

## **A Study on the Fishes of Bozcaada Island (North Aegean Sea)**

### **Bozcaada (Kuzey Ege Denizi) Balıkları Üzerine Bir Araştırma**

**Lütfiye Eryılmaz**

Istanbul University, Faculty of Science, Department of Biology,  
34118 Vezneciler, İstanbul-Turkey

---

#### **Abstract**

This research was carried out in the shore and offshore of Bozcaada Island to new contributions to the recognition of the fish fauna of to the Aegean Sea. Fish specimens examined in this study were obtained from 17 stations between the years 2000 and 2001, from depths of 5 to 140 m, by using trawl, drift net and dredge. A total of 92 species belonging to 44 families were identified. From these species, 15 belong to Chondrichthyes and 77 to Osteichthyes. These species are new records for Bozcaada neritic waters of North Aegean Sea.

**Key Words:** Fish species, Bozcaada Island, Aegean Sea.

---

#### **Introduction**

The Island Bozcaada locates between longitudes 25°57'48" E - 26°05'00" E and latitudes 39°47'18" N - 39°50'54" N in the northeast Aegean Sea with an area of 42 km<sup>2</sup>.

In the Aegean Sea there are three different masses of water, namely surface water, an intermediate layer and deep water. The northern surface waters in the Aegean Sea, where Bozcaada is located, are

under the effect of the Black Sea waters which display the characteristics of brackish water (Yüce, 1995).

Taxonomic investigations for the determination of fish fauna of the Turkish seas were initiated by foreign researchers at the beginning of the 20th century, and entered an intensive stage with the participation of Turkish researchers in the 1940s. Some of the publications dealing with the fishes in the Aegean Sea are those by Kosswig (1954), Akşiray (1954), Tortonese (1956), Demir (1958), Bini (1967), Tortonese (1970), Akşiray (1987), Fischer et al., (1987), Papaconstantinou (1988), Whitehead et al., (1986,1989), Kaya (1993), Meriç (1994), Mater and Meriç (1996), Meriç et al., (1997), Meriç and Altun (1999), Torcu and Aka (2000), Torcu and Mater (2000), Mater et al., (2002) and Bilecenoğlu et. al., (2002). In addition to these, the presence of some fish species in the Aegean Sea has been confirmed by research on fish eggs and larvae Demir (1959).

The aim of this first detailed research carried out on the fishes of the neritic waters of Bozcaada except in our two studies (Eryılmaz, 2002-b; Eryılmaz et al., 2003) to report fish fauna in this area.

#### **Material and Methods**

Fish species examined in this study were obtained at 17 stations (Figure 1, Table 1) in various seasons between 2000 and 2001, from depths of 5 to 140 m in neritic waters of Bozcaada Island using bottom trawl, drift net and dredge.

These specimens were preserved in 5 % formaline in sea water. During the analysis of the fish, the taxonomic order suggested by Nelson (1994), species names suggested by Fischer et al., (1987), Whitehead et al., (1986, 1989), Wheeler (1992), Golani (1996), Eschmeyer (1998) and the English common names suggested by Whitehead et al., (1986, 1989) and Wheeler (1992) were used. From the metric characters only total length was measured. All of the analysed specimens are conserved in the Hydrobiological Museum at the Istanbul University, Faculty of Science, Department of Biology.

