

## Note on Occurrence of *Jaydia queketti* (Osteichthyes: Apogonidae) from the Bycatch of Tropical Trawl Fishery

L. RANJITH<sup>1</sup>, S. RAMKUMAR<sup>2</sup>, K. KANNAN<sup>1</sup>, K. VINOD<sup>3</sup>, K. K. JOSHI<sup>4</sup>,  
S. P. SHUKLA<sup>5</sup>, C. S. PURUSHOTHAMAN<sup>4</sup> and S. K. CHAKRABORTY<sup>5</sup>

<sup>1</sup>Central Marine Fisheries Research Institute, Research Centre, Tuticorin, India.

<sup>2</sup>Central Marine Fisheries Research Institute, Research Centre, Mumbai, India.

<sup>3</sup>Central Marine Fisheries Research Institute, Research Centre, Calicut, India.

<sup>4</sup>Central Marine Fisheries Research Institute, Kochi, India.

<sup>5</sup>Central Institute of Fisheries Education, Mumbai, India.

<http://dx.doi.org/10.12944/CWE.11.2.32>

(Received: April 12, 2016; Accepted: May 09, 2016)

### ABSTRACT

Three specimens of apogonids species of total length 72.69, 106.28 and 110.67 mm were caught off Tuticorin at the depths of 90-100 m as a bycatch on 1<sup>st</sup> January 2013 from the commercial trawler operated from Tuticorin Fishing Harbour, Southeast coast of India. In this paper, on the occurrence of *Jaydia queketti* was figured and the comprehensive diagnostic features of the recorded specimens were elucidated. The species of this genus *Jaydia* is distributed continentally and often caught as a bycatch from shrimp or fish trawl. These species are widely distributed in New Guinea, larger islands in the Coral Sea, Australia, Arabian Sea of India and also from Africa to Japan. Nevertheless, the present observation shows the occurrence of *J. queketti* from the bycatch of trawl fishery operated along Gulf of Mannar, Southeast coast of India.

**Keywords:** Cardinalfish, Trashfish, Gulf of Mannar, Distribution.

### INTRODUCTION

Cardinalfishes (Family: Apogonidae) are small percoid species, mostly less than 100 mm; generally marine, qualitatively abundant families in the reef ecosystems and are found in estuaries and lowland freshwater bodies<sup>1,2,3</sup>. They are nocturnal; few species show parental care; where males are known for mouth brooding of eggs, and some of the species have a ventral luminous organ<sup>1,4,5</sup>. Apogonids have a wide geographical range from warm temperate to tropical areas in the Oceans of Pacific, Indian and Atlantic<sup>1,2</sup>. They are distributed in a wide range of ecosystem viz., coral reefs, rocky reefs, sea grasses meadows, coralline algal meadows and other soft-bottom communities<sup>1,2</sup>.

The family Apogonidae was divided into two subfamilies viz., Apogoninae and Pseudamiinae<sup>1</sup> but later Mabuchi *et al.* (2014) erected two more subfamilies as of now the family Apogonidae has four subfamilies viz., Apogoninae (thirty four genera), Pseudamiinae (one genera, *Pseudamia*), Paxtoninae (one genera) and Amioidinae (two genera). The genus *Jaydia* Smith 1961 comes under the Apogoninae subfamily and tribe Sphaeramiini (6 genera). The tribe Sphaeramiini differs from the other apogonids in having melanophores completely blackish in the stomach and intestine, seven first dorsal spines with third dorsal spine shorter than fourth spine.

