

Nesting success on the emergences of *Caretta caretta* in the Island of Boavista, Cape Verde, Western Africa

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INTRODUCTION

The nesting population of loggerhead sea turtle, *Caretta caretta*, (Linnaeus 1758) in Boavista island (16° 40'N, 25° 55' W, Fig. 1) is being examined in order to its conservation as well as knowing the most significant aspects of its reproductive biology. Cape Verde Islands represent one of the most important population of *Caretta caretta* in the North Atlantic (López-Jurado and Andreu 1998, López-Jurado et al. 1999).

The main objective of the research is in the one hand, analyzing which places are mostly selected by turtles for emerge. On the other hand, being able to define which zones of the studied beaches are preferably chosen by turtles to nest, based on the relationship between the number of emergences and number of nests laid.

MATERIALS AND METHODS

From 7th of July to 22nd of October in 2001, it was monitored the *C. caretta* arrivals at Ervatão, Ponta Cosme and Calheta beaches (southeast of Boavista island, Rep. of Cape Verde), by nocturnal and diurnal dairy patrols. During these patrols, it was monitored: trace sort, width and length of the trace, number of nesting attempts, nesting, and zone of the beach where found the track. The presence of nest was marked as "Y", which was made in case of having seen the egg-laying, having found the eggs after digging or when obvious signals of nest (Schroeder and Murphy 1999).

In case of no signal, it was marked as "N". Another possibility was that after digging so as to find the eggs, they were not found, or that the signals were not clear enough to assure the presence of a nest, in that case it was marked as "U" (unknown). Ervatão and Ponta Cosme beaches were divided into six zones, according to their own characteristics defined arbitrarily (see Figs. 1a,b,c).

RESULTS AND DISCUSSION

The selection of the nest placement is influenced by several environmental factors (Mrosovsky et al. 1984, Ackerman 1980, Mortimer 1990). There are very little studies in which the possible influence of vegetation is taking into account (Cornelius 1976) and, those ones that consider this fact show that most of the nestings are in open sand (Hays and Speakman 1993).

Comparing the three beaches where we took data, Calheta is the beach with the main nesting success, almost half of the turtles that emerge (48.71%), whereas the success is low in Ervatão and Ponta Cosme beaches (28.06% and 21.07%, respectively). This could be due to the morphology of the beaches, being Calheta the most homogeneous which backshore is very wide out of the influence of high tides. Despite the other two beaches are "Short beaches", that is, those with a minimal traversal distance and, as a result, suitable for nesting (LeBuff 1990), are not very homogeneous, with flooded areas due to tides, and the vegetation line near high tide line what force turtles to nest in the vegetation zone.

The number of emergences depends on the morphology of the intertidal and subtidal (Mortimer 1982, Bjørndal and Wood 2000), while the success in nesting depends only on the backshore morphology ($p < 0.0001$). Consequently, we obtain that, in Ervatão, the main number of emergences occurs in zone three

though few turtles lay eggs and, comparing to other zones, we see that the main nesting percentage correspond to zone 6. In contrast to Ervatão beach, in Ponta Cosme beach the distribution of the emergences is fair in each zone due to the apparently homogeneity of subtidal and intertidal.

We find that the lowest success in nesting happens at occasional flooded zones by tides (zone 1 and 5 in Ervatão beach; and, zone 3, 4 and 5 in Ponta Cosme beach). In spite of this great success in zone 6, Ervatão beach, turtles emergences to sand are few. The reason it occurred could be explained by the rocky intertidal area. But the conditions upwards are the most suitable of the others, with a sandy backshore out of the influence of tides. In Ponta Cosme beach, zone 1 and 2 show the highest percentage of nests though they have a vegetation line very close to the high tide line. However, the main number of emergences is at zone 6. This two factors make zone 6 have the major number of nests per length beach due to the combination between suitable conditions for going out the water and a good morphology for nesting (with a wide sandy backshore with some dunes not affected by tides).

