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The Occurrence of the Indo-Pacific Yellowfin Surgeonfish, *Acanthurusxanthopterus* in the Libyan Waters

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Abstract
Two specimens of the Yellowfin Surgeonfish *Acanthurusxanthopterus*Valenciennes, 1835were collected for the first time from Libya and for the second time from the Mediterranean Sea. It is suggested that this species reached the Mediterranean Sea via theSuez Canal(Lessepsian migrant) and its exclusion from the Red Sea ichthyofauna in the past may not be justify.

Keywords: Lessepsian migrant, Surgeonfish, Mediterranean Sea, Libya, citizen science.

Introduction

The Mediterranean Sea is the most invaded sea in the world [1]. The main vector of new arrivals is via the Suez Canal, but other human-mediated activities, such as shipping activities, drilling platforms, aquarium and agriculture releases have contributed numerous of exotic species to the Mediterranean Sea. As a result of this massive influx, ca. 25% of the eastern Mediterranean ichthyofauna is composed of exotic species[2].

In the present note we report the collection of two specimens of *Acanthurusxanthopterus* from Libya, thus being the first record from Libya and the second record of this species from the Mediterranean Sea. In the east of Libya, introduction rates seem to be rising, records obtained by social media platforms and citizen science projects [3,4,5,6]. The family Acanthuridae, consists of 85, which are found in all tropical and subtropical waters [7,8,9]. Their common name, Surgeonfish, comes from the family's unique characteristic, which is the caudal peduncle's razor-sharp spines [10].

The yellowfin surgeonfish, or *Acanthurusxanthopterus*, is the largest species in the genus *Acanthurus*, with a standard length of over 500 mm. It is typically found in lagoons and bays, where it can be found alone or in small to medium-sized groups. However, it can also be found in outer reef areas, typically at depths greater than 10 to 15 m, with reports of sightings reaching as deep as 90 m. This is a diurnal fish that is grazer/detritivorous. It consumes benthic algae, hydroids, and the fine layer of diatoms and debris on sand [11,12,13].

The species is widely distributed in the Indo-Pacific, which stretches from the coasts of East Africa to French Polynesia, the Hawaiian Islands, and southern Japan. In the Eastern Pacific, it is found from the southern regions of the Gulf of California and Clipperton Island to Panama, the Galapagos Islands, and Peru [14,15,16]*Acanthurusxanthopterus*is distinguished from its co-generics by its color pattern, dark

brownish-gray body with yellow posterior edge of pectoral fin [17,18]*Acanthurusxanthopterus*was first recorded from the Mediterranean Sea from Alexandria Egypt [18]. In the present note we report the collection of two specimens of *Acanthurusxanthopterus* from Libya, thus being the first distribution record from Libya and the second record of this species from the Mediterranean Sea.

Materials and Methods

In the framework of a citizen science-based project aiming at assessing marine biodiversity in Libyan waters, social media platforms were periodically screened, and a WhatsApp group was created for this purpose by one of the authors (A.F.).

On 18thAugust, 2024, the picture of the freshly fished surgeonfish at Deryanah, approximately 30 km east of Benghazi (32.458° N, 20.808° E)**,** was posted on a social media platform by the fisherman, Mr. Hamdi Faraj (Figure. 1A).

On 3rd September 2024, Asurgeonfish fished at Tocra **(**32.533° N, 20.579° E), approximately 70 km east of Benghazi, by spearfishing at 15-20 m depth. The fisherman, Mr. Ahmed Faraj, contacted the first author (A.F.). (Figure. 1B).Both fish were sent to one of the authors (A.F).Permission was sought and obtained from both fishermen to use pictures and information about the catch. The specimens were deposited at the Department of Marine Resources, Faculty of Natural Resources, University of Tobruk.. Measurements and meristic counts (Table.1) were taken in accordance with Randall (1956).