The genus *Jaydia* differs from other genera like *Apogonichthyoides*, *Nectamia*, *Pterapogon*,

*Quinca* and *Sphaeramia* by which on the third pterygiophore the longest dorsal spines exists whereas in the other genera on the second pterygiophore has the longest dorsal spine<sup>6</sup>. This genus has 19 valid species viz., *Jaydia albomarginatus* (Smith & Radcliffe, 1912), *J. argyrogaster* (Weber 1909), *J. carinatus* (Cuvier, 1828), *J. catalai* (Fourmanoir, 1973), *J. ellioti* (Day,

1875), *J. erythropthalma* Gon, Liao & Shao, 2015, *J. hungi* (Fourmanoir & Do-Thi, 1965), *J. lineata* (Temminck & Schlegel, 1842), *J. melanopus* (Weber, 1911), *J. novaeguineae* (Valenciennes, 1832), *J. photogaster* (Gon & Allen, 1998), *J. poecilopterus* (Cuvier, 1828), *J. quartus* (Fraser 2000), *J. queketti* (Gilchrist, 1903), *J. smithi* Kotthaus 1970, *J. striata* (Smith & Radcliffe, 1912), *J. striatodes* (Gon 1997), *J.*



Fig. 1: Lateral left side view of the specimen *Jaydia queketti* caught off Tuticorin coast, Gulf of Mannar, Southeast coast of India

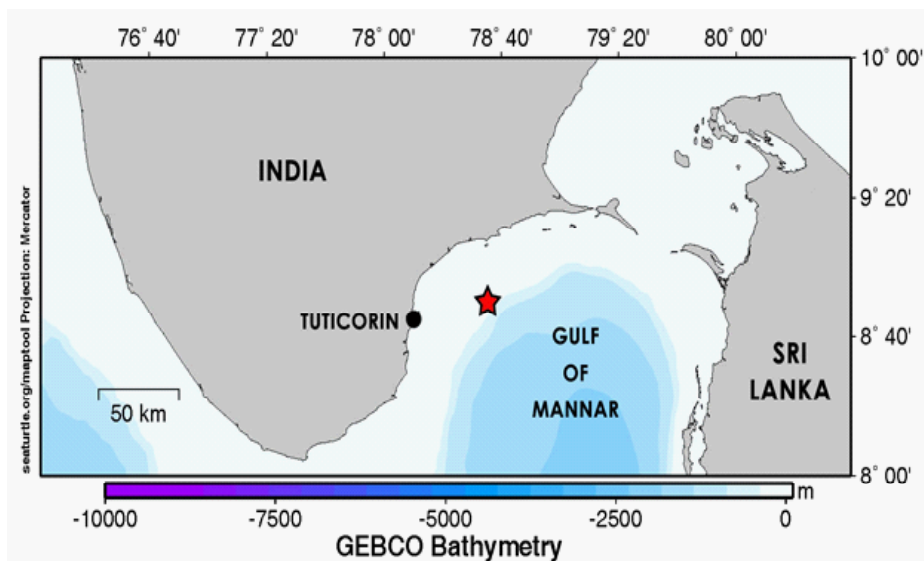


Fig. 2: Location of *Jaydia queketti* caught off Tuticorin coast, Gulf of Mannar, Southeast coast of India. (Red star : caught location)

**Table 1. Morphometric (% of TL) and meristic counts of *Jaydia queketti* from south east coast of India**

<b>Morphometric characters</b>	<b>sp1 %</b>	<b>sp2 %</b>	<b>sp3 %</b>
Total length (TL)	100	100	100
Standard length	76.95	78.37	78.80
Head length	38.86	36.47	39.59
Eye diameter	25.42	25.25	27.64
Orbit diameter	15.95	15.94	13.84
Inter-orbital length	25.61	27.50	25.57
Upper jaw length	47.79	53.72	53.92
lower jaw length	44.33	52.03	54.05
Snout length	20.76	21.74	17.72
I Pre dorsal length	39.28	39.07	39.03
II Pre dorsal length	61.01	63.41	60.33
Pre pectoral length	42.24	39.95	40.48
Pre pelvic length	39.70	37.44	37.34
Pre anal length	62.18	68.57	60.57
I Dorsal fin base length	18.87	18.40	19.29
II Dorsal fin base length	17.04	16.41	15.50
Pectoral fin base length	5.99	6.61	6.38
Pectoral fin length	24.56	22.24	25.66
Pelvic fin base length	8.02	7.51	7.33
Anal fin base length	14.21	15.50	13.89
Body depth (max.)	33.76	32.12	25.96
Caudal peduncle length	25.77	25.14	25.13
Caudal peduncle depth	16.53	15.98	16.20
Distance between anal to anus	3.03	3.00	3.77
Distance between pelvic to anal	28.18	33.28	27.89
Distance between pelvic to anus	21.42	28.97	22.71
Meristic characters			
I Dorsal fin rays	VII	VII	VII
II Dorsal fin rays	I+9	I+9	I+9
Pectoral rays	14	14	14
Pelvic fin rays	I+5	I+5	I+5
Anal fin rays	II+8	II+8	II+8
Lateral- line scales	27	27	27

