

Apogon selas, a New Cardinalfish from the Western Pacific

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Abstract A new species of cardinalfish, *Apogon selas*, is described from 27 specimens from New Guinea, Ryukyu Islands, and Philippines; also known from photographs taken in the Solomon Islands and Indonesia. It is a species of the subgenus *Ostorhinchus* Lacepède, distinctive in having a first dorsal fin of VII spines, 13 pectoral rays, 14–19 gill rakers, smooth preopercular ridge, body depth 2.9–3.6 in SL, and a color pattern of a black spot as large as the eye centered on the caudal-fin base and two dusky stripes (mainly red or golden in life), one midlateral and the other from tip of lower jaw across cheek to thorax. *A. selas* appears to be most closely related to *A. endekataenia* Bleeker which differs in having 14 pectoral rays, 18–21 gillrakers, and six dark stripes on the body.

A colorful new species of cardinalfish of the genus *Apogon* Lacepède, subgenus *Ostorhinchus* Lacepède, is described in the present paper from specimens from Papua New Guinea, Philippines, and the Ryukyu Islands. It is also known from photographs taken in the Solomon Islands and Indonesia.

Type specimens have been deposited in the Australian Museum, Sydney (AMS); British Museum (Natural History), London (BMNH); Bernice P. Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS); Royal Ontario Museum, Toronto (ROM); J. L. B. Smith Institute of Ichthyology, Grahamstown (RUSI); National Museum of Natural History, Washington, D. C. (USNM); Western Australian Museum, Perth (WAM); and Yokosuka City Museum, Kanagawa (YCM).

Lengths given for specimens are standard length (SL), measured from the front of the upper lip to the base of the caudal fin (posterior end of hypural plate); body depth is the maximum depth from the base of the dorsal spines; body width is measured just posterior to the gill opening; head length is taken from the front of the upper lip to the end of the opercular membrane, and snout length from the same anterior point to the fleshy edge of the orbit; orbit diameter is the greatest fleshy diameter, and interorbital width the least bony width; caudal peduncle depth is the least depth, and caudal peduncle length the horizontal distance between verticals at the rear base of the anal fin and the caudal-fin base; lengths of fin spines and soft rays are measured to their extreme bases; caudal concavity is the horizontal distance

between verticals at the tips of the shortest and longest caudal-fin rays.

Pectoral-ray counts include the upper rudimentary ray; lateral-line scale counts are made to the base of the caudal fin (hence do not include the three pored scales posterior to the hypural plate); gill-raker counts are made on the first gill arch and include all rudiments; the count of the upper-limb rakers is given first, followed by the lower-limb count; the raker at the angle is contained in the lower-limb count. The term developed raker refers to one which is higher than its base.

Proportional measurements of type specimens are given in Table 1 as percentages of the standard length. Body and fin proportions contained in the text are step-in measurements rounded to the nearest .05. Data in parentheses in the description refer to paratypes.

Apogon selas sp. nov.

(Japanese name: Nagareboshi)

(Figs. 1, 2; Table 1)

Apogon sp.: Burgess and Axelrod, 1975: 1440, fig. 89 (Marau, Solomon Islands); Hayashi and Kishimoto, 1983: 34, pl. 7, fig. 35 (Iriomote Island, Ryukyu Islands).

Apogon sp. 2: Hayashi in Masuda et al., 1984: 148, pl. 132, fig. B.

Holotype. BPBM 32629, male, 36.9 mm SL, Papua New Guinea, Madang Province, lagoon off Nagada Harbor, Tripod Reef, small coral patches and silty sand, 30 m, rotenone, John E. Randall, 18 November 1987.

Paratypes. YCM-P10231, 11: 19.4–25.7 mm SL, Ryukyu Islands, Yaeyama Shoto, Iriomote Island,



Fig. 1. Holotype of *Apogon selas*, BPBM 32629, 36.9 mm SL, Papua New Guinea (photo by John E. Randall).



Fig. 2. Underwater photograph of *Apogon selas*, about 50 mm total length, Banda, Indonesia, 42 m (photo by John E. Randall).

