Evolution and climate change research advances at Rutgers-Camden

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Charles Darwin may have been born 200 years ago come Feb. 12, but his theory of evolution remains an everyday touchstone for modern biologists. And while the Origin of Species author might not have known the term "global warming," he wouldn't have been surprised that the environment is changing. He would, however, be astonished by the speed at which it's happening today.

"Every species is under temporary permanence," says Bill Saidel, an associate professor of biology at Rutgers University's Camden Campus, where he teaches Animal Behavior and Behavioral Neurobiology. Darwin would have predicted changes in species' habits and even changes in the environment, but the planet's facing changes that are both drastic and unpredictable.

Saidel notes some already observed results of global warming today, like changing avian migration patterns and pH levels in oceans. But how would Darwin begin to determine how every species might respond to climate change? Most likely he'd begin by observing those habitats that are uniquely individual and well-defined.

This approach -- researching one specialized habitat for insight into a larger understanding of evolution -- is how Saidel conducts his own research at Rutgers-Camden. His interest in the exotic African butterfly fish is precisely because it has evolved two retinas in each eye, but only feeds from information derived from one. The fish's highly specialized adaptations, from retina to brain, serve as a model for discerning the

circuitry of feeding in all vertebrae whose visual traits aren't as clearly segmented.

"This fish has much to teach us. It has adapted extraordinarily to a single unique environment. Yet, the consequences of a highly adapted species is that any change can be dire," says Saidel.

Dan Shain, associate professor of biology at Rutgers-Camden, also researches highly specialized creatures: worms that thrive in the world's most extreme climates. He studies them for insight into their adaptations and their unique cocoon production processes, which have biomaterial applications. Only the intensely frigid environs Shain once explored in destinations like Alaska aren't as cold anymore.

This summer, the Rutgers-Camden researcher traveled to Denali National Park to observe ice worms, whose glacial habitats make them an ideal indicator species for climate change.

"Ice worms have been around at least a few million years and have been through many ice ages, but the change there now is dramatic," Shain says. "I've been traveling to Alaska for 10 years studying ice worms. The mass of the glaciers is about half of what it was a decade ago."

Disappointed, Shain didn't find new specimens allegedly living in Eldridge Glacier. Even the glaciers he previously identified as housing a plethora of ice worms had sadly receded.

"The number of ice worms is radically down. We think ice worms are getting washed off the glaciers and they don't have the capability to move up the glacier quickly enough," he reports.

The issue of time is crucial to understanding the implications of global warming. Shain calls it "accelerated evolution" and predicts large-scale

extinctions that even Darwin couldn't comprehend. Species that can best adapt to this abrupt change will go on and multiply, leaving the world with less of a variety.

"We lose diversity with a rapid change, but always life finds a way. Some kind of life will fill the gap."

Source: Rutgers University