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GUEST COLUMN: Final installment aboard Healy

Editor's note: This is the final in a series of guest columns planned to cover a local teacher's trip to the Arctic.

By CHANTELLE ROSE

Time is drawing near for my debarkation off the United States Coast Guard Cutter Healy. The Science team has been aboard for 38 days. It's been a very productive and amazing learning experience. The basis of this voyage was to sample the winter waters of the Arctic for species of zooplankton, specifically Calanus copepods and krill. We've conducted science operations at more than 100 stations in the Bering, Chukchi and Beaufort Seas. The samples that were collected, photographed and processed will be analyzed at the University of Rhode Island Graduate School of Oceanography.

The samples will be analyzed in four ways: morphometrics, CN, and RNA/DNA analysis and genetic sequencing. Morphometrics is the analysis of size and shape. For each digital image, measurements will be made on the organism's length, width, area and size of the lipid sac, which is used as a source of nutrition during diapause, a hibernation-like state. The samples are combusted in a gas chromatograph to analyze the amount of carbon and nitrogen stored in their bodies. The morphometric and CN analysis can tell us about the animal's state of health. For instance, the size of the lipid sac and the ratio of the total carbon to nitrogen content are excellent indicators of an animal's recent feeding history and its readiness for diapause.

RNA/DNA stands for ribonucleic acid and deoxyribonucleic acid. These samples were frozen to negative-80 degrees aboard Healy. Once in the lab, the RNA and DNA are extracted and exposed to a fluorescent label. DNA remains constant in an animal and the amount of RNA fluctuates as the animal's cells are replicating. By examining the ratio of RNA to DNA, the activity level of the animal can be determined: an animal that is actively feeding, growing and producing offspring will have high RNA:DNA ratios, while for an animal in a state of diapause the ratios are very low. Genetic sequencing will also be conducted on the animals to determine if populations in the Bering, Beaufort and Chukchi Seas are related. This should lead to a better understanding of the importance of the linkages between animal populations in these seas and how climate change may affect the future distributions of these key organisms and the potential impacts to Arctic marine food webs.

Besides collecting and processing samples, I had the opportunity to live and work on a United States Coast Guard Icebreaker. I will forever remember the views of the sun, low on the horizon and North of the Arctic circle, the sounds of Healy breaking and grinding through thick multi-year sea ice and the dedication of the Crew of Healy to their country and the Coast Guard.

For more information, go to www.polartrec.com/expeditions/winter-sampling. There you can access my Daily Journal, Photos, Resources and much more information about the expedition.

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