We must emphasize that in Ervatão beach, zone 4 is where few turtles nest though the number of emergences is the highest. This is due to the existence of a rocky wall which acts as a obstacle for natural transport of sand to beach what produces a dune in the upper part.

Acknowledgements. We thank all the volunteers and people from Boavista who helped in this work, especially Pedro López and Ana Pereira, and Angelo Santana del Pino for statistical advice.

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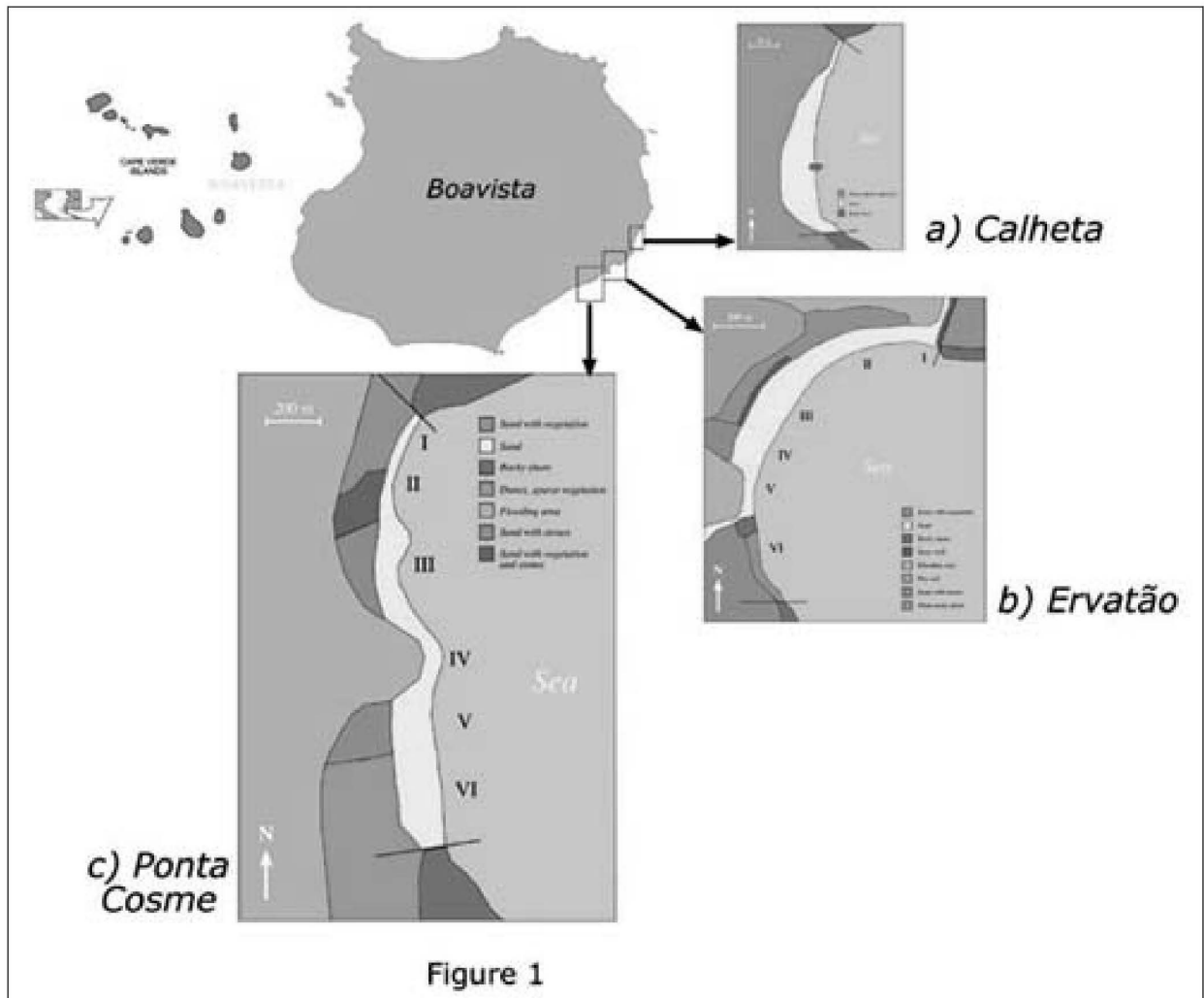


Figure 1

Fig. 1. Map showing the location of the Cape Verde archipelago and Boavista and the three beaches studied (a, Calheta, b, Ervatão, and c, Ponta Cosme).

