



Redescription of the cardinalfish *Apogonichthyoides maculipinnis* (Percomorpha: Apogonidae: Apogoninae) from the Maldives, last collected 118 years ago

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Abstract

Apogonichthyoides maculipinnis, a deeper-dwelling cardinalfish, is redescribed from the holotype and a second specimen collected recently, including a live color photograph. Both Regan's holotype, collected in April 1900, and the new specimen were collected at the same atoll in the Maldives. Diagnostic color features include: a dark wedge-shaped bar extending from the bottom of the eye past the end of the maxilla, followed by a wide pale area on cheek, bordered above with a short wedge-shaped stripe from the rear edge of the iris ending in a dark vertical bar along the rim of the preopercle; rows of small brown dots, one per scale, in three rows, uppermost along the lateral line, middle along the lateral midline from behind the opercle flap to mid-caudal peduncle, the third parallel to the second, from behind the pectoral fin to above the middle of the anal fin; a large dark blotch on the distal membranes of the third and fourth dorsal-fin spines; and a small dark-brown spot on the body at the base of the last two branched dorsal-fin rays. The combination of these color patterns distinguishes *Apogonichthyoides maculipinnis* from other congeners, in particular *A. umbratilis* and *A. gardineri*, which share the dark mark on the first dorsal fin and darkish bar-like marks on the body but lack the numerous brown spots on the head and body.

Key words: taxonomy, systematics, ichthyology, coral-reef fishes, Indian Ocean, Haddhunmathi Atoll, Laamu Atoll, *Apogon*, Specklehead Cardinalfish.

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Introduction

Regan (1908) described 5 species of cardinalfishes from the Indian Ocean, 4 of them from 36–73 m depth, i.e. *Apogonichthyoides gardineri*, *Apogonichthyoides maculipinnis*, *Apogonichthyoides punctatus*, and *Ostorhinchus quinquestriatus* (he assigned all to *Apogon*). Additional records of these species have been rarely reported in recent literature, likely because few collections have been made in this depth range in the Maldives and Cargados Carajos.

Fraser & Allen (2010) resurrected *Apogonichthyoides* with 19 species and two species complexes. For the past 110 years, *Apogonichthyoides maculipinnis* (Regan, 1908) has been known only from the holotype collected by a dredge in 73 m at “Haddumati Atoll” (currently Haddhunmathi Atoll or Laamu Atoll) in the Maldives. Fraser & Allen (2011) included *A. maculipinnis* in their key to 22 species of *Apogonichthyoides* based on the holotype. Recently a second specimen was collected and photographed by Mark V. Erdmann from the type locality in 40 m depth. The additional specimen, with a live photograph, permits a more complete redescription of the species and direct comparison with other species of *Apogonichthyoides*. The color pattern of *A. maculipinnis* aligns it with the *timorensis* complex, but it was not included in the key for that complex by Fraser & Allen (2010).

Materials and Methods

The holotype is deposited at the British Museum of Natural History, London, UK (BMNH). The additional specimen is deposited at the Western Australian Museum, Perth, Australia (WAM).

Methods for making counts and measurements follow Fraser (2005). Meristic data and proportions as percentages of standard length (SL) are given for the holotype followed in parentheses for the additional specimen. Gill-raker counts were broken down into rudiments and rakers by arch. All photographs were processed with Adobe Photoshop CS6 software.

Apogonichthyoides maculipinnis (Regan, 1908)

Specklehead Cardinalfish

Figures 1–3.

Apogon maculipinnis Regan, 1908: 227 (Haddumati Atoll, Maldives).

Apogonichthyoides maculipinnis Fraser & Allen 2011: 68 (listed in key to *Apogonichthyoides* only).

Holotype. BMNH 1901.12.31.7, 40.2 mm SL, Republic of Maldives, Haddhunmathi Atoll (Laamu Atoll), dredge, 73 m, Maldive & Laccadive Expedition, J. Stanley Gardiner, April 1900.

Non type material. WAM P.34842, 37.0 mm SL, Republic of Maldives, Haddhunmathi Atoll, Olhuveli Island, Hondala Faru, 1.853°, 73.536°, 10–40 m, MAL-18-005, M.V. Erdmann, 24 February 2018.

Diagnosis. Brownish spots, variable in size, on jaws, snout, interorbital, nape, preopercle, subopercle, and abdomen; a dark wedge-shaped bar below eye; rows of small brown dots, one per scale, in three rows, uppermost along lateral line, middle along lateral midline from behind opercle flap to mid-caudal peduncle, third parallel to second, from behind pectoral fin to above middle of anal fin; a large dark blotch on distal membranes of third and fourth dorsal-fin spines; a small dark-brown spot on body at base of last two branched dorsal-fin rays; brownish stripe in second dorsal fin, transparent above and below, no stripe in anal fin; 14 pectoral-fin rays; 3 median predorsal scales on nape; 1+8 gill rakers, 3 upper and 3 lower rudiments; multicolored iris in life.

