



Distribution of *Sphyraena forsteri* in the Arabian Sea off South Gujarat

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Abstract: The objective of the present study was to provide classical taxonomic analysis and a detailed description of *Sphyraena forsteri* a specimen obtained through trawling operation and brought to Dholai fishing harbour. The single specimen of 515 mm length and 210 gm weight was collected for morphometric analysis for the first time from Dholai fishing harbour along the Arabian Sea coast of the South Gujarat region. This paper provides comprehensive details about the morphometric parameters observed in adult specimen of *S. forsteri*.

Keywords: Barracudas, Dholai Fishing Harbour, South Gujarat

The 27 extant species of barracudas (family Sphyraenidae) are one of the major groups of large coastal piscivores in tropical and subtropical marine habitats. Most barracudas are found in coastal areas, often in close association with stony coral reefs, but several species have a more pelagic distribution and are known to cross large tracts of open water (Daly Engel et al., 2012). Barracudas tend to be opportunistic predators, with a hunting technique that relies on ambushing prey thanks to their ability to sustain bursts of high swimming speed over short distances. Most species are known to form schools as either juveniles or adults, with schools containing hundreds of individuals in some cases. Some species, however, tend to be solitary or only live in small groups, and adult individuals of some schooling species can sometimes live solitary lives (Froese and Pauly 2014).

Traditionally, barracudas were thought to be related to tunas, snake mackerels, and allies, and, based on selected morphological characters, they have been suggested as the sister group to all remaining members of the perciform suborder Scombroidei. Numerous molecular analyses have definitively refuted the notion of Scombroidei as a monophyletic group (Betancur-R et al., 2013, Miya et al., 2013, Near et al., 2013). These studies reveal that Sphyraenidae, traditionally classified within Scombroidei, are instead part of a larger assemblage that encompasses jacks and pompanos (Carangiformes), flatfishes (Pleuronectiformes), and several other lineages previously considered unrelated such as archerfishes (Toxotidae) (Santini et al., 2014).

Throughout India in the year 2020-21, a total of 37,749 tons of barracudas were landed (Gopalkrishna 2021). The

major species landed are *Sphyraena obtusata*, *S. jello*, *S. barracuda*, and *S. acutipinnis* with the first two species together constituting over 50% of barracuda landings. Multiday trawlers account for nearly 75% of the barracudas landed followed by outboard gillnetters (Abdul et al., 2021). Globally, most cases of incidental capture of *S. forsteri* in shrimp trawl fisheries indicate that it is not specifically targeted or heavily exploited in these fisheries. This incidental capture does not appear to pose a significant threat to the overall population of *S. forsteri*, as it is not being subjected to intense fishing pressure. Furthermore, *S. forsteri* is not the primary target of the trawl fishery suggests that its population is not being disproportionately impacted by fishing activities, thus it is categorized as 'Least concern (LC)' in the IUCN Red List (IUCN 2024).

The state of Gujarat, with its 1600 km coastline, accounts for approximately 26% of the total mainland coastline of India, yet it plays a significant role in fish production. Due to the natural topography on the west coast, the majority of these harbours and landing centers are situated along the northwest coast of Gujarat. Only one fishing harbour, Dholai, and six fish landing centers are located on the southwest coast of Gujarat. Dholai fishing harbour, situated in the Navsari district, serves as a major fisheries hub in the south Gujarat region. Most of the vessels registered at the harbour are mechanized trawlers, with a few exceptions such as small gill netters and other dug-out canoes. The objective of the current study is to provide a detailed description of *S. forsteri*, including its taxonomic classification and morphological characteristics.

MATERIAL AND METHODS

The sample was collected from Dholai fishing harbour (20.73°N, 72.89°E) and brought to the College of Fisheries Science, Navsari and was washed of any debris and other materials. The specimen was observed and measured for various morphometric parameters and meristic characters (Table 1). Identification was done using FAO species identification sheets (Fischer 1984) and Commercial Sea Fishes of India (Kacker and Talwar 1984) The specimen was photographed and submitted to the Aquatic Biodiversity Museum where it was preserved in 10% formalin (Accession No: A 15.15.1.2)

RESULTS AND DISCUSSION

Scientific classification

Phylum: Chordata
 Class: Teleostei
 Order: Carangiformes
 Family: Sphyraenidae
 Genus: *Sphyraena*
 Species: *Sphyraena forsteri*

Total length of the species was 515 mm and 210 gm. Nineteen parameters were recorded on morphology of the fish (Table 1). The body is slender and long arrow-shaped with a pointy snout; the head of the species is larger ($1/4^{\text{th}}$ of the total length) compared to other species of the family. The mouth is larger with flattened teeth in both jaws, the upper jaw has a few triangular teeth followed by an inner row of small teeth. One large canine tooth is present at the tip of the lower jaw, which fits into the upper jaw when the mouth is closed. Upper jaw slightly longer than lower jaw. The eyes are relatively large, comprising 14% of the head length. This

species has no gill rakers on the first gill arch, instead, there are rough platelets present, and the platelets on the lower arm have a few distinct spines. Origin of first spiny dorsal fin (D_1 , VII) slightly behind the origin of pelvic fin (V 7). Pectoral fin (P 15) extended beyond pelvic fin. The second dorsal (D_2 9) fin set slightly forward to the anal fin (A II 8).