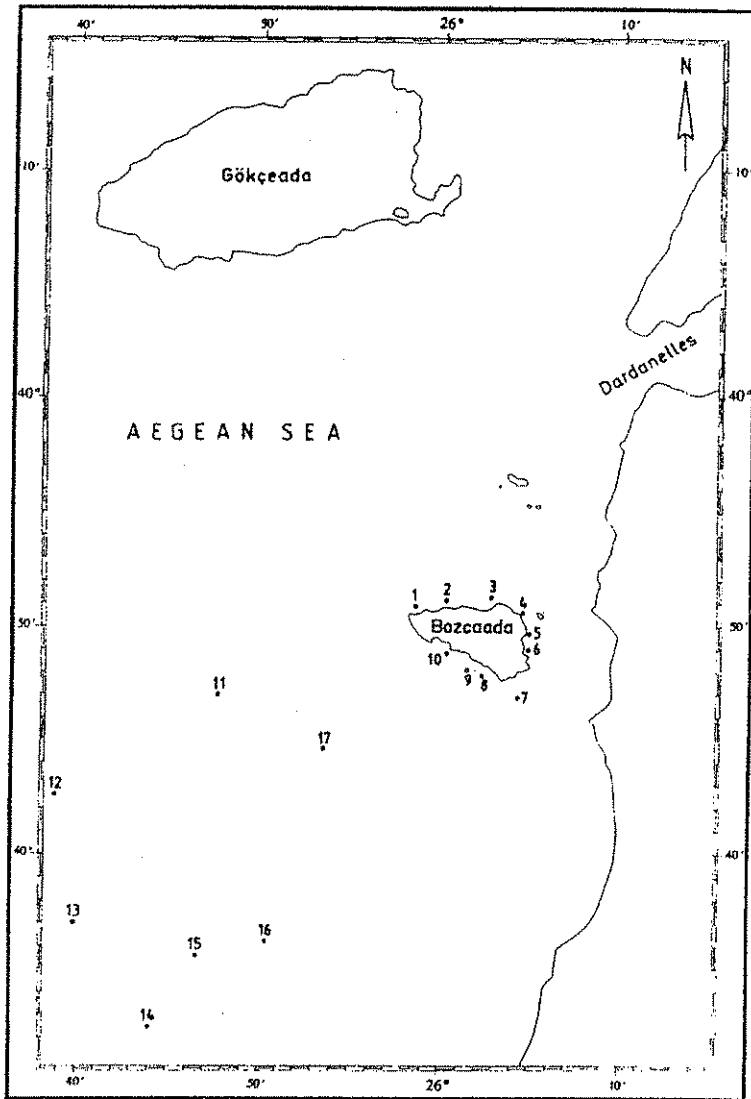


Figure 1: Map of Bozcaada Island (North Aegean Sea) with the sampling stations indicated.

Table 1: Data about sampling stations

Station Number	Date	Co ordinates N/E	Depth m	Tool
1	June-2001	25°58'30"-39°50'42"	5	Drift Net
2	November-2000	26°00'28"-39°51'13"	10	Dredge
3	November-2000	26°02'55"-39°51'18"	5	Dredge
4	February-2001	26°04'35"-39°50'33"	5	Drift Net
5	May-2000	26°04'58"-39°49'40"	9	Dredge
6	February-2001	26°05'00"-39°48'52"	8	Dredge
7	August-2000	26°04'14"-39°46'38"	30	Drift Net
8	February-2001	26°02'15"-39°47'35"	25	Drift Net
9	January-2001	26°01'20"-39°48'09"	30	Drift Net
10	February-2001	26°00'25"-39°48'41"	5	Dredge
11	May-2001	25°47'48"-39°47'00"	68	Trawl
12	August-2000	25°38'30"-39°42'24"	140	Trawl
13	August-2000	25°40'00"-39°37'00"	136	Trawl
14	August-2000	25°44'18"-39°32'38"	136	Trawl
15	August-2000	25°46'36"-39°35'42"	130	Trawl
16	May-2001	25°50'30"-39°36'11"	125	Trawl
17	September-2000	25°53'48"-39°44'32"	60	Trawl

## Results

A total of 92 fish species belonging to 44 families were identified and are listed below. Data on minimum and maximum total length, the station number and the depth where they were caught are given.

Systematic categories are given according to Nelson (1994).

### SCYLIORHINIDAE

*Scyliorhinus canicula* (Linnaeus, 1758) - Lesser spotted dogfish

Material examined: **Sts:1** (1 specimen), **7** (2 specimens), **15** (2 specimens). TL: 213-470 mm n = 5

*Scyliorhinus stellaris* (Linnaeus, 1758) - Nursehound

Material examined: **Sts:1** (1 specimen), **7** (1 specimen).