*tchefouensis* (Fang, 1942), and *J. truncata* (Bleeker, 1854)<sup>2,6,7,8&9</sup>. The present paper aims to record and spot out the presence of spotfin cardinal, *Jaydia queketti* (Gilchrist, 1903) and also to describe about the further occurrence in the trawl bycatch of Tuticorin Fishing Harbour, Tuticorin, Gulf of Mannar, Southeast coast of India.

## MATERIAL AND METHODS

Three specimens of apogonids of 72.69, 106.28 and 110.67 mm total lengths were collected from trawl bycatch from the commercial trawler operated along Tuticorin coast on 1<sup>st</sup> January 2013. These specimens were caught off Tuticorin

approximately 35 km Southeast of Tuticorin fishing harbour between 90 and 100 m depth by a commercial trawler (8° 38' 127" N and 78°12' 612"E). The fresh color and pigmentation of the specimens were recorded, and photographs were taken at the landing centre. The landed specimens were brought into the laboratory of Tuticorin Research Centre of CMFRI for further analysis. The specimen's meristic counts were recorded and by using a digital caliper morphometric measurement were taken to the nearest mm according to Gon (1996) & Gon and Randall (2003).

## RESULTS

The specimens were identified as spotfin cardinal, *Jaydia queketti* (Gilchrist, 1903) (Accession No.: GB.31.9.1.156) and these were deposited in the National Marine Repository of Central Marine Fisheries Research Institute, Kochi, Kerala, India. The morphometric characteristics with percents of total length (% of TL) and meristics counts of *J. queketti* are shown in the Table 1.

### Materials Examined

*Jaydia queketti* (3 specimens; Trawler; bycatch, Tuticorin fishing harbour, Gulf of Mannar, 8° 38' 127" N and 78°12' 612"E).

### Systematics

Class : Actinopterygii  
 Order : Perciformes  
 Sub order : Percoidei  
 Family : Apogonidae  
 Subfamily : Apogoninae Günther 1859  
 Tribe : Sphaeramiini Fraser & Mabuchi, 2014  
 Genus : *Jaydia* Smith 1961  
 Species : *Jaydia queketti* (Gilchrist, 1903)

### Description

Body is medium in size, two separate dorsal fin, first with VII spines & second with I spine & 9 rays; pectoral fin rays 14; third dorsal fin spine smaller than fourth spine; Lateral-line scales 27; one to three median predorsal scales 1-3; Preopercle edge & ridge smooth. Total gill rakers 17 (5+12).

Colour: Dorsal pinkish grey, ventral and lateral sides silvery shade; scales on the body with

dark brown spot forming longitudinal rows; on the rear part of the first dorsal fin with large dark black spot of; anal fin distal edge intense black; anal, caudal and second dorsal fins pale to dusky, with a dark distal edge.

Distribution: Arabian Sea of India, South Africa, Red Sea, Mozambique, and Persian Gulf.

