

# First record of the olive barb *Systemus sarana* (Hamilton, 1822) (Cyprinidae: Smiliogastrinae) from Andaman and Nicobar Islands, India

Mrinal Kumar Das\* and C. Sivaperuman

Zoological Survey of India, Andaman and Nicobar Regional Centre, Port Blair – 744102, Andaman and Nicobar Islands, India; E-mail: dasmrinal09@gmail.com

## Abstract

The present study reports the occurrence of olive barb *Systemus sarana* (Hamilton, 1822) for the first time from Andaman and Nicobar Islands, India based on four specimens collected from the Diglipur area, North and Middle Andaman district, Andaman and Nicobar Islands. A systematic account of this species has been provided. This finding represents a new addition to the freshwater fish fauna of Andaman and Nicobar Islands, India.

**Keywords:** Cyprinidae, First Record, India, North Andaman Island

## Introduction

The family Cyprinidae, the most species-rich family of vertebrates with numerous subfamilies, hundreds of genera, and thousands of species, commonly known as carp, barb, loaches and minnow which ranges from 12 mm to 3 m in size (Nelson *et al.*, 2016). The fishes of Cyprinidae mostly live in freshwater, very rarely occurring in brackish water and these are distributed in Asia, North America (northern Canada to southern Mexico), Africa, and Eurasia. It is the largest and most diverse fish family with about ten subfamilies, 156 valid genera and 1783 valid species found in the world. The subfamily Smiliogastrinae has 30 valid genera and 479 valid species (Fricke *et al.*, 2022a). In Indian waters, the family Cyprinidae is represented by 345 species belonging to 53 genera (Gopi *et al.*, 2017). The genus *Systemus* is an economically important group native to tropical Asia (Kottelat, 2013). *S. sarana* (Hamilton 1822) commonly known as olive barb is widely distributed in south-east Asian countries. It is distributed from the Ganges basin, westwards and southwards across the peninsula of India to Sri Lanka and is also found in Afghanistan, Bangladesh, Bhutan, Nepal, and Pakistan (Talwar & Jhingran, 1991; Fricke *et al.*, 2022b; Sudasinghe *et al.*, 2020). This species is

characterized by a deep and moderately compressed body and, head small with two pairs of barbels. The maximum total length of the fish is recorded to be 42.0 cm (Froese & Pauly, 2022). *S. sarana* is an ecologically important, profitable and cultivable fish species (Chakraborty *et al.*, 2003). A few records of freshwater fishes are available from Andaman and Nicobar Island groups. A total of 7 species of Cyprinidae fishes were reported from the Andaman and Nicobar Islands (Rajan *et al.*, 2021). So far, fish species of the genus *Systemus* have not been recorded from the Andaman and Nicobar Islands. During the survey of freshwater fishes in the Diglipur area, North Andaman Islands, four specimens of *Systemus sp.* were collected from the Kalpong River and a stream in the Kalipur area. After proper morphometric and meristic study of the specimens, the species has been identified as *S. sarana*. So, the present study is reported as the first distributional record from Andaman and Nicobar Islands, and this is a new addition to the freshwater fish inventory of Andaman and Nicobar Islands, India.

## Materials and Methods

The fish specimens were collected by using cast net from the Kalpong River (Lat: 13° 9' 37.89" N and Long: 92° 58'

\* Author for correspondence

9.534" E), and Kalipur stream of Diglipur area (Lat: 13° 13' 5.2752" N and Long: 93° 2' 12.2532" E), North and Middle Andaman district, Andaman and Nicobar Islands during November, 2022 (Figure 1). After the collection, the specimens are photographed in fresh condition and then preserved in 10% formaldehyde solution. A digital caliper was used to measure the morphometric characters nearest to 0.1 millimeters. Morphometric measurements have been taken from point to point based on Hubbs and Lagler (2004). Body measurements are expressed as a percentage of Standard Length, while subunits of the head are expressed as a percentage of Head Length. The specimens have been identified by following the standard literature (Talwar & Jhingran, 1991; Jayaram, 1999) and Eschmeyer's Catalog of Fishes was referred for the scientific names.

