

VOLUNTEERING FOR NATURE: EVALUATING EXPERIENCES OF VOLUNTEERS WITH THE CARIBBEAN CONSERVATION CORPORATION IN TORTUGUERO, COSTA RICA.

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Volunteers play a critical role in conservation, and marine turtle conservation benefits from the willingness of concerned and committed individuals to donate time and/or money to the cause. In an age of government downsizing, the importance of volunteers to conservation programs will continue. Since 1996, the Caribbean Conservation Corporation (CCC) has been surveying research assistants and participant researchers volunteering at the John Phipps Biological Research Station in Tortuguero, Costa Rica. The purpose of the survey is to monitor satisfaction with, and make any necessary changes to, the program, and to provide volunteers with an opportunity to comment on their experiences. In 1998, the CCC agreed to share this data with researchers at the University of Western Ontario, in London, Ontario, Canada, who are interested in volunteer characteristics and motives, as well as their experiences in the program. Survey results from 1996-1998 (n=138) have been analyzed. While some results are quite specific to the CCC's work in Tortuguero, most are more general and may be useful to other organizations operating volunteer programs.

Results presented detail volunteer evaluations of their overall experience, the best and worst components of their experience, and their motivation for participating. Chi Square tests (0.05 significance) were used to determine if volunteer evaluations varied by year in program, gender, or their role as a participant researcher (short term stay that volunteers pay for) or a research assistant (long term stay with room and board provided). Overall, volunteers rank all aspects of their experiences positively. Gender had no significant influence on responses. Year in program was related to evaluation of overall, best and worst things about the program, but not to motivation for participating. Whether or not the volunteer was a participant researcher or a research assistant was related to responses to all questions. In general, research assistants were more critical of all components of their stay. Given that participant researchers pay for their experience, it was anticipated that they would have higher expectations, but this does not appear to be the case. Participant researchers and research assistants appear to be distinct groups, and this poses a management challenge for the CCC.

COMPARISON OF THE HATCHING SUCCESS BETWEEN TRANSLOCATED NESTS AND "IN SITU" NESTS ACCORDING TO THE TYPE OF SUBSTRATE AND THE FLOODS DUE TO THE TIDE

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INTRODUCTION

A new nesting colony of *Caretta caretta* has recently been discovered and described in Boavista (Cabo Verde, Western Africa, FIGURE 1). Although more data are needed, it represents one of the most important populations in the North Atlantic (Brongersma, 1982; ; Ross, 1995; López-Jurado & Andreu, 1998). A tagging and management campaign has been established in Boavista to study this nesting population since 1998.

Several clutches of *C. caretta* in Boavista are laid by the females in improper places, in sand with roots of vegetation, in very compressed sand, or in places usually flooded by tides or rain. During the 1999 season we observed that hatching success was very low (less than 50%, unpub. data), in the beaches of Ponta Cosme and Ervatão, in the southeastern coast of the island, where the density of nesting females is very high. An experiment of artificially incubation of nests was designed in a closer beach to safeguard the survival of hatchlings of *C. caretta* with little probabilities of success in their natural places. We present next data on hatching and emergence success (see Miller, 1999, and Mortimer, 1999).

MATERIAL AND METHODS

In the beach of Benguinho, closer to Ponta Cosme and Ervatão, a hatchery of 225 m² was built as recommended by Mortimer (1999), with parcels of 1 m² each. All clutches relocated were reburied in the two following hours after they were laid by the female (Miller, 1999), inside 45-cm-deep chambers, which was approximately the same depth as the ones observed in natural nests.

Between 7th July and 27th August 2000, a total of 100 nests were relocated to the hatchery from Ponta Cosme and Ervatão, originally laid in improper places. Another 110 nests were monitored in their original places to compare the results.

After 45 days of incubation, a plastic net was placed around the nest to retain the emerging hatchlings for counting and measuring. When the total number of hatchlings emerged was closer to the number of eggs deposited by the female, or after 70 days of incubation without any noticed emergence, it was excavated with caution, categorizing the content shown below (Miller, 1999; TABLE I).

The analysis of hatching success (percentage of hatchlings that hatch out of their shells) and emergence success (percentage of hatchlings that reach the beach surface) was made as defined in Miller (1999), and the incubation period was calculated since the day of oviposition by the female, until the day of first emergence (Alvarado

& Murphy, 1999), because of the difficulty of controlling hatching moment.

RESULTS

A total of 234 nests were monitored, and 165 of them were included in the analysis (88 from hatchery and 77 natural), excluding nests with doubtful results and those in which the marks were lost due to tides and rain.

The incubation period for *C. caretta* in Boavista is 59.0 days (SD=4.21, Range=50-73, N=87), without any significant differences between nests incubated in the hatchery (Mean=58.9 days, SD=3.12, Range=51-66, N=91) and those on the beaches (t=-0.636, p=0.52).