Remarks: Based on shared characters like smooth preopercular and post-temporal ridges, along the body series of spots and on the peritoneum absence of dark spots the species *J. queketti*, *J. carinatus* and *J. poecilopterus* were grouped together within the *carinatus*-group of the subgenus *Jaydia*<sup>6</sup>. Gon (1996) later separated *J. queketti* from the latter by the enlarged dark ocellus on the posterior part of first dorsal fin, conspicuous parallel rows of dark brown spots on scales on the sides and anal; and also caudal fins with dark distal edges. On the other hand, *J. carinatus* has a dark ocellus on second dorsal fin and dark spots on sides not arranged in rows, whereas *J. poecilopterus* bears large indistinct black blotches on sides.

## DISCUSSION

Morphology, colour, morphometric measurements and meristic counts of the present specimen were similar to the specimen examined by Gon and Randall (2003). The key diagnostic characters like presence of smooth preopercle edge and palatine teeth, on the upper limb of first gill arch two developed gill rakers, silvery body with four or five rows of scales with brownish spots, posterior part of first dorsal fin with dark spot or ocellus on, black on distal edges of anal and caudal fins of the recorded specimens were as per various literatures<sup>2,6,10</sup>. The species of this genus *Jaydia* Smith 1961 has a more continental distribution, mostly caught in trawls as a bycatch, widespread in New Guinea, larger islands in the Coral Sea, Australia, Arabian Sea of India and also from Africa to Japan The present observation shows the occurrence of *J. queketti* from the bycatch of trawl fishery Southeast coast of India.

In recent times, there are more reports on the Lessepsian migration (marine species movement across the Suez Canal, i.e., from the Red Sea to the

Mediterranean Sea) of many marine fish species including *J. queketti* as an invasive species to the Mediterranean Sea<sup>11</sup>. The migration of marine species across different Seas could be attributed by the man-made ecosystem alterations and climatic change<sup>11,12</sup>. Moreover, studying the new population driven by man-made alterations and natural selection is the critical concern for the conversion of marine biodiversity.

The present species were caught as a bycatch of trawlers operating along Tuticorin as reported by Froese and Pauly (2014). This species might be a resident to Gulf of Mannar, which was not caught previously, or it may be arrived to the Gulf of Mannar from adjacent ecosystems through climate induced migration. The distribution of this species might be due to the recent changes in environmental and other oceanological features of Gulf of Mannar. Fish species movements towards higher latitudes are due to change climate conditions as fish distribution is affected due to the increases or decrease in sea temperature<sup>12</sup>.

In recent years, many apogonid species like *Apogonichthyoides siali*<sup>13</sup> and *Holapogon maximus*<sup>14,15</sup>, *Cheilodipterus macrodon*<sup>3</sup> have been reported from the southern EEZ (Exclusive Economic Zone) of India. This can be attributed to

the shift in fishing pattern from coastal to deep waters and also due to closer observation and monitoring of bycatches from the deep sea fishery resources. In addition, there is an increase in trend of researchers focusing towards the deep-sea fish diversity in the southern coast of India, in particular to Gulf of Mannar<sup>3,15,16,17</sup>. Moreover, in the Gulf of Mannar, the slope is precipitous beyond 500 m, and 180 to 450 m depth range the bottom topography undulates<sup>18</sup>. Hence, in the forthcoming years future more number of faunal species in particular deep sea fish will be documented due to exploration of new fishing ground along Gulf of Mannar, Southeast coast of India.

#### ACKNOWLEDGEMENTS

The authors are very grateful to the Directors of Central Marine Fisheries Research Institute (CMFRI) and Central Institute of Fisheries Education (CIFE) for the encouragement during the course of this study. The authors express heartfelt thanks to the Scientist-in-charge and other staffs of Tuticorin Research Centre of CMFRI for their support. The first authors thank the anonym's reviewers for the critical comments and betterment of the manuscript. The first author also wishes to acknowledge the online GIS program MAPTOOL, provided by seaturtle.org.

