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Araştırma Makalesi/*Research Article (Original Paper)*

Common Dolphin, *Delphinus delphis* (Cetacean: Dolphinidae) Stranding off Sinop Peninsula in the Black Sea

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Abstract: The present study summarizes information on the stranding common dolphin, *Delphinus delphis*, off the Sinop peninsula and also describes information on the weight-length relationships of the common dolphin in the center Black Sea, Turkey for the first time. During the research period, a total of 10 *D. delphis* were examined as stranding off Sinop Peninsula. It was determined that a lot of water birds species (*Great cormorant*) were seen as died on the sea coast during the dolphin survey. The death reasons of the common dolphin were drowned after the catching the nets and it is also suspected that death reason of common dolphins is water pollution. The length weight relationship (WLRs) of *D. delphis* determined as Log (*W*) = 2.2898 L - 2.6501, r^2 = 0.9959 (n = 7). It is important that standing levels of Cetaceans living in the Black Sea in terms of protection efforts. It is also important to investigate the causes of death. Focusing on these topics in subsequent studies will be important for the protection of endangered (*Phocoena phocoena* and *Tursiops truncatus*) and vulnerable (*D. delphis*) cetaceans in the Black Sea.

Keywords: Cetaceans, Common dolphin, *Delphinus delphis*, Stranding, Black Sea

Karadeniz Sinop Yarımadasında Karaya Vuran Tırtak Türü *(Delphinus delphis*) Yunuslar

Özet: Bu çalışmada, Sinop yarımadası civarında karaya vuran tırtak türü (*Delphinus delphis*) ve bu türün boy-ağırlık ilişkisini orta Karadeniz'de ilk kez özetlemektedir. Çalışma süresince 10 adet yunus bireyi karaya vurmuş olarak tespit edilmiş ve incelenmiştir. Çalışma süresinde ölü yunusların yanında çok sayıda ölü su kuşu (*Great cormorant*) da tespit edilmiştir. Karaya vuran yunusların ölüm nedeninin balıkçı ağlarına dolanıp boğularak öldükleri düşünülmektedir. Ayrıca su kirliliğinin de ölümler üzerine etkili olabileceğinden şüphelenilmiştir. İncelenen yunusların boy ağırlık ilişkisi Log (*W*) = 2,2898 L – 2,6501, r^2 = 0,9959 (n = 7) şeklinde hesaplanmıştır. Karadeniz'de Cetacea türlerinin korunması önlemleri açısından karaya vuran miktarının ve ölüm sebeplerinin bilinmesi önemlidir. Bu kapsamda tehlike altında (*Phocoena phocoena* ve *Tursiops truncatus*) ve hassas (*D. delphis*) kategorisindeki yunus türleri üzerine daha fazla çalışma odaklanmalıdır.

Anahtar kelimeler: Cetacea, Tırtak, *Delphinus delphis*, Karaya vurmak, Karadeniz

Introduction

There are three cetacean species in the Black Sea; *Phocoena phocoena* (Linnaeus, 1758) (Harbour porpoise), *Tursiops truncatus* (Montagu, 1821) (Bottle-nosed dolphin) and *Delphinus delphis* Linnaeus, 1758 (Common dolphin) (Öztürk et al., 1999; Öztürk et al., 2003). The range of common dolphins encompasses almost the entire Black Sea, including territorial waters and exclusive economic zones of Bulgaria, Georgia, Romania, Russia, Turkey and Ukraine, and internal waters of Ukraine in Karkinitsky Bay (Birkun 2008) and Turkey including the Bosphorus Strait and Marmara Sea (Öztürk 1996). Common dolphins are distributed mainly offshore and visit shallow coastal waters following seasonal aggregations and regular mass migrations of their preferred prey, small pelagic fishes such as Black Sea anchovy (*Engraulis encrasicolus*) and Black Sea sprat (*Sprattus sprattus*) (Birkun 2002; Birkun 2008).