TL: 310-545 mm n = 2

### TRIAKIDAE

*Mustelus asterias* Cloquet, 1821 - Starry smooth hound

Material examined: **St:15** (1 specimen). TL: 520 mm

*Mustelus mustelus* (Linnaeus, 1758) - Smooth hound

Material examined: **St:15** (1 specimen). TL: 680 mm

### DALATIIDAE

*Oxynotus centrina* (Linnaeus, 1758) - Angular rough shark

Material examined: **St:17** (1 specimen). TL: 225 mm

### SQUALIDAE

*Squalus acanthias* Linnaeus, 1758 - Spurdog

Material examined: **Sts:7** (1 specimen), **15** (4 specimens).

TL: 260-427 mm n = 5

### TORPEDINIDAE

*Torpedo marmorata* Risso, 1810 - Marbled electric ray

Material examined: **St:1** (1 specimen). TL: 335 mm

*Torpedo torpedo* (Linnaeus, 1758) - Common torpedo

Material examined: **St:17** (1 specimen). TL: 520 mm

RAJIDAE

*Raja alba* Lacepède, 1803 - White skate

Material examined: **St:16** (1 specimen). TL: 246 mm

*Raja clavata* Linnaeus, 1758 - Thornback ray

Material examined: **St:15** (4 specimens). TL: 381-635 mm

*Raja miraletus* Linnaeus, 1758 - Brown ray

Material examined: **St:17** (1 specimen). TL: 267 mm

*Raja montagui* Fowler, 1910 - Spotted ray

Material examined: **St:15** (1 specimen). TL: 272 mm

*Raja naevus* Müller&Henle, 1841 - Cuckoo ray

Material examined: **St:8** (1 specimen). TL: 410 mm

*Raja radula* Delaroche, 1809 - Rough ray

Material examined: **St:7** (1 specimen). TL: 293 mm

MYLIOBATIDAE

*Myliobatis aquila* (Linnaeus, 1758) - Eagle ray

Material examined: **St:14** (1 specimen). TL: 485 mm

ACIPENSERIDAE

*Huso huso* (Linnaeus, 1758) - Beluga

Material examined: **St:7** (1 specimen). TL: 459 mm

MURAENIDAE

*Muraena helana* Linnaeus, 1758 - Moray eel

Material examined: **Sts:1** (1 specimen), **11** (1 specimen).

TL: 710-855 mm n = 2

CONGRIDAE

*Conger conger* (Linnaeus, 1758) - Conger eel

Material examined: **Sts:7** (1 specimen), **9** (1 specimen).

TL: 556-595 mm n = 2

ENGRAULIDAE

*Engraulis encrasicolus* (Linnaeus, 1758) - Anchovy

Material examined: **St:15** (5 specimens). TL: 112-117 mm

CLUPEIDAE

*Sardinella aurita* Valenciennes, 1847 - Round sardinella

Material examined: **St:9** (2 specimens). TL: 185-220 mm

CARAPIDAE

*Carapus acus* (Brünnich, 1768) - Pearl fish

Material examined: **St:11** (4 specimens). TL: 149-161 mm

PHYCIDAE

*Gaidropsarus mediterraneus* (Linnaeus, 1758) - Shore rockling

Material examined: **St:10** (1 specimen). TL: 119 mm

*Gaidropsarus biscayensis* (Collett, 1890) - Mediterranean bigeye rockling

Material examined: **St:14** (2 specimens). TL: 157-163 mm

*Phycis blennoïdes* (Brünnich, 1768) - Greater fork-beard

Material examined: **Sts:13** (2 specimens), **15** (3 specimens).

TL: 140-197 mm n = 5

*Phycis phycis* (Linnaeus, 1766)

Material examined: **Sts:7** (1 specimen), **8** (1 specimen).

TL: 220-243 mm n = 2

MERLUCCIIDAE

*Merluccius merluccius* (Linnaeus, 1758) - Hake

Material examined: **Sts:12** (1 specimen), **15** (1 specimen).

