

## First record of a cardinalfish, *Jaydia striata* (Smith and Radcliffe 1912) (Apogonidae), from the east coast of India

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*Jaydia striata*, is reported from West Bengal coast along the east coast of India. This forms its first record from the Bay of Bengal as well as east coast of India. Systematic account of the species along with its mouth-brooding evidence is provided in the present article. Their differences from other congeners known from Indian waters were examined in this study.

[**Key words:** Bay of Bengal, Taxonomy, West Bengal, Morphometry]

### Introduction

Fishes of the family Apogonidae, usually inhabit reef or near reef areas, but occasionally found in estuaries or streams<sup>1-2</sup>. This family comprises 360 species and 39 genera placed in four subfamilies<sup>3-5</sup>.

Molecular study by Mabuchi *et al.*<sup>3</sup> established *Jaydia* Smith 1961 as a valid apogonid genus. The genus is characterised in having seven spines in first dorsal fin; fourth dorsal spine longer than third spine; dorsal-fin rays 8–13; anal-fin rays 8–9; caudal fin emarginate, truncate or rounded; longest procurrent caudal-fin rays segmented; no canine teeth; some lateral dentary teeth may be slightly enlarged; supramaxilla small, difficult to detect or absent; first three infraorbitals with upper edges smooth to crenulated; preopercular ventral edge ossified, serrated, crenulated or smooth; one pored lateral line, lateral-line scales less than 29; stomach and intestine with melanophores to completely blackish; silver or blackish band (bioluminous in life) along ventral side from hyal region extending past abdomen onto caudal peduncle absent<sup>3</sup>. This genus contains 18 species<sup>4</sup> and placed in the subfamily Apogoninae and tribe Sphaeramini<sup>3</sup>. They are nocturnal; seek shelter during day time in caves and crevices or around coral formations, active at night and feeds on crustaceans, fish larvae and eggs. They are mouth brooders, most species appear to have mouth-brooding/ oral incubating males without distinct nuptial coloration<sup>3,6</sup>.

The authors happened to come across 16 Apogonid specimens during the collection of ornamental fishes along the northern east coast of India, which were identified as *Jaydia striata* (Smith and Radcliffe, 1912). This forms the first report of the species from the East coast of India.

### Materials and Methods

During local survey around Digha coast of West Bengal, around May-June, 2011 total 16 specimens of cardinal fishes were collected ranging from 55.38-39.00 mm in standard length (SL). As informed by local fishermen, these fishes were captured in trawl nets, 34 km away from Digha Mohona, a major fish landing station of West Bengal. Depth of collection was ranging between 40-42 feet. Morphometric measurements and meristic counts were following Frasser<sup>7</sup>. The term of head length and body depth was abbreviated as HL and BD, respectively. Measurements were done by digital calipers and recorded to the nearest 0.1 mm. Fresh photographs (Fig. 1) were taken and preserved in 5% formaldehyde solution. The specimens were deposited in MARC, ZSI, Digha, West Bengal with catalogue number MARC/ZSI F 2821.

### Result

The collected Apogonid specimens were identified as *Jaydia striata* (Smith and Radcliffe, 1912) and the systematic account for the species is given hereunder to establish its first record from east coast of India.

*Jaydia striata* (Smith and Radcliffe, 1912)

*Amia striata* Smith and Radcliffe, 1912, *Proc. U. S. Nat. Mus.*, 41 (1868): 437, Pl. 35 (fig. 1) (Type locality: Western coast of Luzon Island, 16°30'36"N, 120°11'06"E, Philippines, 'Albatross' station 5442, depth 45 fathoms).

*Apogon (Jaydia) striatus*: Gon, 1977, *Trans. Roy. Soc. S. Afr.*, 51: 183, fig. 16.

*Jaydia striata*: Mabuchi, Fraser, Song, Azuma and Nishida, 2014, *Zootaxa*, 3846 (2): 202.

*Diagnosis*

A species of *Jaydia* with following combination of characters: body depth 2.65-3.04 in SL; pectoral fin rays 15; 4<sup>th</sup> dorsal fin spine longest; developed gill rakers 3 + 8-9; lateral line scales 25-26; angle of pre-opercular with serration but upper margin and crest smooth; opercle with a single flat obtuse spine; body colour whitish brown with silvery shine, crossed by 8-10 dark cross bands of almost equal width and interspaces; anal fin pale; peritoneum with dark pigments.