Description. For general body shape, see figures; greatest body depth 39.5 (43.8); head length 45.5 (42.2); eye diameter 14.9 (13.2); snout length 8.9 (9.7); bony interorbital width 8.7 (9.5); upper-jaw length 21.4 (23.0); caudal-peduncle depth 13.4 (15.9); caudal-peduncle length 20.6 (19.7); first dorsal-fin spine length 3.2 (3.2); second dorsal-fin spine length 8.0 (8.4); third dorsal-fin spine length 20.1 (17.0); fourth dorsal-fin spine length

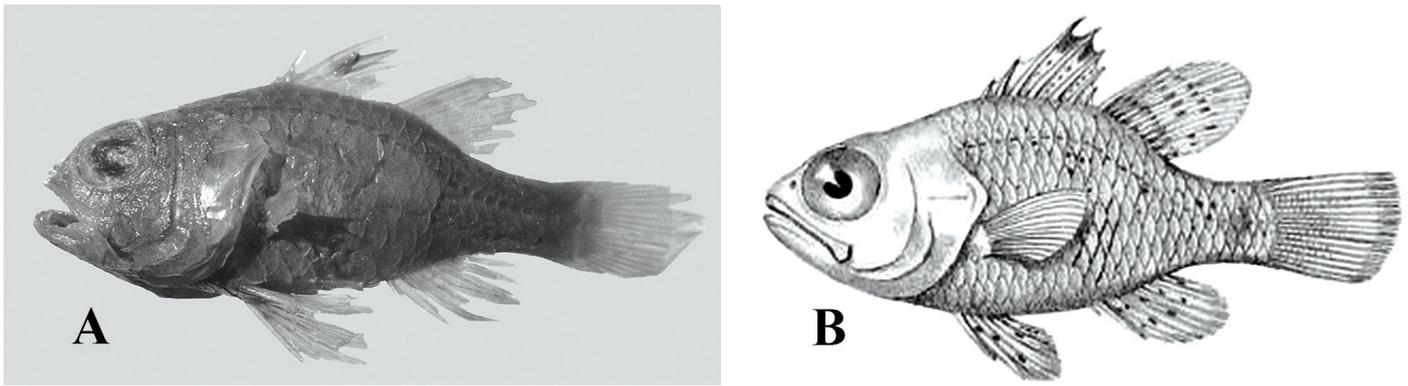


Figure 1. *Apogonichthyoides maculipinnis*, holotype, BMNH 1901.12.31.7, 40.2 mm SL; A: photographed June 1972 by T. H. Fraser. B. From Regan (1908), Plate 27, Figure 3, edited by T.H. Fraser.

18.9 (15.1); spine of second dorsal fin 15.4 (14.3); first anal-fin spine length 3.7 (1.3); second anal-fin spine length 13.4 (9.7); pectoral-fin length, broken (22.4); pelvic-fin length 25.4 (24.6).

Dorsal-fin elements VII-I,9 (VII-I,9); anal-fin elements II,8 (II,8); pectoral-fin rays 13 or 14 (14 & 14), uppermost ray short splint-like, second ray and lowermost unbranched; pelvic-fin I,5 (I,5); principal caudal-fin rays 9+8 (9+8); branched caudal-fin rays 8+7 (8+7); pored lateral-line scales, some missing (24); transverse scale rows above lateral line 2 (2); transverse scale rows below lateral line 5 (6); median predorsal scales 3 (3); circumpeduncular scale rows, some missing (5+2+5); gill rakers and rudiments 15 (15), upper arch with 1 (1) raker and 3 (3) rudiments, lower arch with 8 (8) rakers and 3 (3) rudiments; preopercular ridge smooth, edges serrate, posttemporal with 3 or 4 serrations, infraorbitals smooth.

Band of villiform teeth on premaxilla; band of villiform teeth on dentary; one row on the palatine and vomer (2 rows on non-type specimen); none on ectopterygoid, endopterygoid or basihyal. Two supernumerary dorsal-fin spines, one supernumerary anal-fin spine. Supramaxilla absent.

Non-type specimen with scales on opercle, subopercle, interopercle, cheek, breast, and body ctenoid; snout, interorbit and most of nape without scales, no scales on dentary or hyal region; stomach pale, intestine pale, peritoneum pale with small dot-like melanophores; one large supraorbital pore, many additional small head pores, large slit-like anterior supraorbital pore at edge of snout, dentary with two anterior mandibular pores.

