

POPULATION STATUS AND BEACH STUDIES: SOUTH AMERICA

Reproductive Biology and Conservation Status of the Loggerhead Sea Turtle (*Caretta caretta*) in Espírito Santo State, Brasil

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Five species of sea turtles nest in Brazil: loggerheads (*Caretta caretta*), green turtles (*Chelonia mydas*), hawksbills (*Eretmochelys imbricata*), olive ridleys (*Lepidochelys olivacea*) and leatherbacks (*Dermochelys coriacea*). The loggerhead is the most common species nesting on Brazilian continental beaches with about 80% of the nests belonging to that species. The area from the north of Espírito Santo State (19°40'S) to the contiguous extreme south of Bahia State (18°20'S) is the second largest nesting area for loggerheads in Brazil (the north of Bahia State is the largest). In Espírito Santo State, apart from Trindade Island (1200 km offshore, which has a relatively large green turtle nesting colony), loggerheads account for approximately 95% of sea turtle nests.

Projeto TAMAR (TArtaruga MARinha), the National Sea Turtle Conservation Program of Brazil, is affiliated with IBAMA (Brazilian Institute of Environment and Renewable

Natural Resources, a branch of the Brazilian government) and co-managed by Fundação Pró-TAMAR, an NGO. Projeto TAMAR began its activities in 1980 and now has 21 stations along the Brazilian coast and oceanic islands, monitoring both nesting beaches and feeding areas. Projeto TAMAR started working in Espírito Santo State in 1982, initially at Comboios beach, and is gradually extending its activities throughout the state. Currently, Projeto TAMAR maintains 5 stations in Espírito Santo, monitoring 194 km of nesting beaches. Besides beach monitoring, Projeto TAMAR carries out environmental conservation and educational activities with the coastal communities.

This poster presents data regarding the loggerhead nesting biology in Espírito Santo using data gathered from the 1991/1992 season through the 1996/1997 season. A full analysis of these data, including bibliographic references, will be published elsewhere.

Marine Turtle Identification in French Guiana: Why, Where and How?

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The leatherback identification program began at the end of the 1960s in French Guiana. Many different methods have been used: plastic tags, titanium tags, Monel tags, PIT tags, photo-identification and branding. In total, more than 50,000 tags have been put on leatherbacks whereas the estimated number of females is much lower. Although it initially yielded important information the tagging program quickly became what Mrosovsky called the *tagging reflex*, because of the lack of objectives.

In 1998, a new identification program began in French Guiana. The first step of this program was to clearly identify why, where and how leatherback identification should be performed in this region.

Why ?

The first question we asked was not why identify, but what data do we need to improve our knowledge and the conservation of this species. Identification is a suitable tool to perform some of the needed studies such as:

The delimitation of the leatherback population nesting in the Guianas. The coast of the Guianas (North of Brazil, French Guiana, Suriname, and Guyana) is the most

important nesting zone for *Dermochelys coriacea* in the world (Spotila *et al.*, 1996). *Ya:lima:po* beach, in the western part of French Guiana, has a large majority of the leatherback nesting activity in this region (GironDOT & Fretey, 1996). The recent and important decline of French Guiana leatherback populations (**Fig. 1**) is alarming for this already endangered species (Chevalier *et al.*, 1999). However, the frequent natural destruction of beaches in the Guianas causes turtles to shift their nesting sites and could mask another phenomenon at a larger geographic scale. Indeed, the shifting already documented involved beaches of French Guiana and Suriname but are suspected of occurring in other nearby countries.

The estimation of population size and trends. Another alternative to the hypothesis advanced to explain the decline of the French Guiana leatherback population is that rather than the number of females declining the number of nests per female is decreasing since the trend is evaluated in number of nests per year. An identification program will help to establish the number of females per year which is the true index with which to characterize population trends.

The search for the life stage at the origin of the present decline. The reasons for the actual decline are not well

