



## First Record of a Rare Species Atlantic Triple Tail, *Lobotes surinamensis* (Bloch, 1790) from the Northwest Coast of India

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**ABSTRACT:** During our taxonomical research on rare fish species along the Northwest Coast of India, we documented the presence of *Lobotes surinamensis*, (Atlantic triple tail) species at two different locations along the Gujarat coast. One specimen was caught by Wada fishing in the Gulf of Kutch, the northwest coast, and another from Gholvu net from the southwest coast of Gujarat. While commercial fisheries have received significant focus, there has been a lack of studies conducted in the artisanal fisheries sector. In this study, we applied the classical taxonomical method for species identification. For the identification of specimens, we recorded morphometric parameters and meristic characters. The comparison was done with past records, upon close examination of all characteristics. Its presence has been reported from various parts of the globe and the east coast of India. This study confirms the first report of *L. surinamensis* on the northwest coast of India.

**Keywords:** Artisanal gear, Gholvu net, Gulf of Kutch, south Gujarat, Taxonomy, Wada fishing.

### INTRODUCTION

Fishes account for more than 50% of the total number of valid vertebrate species, which is estimated to be around 66,178 (IUCN, 2014). Globally, 36,532 fish species have been documented and described, and still going on. There have been 3,725 new species recorded in the past decade alone (Frick *et al.*, 2023). According to recent data, in India, 2,822 species are documented (Froese & Pauly 2023).

Gujarat has the longest coastline of more than 1,600 km and the most extensive continental shelf of nearly 1,64,000 km<sup>2</sup>, which represents nearly 20% and 32 % of India's coastline and continental shelf, respectively. The coast broadly can be divided into four parts: The Gulf of Kutch, the Saurashtra coast, the Gulf of Khambhat, and the south Gujarat coast. The waters of Gujarat are home to a diverse range of marine life, with around 306 identified fish species residing in its seas and coastal areas. Among these reported species, 23 have been listed in the IUCN's Red Data list, indicating their vulnerable status (Joshi *et al.*, 2017). Additionally, a separate report by the Zoological Survey of India reveals the presence of approximately 120 freshwater fish species in Gujarat (Devi & Indra 2012). In total, Gujarat has recorded a remarkable 422 fish species which represents 14.95 % of India's fish diversity.

The Lobotidae family contains a single accepted genus *Lobotes* (Froese & Pauly 2023). The Genus *Lobotes* consists of two species *i.e.* *Lobotes pacificus* and *Lobotes surinamensis*. Previously various species of *Lobotes* were reported along various coasts of the world but Jordan & Evermann (1898) confirmed the existence

of only two species *i.e.* *Lobotes pacificus* and *Lobotes surinamensis*.

There are over 55 vernacular names for the Atlantic tripletail, commonly known as Black perch or Black grunt, in several nations. Scientifically classified as *Lobotes surinamensis*, is a widely prevalent fish species present in tropical and subtropical waters across all oceans, with the exception of the eastern Pacific (Carpenter & Niem 2001). Distributional records from various parts of tropical seas were being published continuously, extending their native range.

*Lobotes surinamensis* is a semi-migratory pelagic fish commonly found along the coastlines of most tropical and subtropical seas. As typically solitary they may form schools. During the summer season, they tend to inhabit bays, sounds, and estuaries. Juvenile tripletails are often seen swimming beneath patches of Sargassum algae. Adults are predominantly found in the Gulf but they may also be present in passes, inlets, and bays near river mouths. These fish are frequently observed around shipwrecks, beacons, jetty pilings, and sea buoys. Tripletail larvae were discovered in waters deeper than 230 feet (70 meters), with temperatures exceeding 84°F (28.8°C) and salinity levels over 30.3 ppt. In the Atlantic Ocean, *L. surinamensis* stands as the sole representative of its family, Lobotidae (Perrotta, 2017). Scientific documentation of the fishes of Gujarat has been conducted by numerous institutions, scientists, and scholars. Extensive checklists have been prepared regarding the ichthyofaunal biodiversity of different regions of Gujarat. However, the species examined in this study is being reported for the first time from the

