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First record of the Lessepsian Sammara Squirrelfish, *Neoniphon sammara* (Forsskål, 1775), in the Egyptian Mediterranean waters

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Abstract

This paper discusses the first record of the sammara squirrelfish, *Neoniphon sammara* in the Egyptian Mediterranean waters. On April 2020, 17 specimens of this species were recorded in the miscellaneous catch at the Mersa Matruh landing site on the Mediterranean Sea (31.33333° N, 27.216665° E), Egypt. The collected specimens represent the first record of *N. sammara* in the Egyptian Mediterranean waters. These specimens have a total length of 15.3 to 21.5 cm, fork length of 13.3 to 18.7 cm, standard length of 12.4 to 17.2 cm, and total weight of 45.3 to 125.1 g. The specimens' morphometric measurements and meristic counts are described. These new findings increase the number of Lessepsian species from the Egyptian Mediterranean waters to 44 species.

Keywords: Lessepsian immigrant; Holocentridae; Red Sea; Mediterranean Sea; Egypt.

Introduction

The Mediterranean Sea is an enclosed basin connected to the Atlantic Ocean by the narrow sill of the Strait of Gibraltar and to the Indian Ocean by the Suez Canal. Human activities, such as shipping through ballast water and fouling, aquaculture and aquarium trades, and the new corridors such as Suez Canal, have led to the introduction of nearly 1000 alien species into the Mediterranean Sea of which more than 660 species have been established (Çinar *et al.,* 2006; Zenetos *et al.,* 2010, 2012; Zenetos & Galanidi, 2020).

The squirrelfishes or soldierfishes (family: Holocentridae) are a commercially important demersal species in Egypt where members of this family are sold at reasonable prices. Most of them are nocturnal, and are usually cryptic during the day in crevices or beneath the ledges of reefs. They live mostly in shallow water associated with coral reefs and rocky substrates at depths ranging from shoreline to 100 m, rarely over 200 m (Randall & Heemstra, 1986). The family consists of eight genera and up to 90 species that are distributed in the tropical Atlantic, Indian, and Pacific Oceans (Froese & Pauly, 2021). Squirrelfishes have great commercial importance as flavorful edible fishes with reasonable prices.

Sammara squirrelfish is a marine, reef-associated fish that lives in depths ranging from 0 to 46 m (Lieske & Myers, 1994). It is an Indo-Pacific species distributed in the Red Sea and East Africa to the Marquesan and Ducie islands, north to southern Japan, the Ogasawara and Hawaiian islands, south to northern Australia and Lord Howe Island. It feeds on small fishes, small crabs, and shrimps at night (Sommer *et al.,* 1996). Previous studies have not noted that this species is recorded in the Egyptian Mediterranean waters (Halim & Rizkalla, 2011; Mehanna, 2015; Mehanna *et al.,* 2016). This is the first work to record the samara squirrelfish, *Neoniphon sammara* in the Egyptian Mediterranean waters.

Material and Methods

The Egyptian Mediterranean coast is about 1100 km extending from El-Sallum in the West to El-Arish in the East. Mersa Matruh is 240 km west of Alexandria and 222 km east of Sallum, the last point on the Egyptian – Libyan border (31.33333° N, 27.216665° E) (Fig. 1). It is considered an unexploited fishing ground due to its rocky bottom, with an annual average yield of 350 ton.

During a routine visit to the different landing sites along the Egyptian Mediterranean coast on the period from April 22 to 28, 2020, we observed 17 specimens of samara squirrelfish, *N. sammara* in the commercial catch at the Mersa Matruh fishing ground. They were captured among other unsorted species using a trammel net, which was positioned at about 30 m over the hard bottom. The specimens were first identified for their specific characteristics and subsequently confirmed according to FAO

Fig. 1: Egyptian coast of Mediterranean Sea.

identification sheets. The specimens were preserved frozen and transferred to the laboratory for further investigation. Morphometric and meristic characteristics as well as most diagnostic features were recorded and counted with a digital caliper. Body measures were presented in proportion to standard length (SL). The following measurements were taken:

total length (TL), forked length (FL), standard length (SL), body depth (BD), caudal peduncle depth (CPD), pre-dorsal fin length (PRDFL), pre-pelvic fin length (PRPFL), head length (HL), eye diameter (ED), head depth (HD), distance between dorsal fin end and ventral fin origin (DEVOFL), distance between the first spine of the dorsal fin and the end of anal fin (SPDAEFL), pre-anal fin length (PRAFL).

Results

During the period from April 22 to 28 April 2020, 17 specimens of sammara squirrelfish, *N. sammara* were observed among the other mixed species caught by the trammel nets operated at the Mersa Matruh fishing ground.

Description of the specimens

The sammara squirrelfish has a typical squirrelfish shape but the body is more slender than other squirrelfish, with a sharper nose. The fish body is compressed with a forked caudal fin. The body is a silver color striated with red stripes running horizontally across the body with one stripe being more noticeable along the lateral line. The outer margins of the caudal fin are dark red, while the dorsal fin has white and red colors on it with a prominent red blotch on the forward area, which gives the fish one of their regional names (blood-spot squirrelfish). This species is also known as the spotfin squirrelfish and soldierfish, due to the large dark red spot at the front of the dorsal fin.

The total length of the 17 specimens of *N. sammara* ranged from 15.3 to 21.5 cm (20.54 ± 2.15), the fork length ranged from 13.3 to 18.7 cm (18.06 ± 1.88), the standard length ranged from 12.4 to 17.2 cm (16.71 ± 1.53), the body depth ranged from 3.57 to 5.35 cm (4.91 ± 0.56), and the head length ranged from 4.66 to 6.44 cm (5.90 ± 0.67).

