DOLPHINS IN THE BAY OF GIBRALTAR.

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"Great is the truth
enduring is its effectiveness
for it has not been disturbed
since the time of Osiris"

The papyrus writings of Ptahhotep.

INTRODUCTION

The history of Dolphins, especially *Delphinus delphis* has since classical times been well recorded throughout the Mediterranean. Aristotle (384-322 B.C.) was the first to leave on record observations of this marine mammal in his "Historia Anamelium". Pliny the Elder (23-79 B.C.) in his "Historia Naturalis", tells how the fishermen from the region of Nimes, would call to the Dolphin to help them fish Mullet. For this task, according to Pliny, the Dolphin were rewarded with bread dipped in wine. In the Western Mediterranean on both sides of the Strait, coins depicting Dolphins on the obverse side are not uncommon, nor are the depiction of Dolphins on Roman anchors that have been retrieved from the waters of the Bay and Strait area. The finest and undoubtedly largest collection of this type of anchor can be found in Ceuta. Iconography on this "lord of the sea" is legendary and spans thousands of years. In 1551 the French researcher, Pierre Belon du Mans Classified the Dolphin as a "fish with lungs", highlighting how little we have learned about this fellow mammal through the millennium. To-day *Delphinus delphis* is still in the Bay and Strait area as it was in classical times and is the subject of this paper.

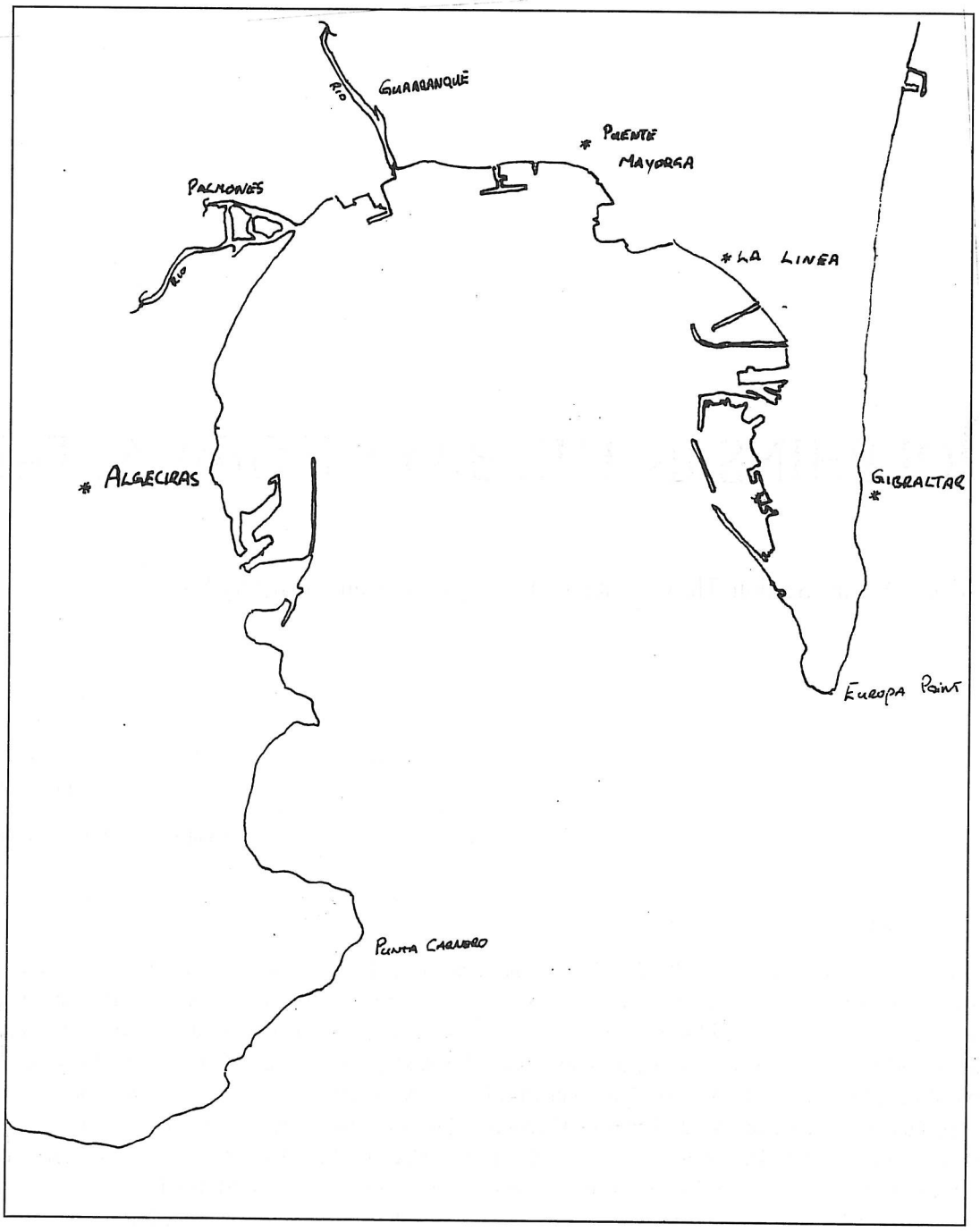
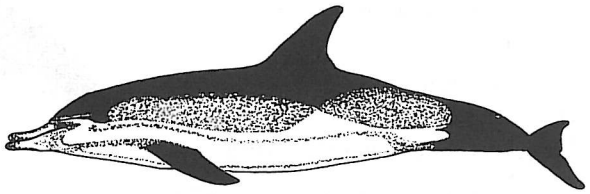


