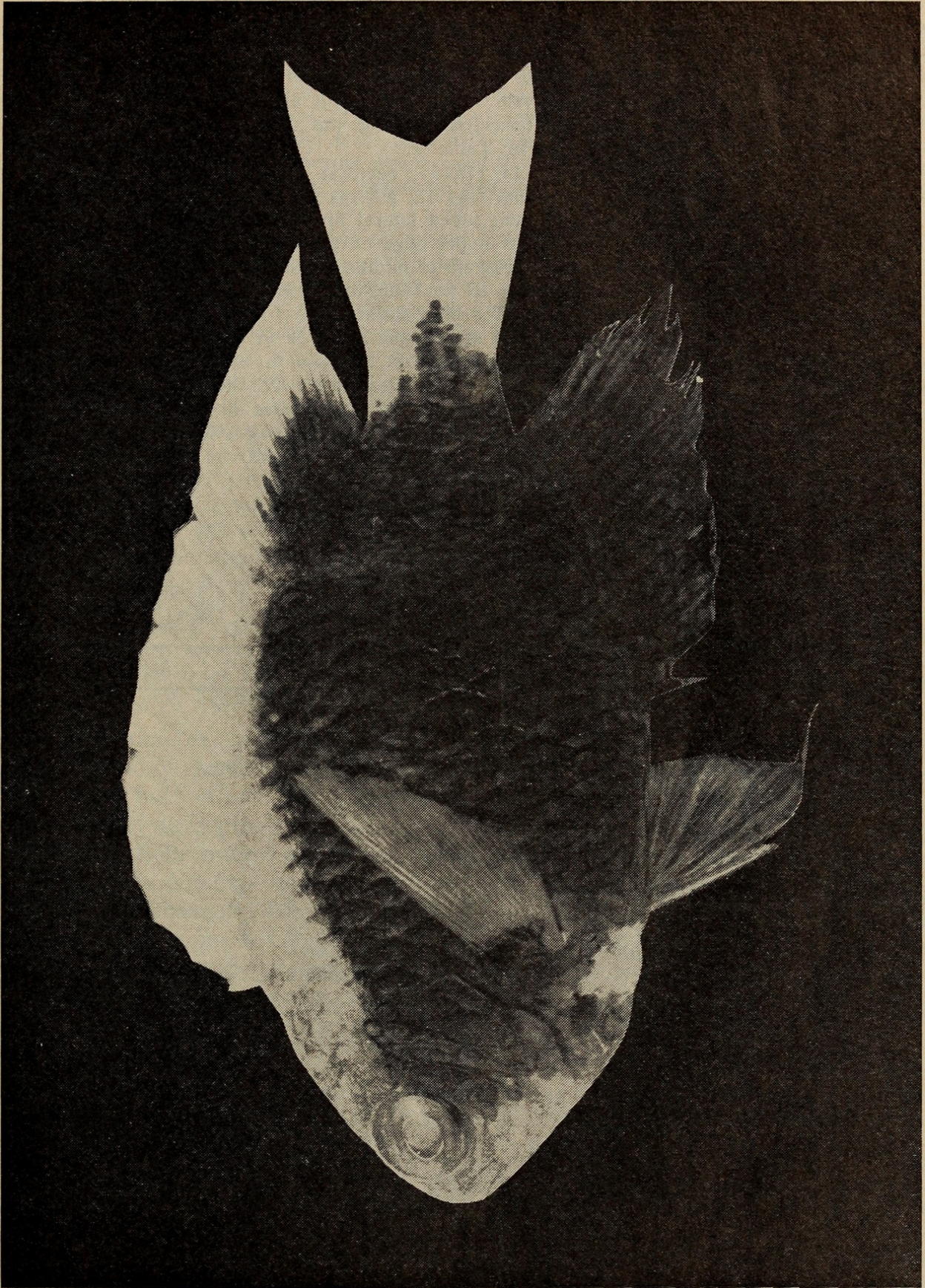


Fig. 1. *Abudehduf starcki*, holotype, 44.7 mm SL, from Osprey Reef, Coral Sea.

Paratype — AMS I.16478-001, 36.0 mm SL, same collecting data as holotype.

Diagnosis — A species of *Abudefduf* with the following combination of characters: Dorsal spines 13; horizontal scale rows between middle of lateral line and dorsal fin base $1\frac{1}{2}$; scales on upper part of head reaching to nostrils; teeth uniserial; preorbital and suborbital naked; body mostly blue with mid-dorsal stripe, dorsal fin and caudal fin yellow.

Description — The proportional measurements for the type specimens are expressed as percentage of the standard length in Table 3.

