

CETACEAN BYCATCHES IN TURBOT FISHERY ON THE WESTERN COAST OF THE TURKISH BLACK SEA

Arda M. TONAY, Bayram ÖZTÜRK

Istanbul University, Faculty of Fisheries
Ordu Cad. No:200 Laleli, 34480 Istanbul - Turkey
e-mail: atonay@istanbul.edu.tr; ozturkb@istanbul.edu.tr.

Abstract

In April - June, 2002 and 2003, the cetacean bycatch was studied in the bottom gillnet fishery for turbot on the western coast of the Turkish Black Sea. The aim of the study was to gather information about the amount of the cetacean bycatch so that the conservation of the cetacean species in the Black Sea could be effectively managed.

A total of 40 *Phocoena phocoena* (harbour porpoise), one *Tursiops truncatus* (bottlenose dolphin) and one *Delphinus delphis* (common dolphin) were examined. There were 9(22.5%) male, 31(77.5%) female *P. phocoena* specimens and the most frequent length interval was 121-130cm (37.5%). Three females were pregnant.

For better conservation measures on dolphin population in the Black Sea, knowing the exact number of incidental catch is of great importance. A conservation action plan should be implemented in the entire Black Sea for the responsible fisheries, mitigation measures and protection of the cetaceans in the Black Sea.

Keywords

Cetacea, bycatch, Black Sea, turbot fishery

Introduction

The Black Sea is a semi-closed basin with relatively great depths(max depth 2258m; over 2000m isobath is 156,604km² and 529,954km³), with little connection to the world oceans, and high bioproductivity of the shelf zone(242t of phytoplankton per km²). Here discharge some big rivers like the Danube, Dneister, Dneiper, which determines the lower salinity of the Black Sea water compared to those of the Marmara, Aegean Seas and Mediterranean. The occurrence of hydrogen sulphide at depths of more 125-224m is another important peculiarity since the surface water saturated with oxygen represent only 12% of the total water volume (Prodanov *et al.*, 1997).

Commercially the Black Sea turbot (*Psetta maxima* and *P. maxima maeotica*) is one of the most valuable species in the basin, and currently is fished with gill nets and bottom trawls (Prodanov *et al.*, 1997).

There are three cetacean species in the Black Sea; *Phocoena phocoena* (Linnaeus, 1758) (harbour porpoise), *Tursiops truncatus* (Montagu, 1821) (bottlenose dolphin) and *Delphinus delphis* Linnaeus, 1758 (common dolphin) (Öztürk, 1999). As the top predators of the Black Sea, these marine mammals have been badly effected by ecological catastrophes such as water pollution, food shortage, microbial contamination, lost of habitats, incidental catch and changes in the population structures (Öztürk, 1999).

Every year several hunderds of dolphins are drowned in gill nets and stranded ashore between early April and June. Large numbers of *P. phocoena* and *T. truncatus* also die as a result of incidental catch during the sole; turbot and sturgeon fishing season. It is estimated at least 2000-3000 individuals of two species are bycaught in the Turkish Black Sea each year (Öztürk, 1996).

Bycatch has been studied in the Black Sea (Öztürk *et al.*, 1999; Tonay and Öz, 1999 and Birkun, 2002), although more information is needed to elucidate this problem to design the conservation plan for the dolphins in the Black Sea. Therefore, the aim of the study was to gather information about the cetacean bycatch so that the conservation of the cetacean species in the Black Sea could be effectively managed.

Materials and Methods

In April-June, 2002 and 2003, the cetacean bycatch was studied in the bottom gillnet fishery for turbot on the western coast of the Turkish Black Sea. The data were collected at the fishing ports of Igneada, Kiyiköy, Karaburun, Rumelifeneri, Sile and Agva (Figure 1).

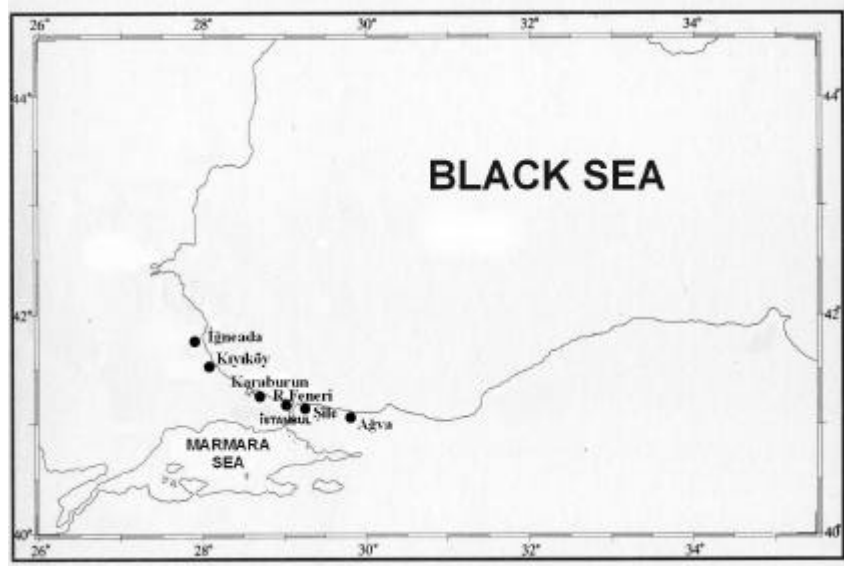


Figure 1. Fishing ports in the study area.

