U of M researchers contribute to global plant database, expanding ecosystems research

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A new database of plants' traits will help scientists around the world learn more about how climate change is affecting ecosystems.

The availability of plant trait data in the unified global database promises to support a paradigm shift in Earth system sciences.

University of Minnesota researchers Peter Reich and Jacek Oleksyn, Department of Forest Resources, and Jeannine Cavender-Bares, Department of Ecology, Evolution, and Behavior, are members of the international collaborative that developed the database, which includes 3 million traits for 69,000 of the world's roughly 300,000 plant species.

The initiative, known as TRY, is hosted at the Max Planck Institute for Biogeochemistry in Jena, Germany, and includes scientists from more than 100 institutions around the world. Among hundreds of scientists, Reich, a resident fellow in the university's Institute on the Environment, is the leading contributor of data to the database.

The first installment of the database was published this week in the journal Global Change Biology.

"After four years of intensive development, we are proud to present the first release of the global database," said Jens Kattge, senior scientist at the Max Planck Institute for Biogeochemistry and lead author of the publication. Reich, Cavender-Bares and Oleksyn are among the many co-authors.

Plants' traits – specific details about how plants look and function – determine how they compete for resources such as light, water and soil nutrients, and where and how fast they can grow. Ultimately, traits determine how plants influence ecosystem properties such as rates of nutrient cycling, water use and carbon dioxide uptake.

A major bottleneck to modeling the effects of climate change at ecosystem and whole-earth scales has been a lack of trait data for sufficiently large numbers of species.

"Global vegetation models commonly classify plant species into a small number of plant functional types, such as grasses or evergreen trees, but these do not capture most of the observed variation in plant traits," said Christian Wirth, professor of plant ecology at the University of Leipzig, one of the initiators of the project.

In contrast, the new database gives trait information for individual plant species—not just types—around the globe. By using it, scientists now will be able to build more realistic models of terrestrial biodiversity.

Reich says the data and the relationships among traits in the database "will revolutionize the biological underpinnings of Earth systems models, and will help us improve our ability to predict the future carbon cycle and climate change, and suggest mitigation strategies. We, and others, are already incorporating these data into large-scale models of Earth's biological function. In fact, a new initiative co-funded by the U of M's Institute on the Environment and the Max Planck Institute for Biogeochemistry is aiming to do just that."

Provided by University of Minnesota

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