Hystrix, (n.s.) 10 (2) (1998): 21-27

A CONTRIBUTION TO THE KNOWLEDGE OF THE CETOLOGICAL FAUNA IN THE WATERS OF WESTERN SARDINIA

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ABSTRACT - A 10 day survey was carried out off Western Sardinia during summer 1997. Conventional observation methods were used onboard a 12 meter motorsailer. A zig-zag sampling of **584** kilometers and 65 hours of observation were done, during which 21 groups of cetaceans were sighted. Five species were observed: the fin whale (3 sightings), the striped dolphin (10 sightings), the common dolphin **(6** sightings), the bottlenose dolphin and the sperm whale (1 sighting each). High sighting frequencies were obtained for the striped dolphin in the pelagic area and for the common dolphin in the slope area, suggesting that each species favours a distinct habitat. This study is in reasonable concordance with the few results already published on the subject. However more research must be done in this area.

Key words: boat survey, cetaceans, sighting frequency, western Sardinia, common dolphins

INTRODUCTION

The cetacean population of the Mediterranean is much better known now than it was ten years ago. However, the recent survey was much concentrated in the northern part **of** the basin, apart from a few particular regions such as the central Tyrrhenian sea and the eastern Alboran sea. In 1997, the Groupe de Recherche sur les Cétacés engaged on a three-year survey covering the southern areas of the Western Mediterranean. Some results of 10 days of sampling off Western Sardinia are reported here. The field methodology combines visual and acoustic sampling, as this study is part of a large scale operation intended to assess the presence of the sperm whale. Only results of the visual sampling are reported in the present paper.

METHODS

The sighting platform was a 12-meter motor-sailer with a 80hp diesel engine. This boat has an average speed of six knots under various sea conditions. The specific equipment consisted of one binocular with compass and reticle for detection measurements, and two GPS used for navigation. Three active observers shared the frontal sector: one searched the +/- 45" frontal sector from the head of the mast, two observers searched the 30° to 90" sector each side from the roof top (3 meters above sea level). One supernumerary observer sat in the cockpit and acted as secretary. Observers rotated on two hour shifts. Environmental conditions, including sea surface temperature, and navigation parameters were recorded every two miles.

The sampling off Sardinia took place from July 25th to August 4th 1997 and was conducted by day on diesel propulsion only. A series of zig-zag legs was designed to encompass the 0-20- mile area, but night acoustic sampling led to incomplete day patterns (Fig. 1). During the daytime, the sampling took place at a maximum wind-speed of 10 knots, good luminosity and in absence

