

First Record of *Danio assamila* Kullander, 2015 (Teleostei: Cyprinidae) from Eastern Ghats, Andhra Pradesh, India

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ABSTRACT: To know the diversity and status of fish's and for their conservation, frequent fish explorations needed. Eastern ghats are geographical unique and contain unexplored diversity along with fish fauna and present study was made to know the fish diversity of small hill stream of Eastern Ghats Andhra Pradesh. *Danio assamila*, Kullander 2015 is recorded for the first time from the Munchangi Puttu hill stream, a river tributary of Sabari of the Godavari River basin, Andhra Pradesh, Eastern Ghats of India. The detailed morphometric and meristic data of the specimens that form the basis of this new record are presented. *D. assamila* is identified by a unique combination of characteristics such as the first ray of pectoral and pelvic fins projected distally from the rest of the rays, a cleithral spot large and rounded or slightly oval, a ring chain pattern not extending onto the caudal peduncle and lateral line complete with 32–36 scales.

Keywords: Freshwater fish, taxonomy, hill streams, Eastern Ghats, River Godavari, India.

INTRODUCTION

Hamilton (1822) defined the genus *Danio* fishes as a subspecies of *Cyprinus*. There are about 25 recognized species in this genus, all of which are found in South and Southeast Asia (Kullander, 2015; Kullander & Britz 2015). Among these, *Danio assamila* Kullander, *D. catenatus* Kullander, *D. concatenates* Kullander, *D. dangila* (Hamilton), and *D. slyphigmatus* Kullander are the five species that Kullander *et al.* (2015) identified as being part of the unique group. The flank color pattern of these Danios is distinctive; it consists of two or more sets of dark rings encircling light centers that resemble chains.

Furthermore, they possess a distinct set of characteristics that set them apart, including an increased (vs decreased) quantity of branched dorsal fin rays, a prolonged (vs non-extended) initial ray of the pelvic and pectoral fins, extremely long (vs lesser) barbels, and an expanded caudal fin in adults. There are two species of danios known to exist in India: *D. assamila* is restricted to the upper Brahmaputra River in Assam and Arunachal Pradesh while *D. dangila* occurs in the Ganga and the nearby Brahmaputra drainage (Kullander, 2015).

Most of the Eastern Ghats hill streams and rivers of the Andhra Pradesh and Odisha region empty into the Godavari River only, and these rivers and rivulets are renowned for their abundant fish species which is not explored yet.

Four *Danio* specimens were collected during the Munchangiputtu stream explorations Eastern Ghats of Andhra Pradesh. After keen observations of morphological and meristic characteristics, we discovered the existence of *Danio assamila* In Eastern Ghats streams. As a result, our study is the first to report the species *Danio assamila* from the Eastern Ghats of Andhra Pradesh state.

MATERIALS AND METHODS

Measurements were made on the left side of specimens with a digital caliper to the nearest 0.1mm. Fin rays and scales were counted under a transmitted Nikon stereo zoom microscope. Measurement of body parts and counts follow Fang (1997); Kullander (2015) respectively. Terminology of body colour marking follow Fang (1998) along with the modifications of Kullander (2015) as P+1, P+2, and P+3 stripes located dorsally to the 'P' mid-stripe (largest) and P-1, P-2, and P-3 stripes below, similarly I+1 and I+2 located dorsal to the 'I' mid-interstripe (formed between P and P+1) and I-1 and I-2 located below it. The collected specimens for this study are deposited in the Andhra University Zoology Museum (AUZM), Visakhapatnam. Data for literature and comparison of *D. assamila* is taken from Kullander (2015).

RESULTS

Danio assamila Kullander 2015 (Fig. 1).

Material examined. AUZM 47, 4 exs., 35.7–46.5 mm SL, stream at Munchangiput, Sabari Rivera tributary of River Godavari, Alluri Sitaramaraju District, Andhra Pradesh; Collected by Matsya Raju, 11. Nov. 2022.

Diagnosis: Based on the diagnosis, *Danio assamila* possesses a special blend of the following characteristics; The cleithral spot is large, rounded, or slightly oval. The anterior interstripe "Ia" is typically present between the two series of markings along the flank that resemble horizontally elongated rings; the ring chain pattern does not extend onto the caudal peduncle. The lateral line is complete with scale counts 34–36.