TL: 73-101 mm n = 2

GADIDAE

*Merlangius merlangus euxinus* (Nordmann, 1840) - Whiting

Material examined: **St:15** (5 specimens). TL: 137-166 mm

*Trisopterus minutus capelanus* (Lacepède, 1800) - Poor-cod

Material examined: **St:15** (5 specimens). TL: 103-117 mm

LOPHIIDAE

*Lophius budegassa* Spinola, 1807 - Black-bellied angler

Material examined: **Sts:13** (2 specimens), **15** (9 specimens).

TL: 96-149 mm n = 11

ZEIDAE

*Zeus faber* Linnaeus, 1758 - Dory

Material examined: **St:15** (8 specimens). TL: 50-472 mm

CAPROIDAE

*Capros aper* (Linnaeus, 1758) - Boar-fish

Material examined: **Sts:12** (6 specimens), **13** (2 specimens), **15** (10 specimens). TL: 33-62 mm n = 18

SYNGNATHIDAE

*Syngnathus acus* Linnaeus, 1758 - Greater pipefish

Material examined: **Sts:9** (1 specimen), **11** (1 specimen).

TL: 226-240 mm n = 2

*Hippocampus guttulatus* Cuvier, 1829 - Seahorse

Material examined: **Sts:7** (2 specimens), **9** (1 specimen), **11** (1 specimen).

TL: 106-114 mm n = 4

MACRORAMPHOSIDAE

*Macroramphosus scolopax* (Linnaeus, 1758) - Snipe-fish

Material examined: **St:12** (1 specimen). TL: 83 mm

SCORPAENIDAE

*Scorpaena notata* Rafinesque, 1810

Material examined: **Sts:7** (4 specimens), **9** (1 specimen), **12** (2 specimens), **15** (2 specimens). TL: 90-312 mm n = 9

*Scorpaena scrofa* Linnaeus, 1758 - Red scorpion-fish

Material examined: **Sts:7** (5 specimens), **14** (1 specimen).

TL: 181-347 mm n = 6

*Scorpaena porcus* Linnaeus, 1758 - Black scorpion-fish

Material examined: **Sts:4** (2 specimens), **5** (1 specimen), **7** (5 specimens), **9** (2 specimens). TL: 120-198 mm n = 10



TRIGLIDAE

*Chelidonichthys cuculus* (Linnaeus, 1758) - Red gurnard

Material examined: **St:15** (6 specimens). TL: 102-163 mm

*Chelidonichthys gurnardus* (Linnaeus, 1758) - Grey gurnard

Material examined: **St:12** (1 specimen). TL: 189 mm

*Chelidonichthys lastoviza* (Bonnaterre, 1788) - Streaked gurnard

Material examined: **Sts:8** (1 specimen), **12** (1 specimen).

TL: 174-195 mm n = 2

*Chelidonichthys lucernus* (Linnaeus, 1758) - Tub gurnard

Material examined: **Sts:12** (3 specimens), **14** (2 specimens).

TL: 82-178 mm n = 5

*Lepidotrigla cavillone* (Lacepède, 1801) - Large-scaled gurnard

Material examined: **Sts:12** (10 specimens), **13** (1 specimen), **15** (5 specimens). TL: 96-121 mm n = 16

*Lepidotrigla dieuzeidei* Audoin in Blanc&Hureau, 1973 - Spiny gurnard

Material examined: **St:15** (14 specimens). TL: 75-109 mm

*Trigla lyra* Linnaeus, 1758 - Piper

Material examined: **Sts:13** (2 specimens), **15** (10 specimens).

TL: 100-147 mm n = 12

*Peristedion cataphractum* (Linnaeus, 1758) - Armed gurnard

Material examined: **St:12** (2 specimens). TL: 157-187 mm

SERRANIDAE

*Serranus hepatus* (Linnaeus, 1758) - Brown comber

Material examined: **St:15** (1 specimen). TL: 84 mm

*Serranus cabrilla* (Linnaeus, 1758) - Comber

Material examined: **Sts:7** (1 specimen), **11** (2 specimens), **15** (1 specimen), **17** (1 specimen). TL: 122-181 mm n = 5

*Serranus scriba* (Linnaeus, 1758) - Painted comber

Material examined: **Sts:4** (1 specimen), **7** (4 specimens), **14** (1 specimen).

