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The Occurrence of Four Syngnathid Species (Osteichthyes: Syngnathiformes) in Mersin Bay (North-Eastern Mediterranean)

Deniz Ergüden*[1], Deniz Ayas[2]

[1]İskenderun Technical University, Marine Sciences and Technology Faculty, Marine Sciences Department, Iskenderun, 31200, Hatay, Türkiye; (derguden75@gmail.com)
[2]Mersin University, Fisheries Faculty, Fishing and Seafood Processing Technology Department, 33342, Mersin, Türkiye; (ayasdeniz@gmail.com)

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* **Corresponding Author**
derguden75@gmail.com

Abstract

In this study, we report the occurrence of four rare syngnathids; Hippocampus fuscus Rüppell, 1838, Hippocampus guttulatus Cuvier, 1829, Syngnathus acus Linnaeus, 1758 and Syngnathus typhle Linnaeus, 1758 from Mersin Bay (Northeastern Mediterranean Sea coast of Turkey). To date, there is little information about the changes in numbers and habitat status of syngnathid species on the Mediterranean coast of Turkey, and these two sea horse species are currently considered as Near Threatened and Not Evaluated. Also, pipefish species are evaluated as Least Concern for the Mediterranean Regional Red List. Because insufficient information is available to assess their extinction risk, this study is significant for seahorse and pipefish populations in the Mediterranean and determining and evaluating their conservation status. Besides, the present study will be useful in the field of fisheries scientists and make an important contribution to fisheries managers.

1. Introduction

The family Syngnathidae is in the Order Syngnathiformes, and this family is represented by three main genera, Hippocampus Rafinesque, 1810, Nerophis Rafinesque, 1810 and Syngnathus Linnaeus, 1758 in the Mediterranean basin (Froese & Pauly, 2023).

To date, 12 sea horse and pipefish species are known in the Mediterranean Sea (Froese and Pauly, 2023; IUCN, 2023), and all species have been assessed for the IUCN Red List of Threatened Species (IUCN, 2016). However, only two of the 12 species are endemic to the Mediterranean (Abdul Malak et al., 2011), and also only Hippocampus fuscus is a lessepsian species that migrated into the Mediterranean via the Suez Canal (Golani and Fine, 2002; Gokoglu et al., 2004).

In the Turkish Mediterranean waters, 9 syngnathid species have been recorded, most of which live in shallow inshore waters (Fricke et al., 2007; Bilecenoglu et al., 2014). Previously, the boreal Atlantic pipefish Syngnathus rostellatus was reported as a new record for Turkey by Gökoglu et al. (2004). It was removed from the checklist of marine fishes (Bilecenoglu et al., 2014) since there was a misidentification of S. tenuirostris or S. acus (Cinar et al., 2021). Also, this species is commonly found in the Northeast Atlantic (Froese & Pauly, 2023).

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In the present study, the four syngnathid species, namely as; Sea pony Hippocampus fuscus Rüppell, 1838, Long-snouted seahorse Hippocampus guttulatus Cuvier, 1829, Greater pipefish Syngnathus acus Linnaeus, 1758 and Broadnosed pipefish Syngnathus typhle Linaneus, 1758 are reported from the Mediterranean coasts of Turkey by Akyuz (1957) and Aksiray (1987), although they also mentioned within the Turkish marine fishes checklists by Bilecenoğlu et al. (2014), so far these four syngnathid species of specimens have not observed from the Mersin Bay (Northeastern Mediterranean Sea, Turkey).

Although in the Northeastern Mediterranean coast of Turkey, syngnathids are not targeted by fisheries, seahorses and pipefish did get taken incidentally as bycatch. The present report is for the rare sightings of four Syngnathid species from northeastern Mersin Bay.

2. Method

The two seahorse and two pipefish specimens were accidentally caught from the marine area of the Goksu, Mersin Bay (Coordinate: 36° 17' 36.7 "N, 34° 02' 50.3"E) using commercial trawl fisheries at 3-10 m depths in April 2019 (Fig. 1).

Göksu River, which is the sampling area, is a river that flows into the Mediterranean Sea in the south of Silifke district of Mersin province. It is located 30 km south of Silifke.

The samples were brought to the laboratory in a ice box. After, the body measurements of fish samples were measured to the nearest 0.1 cm using calipers. The morphological descriptions and color of the captured sea horse and pipefish specimens are in agreement with those by Lourie et al. (1999), Dawson (1986a,b), and Golani et al. (2006) (Fig. 2, Fig. 3, Fig. 4 and Fig. 5).

The Systematic classification was made according to Nelson (2006). These four specimens were deposited in the Museum of Marine Life, Mersin University.

