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RESEARCH ARTICLE

Cetacean sightings in the Eastern Mediterranean Sea during the cruise in summer 2008

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Abstract

The Eastern Mediterranean Sea is one of the least studied areas for cetaceans in the Mediterranean Sea. Lack of basic knowledge such as species composition and habitats makes it impossible to develop effective conservation measures. Therefore, in order to determine the species composition, size and distribution of cetacean populations, cetacean sighting data were collected during a research cruise carried out in summer (11-24 July) 2008 in the international water of the Eastern Mediterranean Sea, as well as the Turkish, Lebanese and Syrian territorial waters. Totally 860 nautical miles (nm) of survey effort was made and 16 sightings were recorded. During the study, five *Physeter macrocephalus* in one sighting, 53 *Stenella coeruleoalba* in five sightings, two *Grampus griseus* in one sighting (associated with *S. coeruleoalba* individuals), two *Delphinus delphis* in one sighting and 27 *Tursiops truncatus* in nine sightings were recorded. The overall sighting rate was 0.18 sightings/10 nm. This is a preliminary study for understanding cetacean populations in the Eastern Mediterrannean Sea, but the results of this study will provide basic information for developing conservation plans in the area.

Keywords: Whale, dolphin, distribution, group size, sighting rate, Eastern Mediterranean Sea

Introduction

According to historical and recent data, in the Mediterranean Sea, totally 23 species of cetaceans were reported; eight of them are considered as common or regular species (Bottlenose dolphin; *Tursiops truncatus*, Common dolphin; *Delphinus delphis*, Striped dolphin; *Stenella coeruleoalba*, Risso's dolphin; *Grampus griseus*, Fin whale; *Balaenoptera physalus*, Sperm whale; *Physeter macrocephalus*, Cuvier's beaked whale; *Ziphius cavirostris*, Long-finned pilot whale; *Globicephala melas*), while the five are called visitor species (Minke

whale; *Balaenoptera acutorostrata*, Humpback whale; *Megaptera novaeangliae*, False killer whale; *Pseudorca crassidens*, Rough-toothed dolphin; *Steno bredanensis*, Killer whale; *Orcinus orca*) and the rest are called vagrant species (Sei whale; *Balaenoptera borealis*, Dwarf sperm whale; *Kogia sima*, Sowerby's beaked whale *Mesoplodon bidens*, Blainville's beaked whale; *Mesoplodon densirostris*, Gervais' beaked whale; *Mesoplodon europaeus*, Harbour porpoise; *Phocoena phocoena*, Indo-Pacific humpback dolphin; *Sousa chinensis*, North Atlantic right whale; *Eubalaena glacialis*, Northern bottlenose whale; *Hyperoodon ampullatus*, Pigmy killer whale; *Feresa attenuata*). In addition, The Killer whale, *Orcinus orca*, reported as regular in the Strait of Gibraltar assumed to be the visitor for the western Mediterranean Sea (Jefferson *et al*. 1993; Beaubrun, 1995; Öztürk, 1996; Goffman *et al*. 2000 and 2004; Manal and Talhouk, 2002; Saad, 2004; Notarbartolo di Sciara and Birkun, 2010). All vagrant species and the killer whale were never reported from the Eastern Mediterranean except an adult female Gervais' beaked whale; *M. europaeus* reported as stranded alive in the port of Fethiye, south-western Turkey, where eventually floated back towards deeper waters (Notarbartolo di Sciara 2009).

The Eastern Mediterranean Sea is one of the least studied areas for cetaceans in the Mediterranean Sea. For the east part beyond 20° East of the Mediterranean Sea except Black Sea, Marchessaux and Duguy (1978) summarized available data on cetacean occurrence until 1977 and indicated one Mysticeti and seven Odontoceti species. Marchessaux (1980) reviewed 13 species (11 Odontoceti, two Mysticeti) and indicated definite records for nine species. Both articles were based on the stranding data, literature survey and personel interviews. Recently, IFAW carried out a basin-wide survey mainly focused on the sperm whale in whole Mediterranean (Lewis *et al*. 2007). Besides, Boisseau *et al*. (2010) carried out a series of visual–acoustic surveys in the whole Mediterranean between 2003 and 2007 and reported sightings on 10 cetacean species. Frantzis *et al*. (1999) and Öztürk *et al*. (2010) reported sperm whale presence in southwest of Crete Island and off Fethiye near Rhodes Trench. Only these three studies included cetacean sightings from the east of 24 degree longitude. Nevertheless data on overall distribution of all cetacean species are still scarce or non-existent for the far-eastern and southern part of the Mediterranean basin (Würtz 2010).

