

Dolphin mortality along the Southern Italian Coast (June-September 1991)

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Summary

A preliminary review of the large number of reported dolphin strandings along the southern Italian coast from June to September 1991 is given. The spatial and temporal distribution of records of the two most common species (striped dolphin—*Stenella coeruleoalba* and bottlenose dolphin—*Tursiops truncatus*) are discussed.

Introduction

Information on cetaceans stranded or accidentally captured in Italy has been collected since 1986 by the Centro Studi Cetacei (CSC). This is a national organization which co-ordinates a network called "Stranding Project" and publishes annual reports on recorded strandings (Centro Studi Cetacei, 1987; 1988; 1989; 1991). "Stranding Project" is the continuation of "Cetacea Project", which began in July 1979, and was coordinated by the Institute of Zoology and Comparative Anatomy of the University of Messina, and by the Civic Museums of Natural History of both Milan and Venice, under the auspices of WWF Italia. The results of the work carried out by "Cetacea Project" have been published (Di Natale, 1979a; 1979b; Di Natale & Mangano, 1981). Stranding information is collected by CSC with the help of Harbour Offices (Capitanerie di Porto) and of the general public, through a 24-hour telephone alerting service sponsored by Europe Assistance. The Italian coasts are divided into 12 zones each, each with a local co-ordinator. The alerting service passes information on stranding events to the appropriate local co-ordinator.

This paper gives preliminary details of the high recorded mortality of dolphins (mainly striped dolphins—*Stenella coeruleoalba*) which occurred in Italian waters from June to September 1991, and discusses the spatial and temporal distribution of these events.

Results and Discussion

The strandings were mainly recorded on the southern Adriatic coast, in the Ionian Sea, and to a lesser

extent in the Sicily Channel and the southern Tyrrhenian Sea (Figure 1).

Two hundred and eighty seven specimens were recorded in these areas from June to September 1991. This is an underestimate of the total mortality, as some strandings will not have been recorded (particularly in the Lucania area, where shore surveillance was very poor) and only a proportion of the moribund or dead animals will have reached the shore. In total, one whale (fin whale—*Balaenoptera physalus*), and five different species of dolphin were identified (Table I). The rest of this note refers only to the two most frequently recorded dolphin species.

Stenella coeruleoalba (Meyen, 1833)

One hundred and ninety eight specimens were recovered, comprising 69% of the total records (Figure 2) and 88% of the specimens were species could be positively identified. Available information on the unidentified specimens indicates that most were dolphins, and it is probable that a similar proportion would also have been striped dolphins.

The number of stranded specimens reported in these four months appears to be much higher than that recorded in previous years in the same coastal areas (Table II), and cannot be accounted for by any obvious change in the reporting system, or by increased public interest in reporting strandings.

The highest number of strandings (Figure 3) was recorded along the southern Adriatic coast and the Ionian coasts.

The monthly distribution of strandings (Figure 4) has been tested in the five study areas (Table III).

The monthly differences are highly significant, with the exception of the Sicily Channel where strandings are very few, and the northern Ionian coast where the decrease in September is attributable to chance fluctuations. In areas where fluctuations are significant, the highest number of strandings was recorded in August.

The bi-weekly analysis for all the areas (Figure 5) shows significant fluctuations (Table IV), except in the Sicily Channel. Most of the areas reach their

