Studying Nematodes and their Soil Habitat in Antarctica: A Day in the Life of Diana Wall

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Each time Diana Wall returns to Antarctica, the same barren, dry landscape is there to greet her. While most people would feel lost in this environment, she is quite comfortable. Wall, a senior research scientist and professor at Colorado State University, has spent 24 seasons in the Dry Valleys of Antarctica studying nematodes—microscopic worms crucial to soil health and biodiversity.

Nematodes aren’t exactly on the radar of most people, but they play an important role in the environment. In Antarctica, these tiny organisms sit atop the food chain, and the dominant *Scottnema* species alone is responsible for 6 to 7% of total soil organic carbon turnover. Carbon turnover happens when organisms consume carbon for energy, eventually dying and decaying and releasing that carbon back into the environment as valuable nutrients, a process crucial to soil life.

Studying nematodes in such an extreme environment like Antarctica actually simplifies the science for researchers, Wall says. Their work is uninterrupted by other plants and animal life due to the harsh climate, allowing for a complete focus on nematodes with limited biological factors to contend with.

The research Wall and her colleagues do in Antarctica is thanks to the McMurdo Long Term Ecological Research (LTER) grant from the National Science Foundation. They spend the month of January in the McMurdo Dry Valleys—snowless valleys that comprise one of the world’s most extreme desert environments. Wall and the team return home in February, their data in hand and ideas for next season’s trip already swirling in their heads.

The fascination with nematodes began for Wall in graduate school, where she studied plant pathology at the University of Kentucky. “I was very interested in plant-parasitic nematodes, and when you start realizing how distinct the different species are from one another, you need to learn about their habitat,” Wall says. “And that’s soil.”

**Getting Away from the Influence of Plants**

As her research with nematodes and their soil habitat continued, she began to realize the challenges of studying the interaction of nematodes and their complex environments. “Some of my colleagues kept telling me I couldn’t show the roles of invertebrates in decomposition, for example, unless I could get away from the influence of plants. I’d worked in deserts, in the Sahara, but then I saw some pictures of the dry valleys in Antarctica, and I knew I wanted to research that landscape.”

Diana Wall, a senior research scientist and professor at Colorado State University, has spent 24 seasons in the McMurdo Dry Valleys of Antarctica (right, aerial photo courtesy of NASA) studying nematodes.

In this landscape, a typical soil sample may only contain one or two types of nematode species, which allows Wall and fellow researchers to isolate nematodes in a natural habitat and perform species-specific studies. In fact, only three species have been identified in the McMurdo Dry Valleys where Wall and her colleagues conduct much of their research.

“We found that one nematode was in about 60% of these barren soils, and the other two were found near more moisture,” Wall says. “It’s really opened up some doors for us to study things like the effects of climate change on these specific nematodes and see what happens to a species over time.”

In the McMurdo Dry Valleys, environmental shifts like climate change, which can lead to increased temperatures and moisture due to glacial melt, can have a significant impact on nematode populations that have adapted to the dry, harsh conditions of the Valleys. In an area of greater biodiversity, if one species struggles to survive or even disappears, other organisms are likely to step in and take...