In these ports, the local fishermen were interviewed. Information on number of bottom gill nets, characteristics of nets and fishing areas were collected. Information on bycatch was collected from two sources: 1.) interviews with fishermen, 2.) the field study. The bycaught animals were examined, measured and photographed immediately. Water depth and location of nets were recorded.

Results

During the research period, a total of 40 *P. phocoena* and one *T. truncatus* were examined from six boats (total 875nets=52500fathom~94.5km), at three fishing ports of Rumeli Feneri, Karaburun and Agva. Furthermore, a bycaught and

stranded *D. delphis* was found on the seashore. Table 1 shows date, species, port, sex and length of collected specimens.

Table 1. Landing date, species, port, sex and length data of specimens

No	Date	Species	Port	Sex	Length (cm)
001	17.05.2002	<i>P. phocoena</i>	R. Feneri	Female	120
002	20.05.2002	<i>P. phocoena</i>	Agva	Female	107
003	26.05.2002	<i>P. phocoena</i>	Karaburun	Female	115
004	26.05.2002	<i>P. phocoena</i>	Karaburun	Female	124
005	01.06.2002	<i>P. phocoena</i>	R. Feneri	Male	119
006	05.06.2002	<i>P. phocoena</i>	R. Feneri	Female	113
007	05.06.2002	<i>P. phocoena</i>	R. Feneri	Male	105
008	05.06.2002	<i>P. phocoena</i>	R. Feneri	Female	124
009	05.06.2002	<i>P. phocoena</i>	R. Feneri	Male	101
010	05.06.2002	<i>P. phocoena</i>	R. Feneri	Male	103
011	16.06.2002	<i>P. phocoena</i>	R. Feneri	Male	121
012	16.06.2002	<i>P. phocoena</i>	R. Feneri	Female	118
013	16.06.2002	<i>P. phocoena</i>	R. Feneri	Female	113
014	23.04.2003	<i>P. phocoena</i>	Karaburun	Female	128
015	24.04.2003	<i>P. phocoena</i>	Karaburun	Female	119
016	24.04.2003	<i>P. phocoena</i>	Karaburun	Female	117
017	24.04.2003	<i>P. phocoena</i>	Karaburun	Female	139
018	26.04.2003	<i>P. phocoena</i>	Karaburun	Male	103
019	09.05.2003	<i>P. phocoena</i>	Karaburun	Female(pregnant)	128
020	09.05.2003	<i>P. phocoena</i>	Karaburun	Female	127
021	10.05.2003	<i>P. phocoena</i>	Karaburun	Female(pregnant)	131
022	10.05.2003	<i>P. phocoena</i>	Karaburun	Male	98
023	10.05.2003	<i>P. phocoena</i>	Karaburun	Female	128
024	10.05.2003	<i>P. phocoena</i>	Karaburun	Female	129
025	24.05.2003	<i>D. delphis</i>	R.F-Gümü'dere	Male	151
026	27.05.2003	<i>P. phocoena</i>	Karaburun	Female(pregnant)	130
027	27.05.2003	<i>P. phocoena</i>	Karaburun	Female	134
028	28.05.2003	<i>P. phocoena</i>	Karaburun	Female	140
029	28.05.2003	<i>P. phocoena</i>	Karaburun	Female	135
030	28.05.2003	<i>T. truncatus</i>	Karaburun	Male	173
031	21.06.3003	<i>P. phocoena</i>	Karaburun	Female	130
032	21.06.3003	<i>P. phocoena</i>	Karaburun	Female	120
033	21.06.3003	<i>P. phocoena</i>	Karaburun	Female	136
034	21.06.3003	<i>P. phocoena</i>	Karaburun	Female	135
035	21.06.3003	<i>P. phocoena</i>	Karaburun	Male	119
036	21.06.3003	<i>P. phocoena</i>	Karaburun	Female	136
037	21.06.3003	<i>P. phocoena</i>	Karaburun	Female	129
038	21.06.3003	<i>P. phocoena</i>	Karaburun	Female	129
039	21.06.3003	<i>P. phocoena</i>	Karaburun	Male	122
040	21.06.3003	<i>P. phocoena</i>	Karaburun	Female	121
041	21.06.3003	<i>P. phocoena</i>	Karaburun	Female	125
042	21.06.3003	<i>P. phocoena</i>	Karaburun	Female	134

There were 9(22.5%) male, 31(77.5%) female *P. phocoena* specimens and the most frequent length interval was 121-130cm (37.5%) (Figure 2).