## Results

### Systematic Account

Order : Cypriniformes; Bleeker, 1859

Family : Cyprinidae Linnaeus, 1758

Subfamily: Smiliogasterinae

Genus : *Systomus* McClelland, 1839

Species: *S. sarana* (Hamilton, 1822)

English name : Olive barb

1822, *Cyprinus sarana* (Hamilton, 1822) Hamilton, F. [Buchanan] (1822). An account of the fishes found in the river Ganges and its branches. Edinburgh & London. Pp i-vii + 1-405, Pls. 1-39.

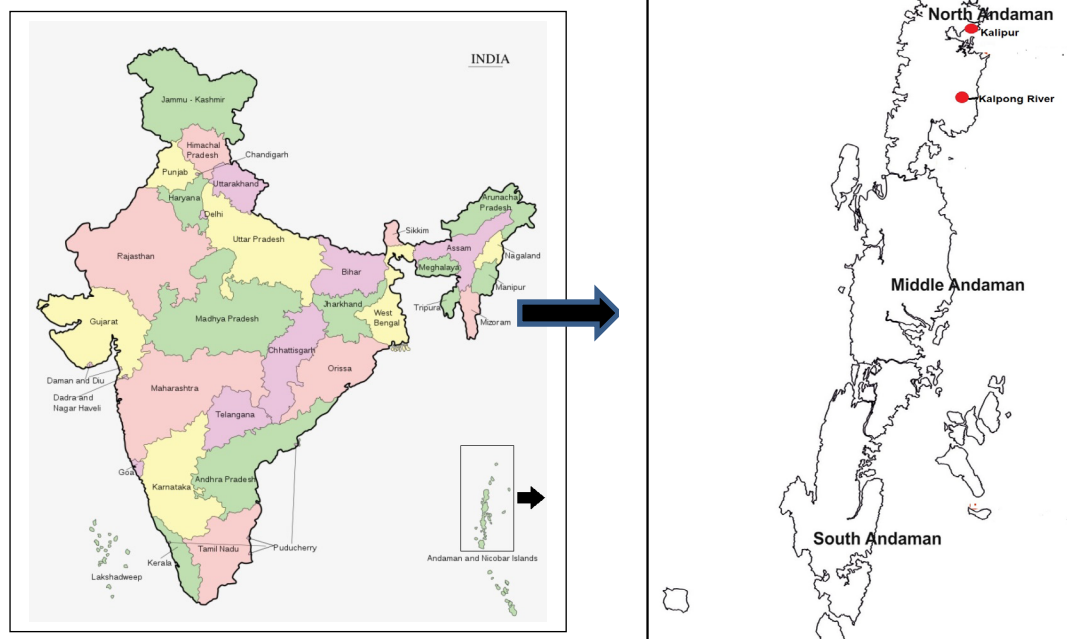
Page(s): 307, 388 (type locality: Ponds and rivers of Bengal).

*Material examined*: ZSI/ANRC/M 28570, 2ex, (SL 129.09 – 176.8mm), Kalpong River, Diglipur, North Andaman island (Lat: 13° 9' 37.89" N and Long: 92° 58' 9.534" E), 12.11.2022, Coll: Mrinal Kumar Das.

ZSI/ANRC/M-28656, 2 ex, (SL 127.3–179.7mm), Kalipur stream, Diglipur, North Andaman (Lat: 13° 13' 5.2752" N and Long: 93° 2' 12.2532" E), 17.11.2022, Coll: Mrinal Kumar Das.

*Meristic characters*: D III 8; A III 5; P I 14-16; VI, 8

*Description*: A total of four specimens ranging from 164.87mm to 213.06mm TL (total length) were used



**Figure 1.** Map showing the collection localities of *S. sarana* (Hamilton, 1822) from Andaman and Nicobar Island, India.

