

## A new species of Cardinalfish (*Apogon*: Apogonidae) from northwestern Australia

Gerald R. Allen

Department of Aquatic Vertebrates, Western Australian Museum, Francis Street, Perth,  
Western Australia 6000

**Abstract** – A new species of apogonid fish of the genus *Apogon* is described from the Northern Territory and northern Western Australia. *Apogon unitaeniatus* is described on the basis of 94 trawl-captured specimens from Darwin Harbour and Shoal Bay in the Northern Territory, and the Kimberley coast of Western Australia. It is a member of the subgenus *Pristiapogon* and very similar in appearance to *A. abrogramma* Fraser and Lachner of the Indo-West Pacific. Both species are distinguished by a blackish midlateral stripe. However, they are readily separated on the basis of counts for gill rakers and pectoral rays (22–25 and 15 respectively for *A. unitaeniatus* versus 17–19 and 13 for *A. abrogramma*).

### INTRODUCTION

Cardinalfishes of the family Apogonidae are one of the most abundant groups of tropical reef fishes. They are primarily nocturnal, although readily observable during daylight when they shelter in caves and crevices or around coral formations. The generic classification of Apogonidae was reviewed in detail by Fraser (1972), but a knowledge of the species composition is still incomplete. Fraser recognized 19 genera. The estimated number of species in the family is 230–250. At least half of the species occur in the area comprised of New Guinea, northern Australia, Indonesia, and the Philippine Archipelago.

The present paper describes a new species of the genus *Apogon* first collected by a prawn trawler off the Kimberley coast of Western Australia in 1978. The specimens were subsequently deposited at the Australian Museum and were recognised in 1992 during an examination of the institution's apogonid holdings. Additional specimens were procured during dredging operations by Rex Williams of the Northern Territory Museum during 1993.

Type specimens of the new species are deposited at the Australian Museum, Sydney (AMS), Northern Territory Museum, Darwin (NTM), and the Western Australian Museum, Perth (WAM).

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 scales posterior to the hypural plate); gill-raker counts are made on the first gill arch; 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.

Proportional measurements of type specimens are given in Table 1 as percentages of the standard length. Data in parentheses in the description refer to paratypes.

### TAXONOMY

*Apogon unitaeniatus* sp. nov.

Figure 1

#### Holotype

AMS I.20402–036, 50.2 mm SL, off NE portion of Bonaparte Archipelago, northern Western Australia (approximately 14°00'S, 124°45'E), 12–60 m, prawn trawl, C. O'Conner, April 1978.

#### Paratypes

AMS I.20402–000, 50.5 mm SL, collected with



**Table 1** Proportional measurements of type specimens of *Apogon unitaeniatus* expressed as percentage of the standard length (\* denotes damaged fins).