Recent shipboard surveys in territorial waters of Lebanon, between 2007-2009 (Khalaf *et al*. 2010) and of Israel between 1998-2007 (Scheinin *et al*. 2009) indicated *T. truncatus* was the only species sighted. In addition, Goffman *et al*. (2009) indicated two pods (40 individual each) of *Steno bredanensis* and suggested that the status of this species may need revision which is currently assumed as visitors.

Lack of basic knowledge such as species composition and habitats makes it impossible to develop effective conservation measures. Therefore, in order to

determine the species composition, size and distribution of cetacean populations, cetacean sighting data were collected during a research cruise carried out in summer 2008 in the international water of the Eastern Mediterranean Sea, as well as the Turkish, Lebanese and Syrian territorial waters.

Materials and Methods

This research cruise was conducted with a 32-m research vessel YUNUS-Sin summer (11-24 July) 2008 in the international water of the Eastern Mediterranean Sea, as well as the Turkish, Lebanese and Syrian territorial waters (Figure 1). The average speed of the vessel was 8-10 nautical miles/h. At each cetacean sighting, date and time, species, group size of animals, location (coordinates), depth, sea state and the behaviour of animals were recorded by a single observer placed in bridge deck. Height of the survey platform was 4 m. Survey route and coordinates were generated by Magellan ExploristXL GPS and related navigation program software. To confirm the identification of species, photographs were taken with 80-200 ED, 80-400 VR lenses and 7x50 binochulars were used. Besides, an omnidirectional simple hydrophone (Offshore Acoustics) sensitive at -154dBV/µPa ±4dB 100Hz with frequency response 6Hz to 14kHz ±3dB and 5Hz to 40kHz ±10dB was used for listening and recording cetacean vocalization when they were visually sighted.

Results and Discussion

Totally 860 nautical miles (nm) of survey effort was made and 16 sightings (108 animals) were recorded (Figure 1). During the study, five *Physeter macrocephalus* in one sighting, 72 *Stenella coeruleoalba* in five sightings, two *Grampus griseus* in one sighting (associated with *S. coeruleoalba* individuals), two *Delphinus delphis* in one sighting and 27 *Tursiops truncatus* in nine sightings were recorded (Table 1). The overall encounter rate was 0.18 sightings/10 nm.

T. truncatus were always observed very close to the coasts, while the other species were observed in open waters except one sighting of *S. coeruleoalba* (sighting no. 10). *S. coeruleoalba* had bigger group size. Average group sizes were calculated as 3 (SD: ±2.3) for *T. truncatus*, 14.4 (SD: ±5.3) for *S. coeruleoalba*. Group size of the other species observed were not compared because of single or few encounters (Figure 2).

Two large and three young individuals of *P. macrocephalus* were observed in the international water between Fethiye and Rhodes while presumably foraging in deep waters near Rhodes Trench-between the east of the Rhodes island and the area close to southwestern Turkey. The deep trough is as deep as 4485 m, according to Woodside *et al*. (2000). All species were observed in the area of

deep waters, except the bottlenose dolphins which were sighted mostly near 100m depth contour. Depth range of the areas where sightings occured varied between 500-3000m for *S. coeruleoalba* and *G. griseus*, 2000m for *D. delphis*, and 70-900m for *T. truncatus* (Table 1).

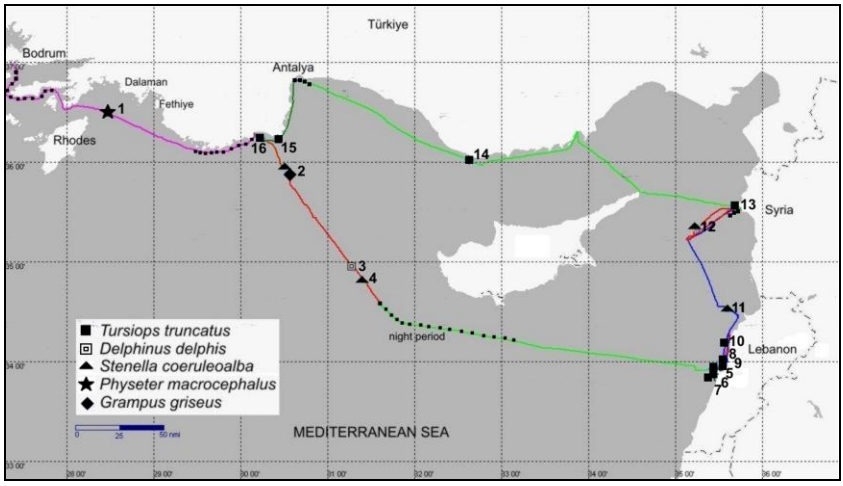

Figure 1. Sighting locations by species and tracklog of the cruise.