Dorsal rays XIII,14; anal rays II,14 (II,15); pectoral rays 17 (16 on right side of paratype); pelvic rays I,5; branched caudal rays 13; gill rakers on the first gill arch 22 (21) with bifurcate raker at angle of gill arch; tubed lateral line scales 15 or 16 (damaged on both specimens); vertical scale rows from upper edge of gill opening to base of caudal fin 28; horizontal scale rows from base of dorsal fin to middle of lateral line (exclusive of dorsal base sheath scales) $1\frac{1}{2}$; from lateral line to anal fin origin 9; predorsal scales about 20 extending well forward of anterior edge of orbits, about to level of nostrils; teeth uniserial, close-set, somewhat incisiform with rounded tips, about 36 to 38 in the lower jaw and about 48 to 50 in the upper.

Body ovate and laterally compressed, the greatest depth 2.2 in the standard length. Head profile conical, the head length contained 3.4 (3.3) times in the standard length; snout 4.9 (5.2), eye diameter 2.3 (2.2), interorbital width 3.8 (4.6), least depth of caudal peduncle 2.1 (2.3), length of caudal peduncle 2.5 (2.7), of pectoral fin 1.0 (0.9), of pelvic fin 1.0, of middle caudal rays 1.3 (1.4), all in the head length

TABLE 3

MORPHOMETRIC PROPORTIONS (IN % OF SL) OF TWO SPECIMENS OF *ABUDEFDUF STARCKI* FROM OSPREY REEF, CORAL SEA

Morphometric measurement	N	Range (% SL)	Mean (% SL)
Standard length (SL)	2	36.0-44.7	—
Body depth	2	45.0-46.1	45.5
Head length	2	29.4-30.4	29.9
Snout length	2	5.8-6.1	5.9
Eye diameter	2	12.8-13.9	13.3
Interorbital width	2	6.7-7.9	7.3
Least depth of caudal peduncle	2	13.1-13.9	13.5
Length of caudal peduncle	2	11.1-11.6	11.3
Snout to origin of dorsal fin	2	32.5-33.4	32.9
Snout to origin of anal fin	2	62.4-62.8	62.6
Snout to origin of pelvic fin	2	40.0-40.0	40.0
Length of dorsal fin base	2	60.8-63.0	61.9
Length of anal fin base	2	31.1-33.0	32.0
Length of pectoral fin	2	29.5-32.3	30.9
Length of pelvic fin	2	29.1-30.6	29.8
Length of pelvic spine	2	17.5-20.0	18.7
Length of 1st dorsal spine	1	—	6.6
Length of 6th dorsal spine	2	15.0-16.7	15.8
Length of last dorsal spine	2	15.0-16.4	15.7
Length of longest soft dorsal ray	2	19.7-20.3	20.0
Length of 1st anal spine	2	7.6-8.1	7.8
Length of 2nd anal spine	2	12.3-13.4	12.8
Length of longest anal ray	2	20.0-22.0	21.0
Length of middle caudal rays	2	22.3-23.3	22.8

NEW SPECIES OF DAMSELFISHES

Single nasal opening on each side of snout, difficult to distinguish from surrounding sensory pores; mouth oblique, terminally located; lateral line gently arched beneath dorsal fin, terminating below base of first few soft dorsal rays; preorbital, most of suborbital (2-3 scales on posterior portion), tip of snout, lips, chin, and isthmus naked, remainder of head and body scaled; most of head scales cycloid, remainder of scales finely ctenoid; preopercle with two horizontal scale rows with additional row of smaller scales on inferior limb; small sheath scales covering about basal $\frac{1}{2}$ of membranous portions of dorsal, anal and caudal fins; lower margin of preorbital and suborbital entire; margin of preopercle and opercle entire.

Origin of dorsal fin at level of second tubed lateral line scale; spines of dorsal fin gradually increasing in length to sixth spine, remaining spines about equal; length of first dorsal spine 6.6, of sixth and thirteenth dorsal spines 2.0 (1.9), of longest soft dorsal ray 1.5, of first anal spine 3.9 (3.8), of second anal spine 2.4 (2.3), of longest soft anal ray 1.3 (1.5), all in the head length; caudal fin emarginate; pectoral fins pointed.

Colour of holotype in alcohol: Ground colour of body dark blue grading to blackish posteriorly; broad pale yellow mid-dorsal stripe extending anteriorly from origin of soft dorsal fin to forehead, covering most of region above lateral line; head dusky, paler ventrally; spinous dorsal fin pale with fine black margin; soft dorsal fin blackish basally, pale distally with fine black margin; caudal fin and upper and lower portions of caudal peduncle pale; pelvic and anal fins blackish; pectoral fins pale with blackish basal bar.