TL: 161-232 mm n = 6

*Anthias anthias* (Linnaeus, 1758) - Swallowtail sea perch

Material examined: **Sts:8** (1 specimen), **17** (2 specimens).

TL: 91-109 mm n = 3

ALLANTHIIDAE

*Callanthias ruber* (Rafinesque, 1810) - Parrot sea perch

Material examined: **Sts:17** (2 specimens). TL: 76-145 mm

POMATOMIDAE

*Pomatomus saltatrix* (Linnaeus, 1766) - Blue fish

Material examined: **St:17** (1 specimen). TL: 188 mm

CARANGIDAE

*Trachurus trachurus* (Linnaeus, 1758) - Horse mackerel

Material examined: **Sts:9** (1 specimen), **14** (1 specimen), **15** (1 specimen).

TL: 93-211 mm n = 3

SPARIDAE

*Boops boops* (Linnaeus, 1758) - Bogue

Material examined: **St:9** (10 specimens). TL: 193-226 mm

*Dentex macrophthalmus* (Bloch, 1791) - Large-eye dentex

Material examined: **St:15** (1 specimen). TL: 105 mm

*Diplodus annularis* (Linnaeus, 1758) - Annular sea bream

Material examined: **St:4** (1 specimen). TL: 105 mm

*Diplodus vulgaris* (E. Geoffrey Saint-Hilaire, 1817) - Common two-banded sea bream

Material examined: **St:4** (4 specimens), **7** (1 specimen).

TL: 108-132 mm n = 5

*Pagellus acarne* (Risso, 1826) - Axillary sea-bream

Material examined: **St:9** (1 specimen). TL: 167 mm

*Pagellus bogaraveo* (Brünnich, 1768) - Red sea-bream

Material examined: **St:12** (1 specimen). TL: 255 mm

*Pagellus erythrinus* (Linnaeus, 1758) - Pandora

Material examined: **St:7** (1 specimen). TL: 173 mm

*Pagrus pagrus* (Linnaeus, 1758) - Couch's sea-bream

Material examined: **St:7** (2 specimens). TL: 127-168 mm

*Sarpa salpa* (Linnaeus, 1758) - Salema

Material examined: **Sts:7** (2 specimens), **9** (1 specimen).

TL: 153-181 mm n = 3

*Spondyliosoma cantharus* (Linnaeus, 1758) - Black sea bream

Material examined: **St:7** (3 specimens). TL: 117-133 mm

CENTRACANTHIDAE

*Spicara flexuosa* Rafinesque, 1810

Material examined: **Sts:7** (2 specimens), **9** (1 specimen), **15** (1 specimen).

TL: 118-162 mm n = 4

*Spicara smaris* (Linnaeus, 1758)

Material examined: **St:9** (1 specimen). TL: 117 mm

MULLIDAE

*Mullus barbatus* Linnaeus, 1758 - Red mullet

Material examined: **St:15** (5 specimens). TL: 143-168 mm

*Mullus surmuletus* Linnaeus, 1758 - Red mullet

Material examined: **St:9** (1 specimen), **15** (5 specimens).

TL: 147-191 mm n = 6

CEPOLIDAE

*Cepola rubescens* Linnaeus, 1766 - Red band-fish

Material examined: **Sts:12** (2 specimens), **13** (1 specimen), **15** (5 specimens). TL: 120-291 mm n = 8

POMACENTRIDAE

*Chromis chromis* (Linnaeus, 1758) - Damsel fish

Material examined: **St:7** (1 specimen). TL: 109 mm

LABRIDAE

*Labrus bimaculatus* Linnaeus, 1758 - Cuckoo wrasse

Material examined: **Sts:7** (2 specimens), **11** (1 specimen).

TL: 162-310 mm n = 3

*Labrus viridis* Linnaeus, 1758 - Green wrasse

Material examined: **St:7** (1 specimen). TL: 215 mm

*Symphodus mediterraneus* (Linnaeus, 1758) - Axillary wrasse

Material examined: **Sts:7** (1 specimen), **8** (1 specimen).