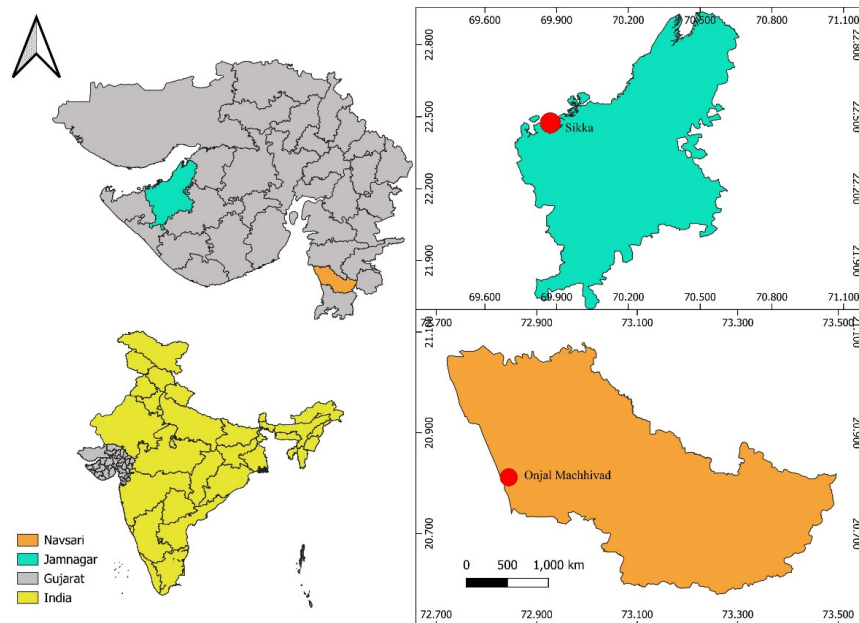
Gujarat coast. Previous studies have reported the occurrence of *L. surinamensis* from the Malabar coast, Puducherry (Cuvier & Valenciennes, 1830), West Bengal (Günther, 1859), Odisha coast (Tripathy & Das 1988), Gulf of Mannar (Gopalakrishnan *et al.*, 2012), Vellar estuary (Murugan *et al.*, 2014) and Vishakhapatnam (Sirisha *et al.*, 2018). This species has a habitat ranging from southwest coast to northeast coast of India. There is no existing documentation or publication confirming its presence along the entire northwest coast of India. The objective of this study is to report *L. surinamensis* from northwest coast of India and describe its taxonomic characteristics.

## MATERIAL AND METHODS

### A. Study area

**Site 1:** Sikka coast lies in the Gulf of Kutch on the northwest coast of Gujarat (Fig. 1), the region is rich in marine biodiversity due to its rocky shore and low

turbidity in the water. Wada fishing (Fig. 2) is a traditional fishing method practiced on the Sikka coast, where fishermen embark on one or two-day fishing trips along the shore and nearby islands. The fishing period usually lasts for about 6-8 hours, depending on the availability of fish and the tide schedule. The setup for wada fishing is typically done in the evening, and the actual fishing takes place the following morning during low tide. The process involves constructing a framework with a fixed net, which is secured in a circular shape using babul (*Acacia nilotica*) tree twigs. The fishing crew, consisting of 6-8 members, adjusts their fishing schedule according to the tide timings. Various factors, such as excessive seaweed growth, strong currents, weather conditions, fish availability, and alternative fishing practices, may lead to a decrease in wada fishing activity on certain days.



**Fig. 1.** Map of Study locations.

**Site 2:** Machhivad is a coastal village located on the Arabian Sea coast in the south Gujarat region (figure1). The coastline primarily consists of sandy shores, and the water tends to be quite turbid. The local fishermen here use an artisanal fishing gear known as the 'Gholvunet,' (Fig. 2) which has a similar operation to

wada fishing. A long wall of small meshed gill nets is set up in the intertidal zone. Generally, thin teakwood (*Tectona grandis*) or bamboo sticks are used to raise the structure, which submerges during high tide and when the water recedes during low tide, fish are trapped in the net.



**Fig. 2.** Artisanal fishing gear.

On two separate dates, 17/03/2021 and 01/06/2023, two specimens were recorded: one from the Gulf of Kutch and the other from Machhiwad, Navsari. During the field visit, these specimens were obtained from the local fishermen and subsequently transported to the Fisheries Research Station in Sikka and the College of Fisheries Science, Navsari. The gears used for the fish catch were confirmed with fishermen. The identification of the specimen was conducted using classical taxonomical methods, employing FAO species identification sheets and the Fishes of India (Day, 1878). A taxonomic board, Vernier caliper, and different measurement scales were used in the identification and data-gathering process. Different morphometric measurements were taken for further study and future publication. The specimens were also photographed and preserved in 10% formalin before being stored in the museum at the College of Fisheries, Navsari (Accession number: A 1.7.1.1).