The paratype is coloured similarly except the interorbital, snout, and ventral portion of the head are less dusky.

Colour of holotype and paratype in life: Most of body royal blue, broad mid-dorsal stripe of canary yellow extending anteriorly from origin of soft dorsal fin to tip of snout, also engulfing spinous dorsal fin and distal half of soft dorsal fin; ventral portion of head yellow; most of opercle, posterior portion of preopercle and suborbital royal blue; basal half of soft dorsal fin, anal fin, and pelvic fins bluish-black; caudal fin and upper and lower portions of caudal peduncle canary yellow; pectoral fin pale yellow with blackish basal bar.

Remarks—*A. starcki* does not appear to have any close relatives. The combination of characters listed under the diagnosis in addition to the colour pattern are distinctive. About 15 specimens were encountered in the vicinity of the type locality in depths ranging from 35 to 52 metres. The type locality consisted of a steep slope intersected by sand channels. Individuals of *A. starcki* were seen around rocky outcrops and near crevices on the reef slope and also around outcrops in the sand channels. They typically feed on plankton a short distance above the bottom. The stomach contents of the types consisted of 99 per cent copepods with a small quantity of gastropod fragments and polychaetes.

Named *starcki* in honour of Dr. Walter A. Starck II, who first pointed out the species to me while diving at Osprey Reef.

Abudefduf caeruleolineatus, new species

Figure 2

Holotype — USNM 207941, 34.9 mm SL, collected with quinaldine and dipnets on outer reef slope off middle of Kranket Island (5°12'00"S, 145°50'52"E; Aus. Chart No. 648), about 1.5 nautical miles north of Madang, New Guinea in 40 metres by G. R. Allen on April 9, 1972.

Paratypes — AMS I.16480-001, 2 specimens, 36.4 and 37.4 mm SL, collected with multi-prong spear on outer slope of Osprey Reef, Coral Sea in 50 metres by W. A. Starck II on June 23, 1972; BMNH 1972.8.14.4-5, 2 specimens, 30.1 and 37.4 mm SL, same collecting