Color of preserved holotype. (Fig. 1) Regan (1908) states “Head and body powdered with blackish dots; body with a few irregular spots; upper parts of spinous dorsal blackish; soft dorsal, anal, and ventrals with series of small dark spots; caudal with numerous dark dots.” Regan’s Fig. 3 on Plate 27 (here as Fig. 1B) shows small dark spots on dorsal, anal, and pelvic fins with several spots on body. My observations from 1972 note a black



Figure 2. *Apogonichthyoides maculipinnis*, live, WAM P34842.001, 37.0 mm SL, Laamu Atoll, Maldives (M.V. Erdmann).



Figure 3. *Apogonichthyoides maculipinnis*, preserved, WAM P34842.001, 37.0 mm SL, Laamu Atoll, Maldives (T.H. Fraser).

mark on distal portion of third and fourth spinous-dorsal-fin membranes. Otherwise no pattern remains on darkish head and body of preserved specimen (Fig. 1A). Under magnification there are tiny dark spots on body and a faint outline of cheek markings.

Color in life. (Fig. 2) Head pale overlain by small brownish spots including snout, occiput, nape, upper and lower jaws, and cheeks; a dark wedge-shaped bar extending from the bottom of eye past end of maxilla to lower portion of preopercle, followed by a wide pale area on cheek with central collection of fine melanophores, bordered above with a short wedge-shaped dark stripe from rear edge of middle iris ending in a dark vertical bar along rear rim of preopercle; three dark lines radiating from upper rear quadrant of iris extending to edge of nape; iris multicolored with brownish spots, larger along periphery and many tiny whitish spots; pupil black. Body mostly speckled with various shades and intensities of browns and whites, often dark outlining of scale edges; dark spots on each lateral-line scale from below first dorsal fin curving down to caudal peduncle; two additional straight rows of dark spots along body, upper along lateral midline from behind opercle flap to mid-caudal peduncle, lower parallel to second, from behind pectoral fin to above middle of anal fin; about 5 faint dark bars along body, first under first dorsal fin, second faint under dorsal fin interspace, third darker under end of dorsal fin with a discrete small dark spot immediately under last two dorsal-fin soft rays; fourth and fifth bars on caudal peduncle. First dorsal fin with a small dark mark on distal portion of second spine, a large dark blotch covering distal membranes of third and fourth dorsal-fin spines, remaining fin translucent with irregular brown spots; second dorsal fin with translucent zone at base of fin with a brownish band above followed by a fainter band, then translucent area to tip of fin rays with irregular small brownish marks; anal fin with small irregular spots on the proximal half; pectoral fins translucent; pelvic fins with small irregular brownish spots; caudal fin translucent with concentrated small brown spots near base and followed by scattered tiny spots.

Color in alcohol. (Fig. 3) The brownish color pattern of head, body, and fins persist after preservation. Note prominent spotting on lower jaw and preopercle.

Distribution and habitat. The species is thus far known only from the two specimens from Laamu Atoll, Republic of Maldives. The live specimen reported here was collected from under a piece of dead-coral rubble on a gradually sloping sand bottom at 40 m depth.

Remarks. In his preface and introduction, Gardiner (1901) gives information about the number of dredge stations at Haddumati Atoll in the Maldives during the 1899–1900 Maldivian & Laccadive Expedition. The register at BMNH for December 1901 lists the atoll and identifies the specimen as *Apogon nigripinnis*. In 1908, Regan described this specimen as the new species *Apogon maculipinnis*. Fraser & Allen (2011) included this species in their key to the species of *Apogonichthyoides*, based only on the holotype. After this redescription, this species

should now key out in a new modified couplet with *A. gardineri* and *A. umbratilis*, not with *A. euspilotus*.

Apogonichthyoides umbratilis Fraser & Allen, 2010, ranging from the eastern Indian Ocean to the West Pacific, has some similar markings to *A. maculipinnis*, however the dark cheek marks are not as wide, the head and body lack the small brown spots, the iris is reddish to brownish, and it has 6 bars, three faint and three darker, on the body. *Apogonichthyoides gardineri*, a Mascarene Plateau endemic, has fewer dark body bars, one bar continuous with a completely dark area covering the first 5 dorsal-fin spines and membranes, and has only a faint cheek mark (Fraser 2000).

Psomadakis *et al.* (2015) included data and an illustration of a likely *Apogonichthyoides* to compare with *A. maculipinnis*, based on a color photograph (plate 111, specimen not saved). The postmortem specimen has black soft dorsal and anal fins; a diagonal line of dark spots, one per scale, from near the upper edge of the preopercle down to the mid-body between the soft dorsal and anal fins; a second line of spots, one per scale, from near the upper edge of the pectoral fin to the lower anterior caudal peduncle; and is lacking small brown spots. The combination of color patterns is suggestive of another new species in the marine waters off of Pakistan.

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