



First Geographic Record of *Acanthurus xanthopterus* and Family Acanthuridae from the Gulf of Kachchh, Northwest Coast of India

Ritesh V. Borichangar ^a, Jeet N. Parmar ^{a*}
and Hitesh K. Kardani ^b

^a Department of Fisheries Resource Management, College of Fisheries Science, Navsari, Gujarat- 396 450, India.

^b Fisheries Research Station, Kamdhenu University, Sikka, Jamnagar, Gujarat-361 140, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study focused on *Acanthurus xanthopterus*, a reef-associated species also known as Yellowfin surgeonfish from the family Acanthuridae. The objective of this study was to identify and describe *A. xanthopterus*. A single specimen of 39.6 cm in length and 1263 g. weight was collected from a fisherman involved in traditional *Wada fishing* in Sikka. Detailed morphological parameters were observed and recorded for taxonomic identification. The results reveal that this species has been observed for the first time on the northwest coast of India, it is also the first recorded mention of the family Acanthuridae from the Gulf of Kachchh northwest coast of India.

*Corresponding author: Email: jeetparmar97@gmail.com;

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Keywords: *Acanthuridae*; *Acanthurus xanthopterus*; gulf of kachchh; ichthyofaunal biodiversity; Wada fishing.

1. INTRODUCTION

The Acanthuridae family, encompassing six genera and 85 species, is exclusively marine, known for its unique anatomical feature—a pair of lancet-shaped spines or bone plates with sharp keels on the caudal peduncle, earning them the common name "surgeon fish" [1-3]. This family includes well-known groups such as surgeonfishes, doctorfishes, tangs, and unicornfishes, with a circumtropical distribution. There are total 28 species found in the Indian waters [4]. Their bright colors make many species popular in the aquarium trade.

Among the members of the Acanthuridae family, the yellowfin surgeonfish, *Acanthurus xanthopterus* [5], boasts one of the most extensive distributions. This species is found throughout the tropical Indo-Pacific Ocean, spanning from East Africa to French Polynesia and the Hawaiian Islands, extending northward to the Gulf of Oman and southern Japan, and southward to the Great Barrier Reef and New Caledonia [6,7]. In the eastern Pacific, its range includes the Gulf of California to Ecuador and all oceanic islands within this region [8-10].

Acanthurus xanthopterus primarily inhabits reef habitats, sandy slopes, and lagoons, with a

preference for lagoons and bays over exposed exterior reefs, thriving at depths of up to 90 meters [11]. Its diet consists mainly of benthic algae, sediments, and detritus, classifying it as an herbivore-detritivore [3,12,13]. Interestingly, its feeding habits also include the consumption of faeces from other pelagic species like carangids [12].

Despite its widespread distribution, *Acanthurus xanthopterus* has not been observed on the northwest coast of India until now. This new observation contributes significantly to the understanding of the ichthyological biodiversity of the region and expands the known geographical distribution of this species.

2. MATERIALS AND METHODS

A single specimen was caught by fishermen involved in *Wada fishing* in the Gulf of Kachchh and landed at Sikka (Fig. 1a). The specimen was collected directly from the fisherman and taken to the Fisheries Research Station in Sikka, where it was further examined using FAO species identification sheets [14] and "The Fishes of India" [15]. The specimen was photographed and subsequently transferred to the College of Fisheries, where it was stored in the Aquatic Biodiversity Museum in a 10% formalin solution (Accession No: A 1.8.1.1).