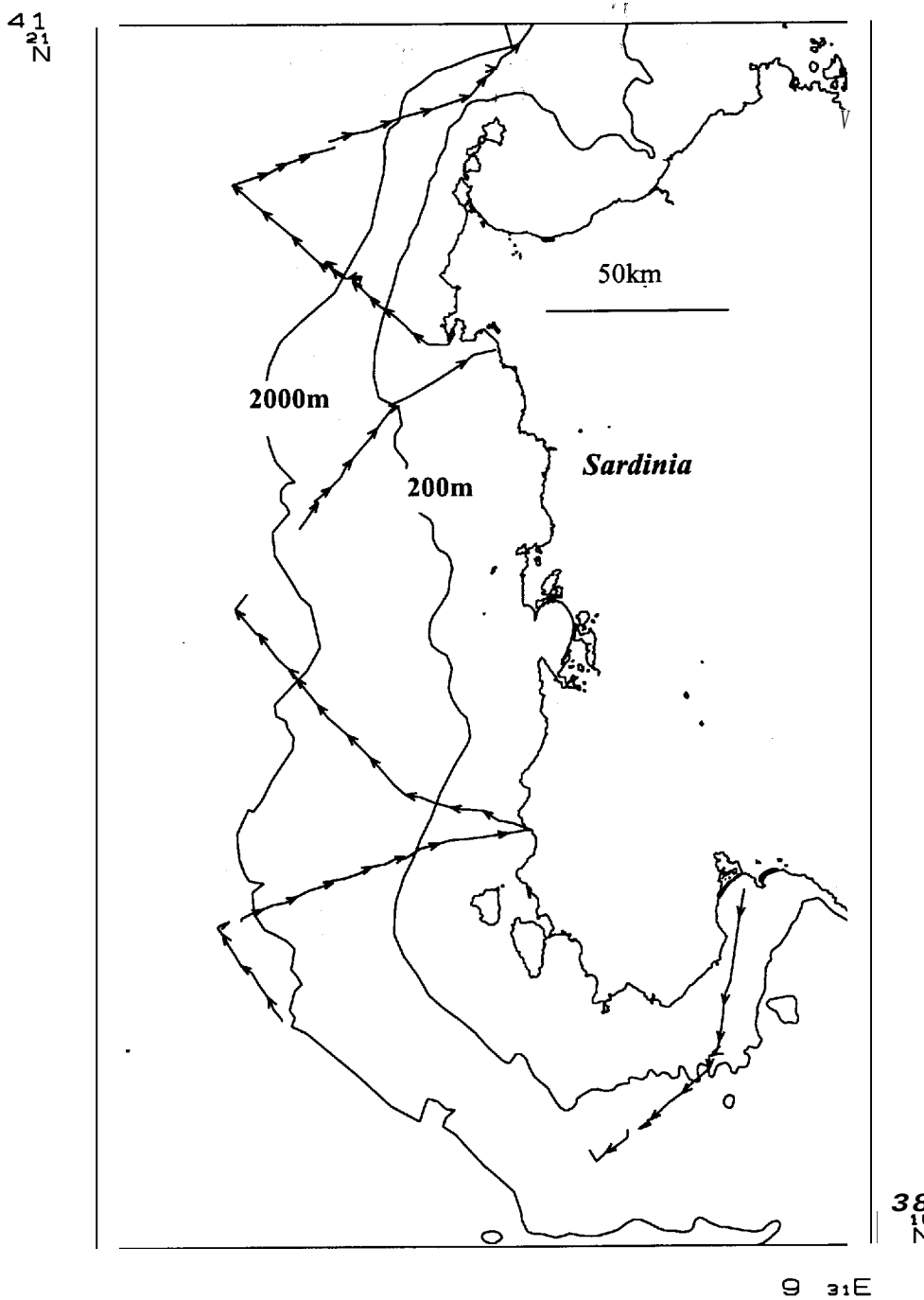

Figure 1 – Study area and effective effort of visual sampling.

of a conspicuous residual swell. A total effective distance of 584 km was achieved during the period in which a total of 65 hours of active visual searching was carried out.

Whenever a cetacean was sighted, the school was approached in order to determine the species and the group size. An average of 5 to 15 minutes were spent in the vicinity of the cetaceans to record information on group structure and activity.

Sighting frequencies for every species were simply obtained by dividing the number of detections by the amount of effort, expressed in time units. Owing to the low number of sampling units (legs), no variance estimate was computed. This operation was repeated by stratifying the data in relation to depth, taking into consideration three categories: the coastal area (depth less than 200 m), the slope area (depth between 200 and 2000 m) and the pelagic area (depth over 2000 m).

RESULTS

21 groups of cetaceans were observed during the survey, including three sightings of the fin whale, ten of the striped dolphin, six of the common dolphin, one of the bottlenose dolphin and one of the sperm whale (Table 1).

Table 1 - Sighting results (mean school sizes and associated coefficients of variation are given when available)

species	number of sightings	mean school size	maximum school size	minimum school size
striped dolphin	10	17.7 (21.7%)	35	2
common dolphin	6	14.1 **(15.8%)**	20	5
bottlenose dolphin	1		15	15
fin whale	3		2	1
sperm whale	1		1	1

The fin whales were observed off the south-western and north-western coast of Sardinia in a sea zone with depth varying from approximately 200 m to more than 2000 m (Fig. 2). The two sightings off Southern Sardinia included one mother-juvenile pair and one solitary juvenile. The behaviour patterns indicated feeding activity. The striped dolphins were found exclusively below the 1000 m depth contour, most of the animals being observed in waters which were deeper than 2000 m, and all of them north of the Gulf of Oristano (Fig. 2). Schools contained 2 to 35 animals. They were sometimes sighted around driftnets, while engaged in evening foraging activity. The common dolphins were observed above the 1000 m depth contour and even in waters less than 200m deep (Fig. 2). All the groups were seen south of the Gulf of Oristano. The groups contained 5 to 20 animals and on most occasions, juveniles and adults were seen. No new-born calf was detected. Behaviour patterns corresponded to foraging activity on 4 occasions. A group of 15 bottlenose dolphins was seen on July 31st south-west of Alghero and was heading south-east and swimming at 5.5 knots, apparently engaged in fish foraging activity. The sighting of the sperm whale took place on August 3rd, after one hour of acoustic tracking. The solitary animal was a large sized individual and a dive of 50 minutes was recorded.