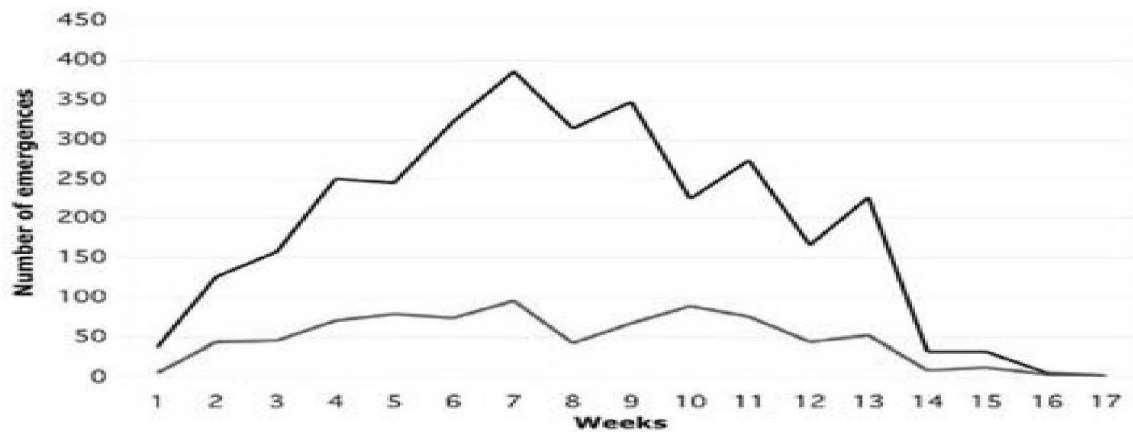


Fig. 2. Number of emergences (top line) and nests (bottom line) across 2001 nesting season in Boavista.

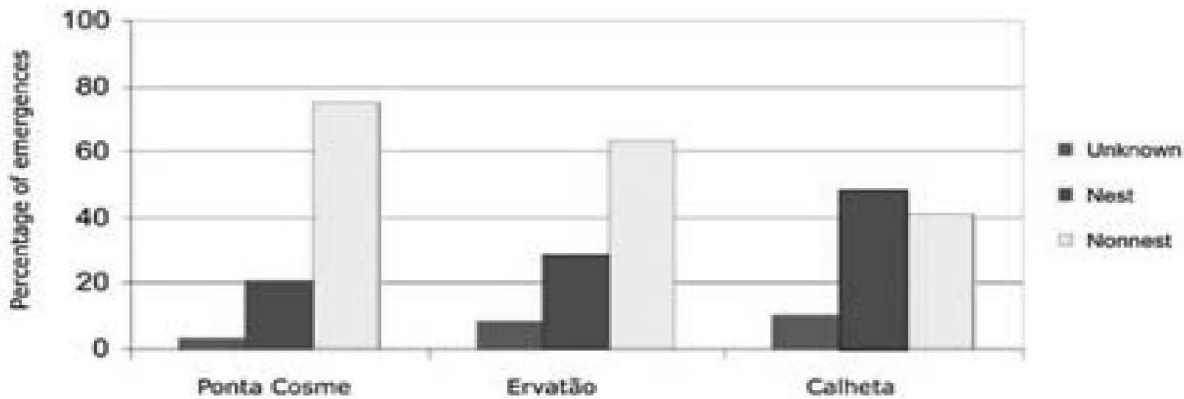


Fig. 3. Percentage of emergences with nest, with no nest, and unknown, in Boavista during 2001 season.