Figure 1. The study area.

SPECIES

There follows a brief description of the species under study.

Common Dolphin *Delphinus delphis* (Linnaeus, 1758)
Maximum size male 2.6m female 2.3
Average adult size 1.7m to 2.4m
Average weigh 85kg max136kg
Newborn size 76-95cm
Gestation 10 to 11 months
Longevity Estimated at 25 to 30 years



Delphinus delphis

The common dolphin is found in tropical and temperate waters world wide and is as its name implies, quite common.

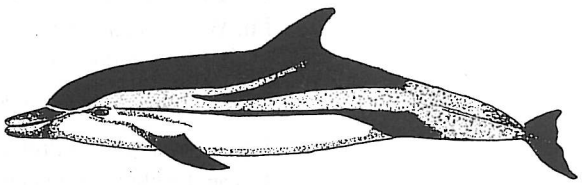
The markings of *Delphinus delphis* are an overlay of black through grey to white that cannot be confused at close range with any other species. The markings are a figure of eight shape across the flanks from eye to tail stalk. The eye has a dark outline, and the forward upper flank is shaded yellow, this yellow shading however is not present in all individuals of this species.

There is a great deal of shading on this species found on body, face, dorsal and pectoral fin (the pigmentation patterns in the latter three areas can be used in fingerprinting this species).

The dorsal fin throughout this species has many variations in shape and size and should not be used as a species indicator over a large distance. Though thought of as one of the world's most common large mammals, it was once the subject of a fishery in the Black Sea and in some areas may still be. In Italy *D. delphis* are still taken to make musciame in Genoa.

The greatest threat to this species today is entanglement in nets. Its greatest threat is Man.

Striped Dolphin *Stenella coeruleoalba* (Meyen 1833)
Maximum size male 2.39m female 2.26
Average size 1.75m to 2m
Maximum weight 140kg
Newborn size 90cm to 1m
Gestation 12 months
Longevity Estimated at 50 years



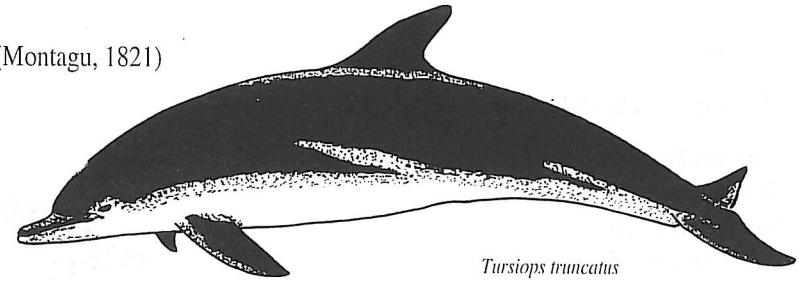
Stenella coeruleoalba

The Striped dolphin is found in tropical and temperate seas of the world. There are four separate species in the genus *Stenella. S. coeruleoalba* however is the only one found throughout the Mediterranean.