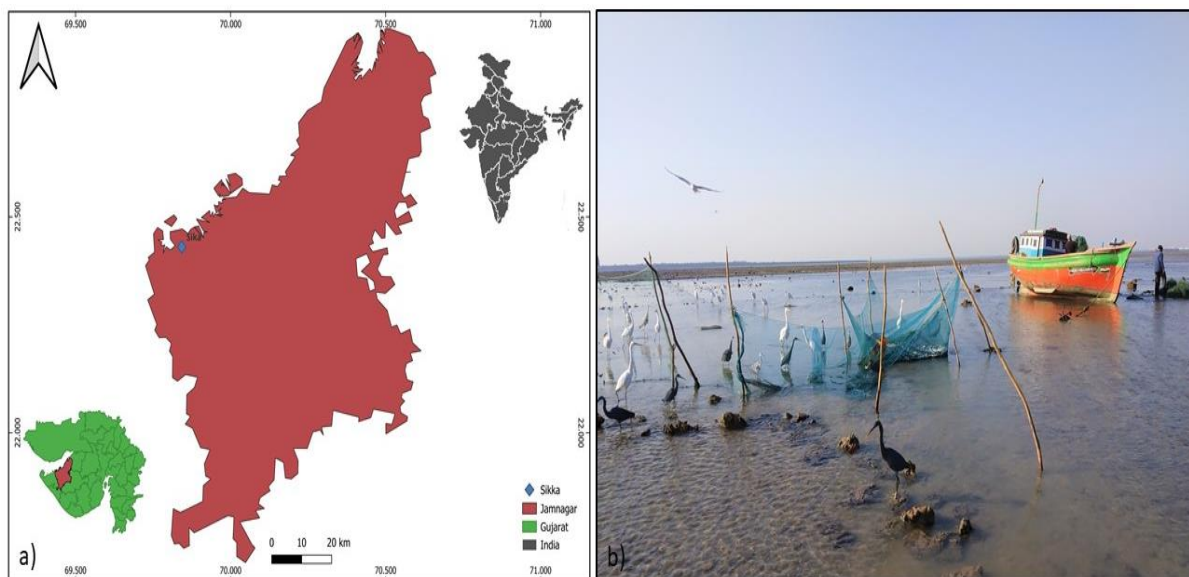


Fig. 1. a) Location of sampling on the map of India, b) Wada fishing

Study Location: Sikka coast, located in the Gulf of Kutch on the northwest coast of Gujarat, is rich in marine biodiversity due to its rocky shore and low turbidity waters. *Wada fishing* (Fig.1b), a traditional method practised here, involves fishermen going on one or two-day trips along the coast and nearby islands. Fishing lasts 6-8 hours, depending on fish availability and tides. The setup is done in the evening, and fishing occurs the next morning during low tide. The process includes setting up a circular fixed net using babul tree twigs. A crew of 6-8 members adjust their schedule based on tide timings. Factors like excessive seaweed, strong currents, weather, fish availability, and alternative fishing practices can reduce *Wada fishing* activity on some days [16,17].

3. RESULTS AND DISCUSSION

The specimen had a total length of 39.6 cm and weighed around 1263 g. In the present study a total of 23 morphometric parameters (Table 1) were recorded as per FAO standards and used for analysis and identification of the specimen. All the parameters recorded were calculated against total length (T.L.).

Species description: The species in this study is laterally compressed (Fig. 2a). Snout short about 5 times in length of standard length. Small eyes with around 20% of head length (H. L.). Suborbital depth 1.5 times in H.L. Small terminal mouth, its length from rictus to rictus is about 2.6 times of head length with a single series of large plate-like teeth in the upper jaw (21 nos.) and similarly 18 teeth in the lower jaw (Fig. 2b). The edge of the teeth has lateral denticulations along its cutting edge, no teeth are present on the vomer or palatine. The premaxilla is not protractile. The entire body is covered with small ctenoid scales. Completely developed lateral line that is set high on the body, above operculum. Operculum restricted to sides only. Body depth at the widest point is nearly 50% of the standard length (S.L.). This study focused on *Acanthurus xanthopterus*, a reef-associated species also known as Yellowfin surgeonfish from the family Acanthuridae. A single lancet-like spine is present on both side of the caudal peduncle of the specimen, which opens forward and fits into deep horizontal grooves on the caudal peduncle, where spines in dorsal, pelvic, and anal fins extend backward (Figure 2c). Lancet 3 times in head length. Caudal fins lunate, the concavity of caudal fin is 37% of S.L.

Table 1. Morphometric parameters of *Acanthurus xanthopterus*

Sr. No.	Parameter	cm	% TL
1	Total length	39.6	100.00
2	Standard length	28.3	71.46
3	Fork length	34.4	86.87
4	Head length	7.3	18.43
5	Pre-orbital length	3.5	8.84
6	Post-orbital length	2.3	5.81
7	Eye diameter	1.5	3.79
8	Snout	5.7	14.39
9	Sub-orbital depth	4.7	11.87
10	Mouth length rictus to rictus	2.8	7.07
11	Predorsal length	6.8	17.17
12	Dorsal fin base	18	45.45
13	Prepectoral length	7.4	18.69
14	Pectoral fin base	1.8	4.55
15	Prepelvic length	8.7	21.97
16	Pelvic fin base	0.7	1.77
17	Preanal length	12.2	30.81
18	Anal fin base	14.1	35.61
19	Body depth	14.1	35.61
20	Caudal peduncle height	3.8	9.60
21	Caudal peduncle width	2.1	5.30
22	Lancet length	2.3	5.81
23	Caudal concavity	10.6	26.77