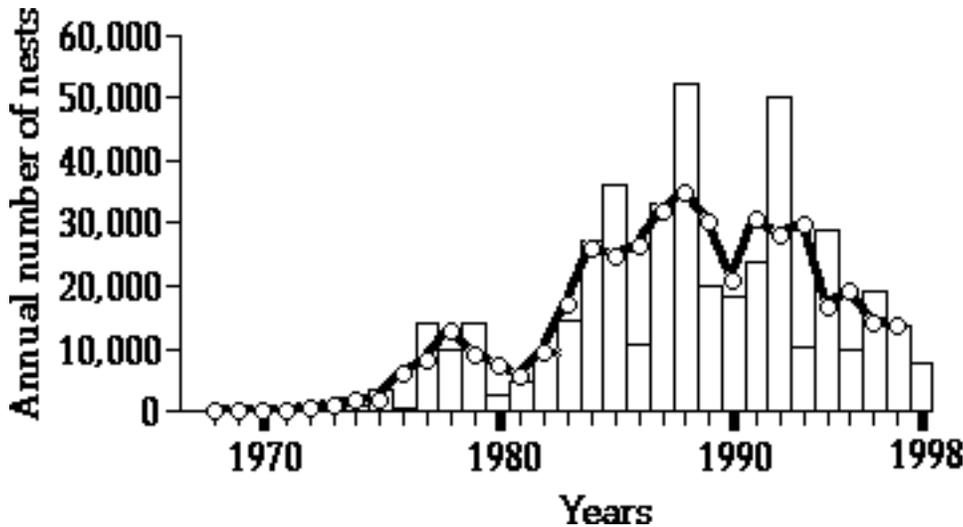


Figure 1. Annual number of leatherback nests on *Ya:lima:po* beach (histogram bars) and 3-point moving average (line).

identified but may rest with specific age cohorts. This study will help us to focus the conservation actions on the primary potential problems for the population. Thanks to this program it will also be possible to recalculate the baseline data on leatherback nesting ecology in the Guianas and to compare them with those from other nesting sites.

Where ?

We need to characterize the area where collaboration on both scientific and conservation programs is needed. The first step is to clarify the relationships between nesting beaches in this region using the results of tagging and genetic studies. Therefore the identification program should be performed first on a large scale to establish the most appropriate scale to study and conserve the Guianese population. In 1998, a new identification program began in French Guiana (Chevalier & Girondot, 1999) and will begin in 1999 in Suriname. Contacts have been made in Guyana and Brazil for similar projects.

How ?

We studied the intra and inter-seasonal retention rate for Monel tags located on the rear flippers which was the method used in French Guiana for the last 15 years. The

daily tag retention rate during the first nesting season was 0.9983 (**Fig. 2**). The expected cumulated tag retentions after two and three years using this daily tag retention rate was 0.25 and 0.17 respectively (**Fig. 3, curve A**). However, the observed values are 0.75 and 0.55 respectively (**Fig. 3, points**), which are significantly different than the expected ones ($p < 0.0001$ for both). The best fit to the observed data with a constant daily tag retention rate at sea is obtained with 0.9996 (**Fig. 3, curve B**). However, this curve does not fit to the observed cumulated tag retention rate. Finally, the best fit is obtained when the daily tag retention rate decreased with time (**Fig. 3, curve C**), a classical phenomenon called « tag senescence » (Nichols and Hines, 1993). In conclusion, tags are poorly retained just after the tagging, then the retention rate is higher at sea but decreased with time. After three years, which is close to the mean internesting season interval, around half of the tags are lost. This tag loss rate lead to an important bias in the nesting ecology studies (**Fig. 4**).

Therefore, we changed the identification method and have used PIT tags since 1998. Although some leatherbacks had already been PIT tagged in the neck in French Guiana in 1995 and 1996 (Girondot & Fretey, 1996), the need for standardization in identification methods and the good

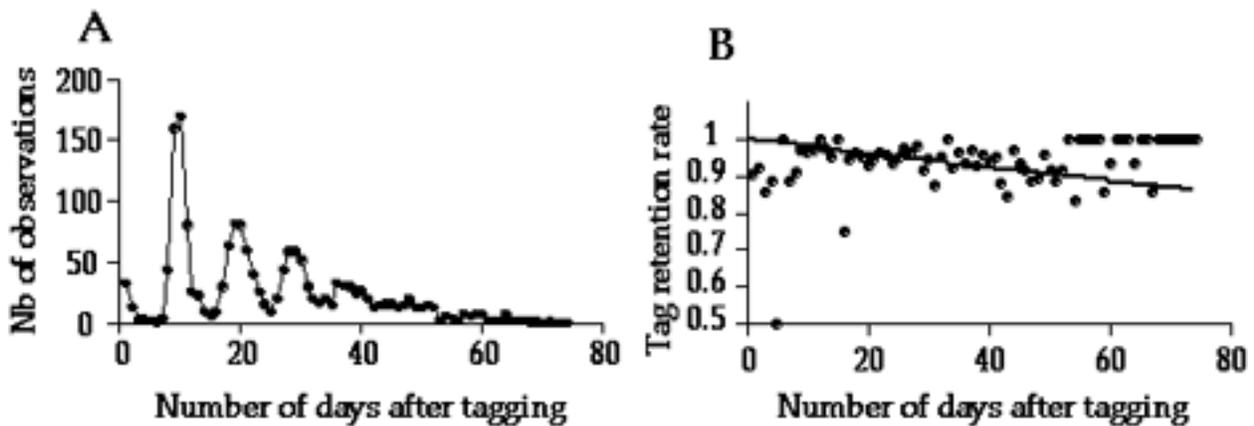


Figure 2 : Intra-seasonal retention rate of Monel tags at rear flipper location. Points are observed data (A, B) and the regression line in (B) corresponds to the best fit using ponderation by the number of observations.