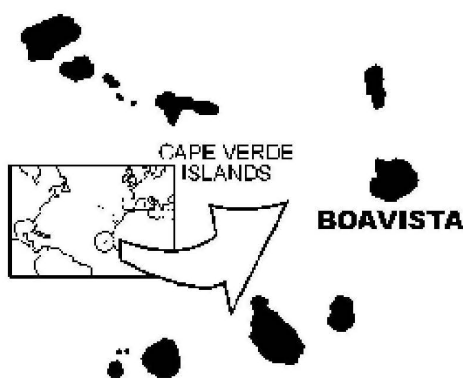
Hatching success for loggerheads in Ponta Cosme and Ervatão averages 46.9% (SD=38.45, Range=0-100, N=77), whereas it averages 63.5% in the hatchery (SD=22.54, Range=0-100, N=88). In the hatchery, the hatching success is significantly higher than on the beaches (Mann-Whitney: U=4036.50, p=0.034, FIGURE 2).

Furthermore, emergence success in Ponta Cosme and Ervatão averages 43.4% (SD=38.83, Range=0-100, N=77), and in the hatchery the mean is 62.6% (SD=22.79, Range=0-100, N=88). As we saw before, there are significant differences in emergence success between the hatchery and the beaches (Mann-Whitney: U=4204.50, p=0.007), the percentage being higher in the former one (FIGURE 2).

DISCUSSION

Incubation period for *C. caretta* in Boavista ranges between the values reported in the literature, more closely related to thermal regimes of more temperate regions, e. g., North Carolina and Turkey (see revision in Dodd Jr, 1988).

Figure 1. Map showing Cape Verde Islands, and the position of Boavista.



Hatching success for *C. caretta* in Boavista seems to be low (TABLE I). The beaches of Ponta Cosme and Ervatão have a very high density of nesting females, but they also have features which are improper for nesting, due to the very short range of useful sand and because they are very frequently flooded by tides and rains. It is possible that in other beaches of Boavista with more proper characteristics the hatching success is higher, as in Calheta (70%, unpub. data). As the hatching success increases significantly in the hatchery, the goal of the project of safeguarding survival of hatchlings is achieved. Moreover, further research must be planned with caution, so as not to affect other parameters of population, such as sex ratio (Mortimer, 1999).

Emergence success seems to vary little with respect to hatching success, so it is low compared to other populations (TABLE I). But it is interesting to notice how emergence success in the hatchery is closer to hatching success than in the natural beaches.

Figure 2. Percentage of hatching success and emergence success in natural (black) and relocated nests (white) of *Caretta caretta* from Boavista.

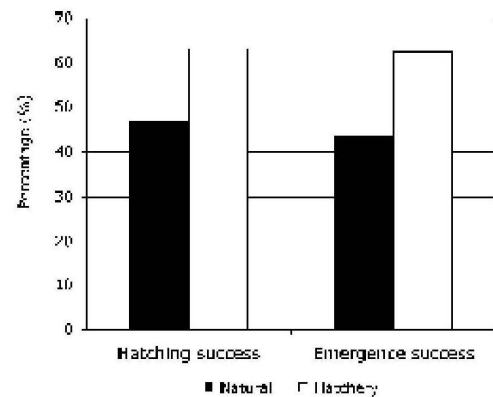


Table 1. Hatching success and emergence success of *Caretta caretta* in some populations of the world.

	Hatching success (%)		Emergence success (%)	Source
G'oksu delta (Turkey)	Mean		63	Peters et al. (1994)
	Range		2-98	
	N		33	
Cephalonia (Greece)	Mean	71.6		Hays & Speakman (1993)
	Range	43.7-89.9		
	N	8		
Northern Cyprus	Mean	79.1		Broderick & Godley (1996)
	Range			
	N	321		
Florida (USA)	Mean		55.7	Ehrhart & Witherington (1987)
	Range		0.0-99.1	
	N		97	
Tongaland (South Africa)	Mean	66.1*		Hughes (1971)
	Range	31.3-83.1		
	N	659		
Tongaland	Mean	77.8		Hughes (1974)
	Range	0.0-98.7		
	N	72		
Oman	Mean	57.3		Ross (1975)
	Range	-		
	N	18		
Queensland (Australia)	Mean	81.9		Limpus (1985)
	Range	-		
	N	422		
Boavista (Cabo Verde)	Mean	46.9	43.4	
	Range	0-100	0-100	
	N	77	77	
Boavista (Cabo Verde)	Mean	63.5*	62.6*	
	Range	0-100	0-100	
	N	88	88	

* Data on clutches incubated in hatcheries

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DEATH EVIDENCE OF SEA TURTLES BY ANALYSIS OF OSSEOUS REMAINS FOUNDED AT THE TALPICHICHI COVE, CABO CORRIENTES, JALISCO, MEXICO

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Talpichichi Cove is located on the coastal zone of the Pacific Ocean, in the Cabo Corrientes Municipality in Jalisco's northwest, México (20° 14' N, 105° 54' W). Has a length of 800 m. In the nearby region, it is known the intense predatory activity on the sea turtle.

We have known that an important number of organisms are captured with nets to be sacrificed for obtain the eggs from the womb, the skin and some of the meat for self-consumption. This is a place where the remainings of sacrificed animals are dropped and some of them after being drifting get to the zone where the waves are breaking. Trying to prove the existence of this illegal activity by the means of direct methods has been difficult.



The purpose of this project is to obtain a first estimation of the number of sacrificed organisms. In order to do this, we recollected all the sea turtle's bones we found all over the cove Talpichichi during the second week of April, 2000. We carried them to the