The HL was 2.83 in SL, the BD was 3.40 in SL, the ED was 1.5 in SL, and the ED was 2.76 in HL. The dorsal fin spines were XI, whereas the soft rays were 13; the anal fin spines were IV plus eight soft rays; the pelvic fin spines were one plus seven soft rays; the lateral line had 41 large rough and ctenoid scales (Fig. 2; Table 1).

Discussion

The first Holocentrid species that migrated and was established in Mediterranean from long time was *Sargocentron rubrum* (Forsskål, 1775), which entered the Mediterranean Sea via the Suez Canal (Golani & Ben-Tuvia, 1985). Until 2020, *S. rubrum* was considered the only

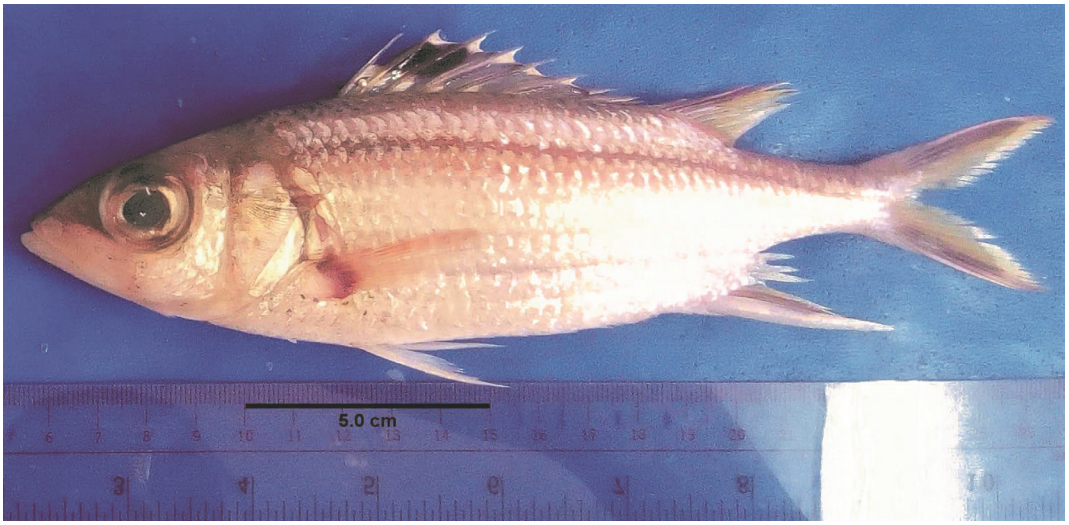

Fig. 2: Sammara squirrelfish *Neoniphon sammara* from Matruh, Mediterranean Sea.

Table 1. Morphometric, meristic counts and relative characteristics of *Neonephion sammara* (n = 17) collected from the Mersa Matruh fishing area, Egypt.

Parameter*	Measurements (cm)	Parameter*	Measurements (cm)
Total length TL	20.54	Body depth at 1st dorsal fin origin BD	4.91
Forked length FL	18.06	Eye diameter ED	1.97
Standard length SL	16.71	CPD	1.35
PRDFL	6.42	DEVOFL	9.07
PRPFL	6.47	SPDAEFL	9.0
PRAFL	13.09	SL/BD	3.40
Head depth HD	4.09	SL/HL	2.83
Head length HL	5.90	SL/ED	8.50
Dorsal fin counts	XI+13	HL/ED	2.76
Anal fin count	IV+8	SL/PRDFL	2.60
Pelvic fin count	I+7	SL/PRPFL	2.58
Scales on lateral line	41	SL/PRAFL	1.28

* CPD: Caudal peduncle depth, DEVOFL: Distance between dorsal fin end and ventral fin origin, SPDAEFL: Distance between the first spine of the dorsal fin and the end of anal fin, PRDFL: Pre-dorsal fin length, PRPFL: Pre-Pelvic fin length, PRAFL: Pre-Anal fin length).

representative of the squirrelfish in the Mediterranean Sea (Haas & Steinitz, 1947, Štirn, 1970, Ibrahim & Soliman, 1996). With the finding of this work, the squirrelfish that migrated and was recorded in the Eastern Mediterranean became two representatives.

For the Egyptian waters, the check list of El Sayed (1994) included 31 Erythrean fish species, whereas Rizkalla (1997) and Gamee (2005) reported 38 Erythrean fish species. Halim & Rizkalla (2011) and Mehanna (2015) reported four new records of Erythrean fishes presented along the Mediterranean Egyptian coasts, bringing the list to a total of 42 species. The Red Sea goatfish, *Parupeneus forsskali* was added to the list by Mehanna *et al.* (2016) who recorded this species for the first time among the red mullet catch from the Alexandria fishing area. With the present finding, the Egyptian Erythrean fish species list became 44 fish species.

Conclusion

In Egypt, the Lessepsian species greatly contribute to the country economy and have become the main food resource for the growing population in Egypt. By reporting the sammara squirrelfish, *N. sammara* in the fish landings of Matruh fishing area, 44 Lessepsian fish species are listed in the Egyptian Mediterranean but this number may not be representative of the exact number due to the

lack of reliable information about the Lessepsian migration and Lessepsian species. The observation of the new species is still done individually and the impact of such migration on the ecology and native species in Mediterranean is underestimated.

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