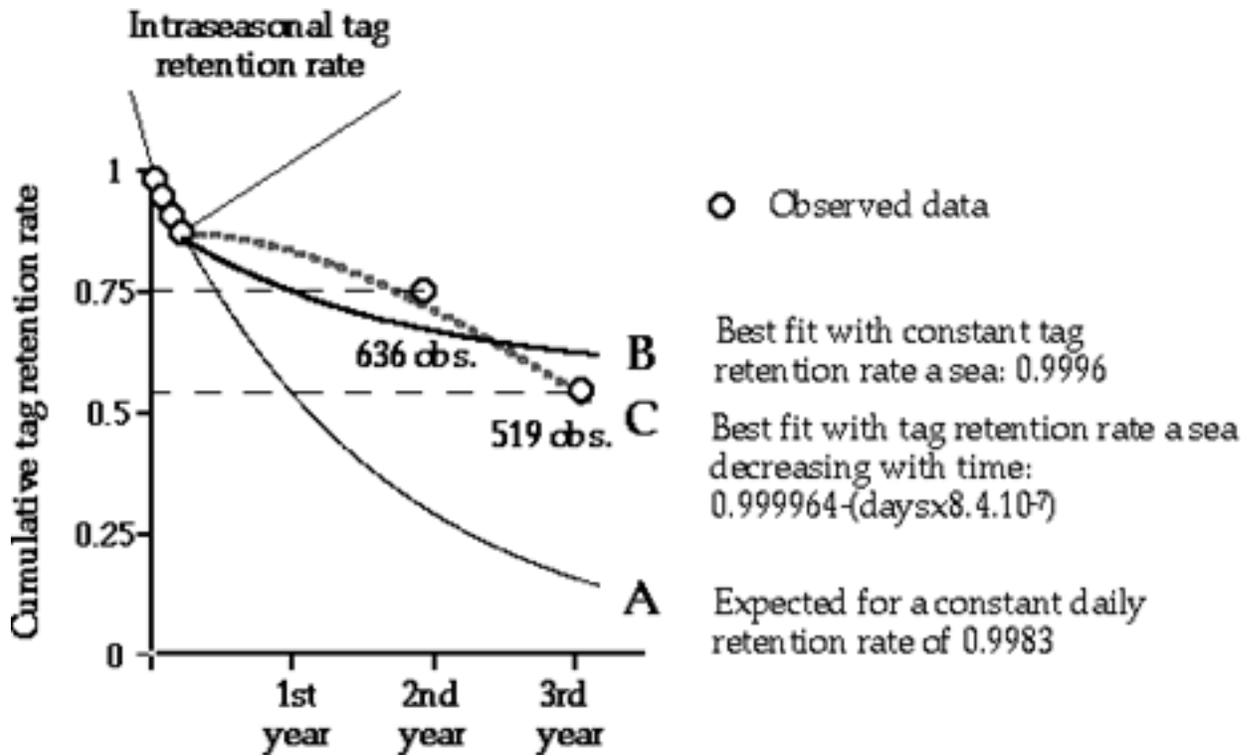


Figure 3. Long-term Monel tag retention rate on the rear flipper.

retention rate observed at other nesting beaches (Mac Donald & Dutton, 1996) lead us to PIT-tag females in the right shoulder (Dutton & Mac Donald, 1994). TROVANs material was chosen because of its storage capacity which is very useful on high density nesting beaches like *Ya:lima:po* beach.

The fact that PIT tags can't be read as easily as Monel tags, is not a problem since we have already gotten tag

returns from most of the North Atlantic Ocean (Fig. 5). The next step in order to study the migration of these leatherbacks is telemetry, not a tagging program.

Conclusion

This identification program is a part of larger conservation program focused on the marine turtles of the Guyana Shield region (Swinkels *et al.*, 1999). In this region, collaboration between the different countries of the Guianese nesting zone is certainly the only suitable way to face the alarming decline of leatherback turtles.

