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On the occurrence of the elusive cardinalfish, *Apogon fugax* (Teleostei, Apogonidae), in the Bay of Bengal

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Short Communication

Abstract

The cardinalfish *Apogon fugax* Gon, Bogorodsky, Mal and Alpermann, 2020, was originally described from the Red Sea, Myanmar, and Australia. Three specimens (64.0–72.5 mm SL) were collected from the bycatch of demersal trawlers operating at depths of 30–70 m off Pazhayar, Tamil Nadu. This record represents a range extension from the previously known locations in the Indian coast (Gujarat, Kerala) to the Coromandel coast, the east coast of India. The species was identified based on a detailed morphometric analysis and meristic counts, which align with the original description, including key diagnostic characters such as 10–11 lower gill rakers and a distinctive colour pattern featuring a series of black dots on the first dorsal fin. Given the high diversity of cardinalfishes (Apogonidae) in Indian waters and their prevalence in trawl bycatch, this study underscores the importance of continued biodiversity assessments.

Keywords: *Bottom trawl, bycatch, Coromandel coast, range extension, rocky crevices*

Introduction

Globally, the family Apogonidae exhibits significant diversity, with a contemporary framework recognising four subfamilies: Apogoninae (34 genera, 354 species), Pseudamiinae (3 genera, 23 species), Amioidinae (2 genera, 3 species), and Paxtoninae (1 genus, 1 species), collectively amounting to 40 valid genera and 381 species (Fricke *et al.*, 2026). Within the Indian EEZ, the known apogonid fauna, estimated at 77 species spanning 26 genera, is predominantly composed of members from the Apogoninae and Pseudamiinae subfamilies (Saravanan *et al.*, 2017; Vishnupriya *et al.*, 2020; Kosygin *et al.*, 2024). A key feature of this regional diversity is the limited documentation of the genus *Apogon*; despite its global richness of 55 species, only three have been formally recorded from Indian waters in the past (Rajan *et al.*, 2021; Ragul *et al.*, 2024; Kosygin *et al.*, 2024).

The recent description of *Apogon fugax* from the Red Sea, Pakistan, Myanmar, and Western Australia (Gon *et al.*, 2020; Moazzam and Osmany, 2023) was followed by its report from the Gujarat (Ragul *et al.*, 2024) and Kerala (Suyani *et al.*, 2025) coast, representing a significant range extension into Western India (Ragul *et al.*, 2024). The present record of *A. fugax* from rocky crevices at 45–60 m depth on the Coromandel coast further extends its known distribution to the eastern coast of India. As a predominantly reef-associated taxon, its occurrence in these non-reef areas suggests the presence of structurally complex habitats, such as rocky substrata, that provide analogous ecological niches.

Apogonids are a ubiquitous component of warm temperate to tropical demersal assemblages, often ranking among the most diverse and abundant groups in reef ecosystems (Bellwood and Wainwright, 2002). Their ecological role as nocturnal mesopredators, combined with their susceptibility to bottom-trawl bycatch and value in the aquarium trade, underscores their conservation significance. The present work reports the first record of *A. fugax* from the eastern coast of India, representing a range extension from its known distribution along the western coast. The species identification is corroborated through a comprehensive analysis of its morphology, meristic counts, and live colouration.

Material and methods

Field surveys were undertaken from the trawl landing centres on the Coromandel coast of Tamil Nadu, India, in August 2023. During this period, a total of three specimens of *A. fugax*, ranging from 64.0–72.5 mm standard length (SL), were collected from the bycatch of Pazhayar (11° 21′32″ N 79°49′ 22″ E) bottom trawlers (cod end mesh sizes ranging from 18 to 35 mm). The fishing was mostly focused on demersal species *Metapenaeus* spp. at a depth range of 30 to 70 m and was undertaken mostly during the night hours, with the catch being landed in the morning hours. The specimens were procured from the bycatch of commercial trawlers at the Pazhayar landing centre.

The collected specimens were transported to the laboratory, and photographs were taken for documentation. Morphometric measurements were conducted using a Mitutoyo CD-6″ASX® digital Vernier calliper, ensuring precision to the nearest 0.1 mm. Measurements and proportions follow Hubbs and Lagler (1954) and Gon and Randall (2003), with morphometric characters expressed as percentages of standard length (SL) and head length (HL). The specimens were identified to the species following Gon *et al.* (2020). To ensure effective preservation, the collected materials were immersed in a 10% formalin solution and subsequently deposited in the Marine Biology Regional Centre, Zoological Survey of India, Chennai, Tamil Nadu, India, for future reference.