The markings of this species can resemble those of the common dolphin if the animal is not seen clearly. There is an unmistakable dark stripe from the eye leading down the flank were it widens as it curves below the tail stalk. There is a second stripe that likewise starts at the eye and leads downward were it joins the pectoral fin. The centre upper section with its blue grey pigmentation has a characteristic upward flash that ends below the dorsal fin in most animals and is a good indicator marking when spotting in rough seas.

The striped dolphin is not found in the same numbers as the common dolphin in the western Mediterranea. The threats to this animal are the same as for the Common dolphin. In the Strait and Bay area of Gibraltar this species was the one must commonly found mutilated or entangled in mono-filament nets. Its greatest threat is man.

Bottlenosed Dolphin *Tursiops truncatus* (Montagu, 1821)
Maximum size 4m male & female
Average size 1.9m to 4m
Weight 90kg - 650kg.
Newborn 90cm to 1.30m
Gestation 12 months
Longevity 35 years possibly longer



Tursiops truncatus

The Bottlenosed dolphin is found in cold, tropical and temperate seas throughout the world and is regarded as being very common throughout the Mediterranean.

The largest of all dolphins its shear size is the usual giveaway. There are pink blemishes on the underside of some animals, starting at the throat down to the centre chest area between both pectoral fins. Close observation to the upper body areas and flanks of this animal usually shows a great deal of scarring. The species is coastal or oceanic. A close encounter with this animal for the first time is quite a shock for most people. Its overall size and bulk do not compare with the T.V. dolphin with which we have all come to associate the bottlenosed.

Overall threats to this animal are the same as for all whales and dolphins, Nets, leaching pesticides from the land, marine contamination, hunting and Man's great capacity for destruction.

OTHER SPECIES

The following other species of marine mammal and turtles were recorded during the period of study.

Killer Whale *Orcinus orca* (Linnaeus, 1758)
Sperm Whale *Physeter catodon* (Linnaeus, 1758)
Long-finned Pilot Whale *Globicephala melas* (Traill, 1809)
Fin Whale *Balaenoptera physalus* (Linnaeus, 1758)
Minke Whale *Balaenoptera acuturostrata* (Lacepede, 1804)
Sei Whale *Balaenoptera borealis* (Lesson, 1828)

Loggerhead Turtle Caretta caretta (Linnaeus, 1758)
Green Turtle *Chelonia mydas* (Linnaeus, 1758)
Leatherback Turtle *Dermochelys coriacea* (Vandelli, 1761)

Records of birds seen during this study were submitted to the Strait of Gibraltar Bird Observatory (SGBO) of the Gibraltar Ornithological & Natural History Society (GONHS) and will be published in forthcoming SGBO bird reports and in *ALECTORIS*, the Journal of GONHS.

RESEARCH

Study area

The Bay of Gibraltar (Fig 1) stands at the entrance to the Mediterranean, a natural bay covering some 16 square kilometres unaffected by the large volumes of water that pour through the Strait, its surrounding shore line habitat is a natural

haven and nursery for pelagic species (Shaw 1996) in need of shallow water, with the centre of the bay providing the same facility for deep water species. These resources coupled with the uniqueness of the Bay area provide a home range and breeding ground to three species of Cetaceans described above.

Methods

Though the GONHS provide sight information on the movement of all Cetaceans seen by their observers throughout the calendar year within this study area, only sightings made during boat transects provide the findings in this paper.

The boat transects were carried out from the NIMO, a 31 foot Mitchell, GRP hull vessel with a 145hp turbo charged Perkins inboard engine.

Transects were carried out over a fixed course at a regulated speed of not less than 5 knots and no more than 8 knots over a time period of two and a half hours for each transect survey.

The team consisted of two persons, one spotter on the bow of the vessel, one navigating the vessel working on a rotation basis to cut down on wave blinding (choppy seas can deceive the eye over a period of time). The spotter would have each distant sighting confirmed by the navigator who would use binoculars to confirm all distant sightings, each sighting (distant and close) was confirmed by both spotter and navigator as were numbers and species seen on each transect outing.