Table 1. Morphometric parameters of *Sphyraena forsteri*

Parameter	Cm	% T.L.
Total length (T.L.)	51.5	100.00
Fork length	45.2	87.77
Standard length	41.2	80.00
Pre-anal length	31.4	60.97
Anal fin length	3.3	6.41
Pre-dorsal length	17.8	34.56
Dorsal length D1	4.1	7.96
Dorsal length D2	3.7	7.18
Inter dorsal length	8.0	15.53
Pre-pelvic length	15.4	29.90
Pelvic length	3.4	6.60
Prepectoral length	12.5	24.27
Pectoral length	4.6	8.93
Body depth	6.0	11.65
Pre-orbital length	6.3	12.23
Orbital length	1.8	3.50
Post-orbital length	4.7	9.13
Head length	12.7	24.66
Caudal peduncle length	7.3	14.17

*All the morphometric parameters are calculated against the total length (T.L.) of specimen

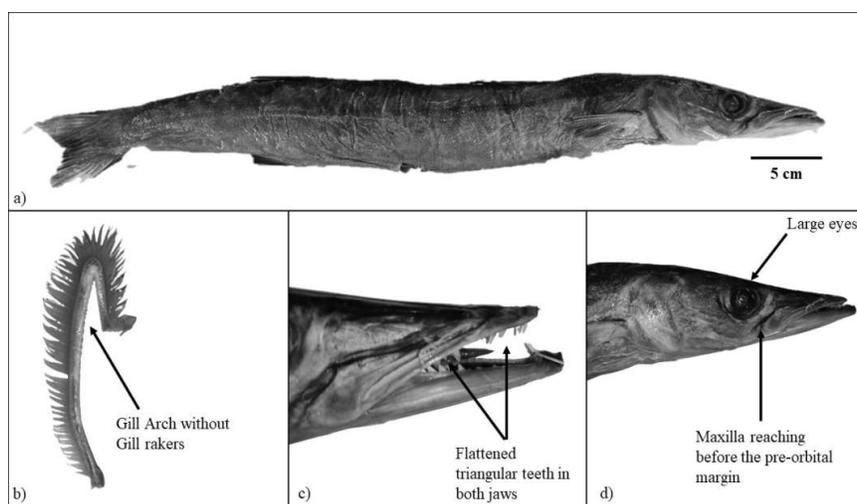


Fig. 1. a) Lateral view of preserved specimen of *S. forsteri* b) First gill arch c) Lateral view of mouth and teeth d) Lateral view of head

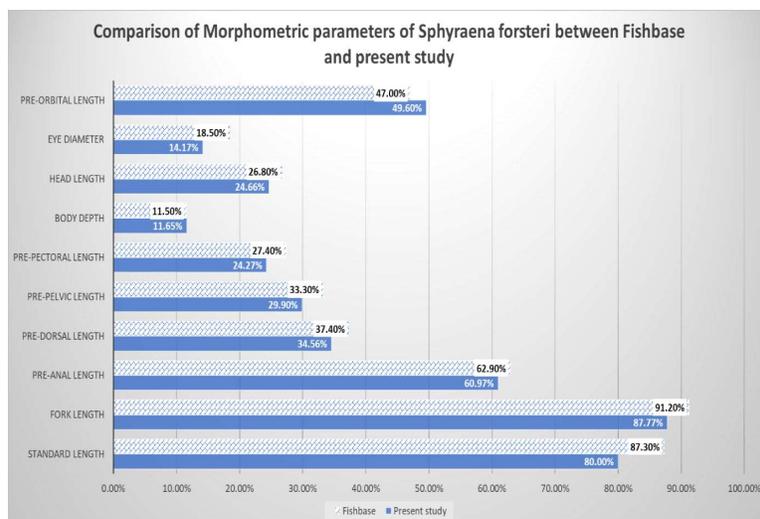


Fig. 2. Morphometric parameters of *S. forsteri* with those available on fishbase (Froese and Pauly 2024)

Numerous studies have examined the diversity of fish species across various harbours and fish landing sites in Gujarat. Notable investigations include by Brahmane et al. (2014), Katira (2017) and Parmar et al. (2022) in Sikka (northwestern Gujarat) and its vicinity; Sidat et al. (2021) along the Mandvi coast and the Gulf of Kutch; and Singh (2021) in Sutrapada. Additionally, Joshi et al. (2015), Sikotariya et al. (2018), and Solanki et al. (2020) have focused on fish diversity in Veraval Harbour, the fish market, and Okha Port, respectively. Despite the extensive efforts of these researchers, none have recorded the presence of *Sphyraena forsteri* anywhere in Gujarat. Furthermore Borichangar et al. (2022) at Dholai fishing harbour also did not document this species in southern Gujarat. This study provides the first confirmed record of *S. forsteri* from Dholai fishing harbour, filling a significant gap in the understanding of the region's ichthyofaunal diversity. The morphometric analysis conducted in this study was compared with data from FishBase (Froese and Pauly, 2024) (Fig. 2). The morphometric parameters of the specimen were evaluated against established identification keys, providing conclusive evidence for the identification of the species.

CONCLUSION

The study confirm the presence of *Sphyraena forsteri* at the Dholai fishing harbour, marking its first geographical record from the southwest coast of Gujarat. The absence of this species in previously documented checklists highlights the significance of this discovery.

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