Isotope analysis reveals foraging area dichotomy for Atlantic leatherback turtles

March 26 2008

The beaches of French Guiana constitute a major reproduction site for leatherback turtles. This sea turtle, although a protected species, is threatened by human activity: it ingests plastics, get accidentally caught in fishing nets, sees its egg-laying sites destroyed and its adults hunted illegally for their meat and their eggs. Female turtles return to the same beach every two to three years to lay their eggs. What happens in the interval remains a mystery.

It is sometimes possible to spot them offshore in the North Atlantic. Some even swim to very high latitudes (Canada) in search of their favorite food (principally jellyfish). Argos beacons have recently revealed that some females were swimming in two principal directions: the north as would be expected, but also towards the African coast east of French Guiana.

The question is whether these locations represent two distinct feeding areas or simply an extra stopover in their migration to the far north.

Several French and Belgian scientists (University of Paris-Sud and the Laboratory for Oceanology of the University of Liège, respectively) have studied the question, in particular the carbon and nitrogen isotope ratios (d13C and d15N) in the blood and eggs of these turtles. Isotope ratios are indeed significant dietary markers and indicate, if conditions are favorable, the diet of the animals in recent days, weeks or months, depending on the tissue analyzed.

These analyses, published in this week's *PLoS ONE*, are the culmination of long and painstaking fieldwork carried out by the team from the University of Paris-Sud in Guiana. Researchers worked around the clock spotting the turtles, identifying them thanks to their tags (electronic chips serving to identify the animals), and taking blood and egg samples. Some of the sampled females had laid their eggs on the same beach two years previously, others three.

Analysis of the samples showed that the carbon and nitrogen isotrope ratios were different for each group, which suggests that the turtles had had a different diet before laying their eggs. These isotope ratios (especially the carbon ratios) are indicative of a dichotomy in the feeding areas of the two groups: one fed in the high latitudes of the North Atlantic's pelagic zone, the other in the low latitudes of the North Atlantic off the African and Iberian coasts.

The existence of these two distinct feeding areas remains to be confirmed over the long run (through the observation of sea turtles), but these preliminary results already show how urgent it is to determine the precise geographical feeding areas used by the leatherback turtles as well as the duration of their visit during the interval between egg-layings.

The fact that leatherback turtles use two distinct feeding areas over a long period has major implications as far as their preservation is concerned. If one of these two habitats were to be damaged because of overfishing, pollution, sea traffic, etc, this could have dramatic repercussions on the survival of the species.

Citation: Caut S, Guirlet E, Angulo E, Das K, Girondot M (2008) Isotope Analysis Reveals Foraging Area Dichotomy for Atlantic Leatherback Turtles. PLoS ONE 3(3): e1845. doi:10.1371/journal.pone.0001845

Source: Public Library of Science