TL: 137-153 mm n = 2

*Symphodus roissali* (Risso, 1810)

Material examined: **St:8** (1 specimen). TL: 131 mm

*Symphodus cinereus* (Bonnaterre, 1788)

Material examined: **Sts:3** (1 specimen), **6** (1 specimen).

TL: 53-80 mm n = 2

SCARIDAE

*Sparisoma cretense* (Linnaeus, 1758) - Parrotfish

Material examined: **St:9** (1 specimen). TL: 194 mm

AMMODYTIDAE

*Gymnamodytes cicerelus* (Rafinesque, 1810) - Mediterranean sand-eel

Material examined: **St:3** (1 specimen). TL: 75 mm

TRACHINIDAE

*Trachinus draco* Linnaeus, 1758 - Greater weever

Material examined: **Sts:5** (1 specimen), **11** (1 specimen), **15** (1 specimen).

TL: 225-243 mm n = 3

URANOSCOPIDAE

*Uranoscopus scaber* Linnaeus, 1758 - Stargazer

Material examined: **Sts:8** (2 specimens), **12** (1 specimen), **15** (1 specimen).

TL: 140-245 mm n = 4

## BLENNIIDAE

*Parablennius gattorugine* (Linnaeus, 1758) - Tompot blenny

Material examined: **St:7** (2 specimens). TL: 155-164 mm

*Blennius ocellaris* Linnaeus, 1758 - Butter fly blenny

Material examined: **Sts:1** (1 specimen), **16** (1 specimen).

TL: 93-136 mm n = 2

## CALLIONYMIDAE

*Callionymus lyra* Linnaeus, 1758 - Dragonet

Material examined: **St:11** (1 specimen). TL: 114 mm

*Callionymus maculatus* Rafinesque, 1810 - Spotted dragonet

Material examined: **Sts:13** (10 specimens), **14** (1 specimen), **16** (2 specimen). TL: 53-85 mm n = 13

## GOBIIDAE

*Deltentosteus quadrimaculatus* (Valenciennes, 1837) - Four-spotted goby

Material examined: **St:17** (1 specimen). TL: 75 mm

*Gobius niger* Linnaeus, 1758 - Black goby

Material examined: **St:17** (1 specimen). TL: 133 mm

*Gobius paganellus* Linnaeus, 1758 - Rock goby

Material examined: **St:5** (2 specimens). TL: 123-139 mm

*Lesueurigobius friesii* (Malm, 1874) - Fries' goby

Material examined: **St:14** (4 specimens). TL: 43-62 mm

*Zosterisessor ophiocephalus* (Pallas, 1814) - Grass goby

Material examined: **St:5** (1 specimen). TL: 195 mm

## SCOMBRIDAE

*Scomber japonicus* Houttuyn, 1782 - Spanish mackerel

Material examined: **St:9** (1 specimen). TL: 255 mm

*Scomber scombrus* Linnaeus, 1758 - Mackerel

Material examined: **St:11** (1 specimen). TL: 186 mm

*Sarda sarda* (Bloch, 1793) - Atlantic Bonito

Material examined: **St:17** (5 specimens). TL: 214-298 mm

**CITHARIDAE**

*Citharus linguatula* (Linnaeus, 1758) - Spotted flounder

Material examined: **St:16** (2 specimens). TL: 91-115 mm

**BOTHIDAE**

*Arnoglossus laterna* (Walbaum, 1792) - Scaldfish

Material examined: **St:2** (1 specimen). TL: 58 mm

**SOLEIDAE**

*Microchirus variegatus* (Donovan, 1808)

Material examined: **St:11** (1 specimen). TL: 115 mm

**Discussion**

Akşiray (1987) reported 443 fish species along the coasts of Turkey without indicating the seas which they live in. Mater and Meriç (1996) mentioned 337 fish species in the Aegean Sea. Bilencioğlu and Taşkavak (1999) reported that with new contributions, there were 346 fish species belonging to 110 families in the Aegean Sea. Moreover Papaconstantinou (1988) reported 447 fish species belonging to 129 families in the Greek Seas. Torcu and Aka (2000) reported 68 fish species belonging to 38 families from Edremit Gulf in the Aegean Sea. Mater et al., (2002) recorded 361 fish species in the Aegean Sea.

