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RESEARCH ARTICLE

The presence of bristlemouth, *Gonostoma denudatum* (Rafinesque 1810), from the coast of Northern Cyprus (Northeastern Mediterranean)

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ABSTRACT

Gonostoma denudatum belonging to Gonostomatidae family are small fishes living in deep-sea around Atlantic and Mediterranean. They are vital species for plastic accumulation because they can be available in all depths of the water column during the day. In this study, it was aimed to present the recent record of *G. denudatum*, which captured from North Cyprus in May 2018. The total length of the specimen, which obtained from a depth of between 420 and 640 m, is 12.8 cm. Its photograph was taken and the catalogue number (MEUFC-19-11-108) was given. Morphometric characteristics were measured and calculated. The specimen is stored in the Museum of the Systematic, Faculty of Fisheries, Mersin University.

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Introduction

Gonostoma denudatum is a species belonging to the Gonostomatidae family of order Stomiiformes. They are bathypelagic species and live at a depth of 100-700 m (Badcock, 1984). They are found in East and West Atlantic waters (Schaefer et al., 1986). In a study conducted in Iskenderun Bay in 2015, a sample of *G. denudatum* with a standard length of 11.8 cm was reported from a depth of 200 m (Bilecenoğlu et al., 2014). A record of *G. atlanticum* belonging to same genus with *G. denudatum* reported from Cyprus in 2015 (Çoker and Cihangir, 2015). Maximum total length for *G. denudatum* was

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reported as 14 cm (Quéro, 1990). Recently, this species has reported from Mersin Bay as 13.7 cm, TL (Bayhan and Erguden, 2019).

G. denudatum migrate vertically in the water column. They are available at depths of 400-700 m during the daytime and 100-200 m during the nighttime (Badcock, 1984). They are the prey of organisms living at different depths because they migrate vertically throughout the day. Some predators of *G. denudatum* are *Beryx splendens* (Dürr and González, 2002), *Chauliodus sloani* (Battaglia et al., 2018), *Etmopterus spinax* (Bengil et al., 2019), *Mesoplodon bidens* (Pereira et al., 2011) and *Todarodes sagittatus* (Rosas-Luis et al., 2014).

All *Gonostoma* species have a pigment spot on the back of the eye. To distinguish those species, natural pigmentations in different parts of their bodies investigated. *G. denudatum* has a deep pigmentation from the caudal fin base to the dorsal-caudal peduncle and the lower caudal-fin base. (Ahlstrom et al., 1984).

G. denudatum is mostly feeding on Euphausiids and copepods (Badcock, 1984). In a study on the presence of microplastics in fish species living in the mesopelagic area in the Northwest Atlantic region, *G. denudatum* was found to be the fish having the most microplastic in the body (Wieczorek et al., 2018). With this study, an individual of *G. denudatum* caught off the coast of Northern Cyprus is reported. Besides, some morphometric of the fish is given.

Material and Methods

One specimen belonging to *G. denudatum* was caught from North Cyprus offshore waters. Sampling was carried out by a commercial trawl on May 17, 2018. The sampling depth ranged between 420 and 640 m. Sampling gear was prepared according to MEDITS procedures (Bertrand, 2002). The coordinates of the sampling area were 36.07227 N and 34.53326 E (Figure 1).

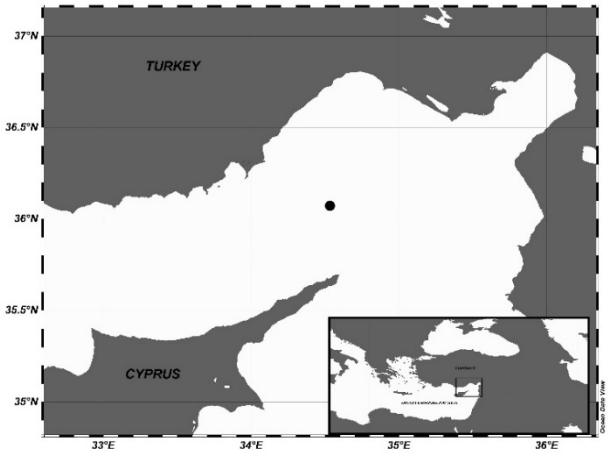

Figure 1. Sampling location of *Gonostoma denudatum*

Its photograph was taken and catalog number (MEUFC-19-11-108) was given. Species identification fulfilled according to information provided in Ahlstrom et al. (1984). Morphometric measurements were performed according to Bilecenoğlu et al. (2014) and compared with previous studies in the Eastern Mediterranean (Table 1). The specimen was preserved in 4% formaldehyde and deposited in the Museum of the Systematic, Faculty of Fisheries, Mersin University.