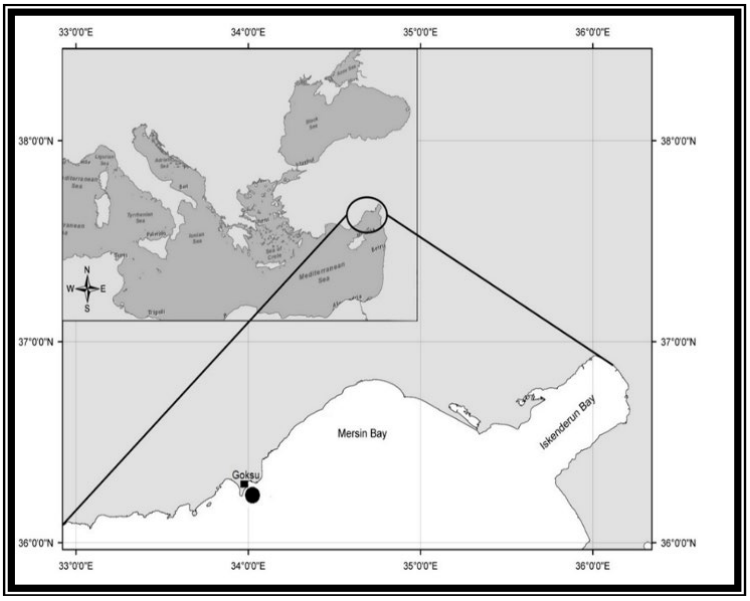

Figure 1. Housing and artificial light source

Figure 2. *Hippocampus fuscus* (female specimen) from Mersin Bay (Northeastern Mediterranean, Turkey)

Figure 3. *Hippocampus guttulatus* (male specimen) from Mersin Bay (Northeastern Mediterranean, Turkey)

Figure 4. Syngnthus acus from Mersin Bay (Northeastern Mediterranean, Turkey)

Figure 5. Syngnthus typhle from Mersin Bay (Northeastern Mediterranean, Turkey)

3. Result

SYSTEMATICS
Class: Actinopterygii
Order: Syngnathiformes
Family: Syngnathidae
Genus: Hippocampus (Cuvier, 1816)
Genus: Syngnathus Linnaeus, 1758

Hippocampus fuscus Rüppell, 1838

Diagnostic features: D, 14; A, 4; P, 14

Description of the Mediterranean specimen: The coronet is lowly raised and slightly curved, and the head is large compared to the body. The body is composed of bony rings arranged in dermal plates without spines. The snout is cylindrical. The prominent spine is above the eyes.

Color: The body is brown or pale yellow to light green with delicate white spots to lemon yellow.

Remarks: The sea pony H. fuscus has a wide distribution in areas along the coast of the Arabian Sea, Red Sea, and Indian Ocean (Lourie et al., 2016) and also entered from the eastern Mediterranean through the Suez Canal (Golani & Fine, 2002; Golani et al., 2021).

Biology and Ecology: This species is found in shallow waters on the edges of algal reefs or seagrass beds between 0-10 m depths (Foster & Vincent, 2004). The maximum length is up to 14.4 cm (Golani and Fine, 2022). The males carry the eggs in a brood pouch found under the tail (Breder & Rosen, 1966).

Threatened status: Not Evaluated (Mediterranean Regional Red List, IUCN, 2023).

Material examined: 1 female specimen, Goksu estuary, Mersin Bay, April 2019. Catalog number: MEUFC-19-11-103-001 (Fig. 2).

Hippocampus guttulatus Cuvier, 1829

Diagnostic features: D, 18; A, 4; P, 15

Description of the Mediterranean specimen: The coronet is small but distinct, with 5 rounded knobs or blunt points. Spines are medium to well-developed with blunt tips. The eye spine is prominent, rounded, and often with a mane of thick skin fronds on the neck and head.

Color: The body is dark green to brown, with prominent white spots on the body and often with a dark ring around them.

Remarks: British Isles and the Netherlands to Morocco, Canary Islands, Madeira, and the Azores, including the Mediterranean. (Dawson, 1990; Lourie et al., 2004; Froese & Pauly, 2023).

Biology and Ecology: Inhabits seagrass or algae in rocky or flat bottom to the depth of 10 m. The maximum length in male specimens is up to 21.5 cm, Standard Length (Curtis & Vincent, 2006). It feeds on zooplankton. Female deposits her eggs on the brood pouch of the male which is found under the tail (Breder & Rosen, 1966). Spawning season from April to October (Golani et al., 2006).

Threatened status: Near Threatened (Mediterranean Regional Red List, IUCN, 2023).

Material examined: 1 male specimen, Goksu estuary, Mersin Bay, April 2019. Catalog number: MEUFC-19-11-103-002 (Fig. 3)

Syngnathus acus Linnaeus, 1758

Diagnostic features: D, 35; P, 12 -Trunk rings: 18; Tail rings: 38.

Description of the Mediterranean specimen: Snout is cylindrical, equal to or less than eye diameter. An elongated lump is found on top of the head behind the eye (Muus & Nielsen, 1999).

Color: The body is light greenish to dark brown with variable markings.

Remarks: Eastern Atlantic from Norway, Faroes, and the British Isles to South Africa and northward to the coast of Zululand in the western Indian Ocean. (Dawson, 1986c; Froese & Pauly, 2023).