Photographic identification (Wurig and Jefferson 1990) was used to catalogue presence of long term and short term users of the Bay, as were visual observations that became known to the observers that proved difficult to photograph.

Observations were pooled into two periods per month (1st to 15th and 16th to end of month) and presence of dolphins, calves and nurseries as well as maximum group sizes were plotted in the Figures (see Results)

RESULTS

Presence in the Bay

This study was conducted to ascertain if *D. delphis* and other cetaceans were present in the Bay of Gibraltar in any numbers throughout the year.

The obvious presence of *D. delphis* during the summer months (July-September) was not in question. Boat trips to see the dolphins in the Bay have been carried out for a number of years in Gibraltar (Lawrence 1985) during these months. During the remainder of the year no such trips took place to confirm the permanent presence of any cetacean. Our objective was to fill in the blank months to confirm if they were present or not.

The presence of D. delphis including the Bay as their home range was confirmed using photographic identification on certain members of family groups, and visual observations. Figure 2 shows the presence of dolphins of the three species in the Bay of Gibraltar. Figure 3 shows the maximum group sizes of *D. delphis* seen throughout the year, suggesting a winter population of around fifty individuals, with a summer influx to several hundred. *S. coeruleoalba* was not present throughout the year, first appearing in March in 1997 and being absent from the transects from October to March in both years under study. Figure 4 shows maximum group sizes for this species throughout the period of study. T. truncatus only appeared between June and August in both years, with a maximum group size of 17 individuals (Figure 5).

