ROTTEN LUCK: USING NON-VIABLE LOGGERHEAD EGGS TO INFER FEEDING GROUNDS ALONG FLORIDA'S EAST COAST*

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In recent years, there has been growing interest in using stable isotopes as a tool to study migratory connectivity and identify foraging areas of marine turtles. Sampling on the nesting beach is relatively easy as the turtles are accessible to researchers. Recently, using a combination of satellite telemetry and stable isotope analysis, we demonstrated that red blood cells (RBC) can be used to assign foraging areas of loggerhead nesting at the Archie Carr National Wildlife Refuge (ACNWR), Florida. Florida hosts ~90% of all the loggerhead nesting activity in the SE USA, yet few research groups encounter nesting females at night. In contrast, thousands of nests are marked to assess hatchling production through an extensive nesting survey program in Florida. Although precise turnover rates are unknown for adult sea turtle tissues, skin, RBC and egg-yolk isotopic values from nesting turtles appear to represent an integration of diet and geographic location over the 4-7 months prior to migrating to the nesting area. Thus, these tissue types have been used to unravel migratory connectivity. Collecting blood or skin samples requires intensive night patrolling and trained personnel, while collecting a fresh-laid egg poses ethical questions related to sacrificing a potentially viable egg. However, a non-viable (addled) egg retrieved at post-hatching excavation might be used as a proxy to infer foraging grounds of loggerheads. To test the usefulness of addled eggs, we collected one fresh laid egg and one unhatched egg at inventory from each nest laid by loggerheads equipped with satellite tags (n=26) and un-hatched eggs from additional females sampled (n=150) at the ACNWR between 2008 and 2012. We used telemetry to validate the use of both tissues to infer non-breeding ground locations. Fresh-yolk isotopic signatures and telemetry-derived foraging locations yielded similar patterns, with no isotopic differences between fresh-yolk and addled eggs collected from the same nest at inventory. Isotopic relationships for both δ13C and δ15N among RBC, fresh-yolk and addled eggs reflect similar resource use at similar timescales. As seen with RBC, females from the three foraging areas (identified by telemetry) segregated by the isotopic signatures of their eggs. Our results suggest that it should be possible to use addled eggs to assign females to foraging grounds, providing an opportunity to (1) sample at a much larger scale, fostering collaborations among research groups, (2) obtain information that is more representative at the population level and (3) begin understanding the relative importance of foraging areas. Acknowledgments: Thank you to the International Sea Turtle Symposium and the following organizations, International Sea Turtle Society, U.S. Fish and Wildlife Service, U.S. National Marine Fisheries Service, Ecoteach, Defenders of Wildlife, Sea Turtle Conservancy, Defenders of Wildlife, Lotek, Sirtrack, Telonics and CLS America for supporting the attendance of SA Ceriani to the Symposium.