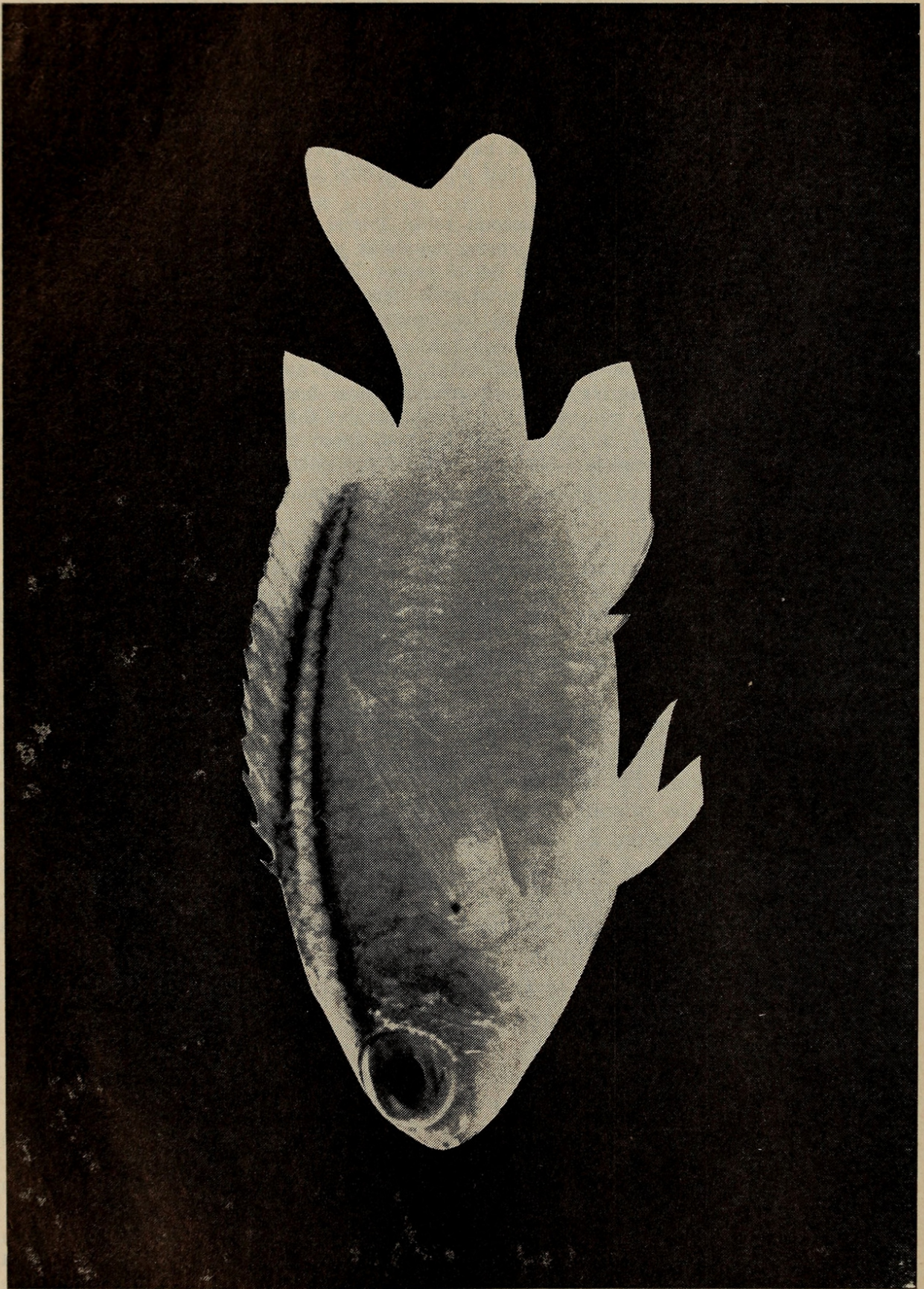


Fig. 2. *Abudedefduf caeruleolineatus*, holotype, 34.9 mm SL, from Madang, New Guinea.

NEW SPECIES OF DAMSELFISHES

data as the holotype; BPBM 13227, 2 specimens, 31.8 and 34.9 mm SL, same collecting data as the holotype except collected on April 4, 1972; MNHN 1972-87, 2 specimens, 32.5 and 36.3 mm SL, same collecting data as the holotype except collected on April 4, 1972; USNM 207942, 36.3 mm SL, same collecting data as the holotype.

Diagnosis — A species of *Abudefduf* with the following combination of characters. Dorsal spines 14; pectoral rays usually 16; tubed lateral line scales 12 to 15; horizontal scale rows between middle of lateral line and dorsal fin base $1\frac{1}{2}$; predorsal scales extending to mid-interorbital; head scales cycloid; teeth uniserial; greatest body depth 2.3 to 2.7; colour bright yellow with iridescent blue stripe above lateral line, extending from anterior portion of soft dorsal fin to snout.

Description — The proportional measurements for the type specimens are expressed as percentage of the standard length in Table 4.

Dorsal rays XIV, $12\frac{1}{2}$ (XIV, $11\frac{1}{2}$ to 13); anal rays II, $13\frac{1}{2}$ (II, 13 to 14); pectoral rays 16 (one paratype with 15); pelvic rays 1, 5; branched caudal rays 13; gill rakers on the first gill arch 21 (20 to 23, usually 22); tubed lateral line scale 15 (12 to 15, usually 13 or 14); vertical scale rows from upper edge of gill opening to base of caudal fin 28 (27 to 28); horizontal scale rows from base of dorsal fin to middle of lateral line (exclusive of dorsal base sheath scales) $1\frac{1}{2}$, from lateral line to anal fin origin 8 (7 to 8); predorsal scale about 12 (about 10 to 14), extending to about mid-interorbital; teeth uniserial, conical with rounded tips, about 40 to 44 in each jaw.

TABLE 4

MORPHOMETRIC PROPORTIONS (IN % OF SL) OF TEN SPECIMENS OF *ABUDEFDUF CAERULEOLINEATUS* FROM MADANG, NEW GUINEA AND OSPREY REEF, CORAL SEA

Morphometric measurement	N	Range (% SL)	Mean (% SL)
Standard length (SL)	10	30.1-37.4	—
Body depth	10	37.7-44.0	40.9
Head length	10	29.1-32.9	31.6
Snout length	10	4.7-7.5	6.3
Eye diameter	10	12.0-14.0	13.1
Interorbital width	10	6.9-8.4	7.6
Least depth of caudal peduncle	10	14.1-16.1	14.9
Length of caudal peduncle	10	9.2-12.9	10.2
Snout to origin of dorsal fin	10	36.0-40.0	38.4
Snout to origin of anal fin	10	64.9-71.5	67.2
Snout to origin of pelvic fin	10	37.0-44.8	40.4
Length of dorsal fin base	10	54.8-63.8	59.6
Length of anal fin base	10	24.5-26.3	25.5
Length of pectoral fin	10	28.9-35.8	32.0
Length of pelvic fin	10	21.9-25.1	23.4
Length of pelvic spine	10	14.0-15.2	14.8
Length of 1st dorsal spine	10	4.4-6.2	4.7
Length of 7th dorsal spine	10	8.7-13.2	11.6
Length of last dorsal spine	10	10.3-13.2	12.1
Length of longest soft dorsal ray	10	17.3-20.4	19.0
Length of 1st anal spine	10	4.7-6.3	5.7
Length of 2nd anal spine	10	11.4-15.2	13.3
Length of longest anal ray	10	15.0-19.6	17.9
Length of middle caudal rays	10	20.9-26.7	22.6