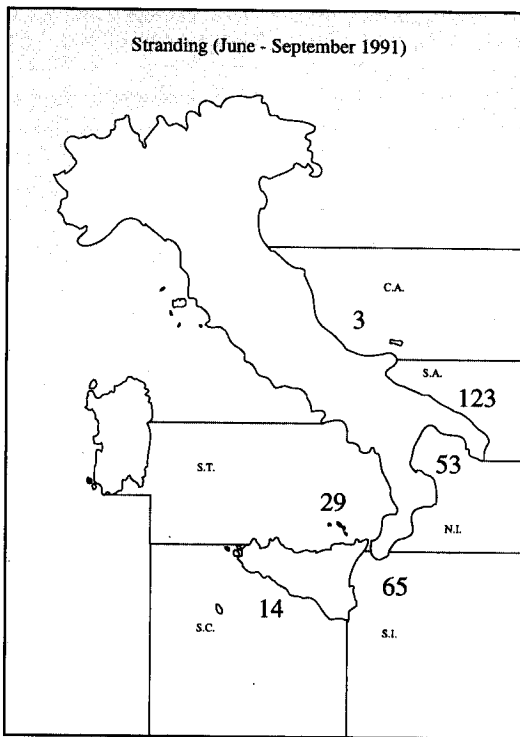


Figure 1. Geographical distribution of Italian cetacean strandings records from June to September 1991. CA. central Adriatic Sea; SA. southern Adriatic Sea; NI. northern Ionian Sea; SI. Southern Ionian Sea; SC. Sicily Channel; ST. southern Tyrrhenian Sea.

Table I. Records of cetaceans species stranded on the southern Italian coasts from June to September 1991

Species	Indiv.	M	F	Sex unident.
<i>Balaenoptera physalus</i>	1	1		
<i>Tursiops truncatus</i>	22	9	1	12
<i>Stenella coeruleoalba</i>	198	60	45	93
<i>Delphinus delphis</i>	1	1		
<i>Globicephala melas</i>	2		1	1
<i>Steno bredanensis</i>	1			
Unidentified Cetacea	62			

maxima between August and the first half of September, but the northern Ionian coast shows more fluctuations. It is surprising that the August and September pattern for the northern Ionian coast is different from those in the other areas examined, but this may partly be explained by the poorer beach surveillance, mentioned above, in some coastal areas

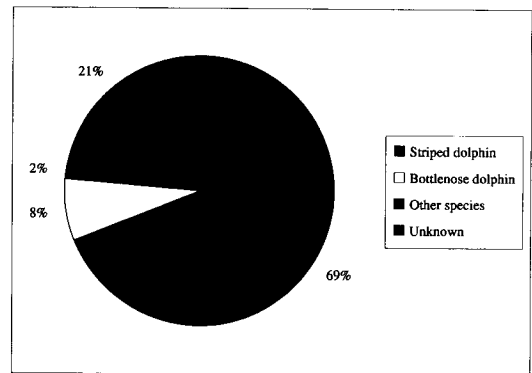


Figure 2. Species distributions of cetacean strandings recorded on the southern Italian coasts from June to September 1991.

of the Gulf of Taranto, and partly by the influence of local currents.

The total data set (Figure 6) shows a trend with significant variations ($\chi^2 = 122.8$; d.f. = 7; $p < .001$). There are a high number of reports during August and the first half of September, with a clear increase between 16th and 31st August.

Tursiops truncatus (Montagu, 1821)

Twenty two specimens were recovered, comprising 8% of the total number of reports (Figure 2) and 10% of the specimens which could be identified by species. Of these, 19 individuals (86%) stranded along the southern Adriatic coast (Figure 7). The number of specimens reported in these four months alone are similar to those reported in some previous full years for the same coastal zones (Table II). This might indicate that the bottlenose dolphins were not affected by whatever caused the striped dolphin deaths, but further investigation is required. The monthly distribution of bottlenose dolphins stranding reports in this area (Fig. 8) does not show significant differences ($\chi^2 = 3.1$; d.f. = 3; $p = .376$).

Research in progress

This high recorded mortality may be connected with similar recent events in Spanish waters. A *Morbillivirus* infection has been noted among the possible causes of the high dolphin mortality in Spain (M. Domingo *et al.*, 1991). Since the events in Italy immediately followed those in Spain, and share many similarities (e.g. the same species mainly involved, the same season and the high number of dead animals), it may be that similar causal factors are operating. It is of particular interest to establish whatever contaminating chlorinated hydrocarbons (especially PCBs) or heavy metals (such as mercury,

Table II. Comparison between cetaceans strandings recorded on the southern Italian coasts in previous years (annual reports of Centro Studi Cetacei, 1986–1989) and in 1991 (June–September). *Data not yet available.