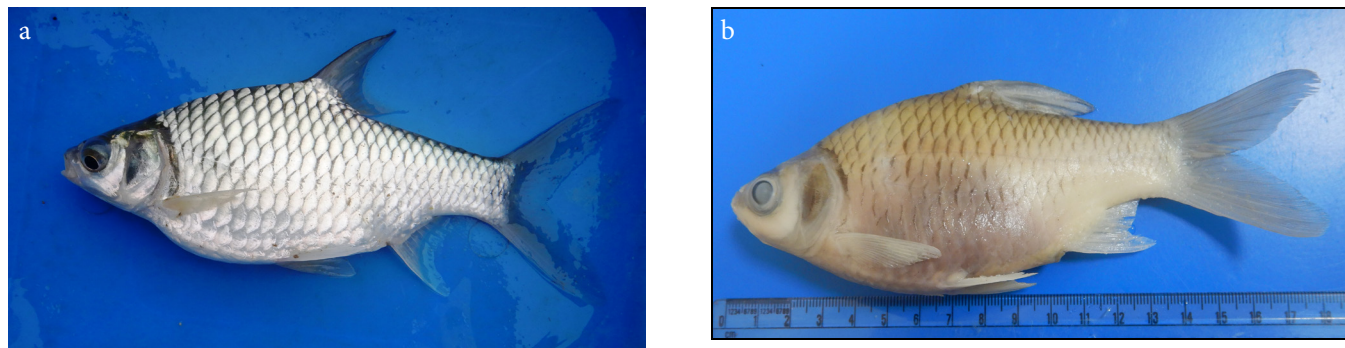
for the studies of morphometric and meristic studies. Morphometric measurements and meristic data are presented in Table 1. The body is oblong and moderately compressed; its depth at dorsal origin is 37.35-40.26 %SL. Head small, its length 26.32-27.30 %SL. Head depth 19.02-27.30 %SL. Pre dorsal distance 48.03-57.06 and pre pelvic distance 47.42-48.01 %SL. Dorsal fin origin midway between the snout and the base of the caudal, dorsal fin origin anterior to pelvic-fin insertion vertically and dorsal fin length 24.32-26.85 %SL. The pectoral fin does not reach the pelvic fin. Length of pectoral fin 20.89-22.69 %SL and length of the pelvic fin 19.01-20.08 %SL. Length and depth of caudal peduncle 17.86-19.57 and 13.02-14.52 %SL respectively. The caudal fin is forked;

its length is 28.33-36.70 %SL. Post dorsal length ranges from 36.12 to 37.84 %SL. Eye diameter 23.00-24.02 %HL; inter-orbital width 41.80-45.97 %HL and Snout length 18.74-21.59 %HL. Dorsal fin with 3 spines and 8 soft rays, anal fin with 3 spines and 5 branched rays, pelvic fin with 1 spine and 8 branched rays, pectoral fin with 1 spine and 14-16 branched rays. The last ray of the dorsal fin is unbranched, strong and finely serrated posteriorly.

**Colour:** Fresh specimens: The body colour is silvery with golden reflections, and the fins are blackish, a light black band present surrounding the opercle. Pectoral, pelvic and anal fin light reddish in colour. Head and operculum black olive in colour. No black colour spot on the caudal base (Figure 2a).