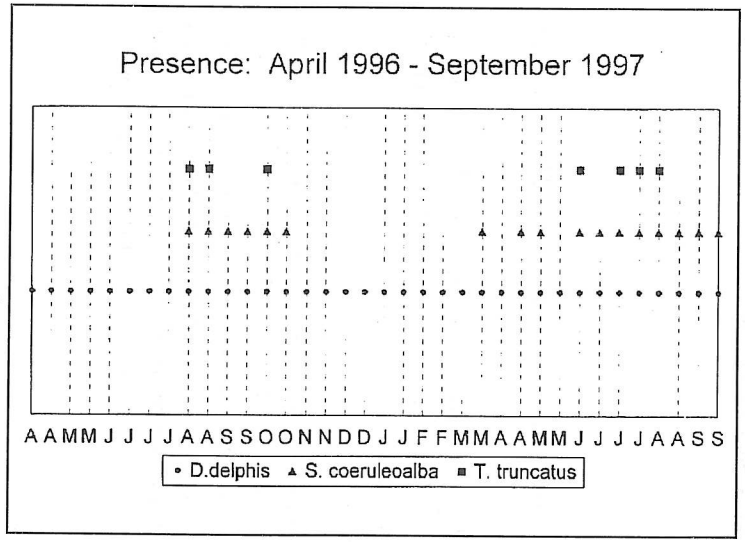


Figure 2. Dolphins in Gibraltar Bay

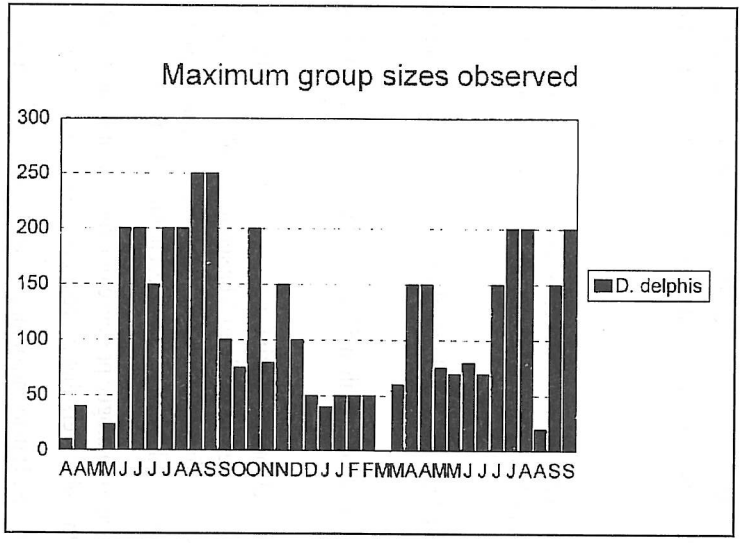


Figure 3. *Delphinus delphis* maximum group sizes, April 1996 to September 1997

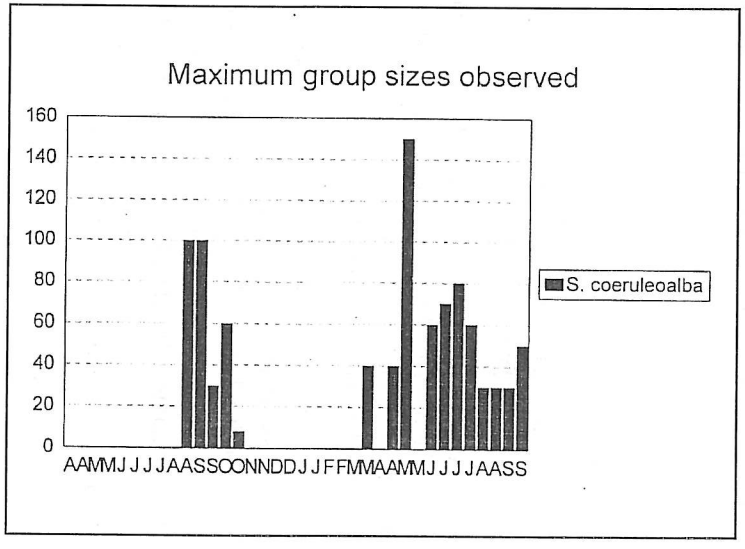


Figure 4. Stenella coeruleoalba maximum group sizes, April 1996 to September 1997

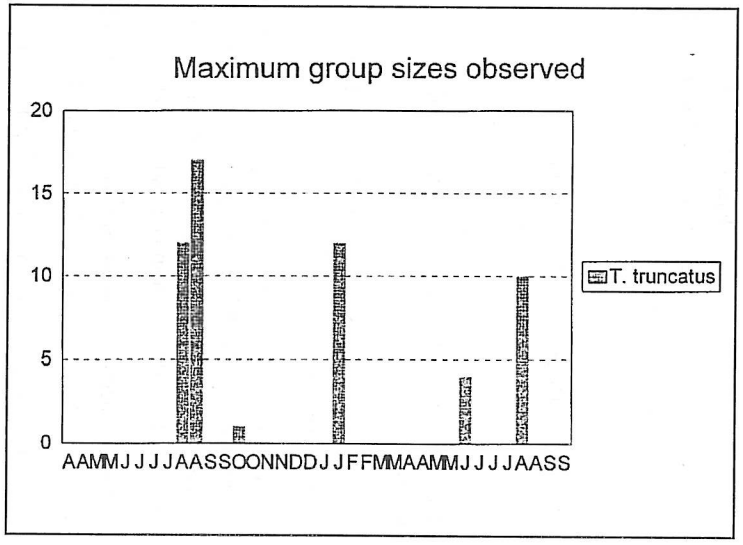


Figure 5. Tursiops truncatus maximum group sizes, April 1996 to September 1997

HUNTING

During the period of observation predictable patterns of behaviour emerged. Feeding took on the pattern of a hunt either with a single family group or multiples. The pattern was always the same immaterial of the number of groups taking part. The prey item could be surface, midwater or deep water, their methodology was the same.

The dolphin would herd the prey species down to the north end of the bay where the waters shelve up between 30m and 60m from surface to seabed. In this area they would jointly confine their prey while several members at a time would dive down and feed. Having done so they would each in their turn take on the task of containing the prey while others took their turn to feed.

If the prey item was surface dwelling (*e.g.* Mullet *Lisa ramada*), non feeders would contain the shoal by circling them while others fed. Smaller prey items such as boar fish Capros aper would be pushed to the surface from below while other members tail slapped the surface waters, forcing the boar fish to ball up even tighter than is their norm for protection in this shoaling species.

On several occasions (eight) we observed boar fish being spat out by dolphins and left floating on the surface. This brought yellow legged gulls *Larus cachinnans* to the location in great numbers. It appeared from these observations that the gulls in fact helped in causing balling up of the fish on the surface. The overhead gull activity and the dolphins' pursuit from around and below packed the fish so tightly that they would be stationary. This feeding behaviour, accident or design, is in need of a more detailed study.