Body relatively elongate and laterally compressed, the greatest depth 2.4 (2.3 to 2.7) in the standard length. Head profile rounded, the head length contained 3.2 (3.0 to 3.4) times in the standard length; snout 4.3 (4.6 to 6.9), eye diameter 2.3 (2.2 to 2.7), interorbital width 3.9 (3.8 to 4.5), least depth of caudal peduncle 2.2 (2.1 to 2.3), length of caudal peduncle 3.4 (2.3 to 3.1), of pectoral fin 1.0 (0.9 to 1.1), of pelvic fin 1.3 (1.3 to 1.5), of middle caudal rays 1.5 (1.2 to 1.5), all in the head length.

Single nasal opening on each side of snout; mouth oblique, terminally located; lateral line gently arched beneath dorsal fin, terminating one scale row below base of 13th (11th to 13th) dorsal spine; preorbital, suborbital, snout, lips, chin, isthmus and anterior portion of interorbital naked; remainder of head and body scaled; scales of the head region cycloid, those of the body finely ctenoid except most of scales above lateral line which are cycloid; preopercle with two horizontal scale rows with additional row of smaller scales on inferior limb; small sheath scales covering about basal $\frac{1}{2}$ to $\frac{2}{3}$ of membranous portions of dorsal, anal and caudal fins; margin of preorbital, suborbital, preopercle and opercle entire.

Origin of dorsal fin at level of fourth tubed lateral line scale; spines of dorsal fin gradually increasing in length to about seventh spine, remaining spines about equal in length; length of first dorsal spine 5.0 to 7.4 (paratypes only, holotype damaged), of seventh dorsal spine 2.6 (2.4 to 3.8), of last dorsal spine 2.7 (2.4 to 3.2), of longest soft dorsal ray 1.8 (1.5 to 1.9), of first anal spine 5.5 (4.2 to 7.1), of second anal spine 2.1 (2.2 to 2.8), of longest soft anal ray 1.7 (1.6 to 2.0), all in the head length; caudal fin emarginate; pectoral fins pointed.

Colour of holotype in alcohol: Head and body entirely pale yellowish except black-edged bluish stripe, about $\frac{1}{2}$ eye diameter in width extending forward from base of anteriormost soft dorsal rays to tip of snout (passing through dorsal half of eye), and covering most of dorsal portion of body above lateral line; mid-dorsal region between stripe of each side including spinous dorsal fin brownish; remainder of fins pale; small black spot superiorly at pectoral base.

Colour of holotype in life: Head and body entirely yellow except black-edged iridescent blue stripe above lateral line; mid-dorsal region between stripe of each side dusky; spinous dorsal fin bluish, remainder of fins yellow; small black spot superiorly at pectoral base.

Remarks — *A. caeruleolineatus* does not appear to have any close relatives. The dorsal spine count of 14 is a rare feature among the *Abudefduf*. The colour pattern of *A. caeruleolineatus* is very similar to that of *A. leucopomus* Lesson as figured by Jordan and Seale (1906, colour plate XLIII, fig. 1) except it lacks the small black spot at the base of the posteriormost soft dorsal rays and the larger triangular blotch at the base of the caudal fin. *A. leucopomus* is a very common species throughout the western tropical Pacific and is restricted to shallow surge areas.

A. caeruleolineatus was the deepest dwelling member of the genus which we observed. It lives on outer exposed reef slopes among rubble or small rocky outcrops which are usually situated in sandy areas at depths ranging from 38 to at least 62 metres. At Madang, New Guinea, it was moderately common in such areas. It was sighted, but not collected, at 60 metres depth on the outer reef off Seymour Bay, Fergusson Island, D'Entrecasteaux Group.

The name *caeruleolineatus* refers to the distinctive blue stripe on the upper back.

Pomacentrus nigromarginatus, new species

Figure 3

Holotype — USNM 207937, 57.3 mm SL, collected with quinaldine and dipnets on outer reef slope off north end of Kranket Island (5°11'24"S, 145°50'54"E, Aus. Chart No.

NEW SPECIES OF DAMSELFISHES

648), about two nautical miles north of Madang, New Guinea, in 35 metres by G. R. Allen on April 17, 1972.