**Table 1.** Morphometric measurements of *S. sarana* (Hamilton,1822) from Andaman and Nicobar Island, India

S. No	Characters	Range	Mean $\pm$ SD
1	Total length (mm)	164.87 – 213.06	191.50 $\pm$ 4.49
2	Standard length (mm)	129.09 – 179.74	155.99 $\pm$ 5.47
<b>% SL</b>			
3	Body depth at Dorsal fin origin	35.12 - 35.75	35.41 $\pm$ 0.32
4	Body depth at Anal	25.24 - 28.11	26.72 $\pm$ 1.44
5	Body width	18.10 - 20.94	19.80 $\pm$ 1.51
6	Head length	24.54 - 26.87	25.95 $\pm$ 1.25
7	Head depth	19.02 - 26.87	23.47 $\pm$ 4.03
8	Head width	14.85 - 16.59	15.73 $\pm$ 0.87
9	Dorsal fin length	22.20 - 26.22	24.01 $\pm$ 2.04
10	Pectoral fin length	19.97 - 22.34	21.11 $\pm$ 1.19
11	Pelvic fin length	18.72 - 19.20	19.04 $\pm$ 0.28
12	Anal fin length	17.76 - 19.37	18.77 $\pm$ 0.88
13	Caudal fin length	27.17 - 35.57	30.21 $\pm$ 4.65
14	Pre dorsal length	48.03 - 54.55	51.30 $\pm$ 3.26
15	Post dorsal length	35.56 - 36.45	36.06 $\pm$ 0.45
16	Length of base of Dorsal fin	12.97 - 14.32	13.49 $\pm$ 0.73
17	Length of base of Anal fin	13.26 -14.33	13.41 $\pm$ 0.85
18	Length of Caudal peduncle	17.07 – 19.57	18.42 $\pm$ 1.26
19	Depth of Caudal Peduncle	13.02 - 13.88	13.42 $\pm$ 0.43
<b>% HL</b>			
20	Eye diameter	23.00 - 24.02	23.55 $\pm$ 0.51
21	Pre-orbital length	26.90 - 29.81	28.34 $\pm$ 1.45
22	Post -Orbital length	38.51 - 58.92	49.59 $\pm$ 10.32
23	Nostril to snout length	18.74 - 21.59	20.20 $\pm$ 1.43
24	Inter-Orbital Length	41.80 - 45.97	43.66 $\pm$ 2.12



**Figure 2.** Photograph of *S. sarana* (Hamilton, 1822) from Andaman and Nicobar Island, (a) Fresh specimen and (b) Preserved specimen.

*Formalin preserved specimens:* The dorsal side of the body is yellow, lateral sides are yellowish to brown on the head, behind the eye, the front of each scale is marked with a dark shade; dorsal, pectoral, pelvic, anal and caudal fins are whitish (Figure 2b).

*Distribution:* Bangladesh, Sri Lanka, Thailand, Myanmar, Afghanistan, Bhutan, India (throughout except peninsular India south of Krishna River), Nepal and Pakistan (Talwar & Jhingran, 1991).

*Habitat:* *S. sarana* inhabits rivers, streams, ponds, beels, ditches, floodplains lakes, estuaries, and reservoirs (Pethiyagoda, 1991; Jena *et al.*, 2007).

## Discussion

The fish species of genus *Systemus* are common freshwater fishes of India, found in most inland water bodies of the country. They possess four barbels, their last unbranched dorsal ray is osseous, strong, serrated and complete lateral line (Plamoottil, 2014). Pethiyagoda *et al.*, (2012) included nine South Asian species in *Systemus*: *S. asoka* (Kottelat & Pethiyagoda, 1989), *S. compressiformis* (Cockerell, 1913), *S. jayarami* (Vishwanath & Singh, 1986), *S. martenstyni* (Kottelat & Pethiyagoda, 1991), *S. orphoides* Valenciennes 1842, *S. pleurotaenia* (Bleeker, 1863a), *S. sarana* (Hamilton,

1822), *S. spilurus* (Günther, 1868) and *S. timberi* (Deraniyagala, 1963). Three new species of *Systemus* were described from Kerala namely *Systemus chryseus*, *S. rufus* (Plamoottil, 2014) and *S. laticeps* (Plamootti, 2016) which are considered junior synonyms of *S. sarana* (Sudasinghe *et al.*, 2020). Recently, Plamoottil and Maji (2020) described one newer *Systemus* species, *i.e.*, *Systemus gracilus* from the Ganges River at Naihati of West Bengal. *S. sarana* has been compared with its similar congeners. *S. sarana* differs from *Systemus gracilis* in having a greenish (vs. light reddish white) body, whitish (vs. reddish) fins, barbels reaching to orbit (vs. not reaching) to orbit, and a lesser number of branched anal-fin rays (5 vs. 6). *S. sarana* is widely distributed throughout mainland India and is also found in Afghanistan, Bangladesh, Bhutan, Nepal, and Pakistan (Talwar and Jhingran 1991). In the present study, *S. sarana* is reported for the first time from the Andaman and Nicobar Islands, India.

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