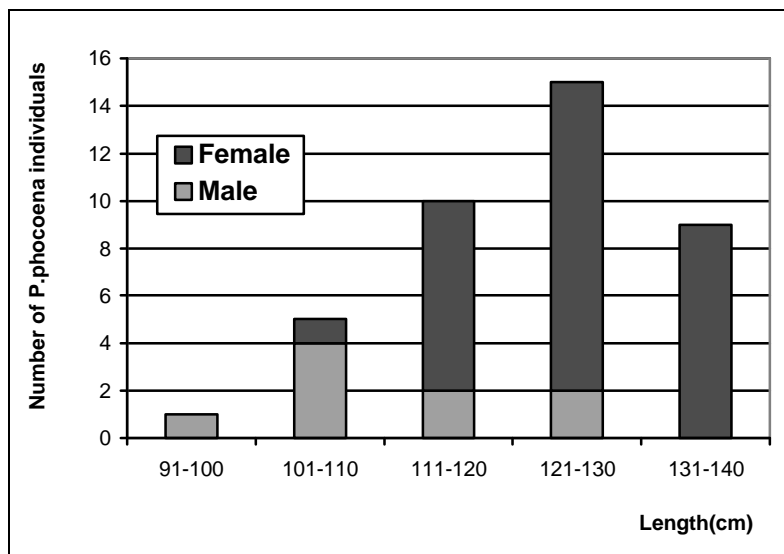
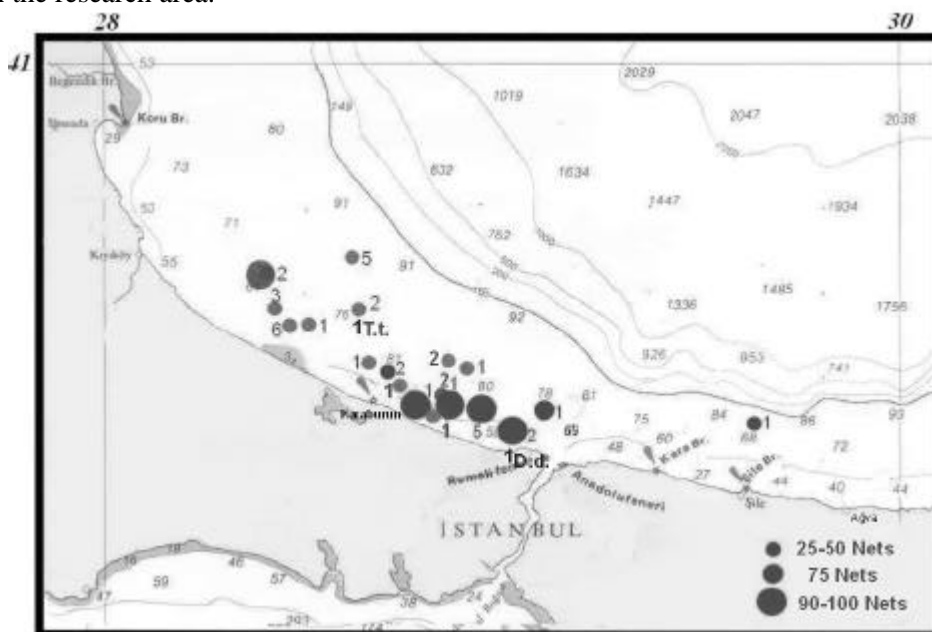


Figure 2. Length distribution *P. phocoena* specimens

Figure 3 shows location, number of nets and number of bycaught animals in the research area.



T.t.: *Tursiops truncatus*, D.d.: *Delphinus delphis*, others: *Phocoena phocoena*

Figure 3. Location, number of nets and number of bycaught animals.

Turbot fishing area is within 100m isobat in the Turkish Western Black Sea. In general, turbot fishery is operated within 15 miles from coast.

Turbot fishery season begins in April and ends in the last week of June. Table 2 summarizes the features of turbot fishery and bottom gill nets in the study area.

Table 2. The features of turbot fishery and bottom gill nets

Season	April, May, June
Fishing depth	20-60fathom(36-108m)
Soak time	10-30 days
Mesh size	160-200mm
Net twine	210d/9-18 no
Net height	5-11 meshes
Prohibitions	Min. fish body length 40cm; banned 15 April-31 May

For the turbot fishery, nets are set end to end. One net is 60 fathom length(=108m). One set of nets has 5-15 anchors. There are 12-30 nets between two anchors. For example, one set of 50nets is approximately 5 km long. The boats used for turbot fishery are between 7 to 30m in length. Table 3 shows number of boats, number of bottom gill nets and distance of fishing area from coast.