On the other hand, in this study 92 species belonging to 44 families in total were identified mentioning the places and the depths at which they were observed. So, a total of 94 fish species are known from the neritic waters of Bozcaada including *Neogobius melanostomus* (Pałas, 1814), *Sphoeroides pachygaster* (Müller and Troschel, 1848) given by Eryılmaz (2002-b) and Eryılmaz et al., (2003) respectively.

Also, during the study the fish species of economic importance which are caught by the island fishermen and used as source of income have been determined. These are *Boops boops*, *Mullus barbatus*, *Mullus surmuletus*, *Merlangius merlangus euxinus*, *Scorpaena scrofa*, *Scorpaena notata*, *Sarda sarda*, *Pagrus pagrus*,

Pagellus erythrinus, Sarpa salpa, Diplodus vulgaris, Scomber japonicus and Zeus faber.

### Özet

Bu araştırma Ege Denizi'nin balık faunasına yeni katkılarda bulunmak amacıyla, Bozcaada kıyıları ve açıklarında yapılmıştır. Bu çalışmada incelenen balık türleri 2000-2001 yılları arasında, 17 istasyonda 5-140 m derinliklerde trol, fanyalı ağ ve direç kullanılarak elde edilmiştir. 44 familyaya ait toplam 92 tür saptanmıştır. Bu türlerden 15'i kırıldaklı ve 77'si de kemikli balıklara aittir. Türler Kuzey Ege Denizi'nin Bozcaada neritik suları için yeni kayıttır.

### References

- Akşıray, F. (1954). Türkiye'nin Zehirli Balıkları. İstanbul Üniv. Fen Fak. *Hidrobiyoloji Mec.* A 2 (2): 85-112.
- Akşıray, F. (1987). Türkiye Deniz Balıkları ve Tayin Anahtarı. (II. Baskı), İst. Üniv. Rektörlüğü Yayınları, İstanbul, pp. 811.
- Bilencioglu, M., Taşkavak, E. (1999). General characteristics of the Turkish marine ichthyofauna. *Chondrichthyes and Osteichthyes, Zoology in the Middle East* 18: 41-56.
- Bilecenoğlu, M., Taşkavak, E., Mater, S., Kaya, M. (2002). Checklist of the marine fishes of Turkey. *Zootaxa* 113, pp.194.
- Bini, G. (1967). Atlante dei pesci delle coste Italiane, 1, Mondo Sommerso Editrice, Milano, Italy, pp. 206.
- Demir, M. (1958). Marmara ve Kuzeydoğu Ege'den üç derin deniz balığı nev'i. İstanbul Üniv. Fen Fak. *Hidrobiol Mec.* A 4 (3-4): 134-151.
- Demir, N. (1959). Notes on the Variations of the Eggs of Anchovy (*Engraulis encrasicolus* Cuv.) from Black, Marmara, Aegean and Mediterranean Seas. İst. Üniv. Fen Fak. *Hidrobiyoloji Mec.* B 4 (4): 180-187.
- Eryılmaz, L. (2002-a). The Spiny Gurnard, *Lepidotrigla dieuzeidei* Audoin in Blanc & Hureau, 1973, New to the Sea of Marmara. *Isr. J. Zool.* 48: 245.
- Eryılmaz, L. (2002-b). A New Fish Record for the Aegean Sea: Round Goby *Neogobius melanostomus* (Pallas, 1814) (Gobiidae). *Isr. J. Zool.* 48: 251-252.

