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On three new records of Apongonids (Order – Perciformes, Suborder – Percoidei) from the Indian seas

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Abstract

A detailed survey of Apogonid fishes of the southwest coast of India from Kollam (Quilon) to Kanyakumari, was undertaken during the years 1999-2000 (2 years).Twenty four species under four genera could be collected from the above area, of which six are new records to the India seas. In the present communication three species of the genus *Apogon* (Lacépéde) viz, *Apogon kiensis* Jordan & Snyder, *Apogon poecilopterus* Cuvier & Valanciennes and *Apogon taeniatus* Cuvier & Valanciennes are described with their salient morphological features, suitable illustration and geographical distribution.

Keywords: Apogonid fishes, new records

Introduction

The cardinalfishes, belonging to the family apogonidae with more than 250 species in 21 genera world over form the eighth most speciose family in the Perciformes (Allen and Morrison, 1996; Allen and Robertson, 1994; Randall *et al.*, 1990). They are relatively smaller fishes, reaching maximum lengths near 20 centimeters and are distributed circum globally in tropical and subtropical waters with the greatest density in coral reef of the Indo-Pacific and inhabit a wide range of habitate from deep ocean to estuaries and fresh water streams of numerous pacific islands (Springer, 1982).

Along the southwest coast these fishes are caught in few numbers as by-catch in shore seine, boat seine, gill net and hooks and line almost throughout the year. Since they do not form an item quantitatively they are often accounted under miscellaneous landing. These are sold in local market along with juveniles of other fishes called "Nonnavu" in local language. No doubt, apogonids have great demand in Aquarium fish market and it is advisable to initiate a follow up in this line by breeding them artificially as collecting them directly from the wild for export, would deplete their standing stock in our seas considerably.

Apogonids are traditionally used in Lakshadweep group of islands as live-bait for exploiting tunas by pole and line method.

Materials and methods

The material for the present study was collected during January 1999 to December 2000 by regular sampling of the commercial catches at various fish landing centres from Neendakara to Kanyakumari either personally or through staff members posted at various places by the Central Marine Fisheries Research Institute for collecting fish landing data.

The specimens collected were preserved in 5% formalin for systematic studies. However, the body colouration was noted in fresh condition. The material included both the sexes, and their morphometric measurements and meristic counts were taken carefully. Each measurement was taken by means of a divider and recorded to the nearest millimeter. The measurements and counts were taken as follows.

1. Total length (TL) – Distance from tip of snout to tip of upper lobe of caudal fin.
2. Standard length – Distance from tip of snout to mid base of caudal fin.
3. Head length – Distance from tip of snout to hind edge of the opercular flap.
4. Snout length – Distance from tip of snout to anterior edge of orbit.

5. Maxillary length – Distance from tip of snout to posterior edge of maxilla.
6. Eye length- Horizontal orbit distance to edge of bony borders.
7. Pre-dorsal length – Distance from tip of snout to anterior margin of the insertion of dorsal fin.
8. Pre-pelvic length – Distance from tip of snout to anterior margin of the insertion of pelvic fin.
9. Depth of body - Origin of first dorsal spine to insertion of pelvic spine.
10. Caudal fin length – Distance between the base of caudal fin, where a dark vertical line is visible across the caudal peduncle, to the tip of upper lobe of caudal fin (the difference between total length and standard length).
11. Caudal peduncle depth - Dorso ventral distance of caudal peduncle at the base of caudal fin.
12. Inter orbital width – Least distance between the dorsal bony edges of the eyes.
13. Pre-anal length – Distance from tip of snout to anterior margin of insertion of anal fin.
14. Depth of head – Dorso ventral distance of head at the posterior border of the eye.
15. Dorsal fin rays and anal fin rays – All branched elements in the last ray, a double element with a single support, counted as one.
16. Pectoral fin rays – All elements counted with no differentiation between branched and unbranched elements.
17. Gill rakers – All elements counted and divided into rudiments and well developed rakers, the gill raker in the ankle included as part of lower arch count and separate from the upper arch gill rakers. Rudiments are very small undeveloped structures.
18. Lateral line scales - Pored scales from post temporal bone to base of hypural plate.
19. Longitudinal rows of scales above lateral line - Same method as lateral line count starting with scales in transverse row just above first pored scale.
20. Transverse scale rows – Rows of scales from origin of first dorsal fin counting downward and backward to but not including lateral line and rows of scales from anal fin origin counting upward and forward but not including lateral line.