Species/years	1986	1987	1988	1989	1990*	1991 (June–Sept.)
<i>Stenella coeruleoalba</i>	4	46	33	29	—	199
<i>Tursiops truncatus</i>	3	18	24	12	—	22

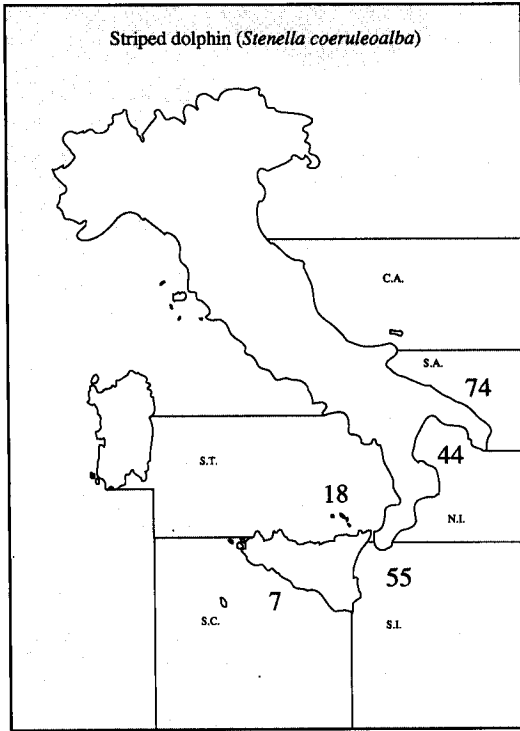


Figure 3. Geographical distribution of striped dolphin (*Stenella coeruleoalba*) strandings records on southern Italian coasts from June to September 1991. (see Figure 1 for abbreviations.)

cadmium and lead) are directly or indirectly connected with any particular pathology. The extent of contamination is therefore being investigated, particularly in the case of PCBs, which have been implicated in immune deficiency in some marine mammals.

Two research units were set up to gather more data in the main stranding areas, one in Puglia and one in Sicily. These units were organized by Fondazione Cetacea to support the activities of local groups and to collect samples for virological and biochemical analysis. Samples obtained from the dissection of 13 specimens were sent to specialized research laboratories. Samples collected by the Bari Marine Biology Laboratory (from three specimens) and by the

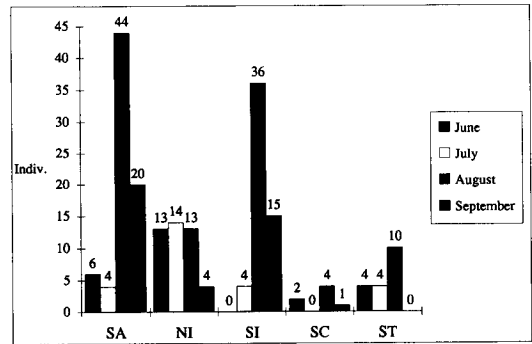


Figure 4. Monthly geographical trends in strandings records for the striped dolphin. (See Figure 1 for abbreviations.)

Table III. Chi-square value and significance level for the detection of monthly changes in striped dolphin strandings.

Areas	χ^2	df	p
Southern Adriatic	55.08	3	<<.001
Northern Ionian	6	3	n.s.
Southern Ionian	56.78	3	<<.001
Sicily Channel	5	3	n.s.
Southern Tyrrhenian	11.33	3	<.01

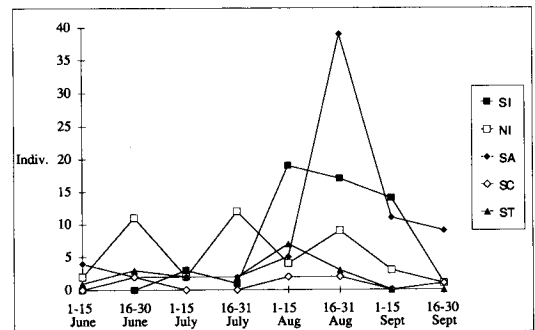


Figure 5. Bi-weekly geographical trends in strandings records for the striped dolphin. (See Figure 1 for abbreviations.)