Paratypes — AMS I.16655-001, 57.1 mm SL, collected with multi-prong spear at Thedford Reef, Great Barrier Reef, off Cairns, Queensland, Australia, in 30 metres by G. R. Allen on August 15, 1972; BMNH.1972.8.14.3, 60.2 mm SL, same collecting data as the holotype except collected with multi-prong spear; BPBN 13226, 2 specimens, 49.6 and 50.5 mm SL, collected with multi-prong spear on isolated pinnacle reef about two nautical miles off south-west side of Seymour Bay, Fergusson Island, D'Entrecasteaux Group in 35 metres by G. R. Allen on May 29, 1972; USNM 207938, 59.9 mm SL, same collecting data as the holotype except collected by W. A. Starck II with multi-prong spear in 31 metres on April 4, 1972.

Diagnosis — A species of *Pomacentrus* with the following combination of characters: dorsal spines 13; preorbital and suborbital naked; slight notch between preorbital and suborbital; inferior edge of suborbital entire; teeth biserial; tubed lateral line scales usually 15; colour basically medium-grey with black margin about $\frac{1}{3}$ to $\frac{1}{2}$ pupil diameter on posterior edge of dorsal and caudal fins; base and axil of pectoral fin black.

Description — The proportional measurements for the type specimens are expressed as percentage of the standard length in Table 5.

Dorsal rays XIII,15 (XIII,14½ to 15); anal rays II,14½ (II,14½ to 15); pectoral rays 16 on right side, 15 on left side (16 to 17); pelvic rays, I,5; branched caudal rays 13; gill rakers on the first gill arch 21 (20 to 21); tubed lateral line scales 14 on right

TABLE 5

MORPHOMETRIC PROPORTIONS (IN % OF SL) OF FIVE SPECIMENS OF *POMACENTRUS NIGROMARGINATUS* FROM MADANG, NEW GUINEA AND FERGUSSON ISLAND, D'ENTRECASTEAUX GROUP

Morphometric measurement	N	Range (% SL)	Mean (% SL)
Standard length (SL)	5	49.6-60.2	—
Body depth	5	46.8-48.1	47.4
Head length	5	28.5-30.0	29.4
Snout length	5	6.1-6.9	6.5
Eye diameter	5	10.7-11.5	11.0
Interorbital width	5	7.0-8.4	7.6
Least depth of caudal peduncle	5	13.7-15.0	14.4
Length of caudal peduncle	5	8.5-10.7	9.0
Snout to origin of dorsal fin	5	36.2-40.9	37.8
Snout to origin of anal fin	5	65.6-68.0	66.3
Snout to origin of pelvic fin	5	37.8-39.8	39.0
Length of dorsal fin base	5	62.0-66.6	63.7
Length of anal fin base	5	28.1-29.7	28.6
Length of pectoral fin	5	31.4-34.5	33.3
Length of pelvic fin	5	29.1-33.1	31.2
Length of pelvic spine	5	16.1-18.0	16.7
Length of 1st dorsal spine	5	6.3-9.4	7.4
Length of last dorsal spine	5	15.2-16.7	16.1
Length of longest soft dorsal ray	5	20.9-26.0	23.6
Length of 1st anal spine	5	6.3-8.6	7.4
Length of 2nd anal spine	5	15.1-17.4	16.5
Length of longest anal ray	5	19.0-22.4	20.6
Length of middle caudal rays	5	22.2-25.3	23.4