The body proportions were studied of which standard length was calculated in percentage to total length, and all other characters viz., head length, snout length, maxillary length, eye diameter, caudal fin length, depth of caudal peduncle, depth of head and depth of body were calculated in percentage of standard length. Four measurements namely, snout length, eye diameter, maxillary length and depth of head were further studied in percentage of head length also. In addition to these, three meristic characters namely number of gill rakers, number of pectoral fin rays and number of lateral line scales were also analysed. Using standard statistical methods the range and mean of morphometric and meristic characters were estimated.

Results

Specimens were collected from January 1992 to December 2000 from commercial landing centers like Neendakara (Quilon), Vizhinjam, Enayam, Colachel, Muttom and Kanyakumari (Cape Comerin) (Fig.1). All the centers are rocky in nature except Neendakara, which is sandy. Trawling is the prevalent mode of fishing here. Maximum number of species (20 numbers) could be collected from Vizhinjam while three centers Enayam, Colachel and Kanyakumari recorded the presence of one species each. The number of species encountered at Neendakara was five, while at Muttom it was only three.

Though 20 species could be collected from Vizhinjam landing center, only *Archamia fucata* (Cantor) and *Apogon aureus* (Lacépéde) were found to occur throughout the year in sufficient numbers to pursue biological investigation. All the other species were stray and seasonal in their occurrence.

Coral reefs are considered to be rich in Apogonid distribution. The total number of Apogonid fishes from Great Barrier Reef of Australia is 36 while that from various atolls of Lakshadweep Archipelago is 22 (Jones

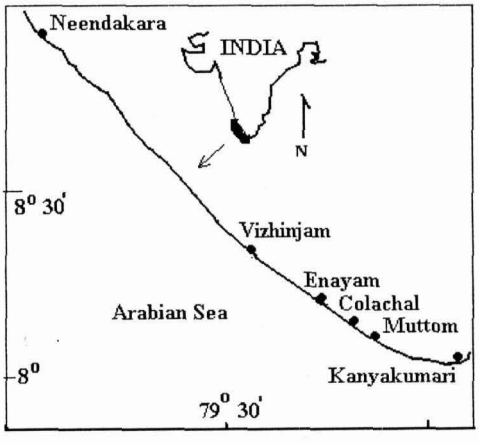

Fig.1. Commercial landing centres –southwest coast of India

and Kumaran 1980). The present study revealed that the southwest coast of India, though not a coral reef environment, harbours a rich and varied biota of apogonids with a total of 24 species.

Of the 24 species reported (Suresh, 2004), 3 are reported in the present study for the first time from the Indian seas and described below in detail.

Apogon kiensis Jordan & Snyder (Fig. 2).

Apogon kiensis Jordan & Snyder, 1901, 905, fig.9; Smith, 1961, 388, fig. 5; Kuiter, 1993, 158; Goren & Dor, 1994, 30; Allen, 1997, 110; Kuiter, 1997, 140; Randall *et al.* 1997, 141; Fraser, 1998, 990; Allen, 1999, 2606; Allen, 2001, 149; Nakabo, 2002, 765.

Amia kiensis Seale, 1914, 64; Fowler & Bean, 1930, 66.

Common name: Rifle cardinal fish

Material: Two specimens, ranging from 58-60mm standard length (75-78mm TL) collected from Neendakara

Meristic counts: D^{I} VI; D^{2} I+9; AII+8; P14 (Table 2); Lateral line scales 23; Gill raker 23 (Table 1); L.tr. 2/5 (Table 3)

Morphometric measurements: Height 3.33 – 3.41 (3.37), head 3.0 – 3.05 (3.02) in body. Eye 3.16 – 3.33 (3.24) in head.