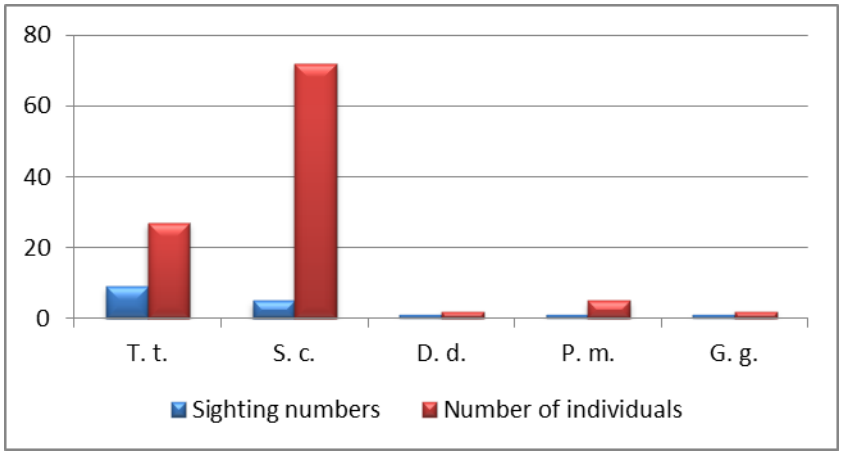

Figure 2. Sighting numbers and number of individuals by species *(P.m.; Physeter macrocephalus, S.c.; Stenella coeruleoalba, G.g.; Grampus griseus, D.d.; Delphinus delphis, T.t.; Tursiops truncates.*

Table 1. Details of cetacean observations. Survey conducted in 11 days out of three days harbouring (15, 18 and 20 of July).

No	Date	Survey effort (nm)	Survey duration	Obs. time	Location		Depth (m)	Species	Number
1	11.07.2008	90	07:00-19:00	12:30	N36°29.932'	E28°29.014'	2900+	*P.c.*	5
-	12.07.2008	41	07:00-12:00	-	-	-	-	-	-
2	13.07.2008	96	07:00-19:30	09:03	N35°56.617'	E30°31.287'	2778	*S.c.*	20
								G.g.	2
3				17:56	N34°56.839'	E31°17.065'	2000	*D.d.*	2
4				19:20	N34°48.980'	E31°25.349'	2300	*S.c.*	20
-	14.07.2008	95	07:00-19:30	-	-	-	-	-	-
5	16.07.2008	28	10:00-14:00	12:22	N33°55.280'	E35°26.741'	900	*T.t.*	8
6				12:28	N33°54.544'	E35°26.562'	200	*T.t.*	3
7				13:50	N33°51.572'	E35°27.113'	104	*T.t.*	2
8	17.07.2008	42	10:00-15:00	09:48	N33°59.918'	E35°33.553'	300	*T.t.*	1
9				15:20	N33°56.862'	E35°32.905'	100	*T.t.*	1
10	19.07.2008	120	06:30-20:00	08:30	N34°11.141'	E35°35.192'	500	*S.c.*	10
11				12:28	N34°31.113'	E35°35.976'	1200	*S.c.*	9
12	21.07.2008	78	07:00-16:00	10:25	N35°20.181'	E35°14.859'	1000	*S.c.*	13
13	22.07.2008	105	07:00-20:00	07:30	N35°32.910'	E35°41.322'	200	*T.t.*	3
14	23.07.2008	110	06:30-20:00	09:06	N36°00.859'	E32°38.147'	70	*T.t.*	3
15	24.07.2008	55	14:00-20:00	18:23	N36°13.311'	E30°26.356'	100	*T.t.*	1
16				19:30	N36°13.713'	E30°14.373'	300	*T.t.*	5

P.m.; Physeter macrocephalus, S.c.; Stenella coeruleoalba, G.g.; Grampus griseus,D.d.; Delphinus delphis, T.t.; Tursiops truncatus

Deep diving predators,sperm whales, are mostly or exclusively teuthophagous. They feed on deeper mesopelagic and bathypelagic species that live down to a depth of 2000 m, such as certain underwater canyons in the central-western Mediterranean basin, along the Hellenic trench and in waters off southwestern Crete. In fact, in these areas sperm whales are present all year around (David 2000; Würtz 2010). Besides, Ozturk *et al.* (2010) reported 14 sperm whale sightings between 1999-2009 from Turkish Aegean and Mediterranean Seas while sightings were made mostly off Fethiye near Rhodes trench.