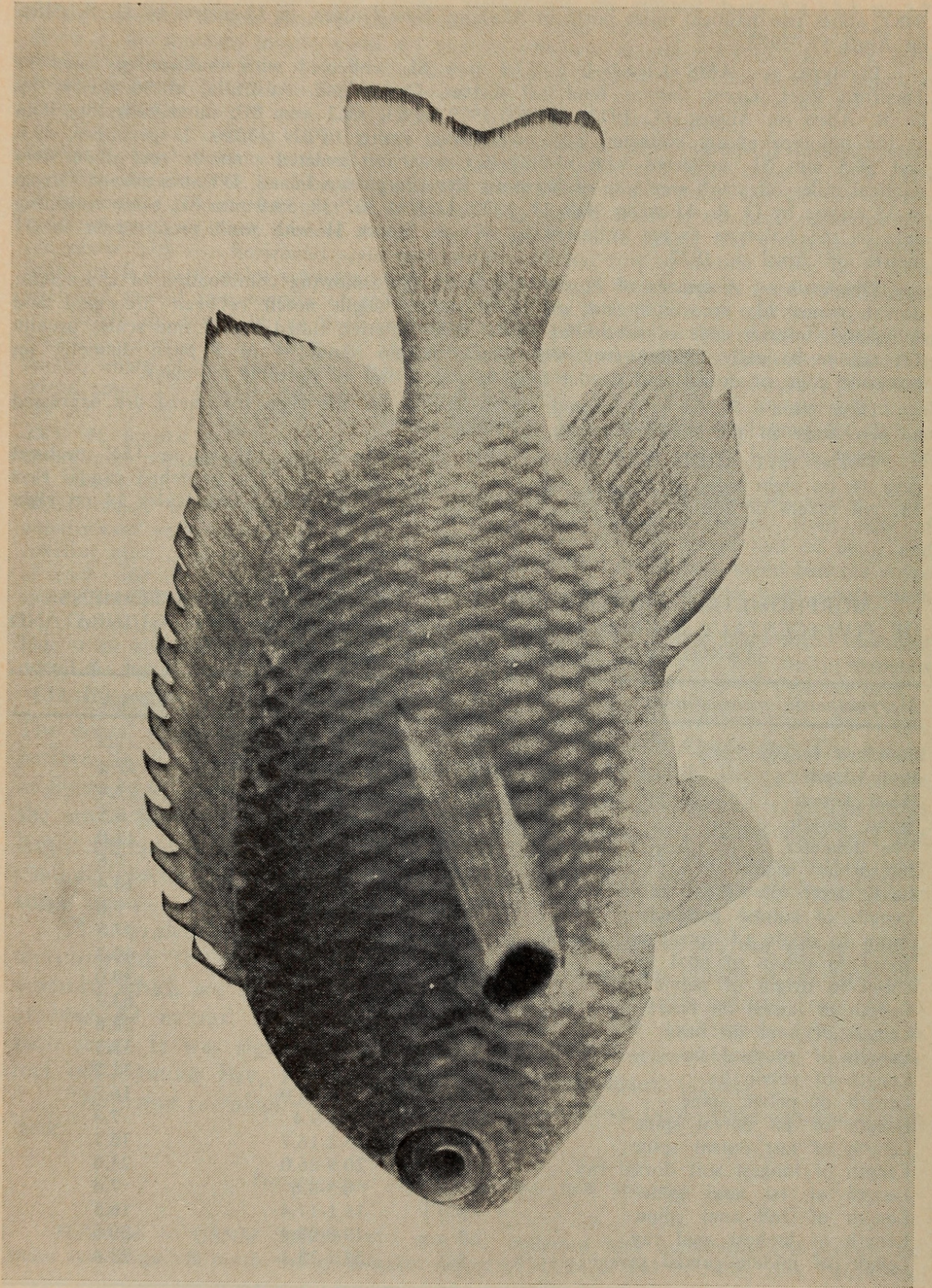


Fig. 3. *Pomacentrus nigromarginatus*, holotype, 57.3 mm SL, from Madang, New Guinea.

NEW SPECIES OF DAMSELFISHES

side, 13 on left side (15, except 17 on left side of one paratype); vertical scale rows from upper edge of gill opening to base of caudal fin 28; horizontal scale rows from base of dorsal fin to middle of lateral line (exclusive of dorsal base sheath scales) $1\frac{1}{2}$; from lateral line to anal fin origin 9; predorsal scales about 20 (about 18 to 22), extending well forward of anterior edge of orbits, about to level of nostrils; teeth biserial at front of jaws, remainder uniserial, conical in shape with gently rounded tips, about 32 in the lower jaw and 42 in the upper.

Body ovate and laterally compressed, the greatest depth 2.1 in the standard length. Head profile conical, the head length contained 3.4 (3.3 to 3.5) times in the standard length; snout 4.8 (4.4 to 4.6), eye diameter 2.7 (2.5 to 2.8), interorbital width 3.5 (3.7 to 4.3), least depth of caudal peduncle 2.0 (1.9 to 2.2), length of caudal peduncle 2.8 (3.4 to 3.5), of pectoral fin 0.9, of pelvic fin 0.9 (0.9 to 1.0), of middle caudal rays 1.2 (1.2 to 1.3), all in the head length.

Single nasal opening on each side of snout; mouth oblique, terminally located; lateral line gently arched beneath dorsal fin, terminating $1\frac{1}{2}$ scale rows below base of posteriormost dorsal spines; preorbital, suborbital, tip of snout, lips, chin and isthmus naked; remainder of head and body scaled; scales finely ctenoid; preopercle with 2 or 3 transverse scale rows with additional row of scales on inferior limb; small sheath scales covering about basal $\frac{1}{2}$ to $\frac{2}{3}$ of membranous portions of dorsal, anal and caudal fins; margin of preorbital and suborbital entire except for very slight denticulations on two of the paratypes; posterior margin of preopercle denticulate; posterior margin of opercle entire.