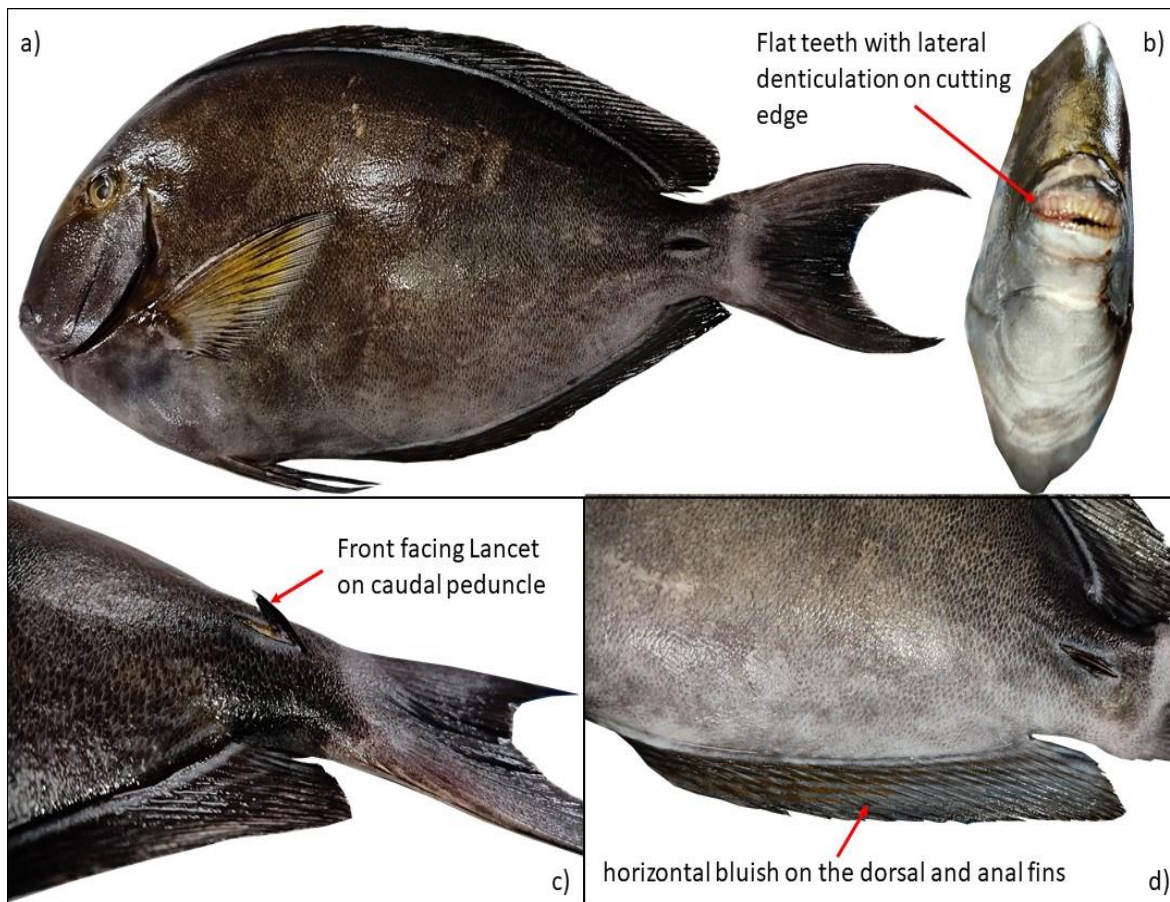


Fig. 2. a) Lateral view of *Acanthurus xanthopterus* b) Front view of Mouth and Snout c) Oblique view showing Lancet d) Posterolateral view of anal fins

Colouration: Entire body brown grey. Four irregular horizontal dark bluish lines are present on the rayed parts of both the dorsal and anal fins (Fig. 2d). Outer $\frac{1}{3}$ part of pectoral fin yellowish in fresh specimens.

Acanthurus xanthopterus is classified as a species of 'least concern', based on a study by Abesamis et al. in 2012. The study was carried out on a global scope of assessment. This fish is harvested for food across its range. There have been no observed declines in its population, primarily because it is predominantly found in marine protected areas [18].

Numerous studies have been conducted by various scholars and scientists on the ichthyofaunal diversity along the Gujarat coast. The research conducted by Solanki et al. [19] from Okha Port, at the mouth of the Gulf of Kachchh, Katira and Kardani [16], Brahmane et al. [20], and Parmar et al. [21] in the southern Gulf of Kachchh (GoK); Sidat et al. [22] along the

Mandvi coast (northern GoK); and Singh et al. [23] in Sutrapada. Additionally, Joshi et al. [24-26], and Sikotariya et al. (2018), are from the Veraval coast, which does not have a mention of *Acanthurus xanthopterus* or the family Acanthuridae.

On the southwest coast of Gujarat, very few researchers have done biodiversity assessments, one of which includes a research work on the Dholai fishing harbour by Borichangar et al. [27-30], which does not have a mention of this species or any other species from the family Acanthuridae.

4. CONCLUSION

Acanthurus xanthopterus is a rocky reef-associated species often found with coral reefs, which are mostly present in marine national parks. It is not targeted as commercial or food fish, thus this could have been an accidental capture in the *Wada fishing*. The presence of *A. xanthopterus* in the Gulf of Kachchh, on the

northwest coast of India (FAO fishing area 51), is the first documented instance of any species from the Acanthuridae family in this region, extending the geographical presence of *A. xanthopterus*.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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