Results

Systematic position

Family: Apogonidae Günther, 1859
Subfamily: Apogoninae Günther, 1859
Genus: *Apogon* Lacepède, 1801
Apogon fugax Gon, Bogorodsky, Mal and Alpermann, 2020
Elusive cardinalfish (Fig. 1)

Apogon fugax Gon, Bogorodsky, Mal and Alpermann, 2020: 485, Fig. 1 and Table 3 (type locality: Jizan coast, Saudi Arabia, southern Red Sea). —Moazzam and Osmany, 2023: 50, Fig.

Table 1. Comparison of morphometric characters of *Apogon fugax* from the Tamil Nadu coast (present study) with previous records

Morphometric characters	Present study (Tamil Nadu)	Gon *et al.* (2020)	Ragul *et al.* (2024)	Suyani *et al.* (2025)
Standard Length (mm)	64.0–72.5	42.5–59.6	46.7–58.0	75.6–84.3
In % Standard Length				
Head Length	39.8–41.1	41.9–45.4	38.7–42.8	40.2 41.8
Snout Length	6.4–7.6	7.5–8.9	6.6–7.7	5.0–6.6
Eye Diameter	10.3–11.9	11.4–13.4	10.7–12.0	10.7–12.3
Body Depth	31.6–32.5	30.7–34.1	28.6–33.1	31.8–34.7
Pre-dorsal Length	40.7–41.1	41.4–43.1	41.3–42.8	37.5–39.7
Pre-ventral Length	34.7–37.4	37.2–40.1	35.3–38.9	32.3–38.2
Pre-anal Length	59.5–62.9	61.8–64.0	60.5–62.0	54.2–62.6
1st Dorsal Fin Base Length	12.0–12.5	–	12.2–13.0	13.4–14.0
2nd Dorsal Fin Base Length	13.3–13.7	–	13.7–13.9	14.5–15.0
1st Dorsal Fin Spine Length	8.4–8.8	8.6–10.5	8.6–8.7	7.8–8.7
2nd Dorsal Fin Spine Length	16.0–16.9	16.5–17.9	16.7–17.2	14.8–15.9
3rd Dorsal Fin Spine Length	15.4–16.6	15.8–17.1	14.7–16.8	15.8–16.1
Spine of 2nd Dorsal Fin Length	14.2–14.4	13.8–14.6	12.8–14.6	12.0–13.1
Anal Fin Base Length	13.1–13.6	–	13.7–13.9	13.3–13.8
1st Anal Fin Spine Length	3.1–3.4	2.9–3.1	3.2–3.4	2.5–4.3
2nd Anal Fin Spine Length	12.3–12.7	12.6–12.7	12.8–12.9	10.8–11.6
Pectoral Fin Length	28.7–28.8	29.2–30.3	29.3–29.9	27.5–29.0
Ventral Fin Length	22.0–23.6	23.1–24.0	23.1–24.1	19.4–23.3
Ventral Fin Spine Length	14.0–14.4	14.2–15.1	14.5–14.6	12.1–12.8
Caudal Fin Length	32.4–34.9	31.4–35.5	29.4–32.1	30.5–32.4
Caudal Peduncle Length	25.7–27.1	25.9–28.2	24.6–27.5	26.4–30.3
Caudal Peduncle Depth	13.6–14.4	13.4–14.0	13.7–14.9	13.7–14.7

Fig. 1. Photograph of fresh *Apogon fugax* (ZSI/MBRC/F.3358) from Pazhayar Fishing Harbour, southeastern coast of India, Tamil Nadu. Scale = 10 mm

4., Ragul *et al.*, 2024: 1, Fig. 1 and Table 1.—Suyani *et al.*, 2025: 1, Fig. 1 and Table 1.

Material examined

ZSI/MBRC/Reg No. F.3358, 3 ex., 64.0–72.5 mm SL (Fig. 1), Pazhayar Fishing Harbour, southeastern coast of India, Tamil Nadu, 11°21′32″N 79°49′22″E, collected by A. Murugan, 15 Aug. 2023.

Diagnosis

Apogon fugax is distinguished from congeners by the following combination of characters: dorsal-fin rays VI + I,9; anal-fin rays II,8; pectoral-fin rays 12; total gill rakers on first arch 14–15 (4+10–11). Live colouration bright reddish to dark orange; first dorsal fin with a distinct mid-line series of black dots.

Description

Dorsal-fin rays VI + I,9; anal-fin rays II,8; pectoral-fin rays 12; pelvic-fin rays I,5; gill rakers on first arch 4 + 10–11, total 14–15.