Funauki Bay, steep reef slope, coral rubble and silty sand, 15 m, hand net, Masayoshi Hayashi and Takashi Itoh, 7 May 1982; AMS I. 28571-001, 22.3 mm SL; BMNH 1989.1.12.1, 21.7 mm SL; CAS 64459, 23.0 mm SL; 55699, 25.4 mm SL; RUSI 27742, 22.6 mm SL; USNM 300937, 25.6 mm SL; WAM P. 29863-001, 23.8 mm SL—all with same data as YCM-P10231; YCM-P19451-53, 5: 22.1-35.2 mm SL,

Philippines, Palawan, El-Nido, patch reefs and fine coral sand, 4 m, quinaldine, Hajime Masuda, 20 March 1983; BPBM 32618, 33.1 mm SL, Papua New Guinea, Madang Province, lagoon side of barrier reef off Nagada Harbor, next to sunken "Coral Queen" (5°9'47''S, 145°50'8''E), reef (dominated by the coral *Pachyseris speciosa*) and silty sand, 29 m, rotenone, John E. Randall, 16 November 1987;

BPBM 32804, 2: 33.0–35.4 mm SL, same data as holotype.

Diagnosis. Dorsal rays VII-1,9; anal rays II, 8; pectoral rays 13; lateral-line scales 24 (rarely 25); predorsal scales 4; gill rakers 17–19; preopercular margin serrate; preopercular ridge smooth; body depth 2.9–3.6 in SL; a black spot as large as eye centered on caudal-fin base; two dusky stripes (mainly red to golden in life), one midlateral and the other from tip of lower jaw across cheek; a deep blue spot often present ventroposteriorly on side of abdomen.

Description. Dorsal rays VII-I,9, all rays branched, the last to base; pectoral rays 13, the upper and lower two unbranched; pelvic rays I,5, all rays branched; principal caudal rays 17, the upper and lower rays unbranched; upper and lower procurrent caudal rays 7, the most posterior (and occasionally the one preceding it) segmented;

lateral-line scales 24 (one of fifteen counted with 25), plus 3 pored scales posterior to hypural plate; scales above lateral line to origin of dorsal fin 1 1/2; scales below lateral line to origin of anal fin 5 1/2; median predorsal scales 4, the fourth notched posteriorly at origin of first dorsal fin; circumpeduncular scales 12; gill rakers 5+13 (3–5+11–14; only one of 15 with 3+11) (2 upper and 10–12 lower rakers developed); branchiostegal rays 7; predorsal bones 3; vertebrae 10+14.

Body depth 2.9 (3.0–3.6) in SL; body width 2.3 (1.95–2.3) in depth; head length 2.55 (2.75–2.95) in SL; dorsal profile of head straight except for rounded front of snout; snout length 4.0 (3.7–4.2) in head; orbit diameter 2.9 (2.4–2.9) in head; interorbital space flat, the least width 4.95 (4.1–5.0) in head; caudal peduncle depth 2.45 (2.5–2.8) in head; caudal peduncle length 1.6 (1.4–1.55) in head.

Table 1. Proportional measurements of type specimens of *Apogon selas* expressed as a percentage of the standard length.