Origin of dorsal fin at level of third tubed lateral line scale; spines of dorsal fin gradually increasing in length to last spine; length of first dorsal spine 3.9 (3.2 to 4.7), of last dorsal spine 1.8 (1.7 to 1.9), of longest soft dorsal ray 1.2 (1.1 to 1.4), of first anal spine 4.2 (3.5 to 4.5), of second anal spine 1.8 (1.7 to 1.9), of longest soft anal ray 1.4 (1.3 to 1.5), all in the head length; caudal fin emarginate; pectoral fins pointed.

Colour of holotype in alcohol: Head and body greyish-brown with reddish suffusion, scale margins and dorsal portion of body slightly darker; spinous dorsal greyish with translucent submarginal band on outer half of fin; basal half of soft dorsal and caudal fins greyish-brown, outer half pale grey to translucent; dorsal and caudal fins with black margin, about $\frac{1}{3}$ to $\frac{1}{2}$ pupil diameter, especially prominent on posterior edges of soft dorsal and caudal fins; pelvic fins pale; pectoral fins pale with prominent black spot covering entire base and axil of fin.

The paratypes are lighter, nearly whitish on the ventral portion of the head and body, and their overall colouration lacks the reddish suffusion of the holotype.

Colour of holotype in life: Head and body pale grey, whitish ventrally; scale margins brownish, but not detracting from the overall pale colouration of the body; prominent black spot covering pectoral fin base and axil; fins greyish with prominent black margin on edge of dorsal and caudal fins.

Remarks—*P. nigromarginatus* belongs to an Indo-Australian Archipelago species complex which includes *P. melanocheir* Bleeker, *P. melanopterus* Bleeker, *P. nigromanus* Weber, and *P. philippinus* Evermann and Seale. These species share similar counts and possess a prominent spot which covers the base and axil of the pectoral fin. *P. nigromarginatus* is clearly separable from *melanocheir*, *melanopterus* and *nigromanus* on the basis of colour pattern and number of tubed lateral line scales. The latter group of species usually have 17 to 19 tubed scales compared with a modal count of 15 (holotype with 13 to 14) for *P. nigromarginatus*. *P. melanocheir* is further separable by the presence of a strongly denticulate suborbital and one or more spinules on the rear margin of the opercle. *P. melanopterus* usually has a few weak denticulations on the suborbital and a flattened spinule

on the upper edge of the opercular margin. The suborbital and opercle are virtually entire in *P. nigromarginatus*.

P. nigromarginatus appears to be most closely related to *P. philippinus* with regards to morphology and colour pattern. They differ appreciably, however, in number of tubed lateral line scales and total gill rakers on the first arch. Furthermore, the suborbital width of *philippinus* fits about 4.5 to 5.0 in the width of the bony orbit compared to about 6.0 to 7.0 for *nigromarginatus*. The suborbital of *philippinus* also differs by possessing scales on its posterior half. There appears to be a great deal of latitude in the colour pattern of *philippinus*, but the species is invariably much darker than *nigromarginatus*. According to Montalban (1927), specimens from the Philippines are predominantly blackish with pale streaks on the scales. The caudal fin and posterior portions of the dorsal and anal fins are yellow. Specimens of *philippinus* collected by the author at the D'Entrecasteaux Group, Egum Atoll (Solomon Sea, near Woodlark Island), and Osprey Reef (Coral Sea) were basically dark brownish with a red-orange suffusion, particularly noticeable on the ventral surface. The caudal and posterior portion of the dorsal and anal fins were also red-orange and had blackish margins similar to those of *P. nigromarginatus*. Specimens of *P. philippinus* collected at Pixie Reef, on the Great Barrier Reef, off Cairns, Queensland, Australia were entirely blackish, including all the fins except the pectorals, and had pale streaks on the scales. *P. nigromarginatus* and *P. philippinus* are further separable on the basis of ecology. Both species occur on exposed outer reef slopes. However, *P. philippinus* lives in depths ranging from 1.5 to 12 metres, usually around coral outcrops or in the shadows of overhanging cliffs and ledges. *P. nigromarginatus* is usually restricted to depths ranging from 30 to at least 46 metres and frequents rocky outcrops which are usually situated on sandy slopes. It was common in this habitat at Madang, Fergusson and Normanby Islands, Egum Atoll, and Osprey Reef. The stomach contents of one of the paratypes consisted mainly of copepods and algal fragments.

The name *nigromarginatus* refers to the characteristic black margin on the dorsal and caudal fins.

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