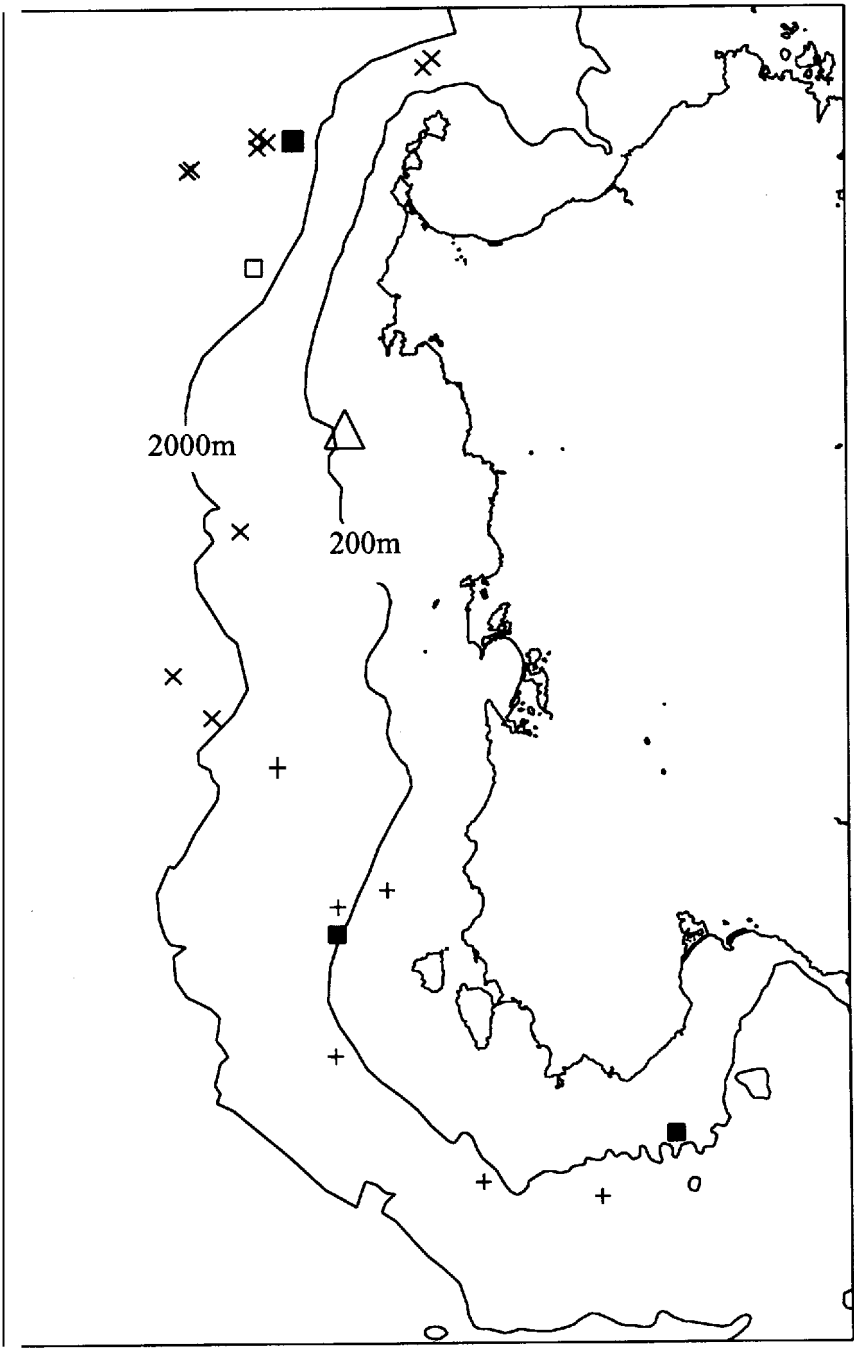

Figure 2 - Cetaceans sightings off Western Sardinia (white square = sperm whale; black square = tin whale; cross = common dolphin; x = striped dolphin; triangle = bottlenose dolphin).

The overall sighting frequencies ranged from 15.3 sightings/100 hrs for the striped dolphin to 1.5 sightings/100 hrs for the sperm whale and the bottlenose dolphin (Table 2).

Table 2 - Sighting frequencies (in number of sightings per 100 hours).

species	global	coastal area	slope area	pelagic area
striped dolphin	15.3	0	3.3	47.8
common dolphin	9.2	6.7	16.7	0
bottlenose dolphin	1.5	6.7	0	0
fin whale4.6	6.7	3.3	5.3	
sperm whale	1.5	0	0	*5.3*

Curiously, the fin whale is the only species present in all habitats, with sighting frequencies of 3.3 to 6.7 sightings/100 hrs. The striped dolphin was observed with a frequency of 47.8 sightings/100hrs in the pelagic area and 3.3 sightings/100 hrs in the slope area. The common dolphin was the most frequent species in the slope habitat, with 16.7 sightings/100 hrs, and was also seen in the coastal habitat, where the other delphinid species seen was the bottlenose dolphin (6.7 sightings/100 hrs). The sperm whale was observed exclusively in the pelagic habitat, with a frequency of 5.3 sightings/100 hrs (Table 2).