Biology and Ecology: Benthic neritic fish species living among rocks, mostly found in vegetation habitat between depth range 0-110 m (Dawson, 1986c). It feeds on small crustaceans (Taşkavak et al., 2010). Spawning season in spring and summer (Golani et al., 2006).

Threatened status: Least Concern (Mediterranean Regional Red List, IUCN, 2023).

Material examined: 1 specimen, Goksu estuary, Mersin Bay, April 2019. Catalog number: MEUFC-19-11-103-003 (Fig. 4).

Syngnathus typhle Linaneus, 1758

Diagnostic features: D, 32; P, 14- Trunk rings: 16; Tail rings: 31.

Description of the Mediterranean specimen: Snout is compressed and taller than the eye diameter, and anterior trunk rings are not fused ventrally (Muus & Nielsen, 1999).

Color: The body is usually harmonized with the surroundings and is brown or beige.

Remarks: Eastern Atlantic from Vardø, Norway, Baltic Sea, and the British Isles to Morocco. Also throughout the Mediterranean, Black Sea, and Sea of Azov (Dawson, 1990; Golani et al., 2006; Froese & Pauly, 2023).

Biology and Ecology: Inhabits seagrass meadows to a depth of 20 m. It feeds on small invertebrates. The male carries the eggs in a brood pouch (Breder and Rosen, 1966). Spawning season from March to October, peaking in the summer months (Golani et al., 2006).

Threatened status: Least Concern (Mediterranean Regional Red List, IUCN, 2023).

Material examined: 1 specimen, Goksu estuary, Mersin Bay, April 2019. Catalog number: MEUFC-19-11-103-004 (Fig. 5).

4. Discussion

The seahorses and pipefishes include more than 300 species in all major oceans and a few species in freshwater systems in the world. Also, 9 species are distributed in the eastern Mediterranean basin (Golani et al., 2006; Bilecenoglu et al., 2014).

The taxonomic information on seahorses and pipefishes is complex and constantly changing, making it difficult to determine the number of species in these fishes (Vincent, 1996; Gürkan et al., 2007). Due to the synonymous confusion, the number of seahorse species stated as close to 133. Scientifically, it is stated valid species as 57 in the literature. Similarly, the number of pipefish species scientifically stated as close to 193 is actually given as 34 valid species (Lourie et al., 2016; Froese & Pauly, 2023).

Two of three seahorses and six pipefish distributed on the Mediterranean Sea coast of Turkey are Endangered (EN), three of them are Near Threatened (NT), three of them are Data Deficient (DD), and one of them is Not Evaluated (NE) have been notified. Fricke et al. (2007) mentioned that is not enough information about these syngnathid species to assess their extinction risk in the region. However, of these nine syngnathid species, two are assessed as Near Threatened, three are Least Concern, three are Data Deficient, and one is Not Evaluated according to the Mediterranean Regional Red List (IUCN, 2023).

The life history characteristics of seahorses, such as male pregnancy, low fertility, and low mobility, have attracted considerable attention regarding biological conservation (Foster & Vincent, 2004). According to the IUCN Red List assessment, the long-nosed seahorse H. guttulatus is Near Threatened in the Mediterranean Sea. This species is also listed in Appendix II: International trade, export is regulated by a licensing system (CITES II since 15 May 2004). However, the alien sea pony H. fuscus is still Not Evaluated category for Mediterranean waters (Pollom, 2017; IUCN, 2023). Seahorses are especially very sensitive to human activities, such as habitat degradation caused by coastal development and destructive fishing gear. Thus, the sea horse populations have been a significant decline in the recent decade in the Turkish Mediterranean waters.

Pipefish and Seahorses in the Mediterranean coast of Turkey are threatened by habitat loss and degradation, tourism coastal development, and bycatch in trawl fisheries. Besides, some syngnathids are also at risk from threats such as pollution, sedimentation, eutrophication, and habitat disturbance through shipping in Mersin Bay (northeastern Mediterranean, Turkey). Therefore, further research study and monitoring are needed in order to determine population sizes, trends in abundance, changes in habitat, and threats for Mediterranean syngnathids in this coastal region.

5. Conclusion

To date, there is very scarce information about the changes in numbers and habitat status of syngnathid species on Turkey's Mediterranean coast. The present report shows that these syngnathid species still exist in the Mersin coasts. Thus, this study is very important for seahorse and pipefish populations in the Mediterranean Sea and determining and evaluating their conservation status. Besides, the present study will be very important and useful to decision-makers and fisheries managers.

Author contributions

DE: Conceptualization, investigation, data curation, writing, sample design and methodology, original draft, writing – review and editing. DA: Supervision, visualization, review and editing, Data collection, validation, image preparation.

Conflicts of interest

The authors declare that for this article they have no actual, potential, or perceived conflict of interest.

Statement of Research and Publication Ethics

No approval of research ethics committee was required to this study.

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