All such hunts observed took place in the north end of the Bay. Some took place in deeper waters within the Bay. These hunts were not contained to a single area but were forever on the move with the speed and direction of the hunt changing in an erratic manner. This type of hunt never lasted long and was so fragmented at times, that it was over before a pattern could be attained. Prey items seen during these hunts were not all identified, however, pipefish *Entelurus aequoreus* and flying fish *Cypselurus heterurus*, were seen leaving the water. The dolphins would take the flying fish on the wing; the pipefish would jump clear of the water only to fall back into the jaws of a waiting dolphin.

CALVING

Only on one occasion was the birth of a calf, of *S. coeruleoalba* seen in the Bay, though new born calves of all three species described above were seen.

D. delphis groups that were known to us from observations would from one day to the next have calf numbers appearing within their family group. During this period (mainly May-August, see Figure 6) family groups not known to the observers would arrive in the Bay and calf numbers not noted on first and second encounters would appear during the new groups' stay in the Bay area.

The same observations were made when *T. truncatus* entered the Bay. These observations were made less difficult as both *D. delphis* and *S. coeruleoalba* give *T. truncatus* a very wide berth. As the latter were never present in large numbers, this made their identification and the presence of calves quite easy to monitor, the only restriction being that this species would not stay within the confines of the Bay for any length of time.

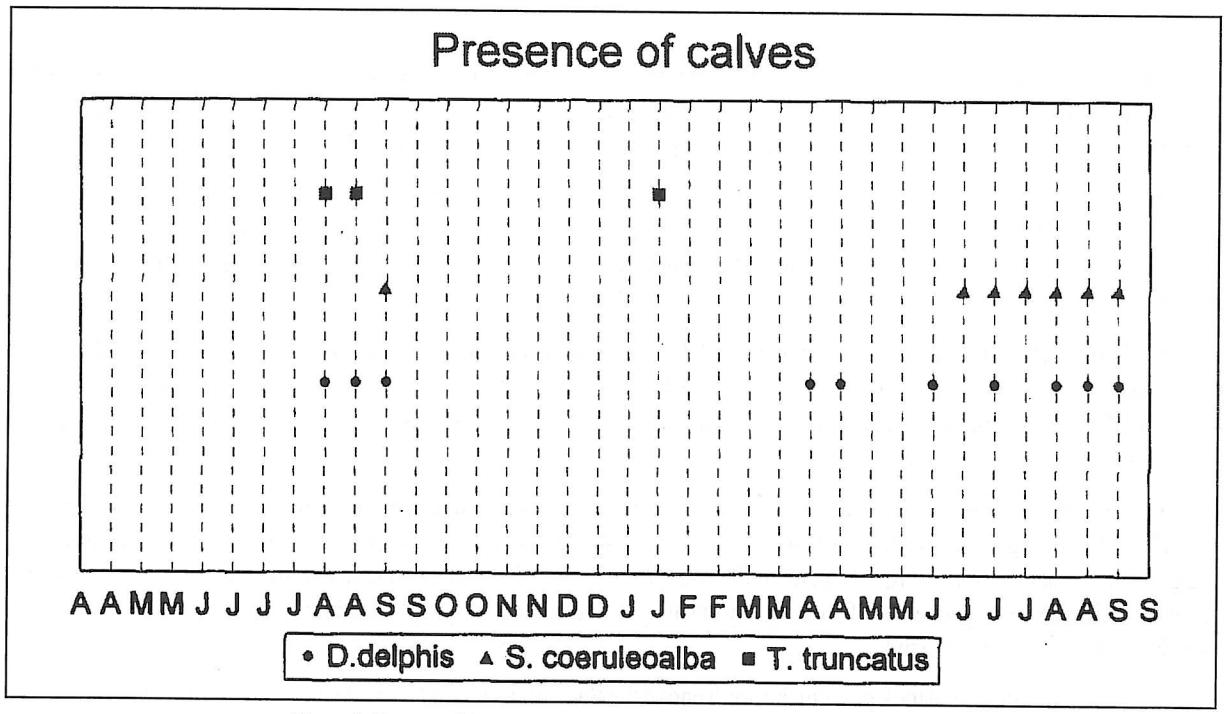


Figure 6. Presence of dolphin calves in Gibraltar Bay, April 1996 to September 1997.