Body stout, compressed and anteriorly blunt; dorsal surface more arched than ventral, depth 2.65-3.04 in SL. Head 2.27-2.59 in SL and dorsally flat; maxilla long reaching vertical to posterior border of eyes; outer orbit rim rough. Two nostrils, posterior larger than anterior. Angle of pre-opercle with serrations, but upper margin and crest smooth; opercle with a single flat obtuse spine. Lower jaw projecting with a band of cardiform teeth present on inner edge, largest at symphysis; front of maxilla without teeth but posteriorly with unequal cardiform teeth which are become smaller and villiform; vomer and palatine with single rows of stout teeth, canines absent. Developed gill rakers on upper limb 3 and on lower limb 8-9. Two dorsal fins separated by a wide interdorsal space, first with VII spine and second with one spine followed by 9 rays; anal fin with II spines and 8 rays; Pectoral fin with 15 rays; ventral fin with I spine and 5 rays. Soft dorsal, soft anal and caudal fin rounded; origin of dorsal fin behind the ventrals; first dorsal spine very small, about 1/3<sup>rd</sup> of 2<sup>nd</sup> spine; 1<sup>st</sup>



Fig. 1 — *Jaydia striata* (Smith and Radcliffe, 1912)

anal spine small. Branchiostegal rays 7. Scales ctenoid, loosely attached; present on opercle, subopercle, cheek, breast and pelvic region. Lateral line scales 25-26.

All the measurements were compared with the holotype (Table-1).

*Morphometrics as times in SL*

Body depth 2.65-3.04; body width 5.57-5.96; head length 2.29-2.59; longest dorsal spine (4<sup>th</sup>) 5.54-6.04; second anal spine 8.80-9.28; ventral fin 4.02-4.35; pectoral fin 3.73-3.95; eye diameter 7.84-8.32; pre dorsal length 2.2-2.56; pre anal length 1.44-1.58; pre ventral length 2.3-2.68; caudal peduncle depth 5.48-5.72; caudal peduncle length 3.70-4.04.

*Morphometrics as times in HL*

Caudal peduncle depth 2.16-2.41; caudal peduncle length 1.58-1.73; eye diameter 3.25-3.52; snout length 4.84-5.19; maxilla 1.80-2.08; interorbital space 4.34-4.79; longest dorsal spine (4<sup>th</sup>) 2.25-2.62; 1<sup>st</sup> dorsal spine 9.17-9.52; 2<sup>nd</sup> dorsal spine 4.12-4.29; 3<sup>rd</sup> dorsal spine 2.32-2.74; 5<sup>th</sup> dorsal spine 2.33-2.54; last dorsal spine 2.47-2.72; longest soft dorsal 1.59-1.79; 1<sup>st</sup> anal spine 6.61-7.15; 2<sup>nd</sup> anal spine 3.38-4; longest soft anal 1.82-2.09; ventral fin 1.69-1.85; Pectoral fin 1.56-1.69.

*Colour in fresh*

Body deep brown above and shiny silvery below; nape, snout, head and cheek brown; sides of head iridescent silver; 8-10 vertical dark bands on sides, equal in size and interspaces; a dark bar runs from eye

Table 1 — Comparative counts and measurements of holotype and present specimens

Characters	Holotype (Radcliffe, 1912)	Present Study
Dorsal fin	VII-I, 9	VII-I, 9
Anal fin	II, 8	II, 8
Lateral line scales	3+6-24	25-26
SL/HL	2.60	2.27-2.59
SL/BD	2.71	2.65-3.04
HL/Caudal peduncle depth	2.16	2.16-2.41
HL/Caudal peduncle length	1.64	1.58-1.73
HL/Eye diameter	3.38	3.25-3.52
HL/Snout length	4.91	4.84-5.19
HL/maxilla	1.75	1.80-2.08
HL/Interorbital space	4.50	4.34-4.79
HL/longest dorsal spine (4 <sup>th</sup> )	2.50	2.25-2.62
HL/soft dorsal	1.69	1.59-1.79
HL/anal fin	1.93	1.82-2.09
HL/ventral fin	1.75	1.69-1.85
HL/Pectoral fin	1.53	1.56-1.69

to preopercular crest. Spinous dorsal with dark edge; second dorsal base white, near the base with dark narrow band and dark margin; anal with white base and dusky margin; ventral light and dusky at base; pectoral light yellow with scattered dusky; caudal with pale yellow base and dusky at margin. Melanophores present on head, peritoneum, and lower lips.