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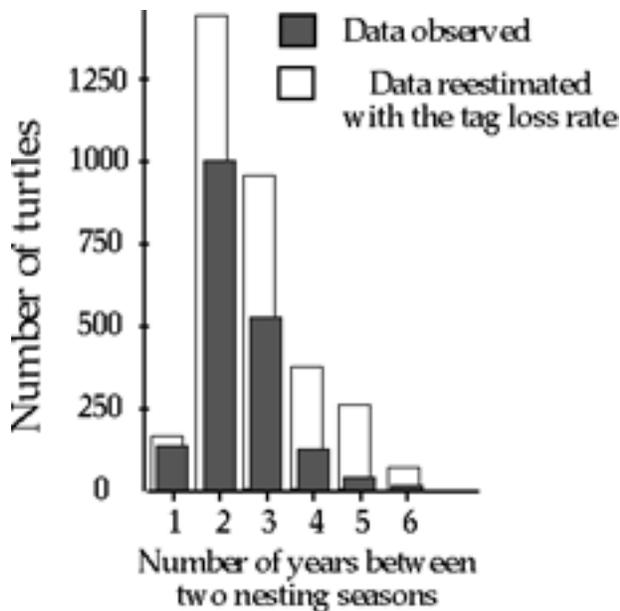


Figure 4. Comparison of the interesting season interval for leatherbacks in French Guiana, based on observed data and reestimated data with the tag retention rate.

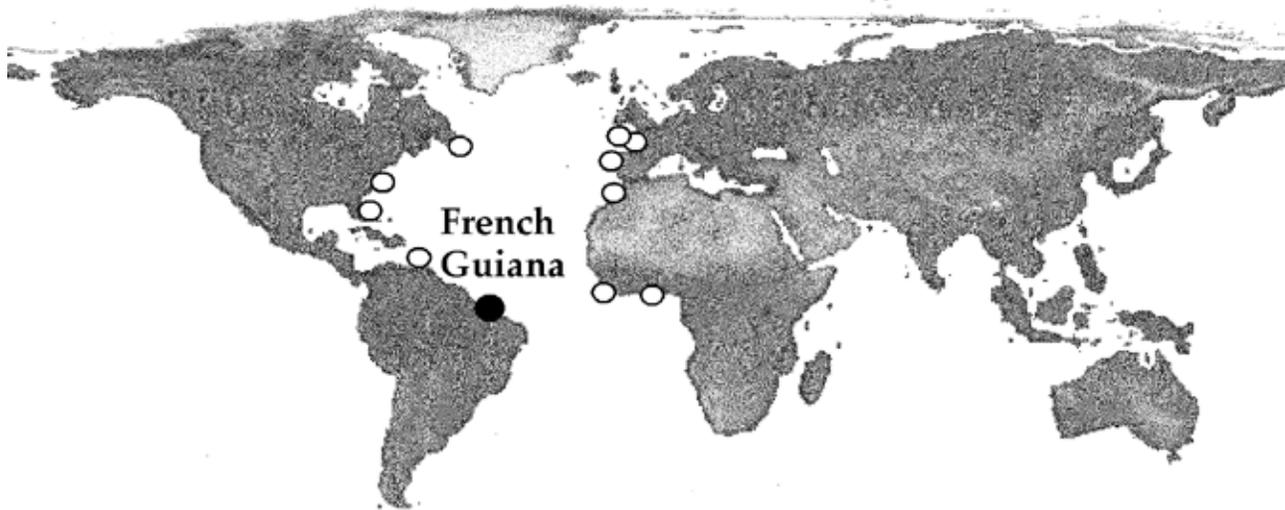


Figure 5 : Distribution leatherback tagged in French Guiana and recovered elsewhere in the Atlantic. White points are the position where Leatherbacks tagged in French Guiana have been caught.

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Study of a Bimodal Nesting Season for Leatherback Turtles (*Dermochelys coriacea*) in French Guiana

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Between April and July, the beaches of the Guianas host the most important population of *Dermochelys coriacea* (Spotila *et al.*, 1996) of the world. A second nesting season, much shorter and with less nests than the main one, occurs around December but had never been clearly characterized. French Guiana and Suriname are, as far as we know, the only nesting sites where leatherback turtles

present two nesting seasons per year. The first goal of this study was to check the presence and describe the *small* nesting season. We also wanted to study the nesting ecology of the leatherbacks nesting during this season, the relationship between those turtles and other nesting groups, and the presence of a *small* nesting season for other marine turtle species.