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Professor Barbara Pierce

News Story: December 8, 2014

Barbara Pierce, associate professor of biology at Sacred Heart University, has received a grant award of \$111,253 from the National Science Foundation in support of her research project on migratory birds. Her area of specialization is physiological ecology, and her research project is titled “Collaborative Proposal: Fat Metabolism and Oxidative Stress in Exercising Migratory Birds.” The NSF grant extends through August 31, 2017.

Pierce’s research focuses on the specific nutrient requirements of birds during migration and the influence of these nutrients on the bird’s ability to complete migration. She has found that migratory songbirds are able to distinguish between foods differing only in fatty acid composition, that songbirds prefer foods with specific unsaturated fatty acids and that birds with certain fatty acids in their fat stores use less energy during flight than birds with other types of fatty acids.

She is currently examining how antioxidants and changes in the fatty acid composition of deposited fat affect energetic performance in birds. Her research also examines the adequacy of small urban forest fragments as stopover sites for migrating songbirds and whether or not these small fragments offer the specific nutrients birds require during migration.

“There is a lot of public interest in dietary antioxidants and how they promote human health. Migratory birds offer a really interesting model for the relationship between antioxidants and fat metabolism, because birds have relatively low rates of free radical production despite their high metabolic rates,” Pierce says.

“Birds generally have higher maximum life spans than mammals of similar size, so our research is basically looking at how a bird’s internal antioxidant system responds during periods of high-energetic demand, like flying,” she adds. Her research will also look at how this system changes between seasons when birds are only migrating (fall) and when they are migrating while preparing for the breeding season (spring).

Pierce will be using two of the world's premier avian wind tunnels—one at the Advanced Facility for Avian Research at the University of Western Ontario, Canada, and the other at the Max Planck Institute for Ornithology, Germany.

Many migratory bird populations are declining because of the loss of suitable stopover habitats during migration, which forces birds to stop at small forest fragments that may or may not contain the nutrients they need to complete their migration, Pierce notes.

“This research will not only give us insight into a unique and apparently very effective internal antioxidant system that may enhance our knowledge of human antioxidant systems, but will also add to our knowledge of the nutritional requirements of migrating songbirds and allow us increase the quality of stopover foods available to these birds,” she concludes.