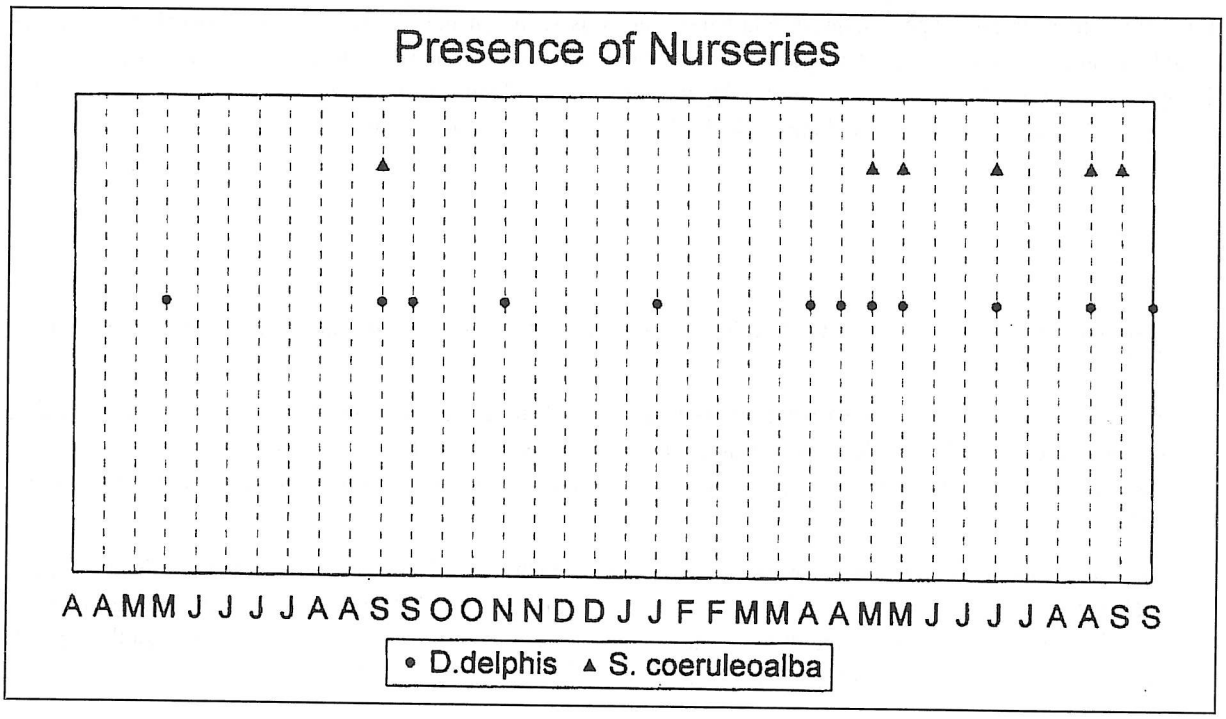


Figure 7. Presence of dolphin nurseries in Gibraltar Bay, April 1996 to September 1997.

From collected data and observations over an eighteen month period, it would appear that all three species use the bay area as a calving grounds and a safe haven during the first few weeks of each calf's life. During this same period of time other mature family group members engage in courting rituals and mating.

Nurseries were also observed for all three species. These consisted of groups of calves, not necessarily recently born, together with a number of adults, usually in the periphery of the group. Figure 7 shows the distribution of the presence of such nurseries in the three study species through the year.

Given the above features within the life cycle of each of these species, the Bay area attains a far greater importance than just being an area were cetaceans are present.

Conservation

Over a long period of time it has been known that drift net fishing has resulted in the deaths of many cetaceans (Martin 1990). The Bay of Gibraltar is no exception. The Marine Section of GONHS has been monitoring the fatalities of these animals for a number of years. The most common fatalities are those that have had their fins cut off to remove them from nets and have then been returned to the water to drown or die from their wounds.

