Narwhals May Produce Signature Vocalizations for Communications

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Scientists have found preliminary evidence that narwhals, Arctic whales whose spiraled tusks gave rise to the myth of the unicorn, produce signature vocalizations that may facilitate individual recognition or their reunion with more distant group members.

Ari Shapiro, a graduate student in the Biology Department at the Woods Hole Oceanographic Institution (WHOI), and colleagues recorded the sounds of two adult male narwhals in Admiralty Bay on Baffin Island, Canada in August 2004. The results are reported in the September 2006 issue of the *Journal of the Acoustical Society of America* (JASA).

Shapiro and colleagues tagged three narwhals with a small digital archival tag, called a D-tag, developed at WHOI and about the size of a cell phone. This non-invasive tag was attached with suction cups, and was designed to detach from the animal within hours. The D-tag contains a hydrophone or underwater microphone and a suite of pressure and movement sensors. Recordings from two of the tagged animals revealed individually-distinctive pulsed/tonal signals and whistles. A third tag was not recovered.

Acoustic signaling is a reliable and efficient form of animal communication underwater. Although relatively little is known about narwhal communication, these animals, like other whales and dolphins, are thought to have excellent hearing. Few studies of the sort presented by Shapiro have been conducted, however, given the traditional difficulty of assigning vocalizations recorded in the wild to the

individual animal that produced them.

“Many unanswered questions remain about narwhals, and understanding their vocal communication will provide insights into their social behavior,” said Shapiro, who is interested in the relationship between the vocal and social behavior of marine mammals. “The individually distinctive pulsed/tonal signals and whistles may be a badge of group membership or a signal of individual recognition.”

Previous studies of bottlenose dolphins have revealed that they produce signature whistle vocalizations, setting a precedent for this kind of communication system among long-lived social toothed whales and dolphins.

Narwhals are found only in Arctic waters and may live 40 years or more. They can migrate thousands of miles in large numbers with subgroups moving in a coordinated fashion. Their major animal predator is the killer whale, but they are also hunted traditionally by the Inuit for their meat and tusks. Narwhal groups range from a few animals to dozens.

During the 2004 study period, when the Arctic ice had largely melted surrounding Baffin Island, groups of five to 30 narwhals traveled into Admiralty Inlet. Three males and five females were caught using an offshore net. While a satellite tag used for tracking animals geographically was attached to these animals, blood samples were collected to assess their health and stress levels before releasing them back into the wild.

Shapiro and colleagues successfully tagged two adult males and one female with D-tags, tracking these animals from a field camp onshore using handheld VHF radio receivers. Once researchers detected that the D-tag had been released from the animal and weather permitted, a small boat recovered the tag and the data were offloaded.

D-tags on the two narwhals, known as mm224 and mm226, recorded for 2.54 and 12.14 hours, respectively. Individual mm224 was about 12 feet long with a tusk of nearly 6 feet, while mm226 was almost 14 feet long and had a tusk measuring roughly five feet. The tusk, a tooth that erupts from the jaw and bores through the upper lip, may function as a secondary sexual characteristic or, as recent research suggests, as an oceanographic sensor. Before much was known about the animal, the tusks were sold as unicorn horns in Europe.

The D-tag recordings revealed that each of the two animals produced two individually-distinctive categories of vocalizations. Whistles were less common than combined tonal/pulsed signals, and Shapiro believes the sounds did not relate to foraging for food but rather to social communication. The distinctive vocalizations may have been produced by each animal to regain contact with other members of their group.

Shapiro will use the D-tag to study vocalizations and movements of free-ranging killer whales in Norway this November.

Source: Woods Hole Oceanographic Institution