DNA reveals mating patterns of critically endangered sea turtle

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New University of East Anglia research into the mating habits of a critically endangered sea turtle will help conservationists understand more about its mating patterns. The turtle is critically endangered, largely due to the (now banned) international trade in tortoiseshell as a decorative material. Because the turtles live underwater, and often far out to sea, little has been understood about their breeding habits until now. The breakthrough was made by studying DNA samples. Credit: Karl Phillips

New University of East Anglia research into the mating habits of a critically endangered sea turtle will help conservationists understand more about its mating patterns.

Research published today in *Molecular Ecology* shows that female hawksbill turtles mate at the beginning of the season and store sperm for up to 75 days to use when laying multiple nests on the beach.

It also reveals that these turtles are mainly monogamous and don't tend to re-mate during the season.

Because the turtles live underwater, and often far out to sea, little has been understood about their breeding habits until now. The breakthrough was made by studying DNA samples taken from turtles on Cousine Island in the Seychelles.

The hawksbill turtle (Eretmochelys imbricata) was listed as critically endangered in 1996 by the International Union for Conservation of Nature (IUCN), largely due to a dramatic reduction in their numbers driven by the international trade in tortoiseshell as a decorative material – an activity which was banned in the same year.

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The Seychelles are home to the largest remaining population of hawksbill turtles in the western Indian Ocean. Cousine Island is an important nesting ground for the hawksbill and has a long running turtle monitoring program. It is hoped that the

research will help focus conservation efforts in future.

Lead researcher Dr David Richardson, from UEA's school of Biological Sciences, said: "We now know much more about the mating system of this critically endangered species. By looking at DNA samples from female turtles and their offspring, we can identify and count the number of breeding males involved. This would otherwise be impossible from observation alone because they live and mate in the water, often far out to sea.

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"We now know that female turtles mate at the beginning of the season - probably before migrating to the nesting beaches. They then store sperm from that mating to use over the next couple of months when laying multiple nests.

"Our research also shows that, unlike in many other species, the females normally mate with just one male, they rarely re-mate within a season and they do not seem to be selecting specific 'better quality' males to mate with.

"Understanding more about when and where they are mating is important because it will help conservationists target areas to focus their efforts on.

"It also lets us calculate how many different males contribute to the next generation of turtles, as well as giving an idea of how many adult males are out there, which we never see because they live out in the ocean.

"Perhaps most importantly, it gives us a measure of how genetically viable the population is - despite all the hunting of this beautiful and enigmatic species over the last 100 years.

"The good news is that each female is pairing up with a different male – which suggests that there are plenty of males out there. This may be why we still see high levels of genetic variation in the population, which is crucial for its long term survival .This endangered species does seem to be doing well in the Seychelles at least."

Lead author Karl Phillips, a PhD student in UEA's school of Biological Sciences, added: "This is an excellent example of how studying DNA can reveal previously unknown aspects of species' life histories."

More information: 'Reconstructing paternal genotypes to infer patterns of sperm storage and sexual selection in the hawksbill turtle' by David S. Richardson, Karl P. Phillips, and Tove H.Jorgensen (all UEA) and Kevin G. Jolliffe, San-Marie Jolliffe and Jock Henwood (Cousine Island) is published by the journal Molecular Ecology on Monday, February 4, 2012.

Provided by University of East Anglia