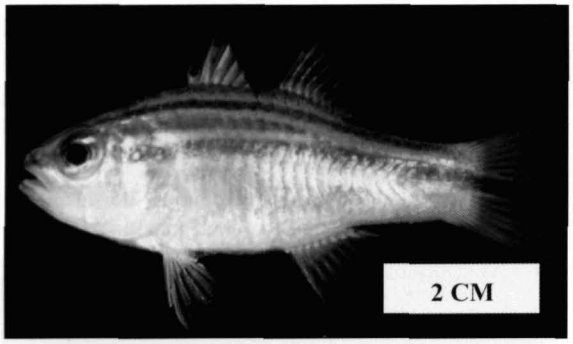

Fig. 2. *Apogon kiensis* Jordan & Snyder

Diagnostic features: Mouth oblique, maxilla to reach below hind margin of pupil, pre-opercular ridge smooth, hind margin serrate. Villiform teeth in two or three bands in each jaw. First dorsal spine little more than half of second, which is longest. Second anal spine about equals spine of second dorsal. Caudal emarginate, lateral line complete. Colour: Silvery with two longitudinal bands on the upper side of the body (Fig. 2.)

General distribution: Indo-Pacific: Red Sea to South Africa; Japan, the China Seas, Philippines and Australia. It is here recorded from the Arabian Sea.

Apogon poecilopterus Cuvier & Valanciennes (Fig. 3).

Apogon poecilopterus Curvier and Valanciennes, 1828, 154; Weber & de Beaufort, 1929, 331, fig. 80; Carcasson, 1977, 105; Allen & Swainston, 1988, 68; Paxton *et al.*, 1989, 550; Krishnan & Mishra, 1993, 222; Gon, 1997, 172; Allen, 1997, 104; Larson & Williams, 1997, 357; Allen, 1999, 2606; Johnson, 1999, 732; Fraser, 2000, 252; Hutchins, 2001, 32.

Apogon galga, Day, 1878, 62.

Apogon truncatus Bleeker, 1854, 415.

Apogon bilaciniaus, Weber, 1909, 161.

Common name: Pearly fined cardinalfish

Material: Two specimens, 70mm standard length (85mm TL) collected from Vizhinjam.

Meristic counts: D^{I}VII; D^{2}I+8; AII+8; P15 (Table 2); Lateral line scales 25; Gill raker 17 (Table 1); L.tr. 1 ½ +1+6 (Table 3)

Morphometric measurements: Height 2.92, head 2.59 in body. Eye 3.38 in head.

Diagnostic features: Mouth oblique, maxillary reaching to below hind margin of eye. Operculum ending superiorly in two pointed flaps each with a soft spine. Serrations absent in pre-operculum. Teeth in anterior third of pre maxilla in one row, posterior in a villiform band, teeth of lower jaw caninoid. Dorsal spines weak, first spine minute, second more than half of third which is shorter than fourth. Fourth spine equals to fifth spine of second dorsal fin. Pectorals longer than ventrals, caudal

Table 1. *Total number of gill rakers in 3 species of apogonids*

Species	No.	Number of gill rakers							Mean
		17	18	19	20	21	22	23	
A. kinesis	2							2	23
A.poecilopterus	2	2							17
A. taeniatus	20		17	3					15

Table 2. *Total number of pectoral fin rays in 3 species of apogonids*

Species	No.	Number of pectoral fin rays		Mean
		14	15	
A. kiensis	2	2		14
A. poecilopterus	2		2	15
A. taeniatus	20	17	3	14

Table 3. *Range of variations in the number of lateral line scales in 3 species of apogonids*

Species	No.	Number of pectoral fin rays			Mean
		23	24	25	
A.kiensis	2	2			23
A. poecilopterus	2			2	25
A. taeniatus	20			20	25

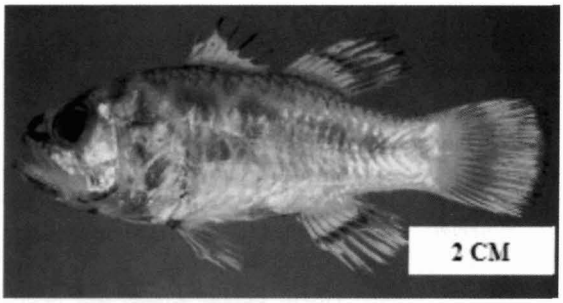

Fig. 3. *Apogon poecilopterus* Cuvier & Valanciennes

feebly rounded, ctenoid scales present. Colour silvery brown (Fig. 3).