To this end GONHS has for many years lobbied both Gibraltar and UK governments to implement legislation for the protection of marine life including all cetaceans.

At Gibraltar Government level an ordinance to protect nature was tabled and passed in 1991. This ordinance, The Nature Protection Ordinance, covered terrestrial species and their habitats and also marine life and all cetaceans with a proviso for the protection of marine habitats. This proviso was acted upon in 1996 when the whole of the territorial waters of Gibraltar were declared a marine reserve (Nature Regulations Protection Ordinance 1991).

At international level the protection of all cetaceans now have blanket protection under the Agreement on the Conservation of Cetaceans of the Mediterranean and Black Seas (ACCOMABS) in the approaches to the strait of Gibraltar from the West on through to the eastern Mediterranean.

POSSIBLE THREATS

Activities within the Bay that can pose a threat to resident and visiting cetaceans are as varied as they are many.

Within the Bay area there are at present four ports.

1. The port of Gibraltar which carries commercial shipping (general), cruise ships and a varied selection of small boats that use it's three small boat marinas.
2. The port of Algeciras which carries commercial shipping (general & container), ferries and commercial fishing boats both large and small.
3. The port of Puente Mayorga which carries commercial shipping (tankers for its refinery), and a small fishing community.
4. The commercially underdeveloped port of La Linea which carries little commercial shipping; however its fishing fleet is well developed and at present accounts for the bulk of its marine traffic.

This, coupled with industrial out fall into the two main rivers (Rio Palmones & Rio Guadarranque) that pour into the Bay's North West corner, and the recreational activities that take place (Jet Skies, Speed boats, etc) makes the presence of any cetacean within it somewhat tenuous if they are not made part of the overall activity that takes place in the Bay.

CONCLUSIONS

Future prospects for the dolphins in the bay depend entirely on our ability to recognise that this area is as important to them as it is to ourselves.

Unill now we were totally unaware that the Bay area was used by these three species as a calving ground and a breeding ground. These animals are to the great part migratory, and may well have been arriving here annually since classical times, from the Atlantic and the Mediterranean to calve and breed.

Our over exploitation to our own ends without the inclusion of these fellow mammals in a proper plan could upset a balance that will affect communities that grace waters much further afield than we may care to think.

The initial objective that brought about this project is proven, there are *Delphinus delphis* present in the Bay's waters all year round. Questions that arise from it are not; they are in need of answers. From how far afield do they come? Is there a cross over between Atlantic and Mediterranean populations ? How important is this calving ground ? What trens are calving experiencing ? Are other cetaceans using the area to the same end ? The questions us are endless.

Eco- tourism is the fastest growing tourism in the world. At this moment in time, before this unique area is over exploited by it or destroyed by commercial activities, the laws that are in place to protect it must be upheld with a physical presence. Research in this perfect of field locations should be co-ordinated and managed locally and expanded to the overall benefit of the animals and habitat.

Work is on going and any further work on these species requires to be co-ordinated centrally by the entities with current obligations in relarion to the protected area of the waters of Gibraltar, GONHS and the Helping Hand Trust and the Gibraltar trust for Natural History, as is currently the case with marine research in other fields, (*e.g.* sea grass meadows (Shaw 1994), artificial reef creation and monitoring (Shaw 1995), shark tagging (Ocana 1997)) . Similarly the exploitation of the dolphins by dolphin watchers must be carefully monitored and controlled to ensure that it does not grow out of proportion and result in undue and unfavourable disturbance to the dolphins.

The calving and breeding ground of the Dolphin was at the commencement of this work, the best kept secret I knew about Dolphins.

It is a secret no longer.

ACKNOWLEDGEMENTS

The acknowledgements are many, and the participants the same. However thanks must go out to the single crew man of the NIMO who faced all weathers, Michael Short. The list of other participants is endless, and in fear of leaving someone out I thank you all here, though you remain nameless. You all know who you are.

DEDICATION

This paper is dedicated to Demi Francesca, her uncle Daybreak and mother Philippa. May they see in years to come what is here today recorded in this paper. If just that is achieved, then all those who dedicate themselves to this type of work will have achieved much more than the many will ever realise.

"And the sea will grant each man new hopes."

Christopher Columbus

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