#### *Colour after preservation*

Silvery shine disappear; dark areas become pale; 8-10 vertical dark bands easily visible; dark bar runs from eye to preopercular crest also visible.

#### *Distribution*

Indo-west Pacific: from Persian Gulf to west coast of India, west coast of Myanmar, Indonesia, Taiwan and the Philippines.

#### **Discussion**

Froese and Pauly<sup>8</sup> maintains its distribution as restricted to Western Central Pacific: Papua New Guinea and the Philippines. However, Eschmeyer *et al.*<sup>9</sup> considered it to be distributed in Indo-West Pacific: from Pakistan to Philippines to Papua New Guinea. Gon<sup>10</sup> collected specimens from Persian Gulf, Gulf of Oman, west coast of India (Off Gujarat and Mumbai, Maharashtra), Myanmar and adjacent Bangladesh, Indonesia, Taiwan and the Philippines. Hence, *Jadia striata* is wide-spread in Indo-west Pacific. However, there is no record of this species from Bay of Bengal. The present report from West Bengal coast extends the occurrence of the species to the east coast of India.

From Indian waters only five species of the genus *Jaydia* are known, viz., *J. poeciloptera* (Cuvier 1828), *J. queketti* (Gilchrist 1903), *J. smithi* (Kotthaus, 1970), *J. striata* (Smith and Radcliffe 1912) and *J. truncata* (Bleeker 1854), while *Apogon ellioti*, described by Day<sup>11</sup> from Madras, India and *Apogon andhrae*, described from Visakhapatnam, India<sup>12</sup> are treated as synonym of *J. truncatus* and *J. smithi* respectively<sup>10</sup>. *Jaydia striata* is closely related to *J. lineata*; but *J. striata* differs from *J. lineata* by having narrow and rough interorbital space, larger eye and shorter snout, longer maxilla, vertical band darker with same width and interspaces compare to 8-12 narrow, dark bands much narrower than interspaces of *J. lineata*. Preopercular edge smooth, without ossified serrae in *J. poeciloptera* and *J. queketti*, while *J. striata* with a serrated preopercular edge. Only one developed gill raker on upper limb of first gill arch in

*J. smithi* and *J. truncata*, contrary to 2 or 3 developed gill rakers in *J. striata*.

Oral incubation or mouth-brooding of fertilized eggs is common in many species of Apogonid fishes<sup>13</sup>. Mouth-brooding usually provided by male in Apogonids<sup>14</sup>. During identification of the species, authors observed two specimens (males) with eggs in mouth (Fig. 2 and 3). From this observation, the possible breeding season of *Jaydia striata* might be during May-June in the East coast. In fact, the environment where predation risk of spawn eggs is high, there male parental mouth-brooding is higher than female, because expose time of eggs to predation is shorter when the male keeps them. In cardinal fishes, predation of their exposed spawn eggs is very high, which might be one of the most effective factors contributing to the evolution of parental mouth-brooding<sup>15</sup>.



Fig. 2 — Eggs inside the mouth of *Jaydia striata*.

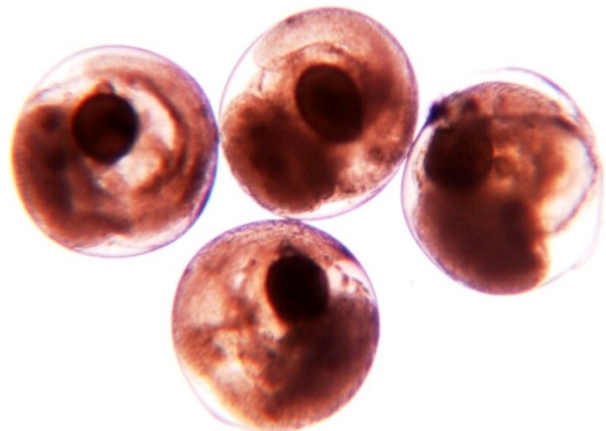


Fig. 3 — Enlarged view of eggs under microscope.

## Conclusion

*Jaydia striata* is reported herewith from West Bengal coast along the east coast of India for the first time. This forms its first record from the Bay of Bengal as well as east coast of India. During identification of the species, authors observed two specimens (males) with eggs in mouth from which it can be concluded that the possible breeding season of *Jaydia striata* might be during May-June in the East coast.

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