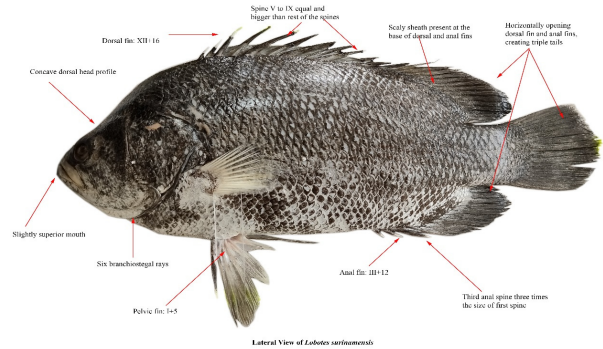
#### B. Conservation Status

Based on the evaluation conducted in 2012, *L. surinamensis* has been classified as least concern in the IUCN red list. It is a pelagic species with a wide distribution, commonly found in both coastal and open waters. While it is frequently targeted in recreational fishing, this activity is not considered a significant threat.

### RESULT

The specimens had a total length (TL) of 458 mm (Navsari) and 452 mm (Sikka). Both specimens were properly observed and morphometric and meristic characters were recorded. A total of 48 morphometric parameters and 20 meristic characters were taken as per the FAO standards and the description given by Day (1878). This particular species belongs to the family Lobotidae of order Acanthuriformes. The taxonomic classification is given as

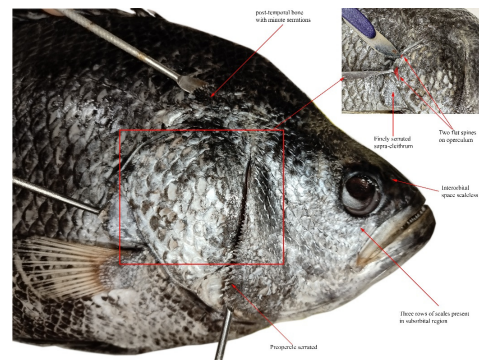
<b>Class</b>	<b>Teleostei</b>
Order	Acanthuriformes
Family	Lobotidae
Genus	<i>Lobotes</i>
Species	<i>surinamensis</i>
Sikka local name	<i>Dai</i>
Machhiwad local name	<i>Karkaro</i>



**Fig. 3.** Lateral view of *Lobotes surinamensis*.

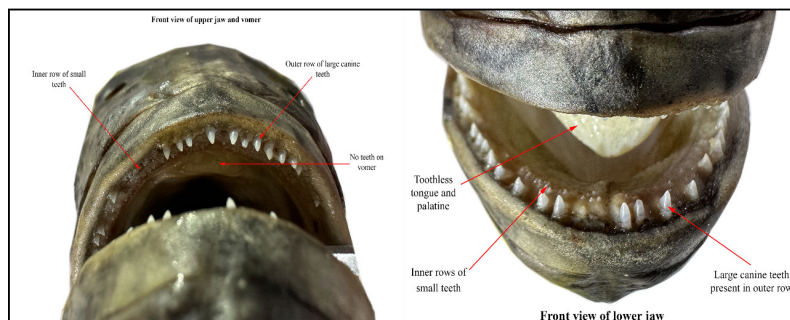
#### A. Species Description

The head length shorter (26.42% TL) than the body depth (33.41% TL). Both jaws equal in size (7.42% TL) but the mouth slightly superior reaching almost posterior to the eye. A single row of small canine teeth presents in both jaws, with numerous rows of smaller teeth behind the first row of canine teeth (Fig. 5). No teeth in the tongue, vomer and palatine. Vertical and horizontal limbs of preopercle serrated (Fig. 4), top  $\frac{1}{3}$  part of vertical limb without serrations; total 28-30 serrations visible with lower  $\frac{1}{3}$  serrations biggest in size.