Body deep compressed; depth 31.6–32.5% SL. Head length 39.8–41.0% SL. Scales ctenoid; single large scale between the first dorsal fin and lateral line. Snout to first dorsal fin origin 40.7–41.1% SL; to anal fin origin 59.5–62.9% SL; to pelvic fin origin 34.7–37.4% SL. Head profile straight; nape elevated. Head width at preopercle 13.3–13.8% SL. Opercular margin weak, without serrations. Preopercle margin serrated. Snout elevated, length 6.4–7.6% SL. Eye large, diameter 10.3–11.9% SL. Mouth terminal; maxilla reaching to below the anterior half of the pupil; upper jaw 20.3–21.6% SL; lower jaw 22.0–24.8% SL. Jaws with villiform teeth. Tongue with a short lobe. First dorsal fin triangular, base 12.0–12.5% SL; first spine shortest (8.4–8.8% SL), second longest (16.0–16.9% SL), third intermediate (15.4–16.6% SL). Second dorsal fin base 13.3–13.7% SL; spine 14.1–14.4% SL. Pectoral fin elongate, 28.7–28.8% SL. Pelvic fins short, 22.0–23.6% SL; spine 14.0–14.4% SL. Anal fin base 13.1–13.5% SL. Caudal fin narrow, elongate, forked, length 32.4–34.9% SL. Caudal peduncle slender, compressed; length 25.7–27.1% SL, width 6.1–6.7% SL, depth 13.6–14.4% SL. For detailed morphometrics, see Table 1.

Colouration

Fresh: Body bright reddish to dark orange (Fig. 1). First dorsal fin with a mid-line series of black dots between second and third membranes. Other fins are orange; the caudal fin distal part, second dorsal fin base, pelvic fin base, and anal fin base are translucent.

Colour in formalin: Body pale. First dorsal fin black dots prominent. Paired and unpaired fins are pale yellowish.

Distribution and habitat

Apogon fugax is known from the Indo-Pacific waters: the Red Sea, Pakistan, India, Myanmar, and Western Australia (Gon *et al.*, 2020; Moazzam and Osmany, 2023). From Indian waters, it is only known from the western coast, *i.e.*, Veraval, Gujarat (Ragul *et al.*, 2024) and Cochin, Kerala (Suyani *et al.*, 2025). This present study reports its occurrence along the southeastern coast, off Pazhayar, Tamil Nadu.

Discussion

Among the four apogonid subfamilies, Apogoninae is the most diverse, encompassing the majority of species and exhibiting the greatest morphological and ecological variation, including the occurrence of bioluminescence (Mabuchi *et al.*, 2014). In Indian waters, cardinalfishes are widely distributed across diverse ecosystems. Regional studies report varying levels of diversity: 41 species from the Gulf of Mannar (Joshi *et al.*, 2016), 48 species from the Andaman and Nicobar waters (Rajan *et al.*, 2021), and fewer species from the Lakshadweep Islands and the west coast (Jones and Kumaran, 1980; Kumar *et al.*, 2019). Comprehensive national checklists estimate the Indian apogonid fauna at 77 species across 26 genera (Gopi and Mishra, 2015; Saravanan *et al.*, 2017; Kosygin *et al.*, 2024), indicating that taxonomic clarity and exact species diversity require further research.

The genus *Apogon* sensu stricto is now represented by three species in Indian waters: *A. coccineus*, *A. ceramensis*, and the recently reported *A. fugax* (Rajan *et al.*, 2021; Ragul *et al.*, 2024; present study). *A. fugax* is distinguished from other Indian *Apogon* species by its lack of a semi-transparent body and from other members of the *A. talboti* group by a lower gill raker count (10–11).

This study confirms the first record of *Apogon fugax* from the southeastern coast of India, extending its known range. The finding underscores significant gaps in our understanding of apogonid taxonomy and distribution in Indian waters, highlighting the need for further research to support the conservation of cardinal fishes.

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Author contributions

Conceptualisation: AM; Methodology: AM; Data Collection: AM; Data Analysis: GM, SR; Writing Original Draft: AM; Writing Review and Editing: GM, SR; Supervision: AM. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Data availability

All relevant datasets supporting the conclusions of this article are included within the article.

Conflicts of interest

The authors declare that they have no conflict of financial or non-financial interests that could have influenced the outcome or interpretation of the results.

Ethical statement

No ethical approval is required as the study does not include activities that require ethical approval or involve protected organisms/ human subjects/ collection of samples/ protected environments.

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