| Character               | Holotype        | Paratypes       |                 |                 |                 |                 |                 |
|-------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                         | AMS             | NTM             | NTM             | AMS             | NTM             | WAM             | NTM             |
|                         | I.20402<br>-036 | S.13711<br>-008 | S.13711<br>-008 | I.20402<br>-000 | S.13711<br>-008 | P.30743<br>-001 | S.13711<br>-008 |
| Standard length (mm)    | 50.2            | 57.6            | 51.8            | 50.5            | 48.2            | 47.6            | 47.0            |
| Body depth              | 39.6            | 36.3            | 36.9            | 39.0            | 35.3            | 36.8            | 36.6            |
| Body width              | 16.9            | 17.2            | 16.0            | 17.0            | 15.4            | 17.0            | 16.4            |
| Head length             | 40.8            | 42.0            | 40.9            | 42.6            | 38.2            | 41.0            | 39.4            |
| Snout length            | 10.8            | 9.2             | 8.1             | 10.3            | 9.1             | 8.4             | 9.4             |
| Orbit diameter          | 13.9            | 12.7            | 12.7            | 12.5            | 12.0            | 12.2            | 13.2            |
| Interorbital width      | 10.0            | 9.5             | 9.7             | 9.1             | 9.1             | 9.0             | 9.4             |
| Upper jaw length        | 21.1            | 21.2            | 21.6            | 20.8            | 20.3            | 20.0            | 21.9            |
| Caudal peduncle depth   | 14.7            | 16.1            | 16.4            | 15.4            | 14.7            | 13.7            | 14.5            |
| Caudal peduncle length  | 24.7            | 25.7            | 24.7            | 23.2            | 28.4            | 25.6            | 25.5            |
| Predorsal length        | 46.2            | 41.1            | 40.9            | 44.2            | 40.9            | 41.4            | 41.5            |
| Preanal length          | 65.3            | 65.1            | 64.1            | 66.3            | 64.3            | 63.7            | 65.5            |
| Prepelvic length        | 38.0            | 39.6            | 40.3            | 40.6            | 37.6            | 40.5            | 38.3            |
| Length 1st dorsal spine | 1.8             | 1.9             | 2.7             | 3.0             | 2.1             | 2.3             | 2.1             |
| Length 2nd dorsal spine | 7.8             | 5.7             | 6.6             | 7.7             | 7.1             | 8.0             | 7.0             |
| Length 3rd dorsal spine | 17.5            | 16.3            | 16.0            | 18.6            | 17.6            | 17.6            | 17.7            |
| Spine of 2nd dorsal     | 15.9            | 15.6            | 13.3            | 13.3            | 13.2            | 13.2            | 13.2            |
| Longest dorsal ray      | *18.9           | 26.9            | 26.4            | 16.8            | 25.9            | *21.8           | 23.4            |
| Length 1st anal spine   | 3.4             | 2.3             | 3.3             | 3.4             | 2.7             | 2.3             | 3.8             |
| Length 2nd anal spine   | 8.8             | 14.1            | 14.1            | 12.1            | 13.7            | 14.1            | 12.8            |
| Longest anal ray        | *14.1           | 22.6            | 23.0            | *15.4           | 22.4            | *19.1           | 21.1            |
| Caudal fin length       | *21.9           | 35.1            | 32.6            | *24.9           | 36.1            | *22.4           | 34.5            |
| Caudal concavity        | *3.9            | 9.7             | 9.7             | *2.9            | 11.6            | *7.5            | 8.5             |
| Pectoral fin length     | *6.1            | 25.9            | 27.0            | *7.1            | 24.9            | 24.4            | 26.6            |
| Pelvic spine length     | 15.1            | 14.9            | 13.9            | 15.4            | 15.1            | 14.3            | 14.5            |
| Pelvic fin length       | 17.7            | 24.0            | 22.8            | 20.8            | 23.2            | 22.7            | 22.3            |

holotype; NTM S.13706-007, 15 specimens, 23.5–57.7 mm SL, middle of Fannie Bay, Darwin Harbour, Northern Territory (approximately 12°25.6'S, 130°49'S) 3–4 m, R. Williams, 7 July 1993; NTM S.13707-002, 9 specimens, 23.6–36.2 mm SL, north of Talc Head, Darwin Harbour (approximately 12°27.8'S 130°46'S), 2 m, R. Williams, 8 July 1993; NTM S.13711-008, 60 specimens, 17.8–57.7 mm SL, off Mila Beach, Darwin Harbour (approximately 12°29.6'S, 130°46.5'E), 1–2 m, R. Williams, 8 July 1993; NTM S.13721-006, 50.5 mm SL, south of Mitchell Creek, Darwin Harbour (approximately 12°30.9'S, 130°56.4'E), 7 m, R. Williams, 16 July 1993; NTM S.13723-003, 3 specimens, 27.9–28.7 mm SL, mouth of Hudson Creek, Darwin Harbour (approximately 12°29.3'S, 130°55.4'E), 2 m, R. Williams, 16 July 1993; NTM S.13732-001, 52.5 mm SL, north of Lee Point, Shoal Bay, Northern Territory (approximately 12°16'S, 130°54'E), 17 m, R. Williams, 16 March 1993; NTM S.13735-011, 33.3 mm SL, West Arm, Darwin Harbour (approximately 12°33.3'S, 130°46.7'S), 12 m, R. Williams, 9 September 1993; NTM S.13813-001, 36.0 mm SL, north end of Shoal Bay, Northern Territory (approximately 12°13'S, 130°56'S), 13 m, R. Williams, 12 October 1993; WAM P.30743-001, 47.6 mm SL, collected with holotype.

### Diagnosis

A species of the subgenus *Pristiapogon* with the following combination of characters: dorsal rays VII–I,9; anal rays II,8; pectoral rays 15; lateral-line scales 24; predorsal scales 4; gill rakers 7–9+15–16, including 1–2 rudiments at beginning of upper and lower limbs; fine serrae present on margin of preopercle, preopercular ridge, and circumorbitals; body depth 2.5–2.8 in SL; colour entirely whitish except for dark midlateral stripe extending from upper edge of preopercle to base of caudal fin.