Every year, several hundreds of dolphins are drowned in gill nets and stranded shore between early spring. Large numbers of *P. phocoena*, *T. truncatus* and *D. delphis* die as a result of incidental catch during the turbot fishing season. It is estimated at least 2000-3000 individuals of *P. phocoena*, *T. truncatus* are by-caught in the Turkish Black Sea each year (Öztürk 1996). Cetacean stranding was reported by Tonay et al. (2012) in the Turkish western Black Sea coast during 2007-2009 and Bilgin et al (2013) in the Turkish eastern Black Sea coast during

2011-2013. Stranding levels of cetaceans may differ significantly between the seasons and geographical areas. The present study summarizes information on the stranding common dolphins (*D. delphis*) off the Sinop peninsula. This paper also describes information on the weight-length relationships of the common dolphin in the center Black Sea, Turkey for the first time.

Material and Methods

This study was carried out off Sinop peninsula on May 2017 and March and April 2018. The common dolphin that stranded off Sinop peninsula were photographed and total length was measured from the tip of the rostrum to the notch of the flukes suggested by Gol'din (2005). Girth measurements were taken rostral (G_1) and caudal (G_2) of the pectoral fins. Sex determination was made as shown in Figure 1.

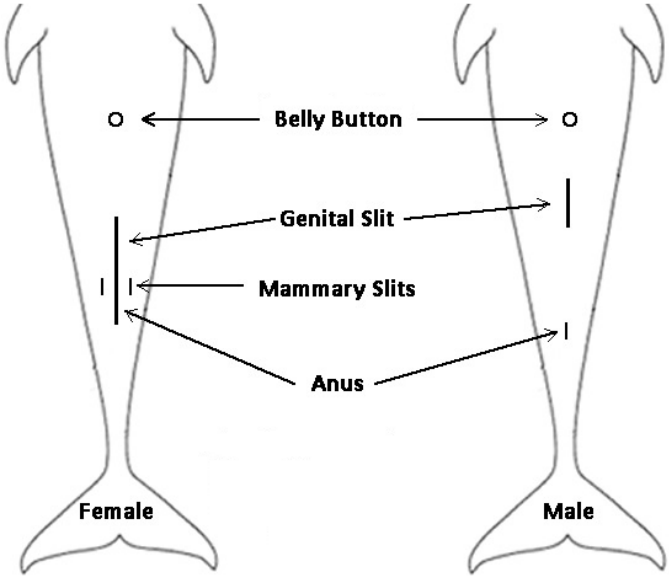

Figure 1. Sex determination of common dolphin (*Delphinus delphis*) (Anonymous 2018).

Total body weight of the animals was determined using following equation (Kastelein and van Battum 1990): $W = 4.74 \times 10^{-5} L1.68 (G_1 + G_2)^{1.05}$, where *W* is the body weight (kg), *L* is the total length (cm), G1 is girth measurements rostral of the pectoral fins, G2 is girth measurements caudal of the pectoral fins. Least squares regression analysis with MS Excel software was used to calculate the weight length relationship parameters of all specimens. The weight length relationship was estimated as: $W = aL^b$. The length-weight relationship was also estimated using log transformed length and weight data as: Log (*W*) = a + b x log (*L*), where *W* is the body weight (kg), *L* is the total length (cm), *a* is the intercept, and *b* is the slope of the regression line.

Results and Discussion

During the research period, a total of 10 *D. delphis* were examined off Sinop Peninsula. The total length of 7 individuals could be measured, and the size of 2 individuals could not measure due to decompose and also 1 individual were not measured (Figure 2). Table 1 showed date, location, sex and length of collected specimens shown in Figure 2-9.