**Fig. 4.** Lateral view of Head and operculum.

Horizontal limb of preopercle has minute serrations. Inter orbital and inter narial space scale less, 3 rows of scales present between the eye and mouth. Ctenoid scales found on the body, scales on the head are small, while scales on the body are moderate to large size. Two flat spines on the opercle, almost unnoticeable (Fig. 4). Supra-cleithrum present with minute serrations on its vertical and horizontal limbs (Fig. 4). Post-temporal bone present with fine serrated edges (Fig. 4).



**Fig. 5.** Front view of Upper and lower jaws.



Six branchiostegal rays present (Fig. 3). Nineteen gill rakers on the outer side of the first-gill arch (Fig. 6), five on the upper limb, and 14 on the lower limb. Out of 19 gill rakers, the last three rakers stubby. A total of 15 gill rakers on the inner side of the gill arch, all of which are rudimentary and stubby.

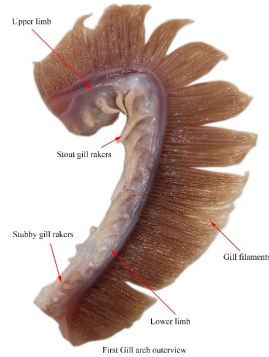


Fig. 6. Outer view of first gill arch.

Thirty-nine predorsal scales present, the dorsalfin continuous with 12 spines and 16 rays, spine five to nine bigger than rest of the spines. Pectoral fin long (16.59% TL) with 16 rays, when fully extended horizontally it reaches near the base of 7<sup>th</sup> dorsal fin spine. Anal fin (26.86% TL) with 3 spines and 12 soft rays, 3<sup>rd</sup> spine the biggest and three times the size of the first spine. The depth of the caudal peduncle (12.23% TL) is more than the length (10.92 % TL). About 23-24 circumpeduncular scales present on caudal peduncle. Origins of soft rays in dorsal, anal, and caudal fins are covered by a scaly sheath. Soft rayed part of the dorsal fin and anal fins are round in shape and extends horizontally beyond the base caudal fin, creating the look of 3 tails, hence the fish is called 'triple tail'. Comparison of morphometric and meristic data to previous studies is given below in Table 1 and 2.

Table 1: Comparison of the present study with studies carried out in the past in different locations.

Sr. No.	Morphometric parameter	Navsari (Present study)	Sikka (Present study)	Pulicat Lake (Moulitharan <i>et al.</i> , 2022)	Russia (Kharin <i>et al.</i> , 2009)	Tunisia (Kechaou <i>et al.</i> , 2018)	Turkey (Daban & Cabbar 2021)	Oman (Jawad <i>et al.</i> , 2015)
1.	Total Length	458 mm	452 mm	115 mm	-	552 mm	379 mm	630 mm
2.	Standard Length	364 mm	359 mm	97.2 mm	250 mm	480 mm	335 mm	530 mm
3.	Head Length	121 mm	113 mm	37.7 mm	80 mm	150 mm	110 mm	245 mm
4.	Body Depth	153 mm	149 mm	-	-	210 mm	180 mm	340 mm
5.	Pre-dorsal length	110 mm	102 mm	52 mm	95 mm	-	125 mm	170 mm
6.	Snout length	22 mm	20 mm	9.6 mm	18 mm	30.3 mm	-	40 mm
7.	Eye Diameter	16 mm	19 mm	6.6 mm	11 mm	19.5 mm	13 mm	-
8.	Inter orbital width	38 mm	38 mm	9.3 mm	23 mm	45 mm	35 mm	-

Table 2: Comparison of meristic characters with different studies.

Sr. No.	Meristics	Present study	Russia (Kharin <i>et al.</i> , 2009)	Turkey (Daban & Cabbar 2021)	Bay of Izmir (Akyol & Kara 2012)	Day (1878)	FAO species identification sheet
1.	Dorsal fin	XII+16	Xi-XII,15-16	XII,16	XII+16	XII+15-16	XI-XIII+13-16
2.	Pectoral fin	16	15	16	16	15-17	-
3.	Anal fin	III+12	III, 10-11	III, 12	III+11	III+11-13	III+11-12
4.	Caudal fin	25-26	-	16	-	17	-
5.	Pelvic fin	I+5	I+5	I+5	I+5	I+5	-
6.	Lateral line scales	47	53	56	-	46-48	-
7.	Gill rakers	18	19	12	-	-	19-22

**Coloration:** both the specimens were black coloured against the description by Day (1878) which states the color of the fish as brassy brown with dark blotches. Head black coloured with chin white to slightly grey coloured. End of pelvic fins yellow. Dorsal part black, ventral portion below pectoral fins gradually becomes white. Scales of dorsal and lateral regions white with black borders, circumpeduncular scales white.