	Holotype		Paratypes					
	BPBM 32629	YCM P10231	YCM P19451	YCM P10231	YCM P10231	BPBM 32804	BPBM 32618	BPBM 32804
Standard length (mm)	36.9	19.4	22.1	25.2	25.7	33.0	33.1	35.4
Body depth	34.7	28.8	28.0	29.8	30.0	32.9	33.0	32.8
Body width	15.1	14.0	14.5	14.2	14.4	15.3	14.8	14.1
Head length	39.2	36.1	36.2	36.3	36.6	37.8	39.3	39.5
Snout length	9.8	9.8	8.9	9.0	9.0	9.1	9.4	9.9
Orbit diameter	13.6	15.1	14.1	12.9	12.9	13.0	13.8	14.3
Interorbital width	7.9	8.8	8.6	8.0	8.1	7.6	7.8	8.0
Upper jaw length	18.5	18.6	18.5	17.5	18.3	18.1	19.0	19.7
Caudal peduncle depth	15.7	14.0	14.7	13.9	14.8	14.9	15.0	14.1
Caudal peduncle length	24.6	25.9	25.8	25.6	24.9	25.0	25.2	25.4
Predorsal length	39.7	40.8	40.7	39.7	40.5	40.0	40.9	41.9
Preanal length	62.4	60.2	61.1	60.0	61.2	62.8	62.5	61.2
Prepelvic length	39.4	36.1	36.2	35.7	37.3	39.4	39.2	39.0
Length of first dorsal spine	2.7	3.9	2.7	3.2	3.3	3.5	2.9	3.2
Length of second dorsal spine	9.6	12.9	12.7	11.9	11.7	10.6	9.8	10.6
Length of third dorsal spine	15.5	18.0	18.1	18.2	19.0	18.4	17.2	18.3
Length of spine of second dorsal fin	14.2	14.7	14.1	14.6	14.4	14.4	14.7	14.4
Length of longest dorsal ray	23.0	22.7	21.9	23.0	broken	23.3	22.3	22.5
Length of first anal spine	4.9	4.7	4.5	4.0	4.7	3.7	4.2	4.0
Length of second anal spine	13.2	14.4	13.1	14.1	14.0	13.0	13.6	13.0
Length of longest anal ray	20.7	20.6	20.4	broken	19.1	20.1	19.6	18.7
Caudal fin length	27.5	broken	broken	broken	broken	27.8	28.3	28.2
Caudal concavity	8.9	—	—	—	—	9.0	9.1	9.0
Pectoral fin length	22.8	21.9	22.6	23.0	broken	23.0	22.4	21.8
Pelvic spine length	14.1	15.1	14.2	15.1	14.8	14.5	14.9	14.2
Pelvic fin length	21.2	21.0	20.8	21.8	21.4	21.1	21.3	22.0

Mouth large, the maxilla reaching or nearly reaching a vertical at rear edge of pupil, the upper jaw length 2.1 (1.95–2.05) in head; mouth oblique, the gape forming an angle of about 30° to horizontal axis of head and body; posterior edge of maxilla slightly concave; no supramaxilla present; lower jaw projecting, the tip thickened and fitting into a median indentation in upper jaw; a band of small villiform teeth in three to four irregular rows on side of upper jaw, narrowing to two rows toward front of jaw, the teeth of outer row slender, conical, and slightly recurved; indented median part of upper jaw edentate; two irregular rows of small teeth in lower jaw, those of outer row slender, conical and recurved, the longest at midside of jaw; an irregular row of small teeth forming a V on vomer; an irregular row of very small teeth on palatines. Tongue broad-based, becoming slender distally with rounded tip, the upper surface with scattered papillae.

Anterior nostril a small, short, membranous tube directly in front of center of eye about half distance from edge of orbit to front of upper lip; posterior nostril ovate without a rim, on a line connecting anterior nostril to top of orbit, more than twice as large as anterior nostril. Largest pores of lateralis system of head as follows: one dorsally at edge of orbit, one below nostrils, one in front of anterior nostril, two at lower edge of preorbital, and one at tip of mandible.

A single, flat, obtuse opercular spine. Preopercular margin nearly fully serrate (31 serrae on one side of holotype and 41 on the other); preopercular ridge smooth.

Scales weakly ctenoid. Lateral line conspicuous, nearly paralleling dorsal contour of body, and ending a short distance posterior to caudal fin base (three pored scales posterior to hypural, the last pointed). No scales on dorsal and anal fins except a low sheath at base of second dorsal and anal fins; small scales basally on caudal fin extending more than half distance to posterior margin (many of these scales lost on specimens); no scales on paired fins except a midventral scaly process at base of pelvic fins more than half length of pelvic spine.

Origin of first dorsal fin above third lateral-line scale; first dorsal spine slender and short, one fourth to one-third length of second dorsal spine, 14.5 (9.25–13.5) in head; third dorsal spine longest, 2.5 (1.95–2.3) in head; first dorsal soft ray longest,

1.7 (1.6–1.75) in head; origin of anal fin below base of second dorsal soft ray; first anal spine short, 8.0 (7.7–10.2) in head; second anal spine 2.95 (2.5–3.0) in head; first anal soft ray longest, 1.9 (1.75–2.05) in head; caudal fin forked, 3.65 (3.55–3.6) in head; caudal concavity 4.4 (4.2–4.4) in head; third and fourth pectoral rays longest, 1.7 (1.6–1.8) in head; origin of pelvic fins slightly anterior to pectoral-fin base; first pelvic soft ray longest, reaching anus, its length 1.85 (1.7–1.85) in head.