Results

The total length of *G. denudatum* (Figure 2), an Atlantic deep water species caught off the coast of Cyprus, was measured as 12.8 cm. The maximum total length reported in the literature is 14 cm (Quéro, 1990). In this case, the individual caught in the waters of Cyprus was mature.

Table 1. Comparison of the morphometric measurements of *G. denudatum* with previous studies

	Present study		Bayhan and Ergüden (2019)		Bilecenoğlu et al. (2014)	
Number of fish	1		1		1	
Measurements	**Size (mm)**	**Values (%)**	**Size (mm)**	**Values (%)**	**Size (mm)**	**Values (%)**
Total length (TL)	128		130.7		N/A	
Standard length (SL)	122		117.5		118	
Head length (HL)	32	26.2	30.3	25.7	29	24.6
Eye diameter	4.9	4	4.7	15.5	5	17.2
Inter orbital distance	4.4	3.6	4.3	14.1	4.5	15.5
Post orbital length	21	17.2	20.9	68.9	17	58.6
Snout length	7.2	5.9	6.3	20.8	6.9	24.1
Pre-dorsal length	77.5	63.5	72	61.2	70.4	59.7
Pre-anal length	76	62.3	69.9	59.5	69.5	58.9
Pre-pectoral length	30	24.6	28.9	24.6	N/A	N/A
Pre-pelvic length	57.3	47.0	55	46.8	N/A	N/A

Note: *N/A means Not Available*

Figure 2. The specimen of the *G. denudatum*

Discussion

The fish caught in this study is a recent report for the Eastern Mediterranean and the first record for Cyprus. It has also contributed to the list of marine fish in Cyprus. In Table 1, morphometric features of *G. denudatum* compared with previous studies. Total length of the specimen was measured as 12.8 cm. However, caudal fin of the specimen was damaged during the fishing operation (Figure 2). In this way, the actual total length of the sample could probably longer than 12.8 cm. When the standard length of the sample compared with other studies, it is seen that this specimen is the biggest individual caught from the Eastern Mediterranean Sea. The most of percentage values of the *G. denudatum* in all compared studies are similar except; eye diameter, interorbital distance, postorbital length, and snout length. It is thought that this difference caused by other studies is due to a mistake made during the calculation. When the given lengths are converted to a percentage, it gives different results. Meristic characteristics couldn't be measured and compared because the fin rays were damaged.

G. denudatum listed as "Least Concern" in the International Union for Conservation of Nature (IUCN) Red List, and the population trend is unknown (Harold, 2015). Together with the recent record of *G. denudatum* from Mersin Bay (Bayhan and Erguden, 2019), and the present study, it can be said that this fish started to make a population in the Eastern Mediterranean region. Also, this study is the first record for Cyprus.

On the other hand, *G. denudatum* is a fish that can found at different depths during the day, and it hunted by various fish species (Badcock, 1984). Some of these predator species have commercial value for human consumption. According to Wieczorek et al. (2018), *G. denudatum* was found to be the most micro-plastic accumulating species in its body. Together with this information, it can be said that *G. denudatum* plays a crucial role in transporting plastic pollution back to humans via the food chain. A further study on this species about its plastic accumulation and transferring them via food chain is planned.

Conclusion

G. denudatum lives in the deep sea, and it's rarely seen in the Mediterranean region because of regular fishing activities not aiming at those depths. Now there are two recent records for *G. denudatum* in the adjacent areas means that those fishes started to increase their population. New researches can be done for those fishes about their plastic accumulation properties. They can be unique and powerful indicators for plastic pollution studies in the future.

Conflict of Interest

The authors declare that there is no conflict of interest.

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