## DISCUSSION

Commercial fisheries have received significant focus on stock assessment and Management, catch composition, gear-specific studies, and socioeconomic Impacts. There has been a lack of studies conducted in the artisanal fisheries sector, this study is part of research on the artisanal fisheries sector of Gujarat. There has been a lack of studies conducted in the artisanal

fisheries sector, this study is part of research on artisanal fisheries of Gujarat.

In the current study, the total length and weight of the specimen were 458 mm and 2469 gm and 452 mm and 2297gm from Machhiwad and Sikka, respectively. The sex determination of the species cannot be done by physical/visual observation, for sex determination, dissecting the fish, and physical observation of gonads is the only feasible method. However, mature females can be identified through an ovarian biopsy using a catheter, while males do not release milt through manual stripping. Generally, the Atlantic tripletail reaches maturity at around 2 years, with males measuring approximately 380 mm in length and females ranging from 494 to 594 mm (Saillant *et al.*, 2021). Supracleithrum and post temporal bones were observed in the present study, which matches with the description given by Kharin *et al.* (2009). The

morphometric data collected in this study correspond well with Fishbase, and most parameters fall within the range of previous studies, except for the pre-dorsal length. The comparison with previous studies reveals that smaller specimens, around 100-120 mm in length, have a greater pre-dorsal length, but as the total length

increases, the pre-dorsal length decreases. This confirms the characteristic of the triple tail that the dorsal head profile becomes more concave as the size of the fish increases. Fig. 7 here shows the chart for comparison of different parameters from previous studies carried out in different regions.

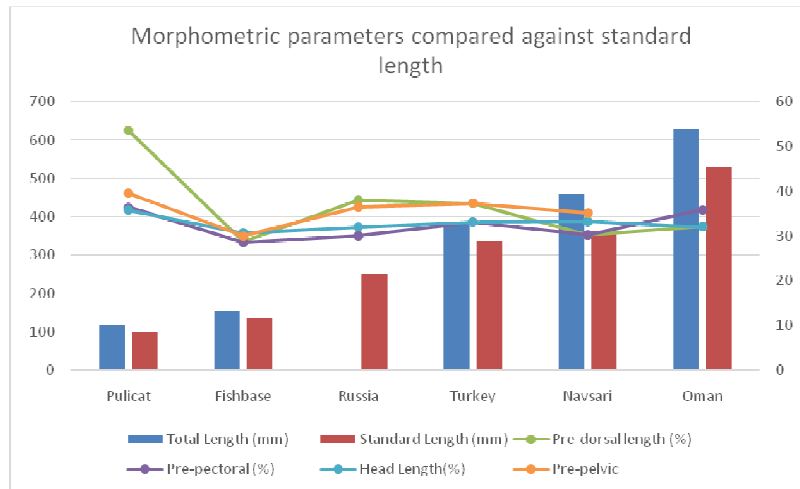


Fig. 7. Comparison of various morphometric parameters against standard length from various regions.

## CONCLUSIONS

Based on previous research and the findings of this study, it has been confirmed that *L. surinamensis* can be found in shallow coastal areas; however, there are no previous records available confirming the occurrence of this species from the northwest coast of India; thus, this study is the first recorded proof of *L. surinamensis* occurrence from the northwest coast of India. Few characters such as black coloration against the previous descriptions of brassy brown. Minute serrations on post-temporal and supra-cleithrum differ from the original description of the *L. surinamensis* is a matter of further study whether there are different morphs exist or whether any subspecies or separate species under the *Lobotes* genera prevail on the Indian coast.

## FUTURE SCOPE

Moving forward, future research could focus on further elucidating the morphological variations observed and investigating the genetic and ecological factors underlying these differences. Moreover, studies exploring the reproductive biology and population dynamics of *L. surinamensis* in Indian waters would provide essential information for sustainable fisheries management and conservation efforts. Continued collaboration between researchers, fisherman, and policymakers is crucial for advancing our understanding of marine biodiversity and ensuring the long-term sustainability of coastal ecosystems in the region.

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