General distribution: Indo-Pacific: Singapore, Philippines, Japan and Madras; it was not recorded earlier from the west coast of India and is here recorded from Vizhinjam.

Apogon taeniatus Cuvier & Valanciennes (Fig. 4)

Apogon taeniatus Cüvier and Valenciennes, 1828, 159; Rüpell, 1828, 48; Kluzinger, 1870, 712; Day, 1878, 49; Smith, 1949, 208, fig. 483; Carcasson, 1977, 102, pl.2, fig.483; Whitehead *et al.*, 1986, 804; Gon, 1986, 6; Krishnan & Mishra, 1993, 222; Goren & Dor, 1994, 31; Randall, 1995, 160; Carpenter *et al.*, 1997, 151; Fraser, 2000, 259.

Apogon bifasciatus Rüpell, 1835, 86, pl.22, fig. 2; Kluzinger, 1870, 711.

Apogon timorensis Bleeker, 1854, 207.

Amia taeniata Bleeker, 1874, 24.

Apogonichthyoides taeniatus Smith, 1961, 394.

Common name: Striped cardinal fish

Material: Twenty specimens, ranging from 82-104 mm standard length (100-131mm TL) collected from Vizhinjam.

Meristic counts: $D^{I}VII$; $D^{2}I+9$; AII+8; P14-15; (14.15) (Table 2); Lateral line scales 25 (Table 3); Gill raker 18-19 (18.15) (Table 1); L.tr. 3+1+7.

Morphometric measurements: Height 2.0 – 2.73 (2.41), head 2.43 – 2.56 (2.54) in body. Eye 3.18 – 3.45 (3.31) in head.

Diagnostic features: Mouth oblique, dorsal profile sloping gently from dorsal to snout, maxillary reaching

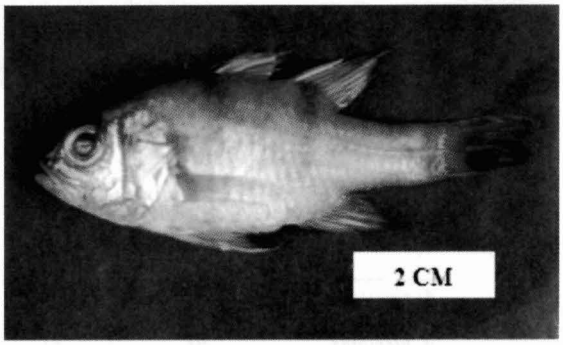

Fig. 4. *Apogon taeniatus* Cuvier & Valanciennes

almost to below middle of eye. Two vertical rows of scales on pre-operculum. Pre-orbital smooth, conical teeth in jaws, that of the lower jaw narrower than that of the upper jaw. Teeth on vomer in two rows, on palatines in a narrow band. Dorsal spines strong; first dorsal spine small, second one about one third of third one, fourth, fifth, sixth and seventh spines gradually decreasing in length. First anal spine minute, second one equal to second dorsal. Caudal incised, the lobes rounded. Colour brown, slivery below. A black transverse band from origin of dorsal to half way origin of ventrals and another second one from origin of second dorsal to half way anus. A dark spot on the lateral line at the base of caudal present. The membrane between the dorsal spine blackish. Males are mouth brooders (Fig. 4).

General distribution: Indo-Pacific: Red Sea and Persian Gulf south to Mozambique, Aldabra, Madagascar, Australia and South China Sea. It is here recorded from the Arabian Sea

Discussion

Apogonid fishes collected from the southwest coast of India during the present study are widely distributed in the Indo-Pacific region, and with the present three records, their total number in the Arabian Sea comes to 24.

Out of the 24 species recorded from the Arabian Sea, only 15 are known from the Bay of Bengal. The paucity of information on the Apogonid species from the Bay of Bengal may be attributed to the scanty study on the taxonomy of this group from the Bay. The Red Sea area may also be investigated thoroughly for the apogonid distribution as only 18 species are known from the area.

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