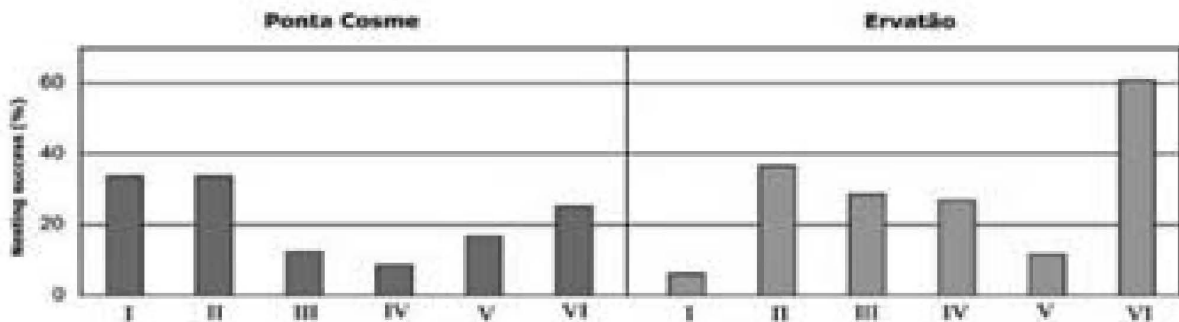


Fig. 4. Percentage of emergences with nests in Ponta Cosme (left) and Ervatão (right) during 2001 season (I to VI represent the zones).

A leatherback (*Dermochelys coriacea*) nest on the southwest coast of Florida

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Female leatherbacks in the western Atlantic nest from the southeastern United States to southern Brazil, with the largest nesting colony located in French Guiana. Other important colonies exist in Costa Rica, Panama, Suriname, and the Dominican Republic. The leatherback was once thought to be a rare visitor to the United States, but now is known to nest regularly in small numbers along Florida's east coast (Meylan et al. 1995). During the year 2001, 935 leatherback nests and 266 leatherback non-nesting emergences were recorded along Florida's coastline (FWC 2001). Leatherbacks generally lay an average of 5 to 7 nests per season. Based on this average, an estimated 16 to 31 individuals nest in Florida each year (Meylan et al. 1995). Occasional reports of leatherback nesting have also been reported along the coastline of the Florida panhandle, Texas, Georgia, and South Carolina (Pete and Winn 1998, Longieliere et al. 1998).

On May 31, 2001, a leatherback (*Dermochelys coriacea*) was observed nesting on Longboat Key, Sarasota County, Florida. This event marked the first documented nesting of a leatherback sea turtle on the southwest coast of Florida. The turtle was sighted at approximately 9:30 a.m. as it was digging its nest cavity, and observed throughout its nesting process. After the turtle deposited its eggs and began covering, it was measured and tagged by Mote Marine Laboratory (MML) personnel. Its

carapace length was determined by measuring between the middle of the nuchal notch and the terminal tip of the caudal peduncle with a soft tape measure, without forcing the tape along the ridge (Wyneken 2001). The curved carapace length was determined to be approximately 146 cm, and the curved width was approximately 111 cm. The turtle was then tagged in the trailing edge of three flippers using metal Inconel tags obtained from the Archie Carr Center for Sea Turtle Research (left rear flipper - XXM274; right rear flipper - XXM275; left front flipper - SSZ401). The turtle was observed and photographed as it completed its nesting process. It returned to the Gulf of Mexico at 10:19 am and was not observed again during the remainder of the 2001 nesting season.

The nest was verified to determine the exact location of the egg clutch shortly after the turtle returned to the water. Once the exact location was known, the area was marked and encircled by four wooden stakes connected with yellow surveyors flagging tape and signage identifying the site as a protected sea turtle nest. It was monitored at sunrise each day by MML staff and volunteers looking for signs of damage by predators or tidal activity or evidence of hatch.

On July 24, after the nest had been inundated by severe high tides and tidal activity, the nest was relocated 43 feet landward of its original location. At the time of relocation, the