Description: In Tables 1 and 2, morphometric and meristic data are displayed. Compressed, elongated to somewhat deep body with no obvious sexual dimorphism. Squeezed head, a little narrower than deep. Short, round nasal that is either roughly equal in length to the diameter of the eye. Terminal mouth, oblique in profile, with nearly equal jaws, extended anteriorly or the lower jaw projecting slightly. Maxilla extends vertically up to the orbit's front margin or slightly beyond it. The lower jaw ends anteriorly at the eye's middle or slightly above. There are no tubercles on the pectoral fin or lower jaw. Long rostral barbel that either crosses the base of the leading pectoral-fin ray or reaches the pectoral-fin ray. The maxillary barbel extends to the middle or fourth portion of the pectoral fin.

The entire lateral line is made up of 34–36 scales. It parallels the ventral profile posteriorly and descends anteriorly for approximately 7 scales. Scales in the lateral line transverse series from the dorsal fin origin to the pelvic fin origin are smaller than those above lateral line scales. The pelvic-fin base is covered by overlapping scales grouped in three rows, and the prepelvic scales elongate, numbering 15 to 18 along the prepelvic midline. There is a pelvic axillary scale. Scales along the base of the anal fin. The dorsal fin is inserted slightly posterior to the middle of the distance from the snout tip to the caudal-fin base with ii, 7½ or ii, 8½ rays; Pectoral fin is inserted at about vertical through posterior margin of opercle with i, 10 or i, 11 rays, posterior margin of branched rays rounded and outer unbranched rays prolonged beyond rest of fin, fin bears well developed axial lobe; Anal-fin with iii, 12–14 rays; pelvic fin with i, 7 a slight fork, lobes about equal caudal-fin rays with 10+7 rays. Colour pattern in formalin preserved specimens is dull yellowish along the ventral midline, lighter abdominally, or dull whitish overall. Except for a small concentration of black pigment near the lower orbital edge and opercle, there are no marks from the head to the venter. The cleithral spot is blackish, rounded, equal to pupil size, slightly ovate in two specimens, and narrower ventrally. Mid dorsal stripe is brownish. Lateral P, P+1, P+2, P+3, P-1, and P-2 stripes are dark brown; P-2 stripe is diffusely brownish in some specimens. P+3 stripe originates from above the upper end of the gill cleft and continues to below the middle or posterior part of dorsal fin base. Approximately 6–7 dark brown rings are formed at the lower branch where the P stripe anteriorly anastomoses.

Between the upper and lower rows of rings, there is a narrow interstripe "Ia" that stretches from beneath the cleithral spot to roughly the vertical margin of the anterior anal fin rays. A narrow P-2 stripe starts at the base of the pectoral fin, diffuses anteriorly, and reaches the upper posterior portion of the anal fin base. Distal half of the dorsal fin is half-hyaline, with a diffuse grayish median stripe. Clearly visible dark median stripe on the anal fin. Caudal with clear markings of the P+1, P, and P-1 stripes.

Distribution: Earlier reported from Brahmaputra River drainage of Assam and Arunachal Pradesh with present studies its extended range extension in River Godavari of Southern India, Easter Ghats (Fig. 2).

DISCUSSION

Present investigations revealed presence of unexplored fish diversity in Easter Ghats region and seems to be rich in fish species and high chances for new taxonomic groups and may be home for numerous fish fauna range extensions. Danios are a unique group of fish that all have the same color pattern, which includes dark rings on the side and a distal protrusion of the first ray from the rest of the rays in the pectoral and pelvic fins. The color pattern makes it simple to distinguish between these species. Since new taxa are frequently introduced, such *Danio annulosus* Kullander *et al.* (2015), it is still unknown how diverse this group of fishes actually is. In the current investigation, *Danio assamila* was found in hill stream water bodies in Andhra Pradesh. It is observed that most of the morphological and meristic characters are accepted range of earlier descriptions in terms predorsal length 55.2–57.4 (vs. 58.2–61.1), pectoralfin length 23.5–27.7 (vs. 25.9–31.6); dorsal fin count ii, 7½ - ii, 8½ (vs. ii, 9½ – 10½), pectoral fin count i, 10 - i, 11 (vs. i, 10–11), median predorsal scale 16–17 (vs. 16–18), scales in transverse series from dorsal-fin to origin to pelvic-fin origin ½6+1+1 (vs. ½6+1+1½–½7+1+1½) and scales along prepelvic midline 15–18 (vs. 14– 17). These little disparities could be attributed to due to the small sample size descriptions and constrained population coverage. Other workers' reports of *D. dangila* (Gurumayum *et al.*, 2012; Bakalial *et al.*, 2014).