### Description

Dorsal rays VII–I,9; anal rays II,8; all dorsal and anal soft rays branched, the last to base; pectoral rays 15, the uppermost and lowermost pairs unbranched; pelvic rays I,5, all rays branched; principal caudal rays 17, the upper and lowermost rays unbranched; upper and lower procurent caudal rays 6, the most posterior segmented; lateral-line scales 24, plus 5 pored scales posterior to hypural plate, the last narrow, somewhat triangular; scales above lateral line to origin of dorsal fin 2; scales below lateral line to origin of anal fin 6; median predorsal scales 4, the fourth notched posteriorly to accommodate origin of first dorsal fin; circumpeduncular scales 11; gill rakers 7+15 (7–9+15–16), including 1–2 rudiments at



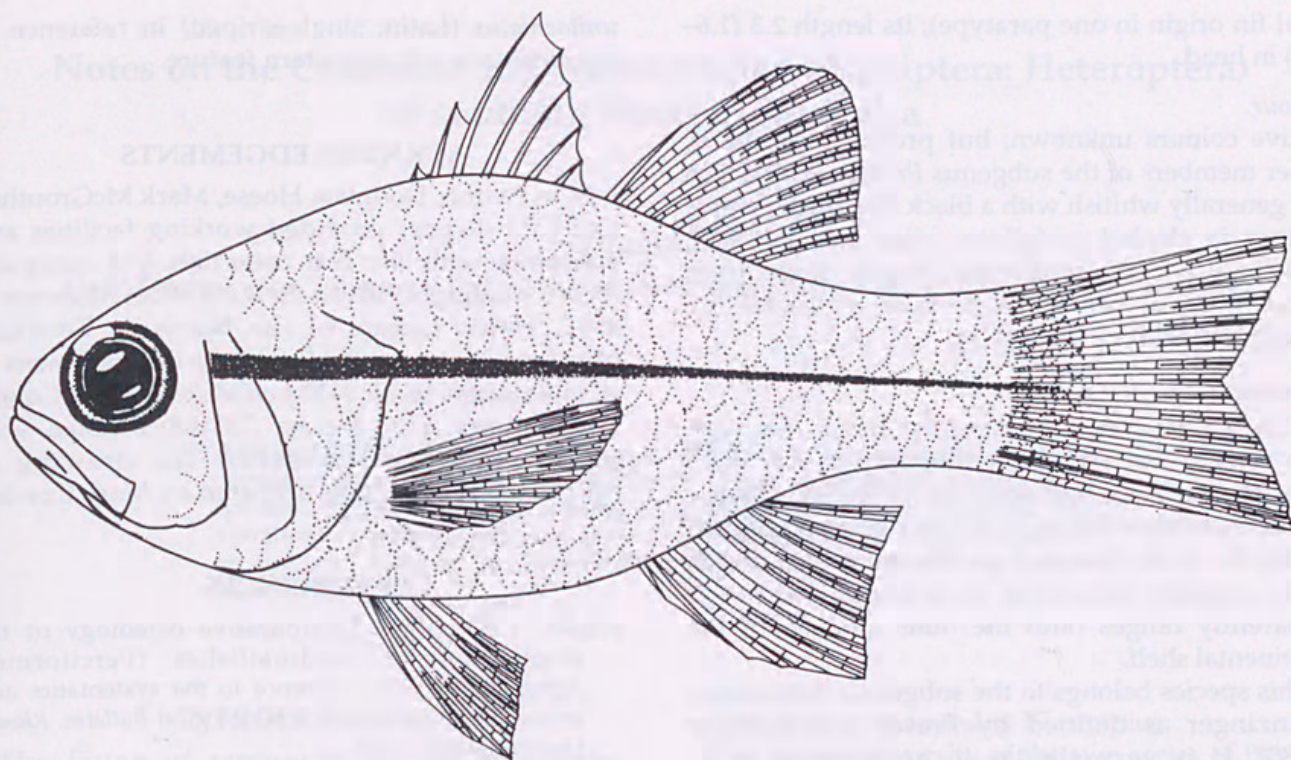


Figure 1 Drawing of holotype of *Apogon unitaeniatus*, 50.2 mm SL. Damaged fins are reconstructed.

beginning of upper and lower limbs; branchiostegal rays 7; vertebrae 10 + 14.