DISCUSSION

There is very little information concerning the cetaceans of the western Sardinian sea, because very few surveys have been carried out in this part of the western Mediterranean. Notarbartolo di Sciara ***et al.*** (1993) give the result of a three-year survey containing 13 survey bouts in the area for an unspecified effort and number of sightings. The overall sighting frequency, all species combined, given by these authors is 13.3 sightings/100 hours, while we found a frequency of 32.3 sightings/100 hours. Rather interestingly, Notarbartolo di Sciara *et al.* (1993) observed the same five species as us: the most frequent cetacean was the bottlenose dolphin (4.6 sightings per 100 hours of searching), followed by the common dolphin (2.7 sightings/100 hrs), the sperm whale (1.8 sightings/100 hrs), the striped dolphin (1.6 sightings/100 hrs) and the fin whale (0.6 sighting/100 hrs). The lower sighting rate and the predominancy of the bottlenose dolphin may be explained by the more coastal survey effort of Notarbartolo di Sciara *et al.* (1993). Our own previous results off Western Sardinia (Gannier, 1995) were limited to the continental shelf and to the northern part of the area. Bottlenose dolphins were frequently seen in the coastal region (with a sighting rate of about 0.17 individual per mile of effort), while striped dolphins and fin whales were common sightings in the pelagic region off Northwestern Sardinia.

Two different aspects of the present results merit more attention: first, the two sightings of the fin whale off South-western Sardinia and second, the high frequency of common dolphin sightings in the same area. It is noticeable that fin whales were observed over, or close to, the continental shelf and were engaged in feeding activity, with prolonged dives. Although the north of the Western basin is generally considered to be the main summer feeding ground of this species, other concentration areas exist, as shown by Marini ***et al.*** (1996) in the Central Tyrrhenian sea. Also, scattered animals may be seen

outside these important feeding sites, as observed by Notarbartolo di Sciara *et al.* (1993). An important think to mention is that the Western Mediterranean is much smaller in area than large oceanic basins where the same species occurs. Hence, only a few days are necessary for a group of whales to move from the south to the north of the basin or *vice versa.* It is perhaps interesting to note that violent north-west gales occurred before the period of study, causing the sea surface temperature to stay below 23°C-24°C during the survey, with local temperatures falling below 20°C .

The six sightings of common dolphin came as quite a surprise, although we knew that *D. delphis* is not rare in the southern part of the western basin (Boutiba, 1992; Forcada, 1995; Sagarminaga and Canadas, 1995). Notarbartolo di Sciara *et al.* (1993) think that the presence of common dolphins off Western Sardinia might be due to meandering from the region of Gibraltar and the Alboran Sea; an other possibility is the existence of a local population of common dolphins in the region.

The same authors observed that this species generally inhabits shallower waters than *S. coeruleoalha.*

This *preferendurn* of common dolphins for intermediate depths has also been suggested by Marini *et al.* (1996). Our results clearly indicate common dolphins have an affinity for the slope area. A progressive continental slope is found off South-western Sardinia (and also Sicily), where common dolphins were sighted. However, there are very steep slopes north of the Porto Conte area, where we observed numerous striped dolphins. Our previous data on that species (3 sightings off Corsica) concord with the above opinion, as does the recent data obtained off Sicily (personal observation). This opinion is also expressed by Sagarminaga and Canadas (1995), although their depth data show only a minor difference between the common and the striped dolphin: in the eastern Alboran sea, where both species occur commonly, the striped dolphin is more frequent in deep offshore waters and the common dolphin in shallower waters. Clearly, other analyses and data are necessary to continue the very interesting debate about the coexistence of common and striped dolphins in the Mediterranean.

CONCLUSION

Some interesting results were drawn from the 10-day survey. The populations observed in the north-western and the south-western parts of the study area appear to be distinct: steep continental slope and deep waters off North-western Sardinia favours the striped dolphin and possibly the sperm whale, while the gradual slope and large extents of shallower waters found off South-western Sardinia seems to be well suited to the common dolphin. As few other survey results exists in the literature, we can not be sure whether our sightings of fin whales close to the shelf of Southern Sardinia are typical or rather incidental. The waters off Westem Sardinia should be given more attention in the future. It is one of the few areas in the Mediterranean where striped dolphins and common dolphins can be routinely observed, and where the possible competition between the two species can be studied from an ecological point of view.

ACKNOWLEDGEMENTS

Many thanks to the following benevolent members of the GREC who helped to achieve the field study: S. Bourreau, V. Drouot, O. Gannicr, G. Pemette and G. Rappé. I would like to thank Dr. Luca Marini and an anonymous reviewer for their help in improving this manuscript.

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