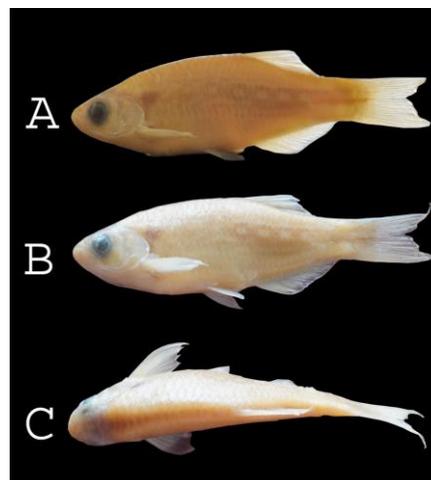


Fig. 1. Dorsal and ventral views of *Danio assamila*.



Fig. 2. Collecting sites of *Danio assamila*.

Table: 1: Morphometric measurement of *Danio assamila*.

	Present study	Songtheng <i>et al.</i> (2017)	Kullander(2015)
Dorsal fin count	ii,7½ - ii,8½	ii,8½-ii.9½	ii,9½-ii,10½
Pectoral fin count	i,10 - i,11	i,9-i,11	i,10 i-11
Pelvic fin count	i,7	i,7	i,7
Anal fin count	iii,12-14	iii,12½- iii,15½	iii,12-iii,15½
Caudal fin count	10+7	10+9	10+9
Lateral line scale	34-36	32-34	32-36
Median predorsal scale	16–17	15-17	16-18
Scales intransvers series from dorsal-fin to Origin to pelvic-fin origin	½6+1+1	½6+1+1½	½6+1+1½
Scales along prepelvic mid line	15–18	15–18	14–17
Circumpeduncular scales rows	13	14	14*(9)

Table 2: Meristic count of *Danio assamila*.

	Present study	Songtheng <i>et al.</i> (2017)	Kullander (2015)
	Range	Range	Range
No. of specimens(n)	4	9	—
Standard length	35.7–46.5	35.5–58.7	37.6–68.3
Body depth	25.5–31.2	27.7–33.0	26.9–34.6
Head length	20.9–22.4	22.9–23.9	21.9–24.2
Snout length	5.8–6.5	6.0–6.7	6.0–6.7
Head depth	15–16.7	15.6–17.1	15.2–17.3
Head width	12.2–13.2	12.8–13.5	12.4–13.6
Upper jaw length	7.8–9.1	8.32–9.5	8.8–9.6
Lower jaw length	10.2–11.2	10.6–11.5	10.1–12.2
Orbital diameter	6.4–7.5	6.6–7.9	6.6–8.0
Inter orbital width	10.2-10.9	10.1-10.8	10.1–11.3
Caudal peduncle length	14.2–17.2	15.5–16.9	13.0–17.8
Caudal peduncle depth	11.4–12.9	11.7–13.3	11.7–14.8
Dorsal-fin base length	14.2–17.5	14.9–16.1	14.4–20.2
Anal-fin base length	18.7–20.7	19.2–22.9	18.6–24.8
Predorsal length	55.2–57.4	58.1–59.9	58.2–61.1
Preanal length	63.1–66.7	65.1–68.3	66.3–71.0
Prepelvic length	44.9–47.5	46.8–49.4	46.7–49.7
Pectoral-fin length	23.5–27.7	24.7–28.5	25.9–31.6
Pelvic-fin length	16.4–18.7	16.6–19.0	16.5–22.7
Rostral barbel length	16.2–21.7	16.5–22.1	15.2–22.7
Maxillary barbel length	23.7–34.4	24.1–35.1	24.0–37.3

CONCLUSIONS

According to the results of the current investigation, *Danio assamila* is found in the Eastern Ghats of India and the state of Andhra Pradesh. This is the first record of the occurrence in the region and indicates the possibilities of hidden diversity in the Eastern Ghats for need more attention for conservation measures to protect the valuable fish gene pool.

FUTURE SCOPE

These investigation result will show a high impact on future fish taxonomic explorations in the Eastern Ghats of India to conserve valuable endemic fish gene pools.

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Conflict of Interest. None.

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