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

No	Date	Length (cm)	G_1 (cm)	G_2 (cm)	Sex	Location
1	31.03.2018	189	94	93	Male	Bahçeler coast
2	31.03.2018	143	73	81	Male	Bahçeler coast
3	31.03.2018	201	85	96	Male	Bahçeler coast
4	31.03.2018	125	66	74	Male	Bahçeler coast
5	31.03.2018	128	67	72	Male	Kiraztepe location
6	01.04.2018	149	75	82	Male	Bahçeler coast
7	01.04.2018	192	82	92	Male	DSI coast

Figure 2. Stranding 3 individuals of common dolphins found in Kiraztepe location on May 1, 2017.

Figure 3. Common dolphin found in Bahçeler coast location on March 31, 2018 (no: 1)

Figure 4. Common dolphin found in Bahçeler coast location on March 31, 2018 (no: 2)

Figure 5. Common dolphin found in Bahçeler coast location on March 31, 2018 (no: 3)

Figure 6. Common dolphin found in Bahçeler coast location on March 31, 2018 (no: 4)

Figure 7. Common dolphin found in DSİ location on March 31, 2018 (no: 5)

Figure 8. Common dolphin found in Bahçeler coast location on April 1, 2018 (no:6)

Figure 9. Common dolphin found in state hydraulic works (DSİ) coast location on April 1, 2018 (no: 7)

Of three Cetaceans in the Black Sea, *D. delphis* was the only determined by-caught species. Among 10 specimens of *D. delphis* found stranding in this study, seven individuals were male. Cetacean species were caught as an incidental catch in the fishing nets especially the turbot gill nets which are the most dangerous for the cetaceans in the Black Sea (Radu et al. 2003). Cetacean by-catch in the turbot gill net fishery was reported for the western coast of Turkish Black Sea (Öztürk et al. 1999; Tonay and Öztürk 2003; Tonay 2016; Özdemir et al. 2017). In the present study, it was determined that a lot of water birds species (*Great cormorant*) were shown as died on the sea coast during the dolphin survey on March 31, 2018. Furthermore, one *D. delphis* obtained as gill net wrapped in a tail. The death reasons of the common dolphin were drowned after the catching the nets and it is also suspected that death reason of common dolphins is water pollution. Furthermore, it is clear that other anthropogenic impacts such as habitat degradation, physical modification of the seabed and disturbance catch in fishing gears have further influenced and reduced populations of Black Sea cetaceans (Birkun 2002).

The length-weight relationship (WLRs) results of male *D. delphis* showed in Figure 10 and determined as follows: $W = 0.0022\ L^{2.2898}$, $r^2 = 0.9959$ (n = 7) and also Log (*W*) = 2.2898 L - 2.6501, $r^2 = 0.9959$ (n = 7). Similar results were reported for *D. delphis* as Log (*W*) = 2.91 L - 4.80, (n = 19) from Atlantic by Gihr and Pilleri (1979).

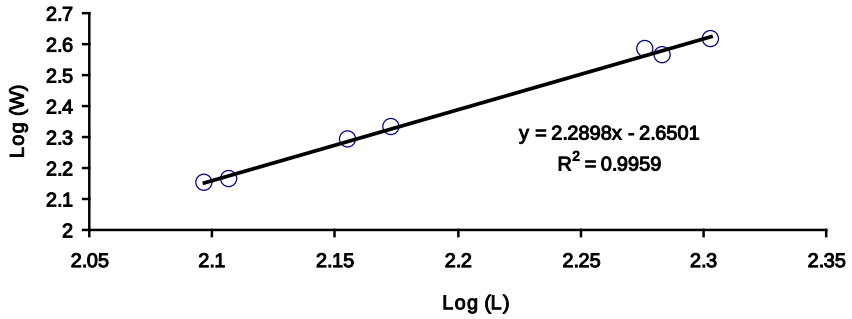

Figure 10. The length weight relationship of *D. delphis*

It is important that the by-catch and standing levels of dolphin and porpoise species living in the Black Sea in terms of protection them. Besides, it is also important to investigate the causes of death. Focusing on these topics in subsequent studies will be important for the protection of endangered (*P. phocoena* and *T. truncatus*) and vulnerable (*D. delphis*) cetaceans in the Black Sea.

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