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First Record of the Non-Indigenous Randall's Lizardfish Synodus Randalli Cressey, 1981 in Libya Waters

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Abstract

The current study is the first record of Synodus randalli (Cressey, 1981) from Libyan waters from Janzour coastal area, western Libya. The species was captured on July 19, 2025, by hook-and-line fishing gear at a depth of 30 meters. Synodus randalli is an alien Lessepsian migrant, which invaded the Mediterranean Sea through the Suez Canal from the Red Sea. This finding is the third recorded occurrence of the species within the Mediterranean region, after previous records had been made in Greece and Turkey. The record provides a testament to the ongoing proliferation of non-native species within the southern Mediterranean basin and demonstrates the necessity for ongoing monitoring and assessment of their ecological impact to continue.

Keywords: Synodus randalli, Lessepsian migrant, Suez Canal, Mediterranean Sea, Libya

INTRODUCTION

The Suez Canal opening in 1869 facilitated the easier migration of numerous Indo-Pacific Sea species into the Mediterranean Sea, a process known as Lessepsian migration. In addition to ongoing climate change, the process has led to an increase of non-native fish species living in the eastern and central Mediterranean [1]. Included among these recent arrivals are members of the family Synodontidae, or the lizardfishes, which are demersal predators distributed widely across the globe in tropical and subtropical seas. The family consists of 83 valid species and four genera to date [2].

Synodus randalli Cressey, 1981, or Randall's lizardfish, is native to the Red Sea and the west Indian Ocean, including waters off Madagascar [3,4]. S. randalli initially occurred in the Mediterranean in June 2023 off Iskenderun Bay, Turkey, at a depth of 80 meters [5], and subsequently from southeastern Crete, Greece, in November 2023[6]. These logs were the first and second recorded occurrences of the species in the Mediterranean Sea.

Unlike other alien synodontids such as Saurida gracilis and Saurida lessepsianus, S. randalli is the only non-native species of the genus Synodus in the region. Diagnosis of adult specimens and sampling in suitable habitats (sandy bottoms and Posidonia meadows) suggest that S. randalli may be successfully naturalizing in the eastern Mediterranean.

Still, the mysterious nature and minute size of the majority of Lessepsian species result in slow detections, and their actual distribution could be wider than has so far been documented, such delays impair information on their ecological roles and impacts.[7]

We report herein the first Libyan record of Synodus randalli from the coast of Janzour in western Libya. The record is the third verified Mediterranean Sea record and represents a significant range extension of the known distribution to the west. The record provides valuable data to the biogeographic tracking of Lessepsian migrants and highlights the need for enhanced monitoring of inadequately surveyed regions of the south Mediterranean.

Material and Methods

The specimen was obtained on 19 July 2025 using hook-and-line fishing gear at approximately 30 meters depth off the Janzour coast, western Libya (32.8429°N, 13.0232°E).

It was identified through Cressey (1981) [8] taxonomic keys. Verification of identification was assisted by Dr. Daniel Golani, a Mediterranean fish taxonomic specialist.

The meristic and morphometric characteristics of the specimen are presented in Table 1 and it was compared with previous studies by Cressey (1981), Turan & Doğdu (2023), and Christidis & Kosoglou (2024).The specimen was kept in a freezer at the Marine Biology Research Center, Tripoli, Libya, for future studies (Figure1).

Results and Discussion

The results in (Table and Fig. 1) show A comparison of the morphometric and meristic features of the Synodus randalli caught in Libya is shown in (Table 1), along with data from earlier reports given by (Christidis & Kosoglou, 2024), (Turan & Doğdu, 2023), and the original description by Cressey (1981) [5,6,8].

The Libyan sample has the greatest sample size compared, measuring 323 mm in total length and weighing 262.96 g in body weight, showing excellent environmental conditions where they grew. The Greek and Turkish samples were very small in length as well as in weight. This disparity in size can be attributed to environmental factors like the availability of prey, temperature of water, and less competition in the new environment.

It is therefore important to understand the environmental drivers that regulate the body size of Synodus randalli in a way that describes these variations across different regions. Although there has been no direct research on this species, existing literature on fish and other aquatic organisms has crucial implications of how temperature, productivity, and competition between different species can affect growth patterns. These findings suggest that the increased size observed in the Libyan specimen may be a result of regional ecological conditions promoting greater growth [9,10,11].

With respect to key morphometric characters, the Libyan record has proportionally enhanced head length, snout length, and upper jaw length, though relative proportions are mostly comparable in all records. The results fall within intraspecific range but verify the morphological homogeneity of S. randalli in different Mediterranean localities.