Table 3. Number of boats, bottom gill nets and distance of fishing area from coast

Fishing Ports	Number of bottom gill nets	Number of boats	Distance of fishing area from coast (nautical miles)
Rumeli Feneri	5,000	30	10-15
Igneada	4,000	80	15
Kiyiköy	5,000	27	15
Karaburun	2,000	8	3-5
Sile	1,000	10	1
Agva	2,000	10	10
Total	19,000	185	-

In 6 fishing ports on the Turkish western coast, 19,000 pieces of bottom gill nets in total were found.

Discussion

Of three Cetacean in the Black Sea, *P.phocoena* was the most frequently bycaught species (95.2%). Among 40 specimens of *P.phocoena* found bycaught in this study, three females were pregnant.

According to Birkun (2002), the turbot-fishing season coincides with porpoise gestation and nursing period and the Black Sea fisheries is focused mainly on *P. phocoena*, the intensity of this impact is probably 30-40 times higher compared to the adverse influence of fisheries on the other two species (Table 4).

Table 4. Result of bycatch studies in the Black Sea

Year	Country	Species			Total	Reference
		P.p.	D.d.	T.t.		
1990-1999	Rom., Rus., Bulg., Geor., Ukr.	363	10	12	385	Birkun, 2002
1993-1997	Turkey	62	-	1	63	Öztürk <i>et al.</i> , 1999
1999	Turkey	28	-	-	28	Tonay and Öz, 1999

P.p.: *Phocoena phocoena* D.d.: *Delphinus delphis* T.t.: *Tursiops truncatus*

The bycatch of 40 *P. phocoena* and one *T. truncatus* occurred in 875 nets, which consist 4.6% of total bottom gillnets in the area. There were 19,000 nets used in the Turkish Western Black Sea in approximately 3500 km².

Furthermore, the pelagic and demersal fish stocks are over-exploited, which obviously has a direct impact on the dolphin populations. The lack of food may lead to increase conflicts between dolphins and the fishing industry, thus increasing the threat to these marine mammals as some fishermen view them as competitors for scarce resources of high commercial value(Öztürk, 1999).

Knowing the exact number of incidental catch is necessary before the impact on dolphin population in the western Black Sea can be assessed. More

detailed studies are needed for certain bycatch data. Furthermore studies on abundance and population dynamics of dolphins in the Black Sea are required. Already existing turbot fisheries and protection laws should be reviewed and revised. Relation between cetacean bycatch and demersal fishery should be investigated. Researches on reducing entanglement, dolphin-safe fishing methods, fishing gears and fisheries technology should be started. Demersal fishery causing bycatch should be monitored with a stranding and bycatch database for all the Black Sea riparian countries. A conservation action plan should be implemented in the entire Black Sea for the responsible fisheries and protection of the cetacean in the Black Sea.

Acknowledgment

We thank Ayhan DEDE Ph.D., Ayaka Amaha ÖZTÜRK Ph.D., Assist. Prof. Bülent TOPALOGLU who encouraged and helped us, Orçun AKIN for help in the field study, turbot fishermen for their help in collecting specimens and Turkish Marine Research Foundation(TUDAV) for financial support.

References

- Birkun, A. Jr. 2002.** Interactions between cetaceans and fisheries in the Black Sea. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco. Section 10, 11p.
- Öztürk, B. 1996.** Whales and Dolphins, Introduction of Cetology. Anahtar Kitapları Yayinevi, Istanbul. 136p.(in Turkish)
- Öztürk, B. (Ed.) 1999.** Black Sea Biological Diversity: Turkey. GEF Black Sea Environmental Programme, United National Publications, Newyork.27-35pp.
- Öztürk, B., Öztürk, A.A., Dede, A. 1999.** Cetacean bycatch in the western coast of the Turkish Black Sea in 1993-1997. in: P.G.H. Evans, J. Cruz and J. A. Raga (Eds.), Proc. 13th Annual Conf. European Cetacean Society, Velencia, Spain. 134pp.
- Prodanov, K., Mikhailov, K., Daskalov, G., Maxim, C., Chashchin, A., Arkhipov, A., Shlyakhov, V., Özdamar, E. 1997.** Environmental Management of Fish Resources in the Black Sea and Their Rational Exploitation. General Fisheries Council for the Mediterranean, Studies and Reviews, No: 68. 185p. Food and Agriculture Organization of the United Nations, Rome
- Tonay, A.M., Öz, I.M., 1999.** Stomach contents of the Harbour Porpoise (*Phocoena phocoena*) bycatches in the Western Black Sea, Underwater Science and Technology Meeting, Istanbul.92-98pp(in Turkish)