Color of holotype in alcohol: pale with a round blackish spot nearly as large as eye centered midlaterally on caudal-fin base; a blackish stripe from front and base of upper lip across snout (where narrow) through eye and across postorbital head (where broad), and passing midlaterally on body where it is progressively fainter posteriorly; a second blackish stripe from front of lower jaw, passing adjacent to lower edge of orbit, and continuing across cheek to end faintly on thorax; a faint, internal, dark bluish blotch ventroposteriorly on abdomen (encloses anus at its posterior edge); fins pale.

Color of holotype when fresh (Fig. 1): translucent pale pinkish gray, becoming silvery on lower half of head and silvery white ventrally on thorax and abdomen, with a large round black spot at caudal-fin base; lateral stripe metallic red overlaid with blackish pigment on head, dusky golden on body; ventral stripe on head also red, suffused with blackish; an iridescent blue-green and blackish spot on side of abdomen just above anus; body posterior to this spot and adjacent to anal-fin base light red; back along base of dorsal fins brownish; fins translucent whitish; upper part of iris yellow.

In life (Fig. 2), the stripes (which may be red) are bordered on head with light blue-green except the part of upper border passing through eye which is bright yellow; lateral stripe on body faintly bordered with light yellow or pink; black spot at caudal-fin base faintly edged with iridescent blue-green or yellow; leading edge of first dorsal fin, anal fin, and lateral edge of pelvic fins blue; remaining fin rays light red, the membranes clear.

In some individuals the two anterior dark stripes are nearly solid black, and the lower stripe may continue along ventral side of abdomen to end in the dark spot above anus (Burgess and Axelrod, 1975: fig. 89).

Etymology. Hayashi and Kishimoto (1983) proposed the Japanese common name Nagareboshi for this undescribed species of *Apogon*. Since the name means shooting star in English, we adopt the equivalent from the Greek, *selas*, meaning fiery meteor.

Remarks. Our collections of this cardinalfish have come from the north coast of Papua New Guinea, the Philippines, and the southern Ryukyu Islands; the specimens were taken in the depth range of 4–30 m. The species is also known from the Solomon Islands from a photograph taken at Marau (Burgess and Axelrod, 1975: fig. 89) and from Indonesia from underwater photographs taken by the senior author in the harbor at Banda at a depth of 42 m (Fig. 2). The localities have all been in sheltered water with low coral growth or coral rubble and on fine or silty sand.

The genus *Apogon*, much the largest of the family, was divided into 10 subgenera by Fraser (1972). *A. selas* belongs in the subgenus *Nectamia* Jordan, as defined by Fraser; however, this subgeneric name has to be replaced by *Ostorhinchus* Lacepède, as shown by Gon (1987) and confirmed by Randall et al. (in press).

Within *Ostorhinchus*, the dominant subgenus of *Apogon*, *A. selas* falls within a large complex of striped species having a first dorsal fin of VII spines, many of which also have a black spot at the caudal-fin base (some reviewed by Randall and Lachner, 1986). On the basis of color it seems closest to *A. endekataenia* Bleeker which was redescribed by Fraser (1974). This species has a very large caudal-base spot like *selas* with a faint pale margin, and its stripes are much darker on the head than the body (see Fraser, 1974: fig. 1C); in life the stripes are usually dusky golden. *A. endekataenia*, however, has six stripes on the body; it also differs in having 14 instead of 13 pectoral rays and 18–21 gill rakers (compared to 14–19 for *selas*).

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西部太平洋産テンジクダイ科の 1 新種 *Apogon selas*

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テンジクダイ科魚類の 1 新種 *Apogon selas* (和名: ナガレボシ) が、ニューギニア、琉球諸島などから 27 個体採集された。また本種はソロモン諸島やインドネシアにも分布することが水中写真により知られていた。本種は背鰭が 7 棘 13 軟条、鰓耙が 14–19、前鰓蓋骨の縁辺に鋸歯がないことなど、*Ostorhinchus* 亜属の特徴的な形質をもつ。体長は体高の 2.9–3.6 倍。尾鰭の基底中央に眼径大の 1 黒斑があること、体側には側線上と下顎先端から頬を通過して胸部にかけてのそれぞれ 2 条の黄金色に輝く暗色縦帯があることなど、特徴的な体色斑紋で他種と容易に区別できる。

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