Body depth 2.5 (2.6–2.8) in SL; body width 2.3 (2.1–2.3) in depth; head length 2.4 (2.3–2.6) in SL; dorsal profile of head straight except for rounded front of snout; snout length 3.8 (4.2–5.0) in head; eye diameter 2.9 (3.0–3.4) in head; interorbital width 4.1 (4.2–4.7) in head; caudal peduncle depth 2.8 (2.5–3.0) in head; caudal peduncle length 1.7 (1.3–1.8) in head.

Mouth large, the maxilla nearly reaching a vertical at about rear edge of pupil, the upper jaw length 1.9 (1.8–2.1) in head; mouth oblique, the gape forming an angle of 30 to 40 degrees to horizontal axis of head and body; posterior edge of maxilla concave; supramaxilla present; lower jaw slightly protruding, the tip thickened and fitting into a median indentation in upper jaw; upper jaw with a band of small villiform teeth in about 10 irregular rows on lateral portion and narrowing to 3–4 rows anteriorly; indented median part of upper jaw edentate; 3–4 irregular rows of similar teeth in lower jaw, the anterior ones recumbent; a narrow band of small villiform teeth on vomer and palatines. Tongue broad-based, gradually tapered anteriorly, the upper surface with scattered papillae.

Anterior nostril a small, low-rimmed tube, directly in front of centre of eye, about half distance from edge of orbit to front of upper lip; posterior nostril ovate without a rim, about twice size of anterior nostril, situated on a line connecting anterior nostril and top of eye. Head with

numerous, tiny lateralis system pores, but enlarged pore present at front edge of snout and on middle of preorbital. A single, flat, obtuse opercular spine. Serrations on head bones scarcely evident in small juveniles, becoming more prominent and increasing in number with added growth. Preopercular margin weakly serrate in adults (18 serrae on left side of holotype, 25–40 on paratypes); preopercular ridge mainly smooth or weakly crenulate, except for 8 (8–20) serrae; ventral and posterior portion of circumorbitals with 13 (5–13) serrae.

Scales ctenoid. Lateral line conspicuous, nearly paralleling dorsal contour of body, and ending a short distance posterior to caudal-fin base (5 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 on basal third of caudal fin; no scales on paired fins except a pair of large midventral scales at base of pelvic fins.

Origin of first dorsal fin above second lateral-line scale; first dorsal spine slender and short, 22.8 (14.3–22.0) in head; third dorsal spine longest, 2.3 (2.2–2.6) in head; second soft dorsal and anal rays longest, damaged in holotype, but their length 1.5–1.9 in paratypes; origin of anal fin below base of fourth dorsal soft ray; first anal spine short, 12.1 (10.3–18.6) in head; second anal spine 4.7 (2.8–3.5) in head; caudal fin slightly forked, its length 1.1–1.3 (damaged in holotype); origin of pelvic fins about even with pectoral-fin base; first pelvic soft ray longest, reaching beyond anus or beyond (to



anal fin origin in one paratype), its length 2.3 (1.6–2.0) in head.

#### Colour.

Live colours unknown, but probably similar to other members of the subgenus *Pristiapogon*, which are generally whitish with a black midlateral stripe. Colour in alcohol as follows: very pale tan with relatively narrow midlateral brown stripe from upper edge of preopercle to base of caudal fin, tapering in width posteriorly.

#### Remarks

This species is known only from the type specimens, but further collecting in northern Australia and adjacent seas will probably increase the distributional limits. It occurs over soft bottoms in depths as shallow as 1 m. The maximum depth limit requires additional documentation, but it apparently ranges onto the outer portion of the continental shelf.

This species belongs to the subgenus *Pristiapogon* Klunzinger as defined by Fraser and Lachner (1985). It is very similar in appearance to *A. abrogramma* Fraser and Lachner from scattered localities in the tropical Indian Ocean and western Pacific. Both species are characterized by a single dark, midlateral stripe. However, *A. unitaeniatus* has an increased number of gill rakers and pectoral rays (22–25 and 15 versus 17–19 and 13, rarely 14 respectively). The new species is named

*unitaeniatus* (Latin: single-striped) in reference its characteristic colour pattern feature.

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