#### REFERENCES

1. Nelson JS Fishes of the world 4th ed, John Wiley & Sons, Inc., p. 624 2006.
2. Mabuchi K, Fraser TH, Song H, Azuma Y, Nishida M Revision of the systematics of the cardinalfishes (Percomorpha: Apogonidae) based on molecular analyses and comparative reevaluation of morphological characters. *Zootaxa* 3846:151-203 2014.
3. Ranjith L, Kannan K, Suresh Kumar K, Joshi KK, Sivadas M, George RM Madan MS. Description on *Cheilodipterus macrodon* (Lacepede, 1802) (Perciformes: Apogonidae) from Gulf of Mannar, Southeast coast of India. *Thalassas* 31(2):55-60 2015.
4. Fishelson L. Spawning behaviour of the cardinal fish *Cheilodipterus lineatus* in Eilat (Gulf of Aqaba, Red Sea). *Copeia* 1970(2):370-371 1970.
5. Thacker CE, Roje DM Phylogeny of cardinalfishes (Teleostei: Gobiiformes: Apogonidae) and the evolution of visceral bioluminescence. *Molecular Phylogenetics and Evolution*, 52:735-745 2009.
6. Gon O. Revision of the cardinalfish subgenus *Jaydia* (Perciformes, Apogonidae, *Apogon*) *Transactions of the Royal Society of South Africa*, 51(1):147-194 1996.
7. Froese R, Pauly D. Fish Base. World Wide Web electronic publication, <http://www.fishbase.org> (version 02/2014). Accessed 10 March 2014.
8. Eschmeyer WN (2014) Genera, Species,

- References. Electronic version <http://research.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> (Accessed 10 March 2014).
9. Gon O, Liao YC, Shao KT A new species of the cardinalfish genus *Jaydia* (Teleostei: Apogonidae) from the Philippines. *Zootaxa* **3980**(2):286-292 2015.
  10. Gon O, Randall E. A review of the cardinalfishes (Perciformes: Apogonidae) of the Red Sea. *Smithiana, Aquatic Biodiversity Bulletin* **1**:1-48 2003.
  11. Eryilmaz L, Dalyan C First record of *Apogon queketti* Gilchrist (Osteichthyes: Apogonidae) in the Mediterranean Sea. *Journal of Fish Biology* **69**(4):1251-1254 2006.
  12. Dulcic J, Bojan M, Valter Z, Armin P, Lovrenc L Northern extension of the range of the vadigo *Campogramma glaycos* (Pisces: Carangidae) from the Adriatic Sea. *Journal Marine Biological Association:UK* **83**(4):87-878 2003.
  13. Manjebayakath H, Akhilesh KV, Pillai NGK Report of *Apogonichthyoides sialis* (Perciformes: Apogonidae) from the west coast of India. *Marine Biodiversity Records* **5**(15):1-3 2012.
  14. Koya KPS, Akhilesh KV, Bineesh KK New record of Titan cardinalfish, *Holapogon maximus* (Apogonidae) along the southwest coast of India. *Marine Biodiversity Records* **4**(36):1-2 2011.
  15. Ranjith L, Kannan K, Joshi KK, Vinod, K Range extension of the titan cardinalfish, *Holapogon maximus* (Boulenger, 1888) in the southern coast of India. *National Academy of Science Letters* **39**(2):95-98 2016.
  16. Kannan K, Sureshkumar K, Ranjith L, Joshi KK, Madan MS, Sajan J First record of the twostripe goby, *Valenciennesa helsdingenii* (Gobiidae, Gobiiformes) from the Southeast coast of India. *ZooKeys* **323**:91-97 2013.
  17. Kannan K, Ranjith L, Joshi KK, Sajan J First record of *Grammonus robustus* Smith & Radcliffe, 1913 (Ophidiiformes: Bythitidae) from Indian waters. *Marine Biodiversity Records* **7**(57):1-4 2014.
  18. Silas EG. Exploratory fishing by R.V. Varuna, *Bulletin of Central Marine Fisheries Research Institute* **12**:1-86 1965.