Results and Discussion

Both the specimens had ellipsoid and compressed bodies. The total length ranged from 32.6-39.2 cm, with the standard length varying between 29.4-36.7 cm. The total weight of the specimens ranged from 0.9–1.5 kg. Head was short 6.1-7.3 cm with convex dorsal profile. The snout length was 3.9-5.1 cm and the eye diameter was(0.9-1.1) cm with a body width of 12.9-13.5 cm(Table.1). There were two robust, pointed spines on either side of the caudal peduncle. Caudal fin was deeply lunate with long filaments on the upper and lower rays, dorsal fins (VIII-IX spines, 24-26 rays), anal fins (III spines, 24-25 rays). There were 22 close-set teeth in the upper jaw and 18 in the lower jaw(adult). Teeth were spatulate (broad and flat) with notched and serrated edge,with 19-23 anterior gill rakers. Body was brownish-grey, the tips of the dorsal and anal fins were orange-brown, and a narrow yellow stripe ran from the snout through the eye, below the dorsal fin base. Posterior third of pelvic fin was yellow Figure.1C.*Acanthurusxanthopterus*was first recorded from the Mediterranean Sea from Alexandria Egypt[18]. They assumed that it probably reached the Mediterranean as an escapee or released from an aquarium and concluded that it is unfeasible that itreached the Mediterranean via the Suez Canal as Lessepsian migrant. This species is however known from east Africa[13],so it is reasonable to assume that its presence in the Red Sea was overlooked, and the collection of the two specimens from Libya is the beginning of establishing asmall population of this species in the Mediterranean as aLessepsian migrant. Based on these findings we strongly recommend in depth research to investigate the distribution of this species across the Libyan waters. There is a need for further research to gain a deeper understanding of these changes and the impacts of non-native species on the Libyan coast. On the other hand, potential collaboration between researchers and fishermen should be facilitated to promptly identify invasions of non-native species in Mediterranean coastal waters [19,20].

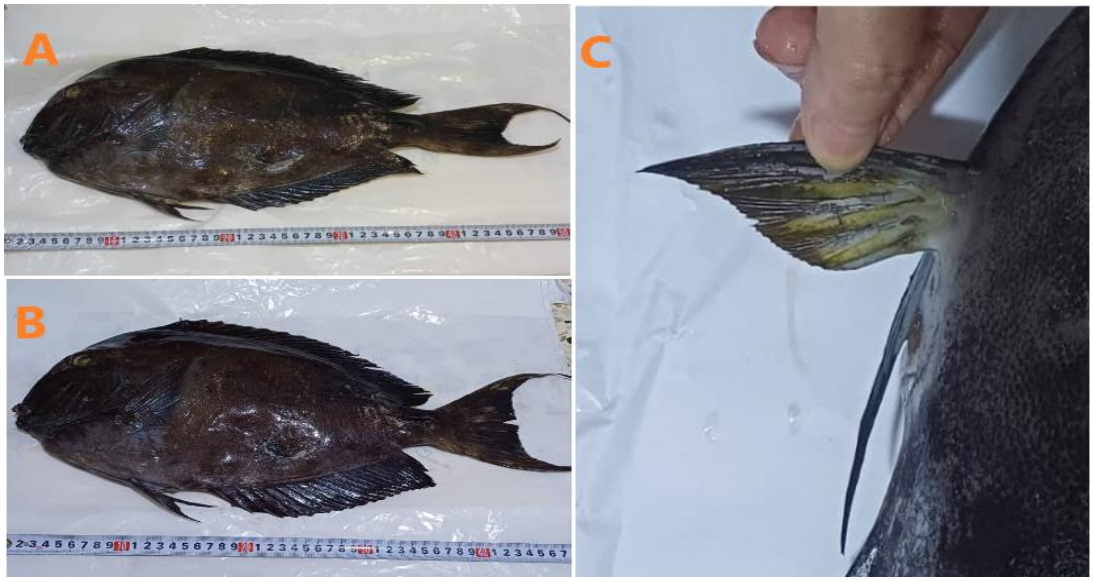

Figure1: (A) The specimen of *Acanthurusxanthopterus* caught at Deryanah, Libya, (B) *Acanthurusxanthopterus* caught at Tocra, Libya. (C) pelvic yellow fin (C, detail of B) (Photos by A. Fitori).

Table 1: Morphometric measurements (cm) of the *Acanthurus xanthopterus* specimens from Libyan waters.

Measurements(cm)	The first specimen	The secondspecimen
Total length	39.2	32.6
Standard length	36.7	29.4
Fork length	34.4	31.2
Head length	7.3	6.1
Snout length	5.1	3.9
Eye diameter	1.1	0.9
dorsal fin length	8.5	7.2
Pre pectoral fin length	6.9	6.3
Pre pelvic fin length	8.5	7.9
Pre anal fin length	13.2	12.1
Body depth	13.5	12.9
Caudal peduncle length	2.6	1.9
Caudal peduncle depth	3.4	2.8
Caudal spine	1.4	1.1

length		
Dorsal fin length	14.6	13.9
Pelvic fin length	5.3	4.4
Pectoral fin length	4.2	4.3
Anal fin length	12.1	11.6
Pre anal length	11.2	10.9
Mouth length	1.3	1.1
dorsal fin spines	VIII	IX
dorsal fin rays	26	24
Anal fin spins	VII	III
Anal fin rays	24	25
Pectoral fin rays	16	18

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