The meristic values were mostly comparable in all records. All the samples contained an equal number of dorsal fin rays (13). anal fin rays (8). pectoral fin rays (12), and ventral fin rays (8)–typical characteristics of the species. Both the Libyan sample and the Greek sample contained the same number of pored lateral-line scales (56) and were within the counts reported in previous studies. Similarly, the teeth count on the free end of the tongue (40) was precisely equivalent to that of both the Greek as well as original records, confirming the species once again. The variation can be attributed to ontogenetic or population-level changes and is not presumed to be taxonomically important. The form of the body of Synodus ran-

dalli is fusiform, the head depressed to a certain degree, and the caudal region is slightly compressed. The species are covered by large cycloid scales. The snout is acutely pointed, and the pectoral fin is longer than between pelvic fin base and the dorsal fin origin. A reddish-brown to yellowish saddle-shaped band runs along the body, and all fins, particularly the dorsal and pelvic fins, have 3 to 5 bars of the same color. The meristic and morphometric data all concur in the fact that the Libyan specimen is well in agreement with the diagnostic features of Synodus randalli, with subtle variations that fall within the range of intraspecific variation.

Figure 1: Synodus randalli specimen collected from the coast of Libya.

18 new Lessepsian fish species from 12 families have been recorded in the Mediterranean during the past five years. Five have established populations, and ten have extended their range by at least 400 km. Three of these were later found to be misidentifications, although, showing that high-quality taxonomic expertise is required to record these invasions [12]. The number of Lessepsian migrants continues increasing, and a major increase in reports has been observed following the expansion of the Suez Canal area, permitting increased water exchange and species mobility [13]. Over 37% of the Lessepsian species reported in Libya are of economic importance and contribute to local fisheries, which highlights the ecological and economic importance of their colonization. Continuous immigration of new species highlights the dynamic nature of Mediterranean marine biodiversity and calls for a priority of ongoing monitoring and repeated faunal inventories along Libyan coasts. Significant studies providing key data on species checklists, first records, distribution, and fisheries impact [14,15,16,17,18].

The success of Lessepsian migrants depends on various ecological traits. Species that are schooling, of large body size, and benthic-spawning with adhesive eggs are likely to establish and extend in the Mediterranean. The depth range at which a species is found also significantly affects the ability of a species to migrate since canal deepening has allowed species from the lower depths to migrate [19]. Lessepsian migrants typically restructure food webs at the local scale. Some species modify their feeding behavior to adapt to the new environment, with some sharing the same dietary regimes as in their native range, facilitating acclimatization and establishment. Invasion by such species is one of the processes driving "tropicalization" of the Eastern Mediterranean and has the potential to induce reorganization of local trophic relations [20]. Besides, Lessepsian immigrants introduce novel parasites, some of which co-invade with their hosts and impact indigenous species and ecosystem health [21].

Lessepsian migration is forecasted to increase even more because of climatic change, canal modification, and ongoing habitat conversion. Regular surveys and updated checklists will be needed to understand the evolving composition of Mediterranean fish fauna and for management of the ecological impacts of invasions [12,13].

Table 1: Morphometric and Meristic Comparison of Synodus randalli Specimens and comparison with previous records.

Characteristic	Present Study (Libya)	Christidis & Kosoglou (2024) (Greece)	Turan & Doğdu (2023) (Turkey)	Cressey (1981)
Morphometrics (mm)				
Total length	323	246	187	-
Fork length	254	235	173	-
Standard length	284	218	161	113
Head length	63	59.27	45.56	31.97
Snout length	15.19	15.16	11.21	8.13
Upper jaw length	36.73	37.44	28.81	20.22
Diameter of bony orbit	13.45	13.62	11.02	7.68
Least width of bony interorbital	8.75	8.59	7.39	3.95
Pre-dorsal fin origin	92.56	92.40	66.91	49.72
Pre-anal fin origin	174.22	173.09	133.62	92.88
Pre-pelvic fin origin	74.33	74.04	55.80	43.61
Pre-pectoral fin origin	58.73	58.88	41.80	40.11
Eye diameter	8.12	8.61	6.22	-
Meristic counts				
Dorsal fin rays	13	13	13	13
Anal fin rays	8	8	8	8
Pectoral fin rays	12	12	12	12
Ventral fin rays	8	8	8	8
Pored lateral-line scales	56	56	58	55
Scales above lateral line to dorsal fin	3.5	3.5	-	3.5
Scales below lateral	4	4	-	4

Characteristic	Present Study (Libya)	Christidis & Kosoglou (2024) (Greece)	Turan & Doğdu (2023) (Turkey)	Cressey (1981)
line to anal fin				
Number of teeth on free end of tongue	40	40	-	40
Weight (g)	262.96	133.33	51.89	-

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