Sperm whales produce a short distinctive stereotyped series of clicks known as codas (Watkins and Schevill, 1977). Coda repertoires have been found to vary both geographically and with group affiliation (Weilgart and Whitehead 1997). In the Mediterranean the coda repertoire is dominated by a pattern "3+1" (/// /, *i.e.*, three regularly spaced clicks, a pause, and then a final click), so called Mediterranean pattern (Borsani *et al*. 1997; Pavan *et al*. 2000; Teloni 2005).

In this study we also recorded sperm whale vocalizations and 3+1 codas which is a well- known pattern in the Mediterranean Sea. Figures below indicates temporal waveform structure as spectral frequency display of a 3+1 coda.

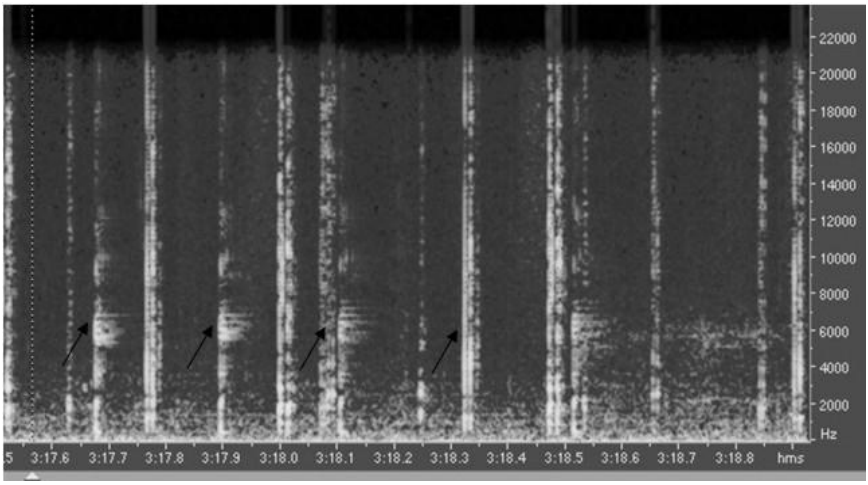

Figure 3. Spectral frequency display of 3+1 cod as in a sperm whale vocalization.

The acoustic repertoire and diving behavior of Mediterranean sperm whales is indicated as sketchy compared to some other areas of the world (Teloni 2005). In the Mediterranean Sea this species is usually encountered as isolated individuals or in small groups of two to three individuals, with few or no visible interactions at the surface (Pavan and Borsani 1997). Therefore visual and acoustic surveys are necessary for the Eastern Mediterranean. These cetacean species are under the protection by national and international laws (eg. Barcelona and Bern Conventions). Besides, according to IUCN criteria, the Mediterranean population of sperm whales and common dolphins have been declared as endangered (Bearzi *et al*., 2003; Notarbartolo di Sciara and Birkun, 2010) while the rest are vulnerable. Existing studies in the Eastern Mediterranean on the species composition and distribution (seasonal-spatial) are not sufficient and show variation with contribution of recent studies. Suez Channel may also provide a migration path for cetacean species to the Mediterranean from the Indian Ocean. This is a preliminary study for understanding cetacean populations in the Eastern Mediterranean Sea, but the results of this study will provide basic information for developing conservation

plans in the area. Therefore, periodic detailed studies and more survey effort are necessary for this purpose.

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2008 yaz mevsimi Doğu Akdeniz araştırma seferi setase gözlemleri

Özet

Doğu Akdeniz'de setase türleri üzerine az sayıda çalışma bulunmaktadır. Tür kompozisyonu ve habitatları gibi temel bilgilerin eksikliği etkin koruma planlarının geliştirilmesini imkansız kılmaktadır. Sonuç olarak, tür kompozisyonunun, setase populasyonlarının büyüklüğünün ve dağılımının belirlenmesi için, 2008 yazında (11-24 Temmuz) Türkiye, Lübnan ve Suriye karasuları ve doğu Akdeniz uluslar arası sularında setase gözlem verileri toplanmıştır. Gözlem eforu toplamda 860 deniz milidir (nm) ve 16 gözlem kaydedilmiştir. Çalışma boyunca, tek bir gözlemde beş *Physeter macrocephalus*, beş gözlem de 53 *Stenella coeruleoalba,* bir gözlem de 2 *Grampus griseus* (*Stenella coeruleoalba* ile birlikte), yine tek gözlemde 2 *Delphinus delphis* ve dokuz gözlemde 27 *Tursiops truncatus* kaydedilmiştir. Toplam karşılaşma oranı 0.18 gözlem/10 nm'dir. Bu çalışma Doğu Akdeniz'deki cetacea populasyonlarını incelemek için gerçekleştirilmiş bir ön çalışmadır ve araştırma bölgesinde koruma planlarının geliştirilmesi için gerekli olan temel bilgilerin toplanması ve literatüre katkı sağlaması açısından önemlidir.

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