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Ecologists explore biodiversity, ecosystem links

ASU ecologists Jianguo "Jingle" Wu and Jim Elser, along with Columbia University ecologist Shahid Naeem, have been awarded a \$1.1 million grant over the next five years from the National Science Foundation to study the relationship between biodiversity and ecosystem functioning in the vast grassland region of China's autonomous Inner Mongolia region.

A better understanding of this relationship will help researchers determine how to manage sustainable ecosystems.

"Biodiversity is the total variety and variability of life," Wu says. "When hearing the word, most people think of the number of individual species. That is indeed a critical part of biodiversity, but our project also will focus on how these species function as a group."

On July 20, Wu traveled to the Inner Mongolia Grassland Ecosystem Research Station to begin fieldwork for the experiments. Over the next five years, he will spend about a month and a half each year in the grasslands.



Stretching from eastern China to Hungary, the Eurasia Grassland is the largest contiguous biome, or regional community of organisms, in the world. According to Wu, who grew up in the region, its vastness and species diversity makes it the perfect testing ground for ecological experiments.

There are more than 50 different species of plants that Wu and his colleagues will manipulate by designing various combinations of functional groups of species in 6-by-6-meter (20-by-20-foot) plots. More than 800 of these plots will be established by the team.

Wu says this research differs from previous attempts to understand relationships in biodiversity because they are working with real ecosystems.

"We're going to manipulate natural communities and create realistic gradients of real biodiversity," he says.

By studying the successes and failures of these combinations, Wu hopes to learn about factors that contribute to a sustainable ecosystem. Sustainability is important because of the resources produced by the environment, such as nutrients that cycle through plants and animals, purified water and air, food, shelter and other "services," as Wu refers to

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them.

Grasslands ecosystems are particularly important, he says, because about 30 percent of the world population lives in arid or semi-arid environments comparable to the grasslands.

Once researchers have a better understanding of the relationships between species in these environments, efforts then can be taken to implement the findings into public policy and land management.

"Biodiversity is the basis for essential natural services," says Wu, a professor in the School of Life Sciences within ASU's College of Liberal Arts and Sciences. "It's crucial to understand the structure and functionality of our ecosystems so we can manage and sustain them. One of the most important aspects of this is establishing the integrity of biodiversity."

In addition to Elser and Naeem, Wu will be assisted by Chinese and U.S. graduate students, as well as collaborators in the Chinese Academy of Sciences in Beijing and the Institute of Botany in Chengdu.

"Biodiversity is the most important ecological question today," Wu says. "We are embracing the idea of global engagement in sustainability, and with this project we could potentially collaborate with researchers from all over the world."

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