- Eryılmaz, L., Özuluğ, M., Meriç, N. (2003). The Smooth Pufferfish, *Sphoeroides pachygaster* (Müller and Troschel, 1848) (Teleostei:Tetraodontidae), New to the Northern Aegean Sea. *Zoology in the Middle East* 28: 125-126.
- Eschmeyer, W. N. (1998). Catalog of Fishes. Published by the California Academy of Sciences. San Francisco,1,2,3, pp. 2905.
- Fischer, W., Bauchot, M.-L. , Schneider, M. (eds).(1987). Fiches FAO d'identification des espèces pour les besoins de la pêche. (Revision 1), Méditerranée et mer Noire, Zone de Pêche 37, 2, Vertébrés, Rome, FAO, pp. 761 – 1530 .
- Golani, D. (1996). The Marine Ichthyofauna of the Eastern Levant - History, Inventory and Characterization. *Isr. J. Zool.* 42: 15-55.
- Kaya, M. (1993). Ege Denizi Derin Deniz Balıkları Üzerinde Bir Araştırma. *Doğa-Tr. J. Zoology* 17: 411-426.
- Kosswig, C. (1954). The Hydrobiological Research Institute of İstanbul University and its work. İstanbul Üniv. Fen Fak. *Hidrobiyoloji Mec.* B 2 (2-3): 92-99.
- Mater, S., Meriç, N. (1996). Deniz Balıkları - Pisces. In Türkiye Omurgalılar Tür Listesi. Kence, A., Bilgin, C.C. eds., Nurool Matbaacılık A.Ş., Ankara, pp. 129 - 172. .
- Mater, S., Kaya, M., Bilecenoğlu, M. (2002). Türkiye Deniz Balıkları Atlası. Ege Üniversitesi Su Ürünleri Fakültesi Yayınları No: 68, Bornova, İzmir, pp.169.
- Meriç, N. (1994). Türkiye Denizlerinde Az Rastlanan Bazı Balıklar. XII. Ulusal Biyoloji Kongresi, 6-8 Temmuz 1994, Edirne, Hidrobiyoloji Seksiyonu, 4 : 295-299.
- Meriç, N., Eryılmaz, L. S., Altun, Ö. (1997). Marmara Denizi, Ege Denizi ve Akdeniz'den ele geçirilen bazı balıklar. XIII. Ulusal Biyoloji Kongresi, 17-20 Eylül 1996, İstanbul, Hidrobiyoloji Seksiyonu, 5: 128-137.
- Meriç, N., Altun, Ö. (1999). The Garfish, *Belone svetovidovi* Collette and Parin, 1970, New to the Aegean Sea. *Isr. J. Zool.* 45: 423-426.
- Nelson, J. S. (1994). Fishes of the World. (3 nd edn), Newyork, John Wiley, pp. 600.



- Papaconstantinou, C. (1988). Check-list of marine fishes of Greece. National Center for Marine Research, Hellenic Zoological Society, Athens, pp. 257.
- Torcu, H., Aka, Z. (2000). A Study on the Fishes of Edremit Bay (Aegean Sea). *Turk. J. Zool.* 24: 45-61.
- Torcu, H., Mater, S. (2000). Lessepsian Fishes Spreading Along the Coasts of the Mediterranean and the Southern Aegean Sea of Turkey. *Turk. J. Zool.* 24: 139-148.
- Tortonese, E. (1956). Leptocardia, Ciclostomata, Selachii. Fauna d'Italia, 2, Calderini, Bologna, pp. 334.
- Tortonese, E. (1970). Osteichthyes (Pesci Ossei). Fauna d'Italia, 10, Bologna, Calderini, pp. 565.
- Wheeler, A. (1992). A list of the Common and Scientific Names of Fishes of the British Isles. *J.Fish Biol.* 41 (Supplement A): 37.
- Whitehead, P. J. P., Bauchot, M.-L., Hureau, J.-C., Nielsen, J., Tortonese, E. (eds). (1986). Fishes of the North-eastern Atlantic and the Mediterranean. 2, 3, Paris, Unesco, pp. 511 – 1473.
- Whitehead, P. J. P., Bauchot, M.-L., Hureau, J.-C., Nielsen, J., Tortonese, E. (eds). (1989). Fishes of the North-eastern Atlantic and the Mediterranean. 1 (1. reprint), Paris, Unesco, pp. 1– 510.
- Yüce, H. (1995). Northern Aegean water masses. *Estuarine, Coastal and Shelf Science* 41: 325-343.

*Received: 10.02.2003*

*Accepted: 09.04.2003*