Table IV. Chi-square value and significance level for the detection of bi-weekly changes in striped dolphin strandings.

Areas	χ^2	df	p
Southern Adriatic	9.25	7	<<.001
Northern Ionian	25.09	7	<<.001
Southern Ionian	69.65	7	<<.001
Sicily Channel	7.86	7	n.s.
Southern Tyrrhenian	15.78	7	<.03

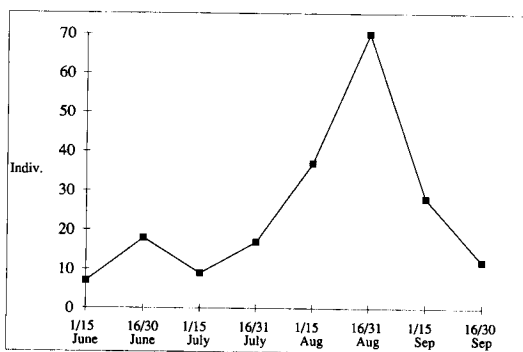


Figure 6. Bi-weekly trend in total strandings records for the striped dolphin. (See Figure 1 for further details.)

Salento Natural History Museum (from two specimens) have also been sent to these laboratories. Professor Silvano Focardi and his team at the Environmental Biology Department, University of Siena, are undertaking the biochemical work. The virology investigations, on samples from the same specimens, are being taken by Prof. Albert D.M.E. Osterhaus and colleagues at the National Institute of Public Health and Environmental Protection, Bilthoven, the Netherlands. At the moment, some results of biochemical analysis (Marsili *et al.*, in press) are available. These show the highest level of PCBs and pp'DDT so far reported in dolphins stranded along the Italian coasts; mercury levels are also very high, and are similar to levels reported in oceanic populations of striped dolphins. When all the results are available, it is hoped that it will be possible to identify the causes of the high mortality, and to draw attention to any possible ecological implication.

Acknowledgements

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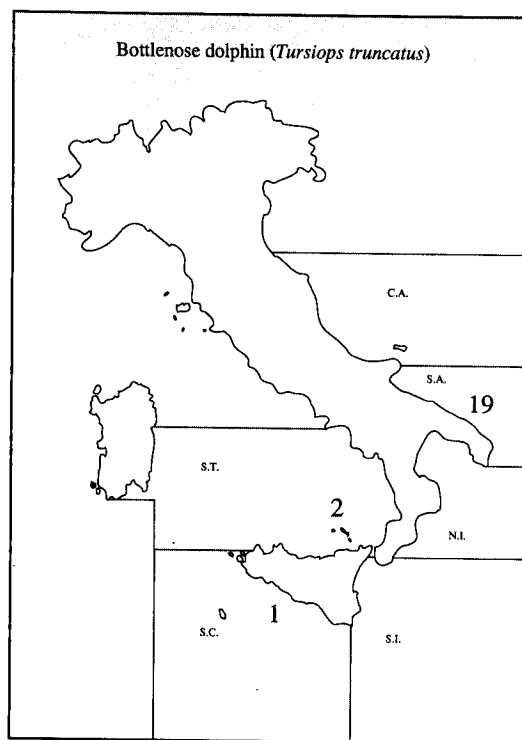


Figure 7. Geographical distribution of bottlenose dolphin (*Tursiops truncatus*) strandings records on southern Italian coasts from June to September 1991. (See Figure 1 for abbreviations.)

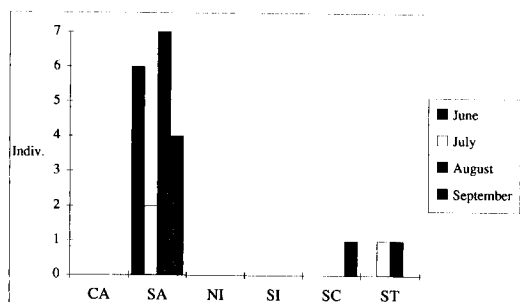


Figure 8. Monthly geographical trend in strandings records of the bottlenose dolphin. (See Figure 1 for abbreviations.)

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