

# Unprecedented worldwide biodiversity study

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Roy Berg Kinsella Research Ranch. Credit: J.C. Cahill, University of Alberta

Humans depend on high levels of ecosystem biodiversity, but due to climate change and changes in land use, biodiversity loss is now greater than at any time in human history. Five University of Alberta

researchers, including students, participated in a leading global initiative to determine whether there are widespread and consistent patterns in plant biodiversity.

Sixty-two scientists from 19 countries spanning six continents studied the relationships between [plant biomass](#) production and species diversity, culminating in a paper appearing in *Science*, the world's leading journal for cutting-edge scientific research. Findings in the paper, "Worldwide Evidence of a Unimodal Relationship between Productivity and Plant Species Richness," reveal a consistent biological rule governing the link between plant biomass and species richness in grassland ecosystems—plant [species diversity](#) is generally greatest at intermediate levels of plant biomass.

The results of these findings help unveil how natural systems operate and have global ramifications for the management and conservation of grassland biodiversity.

"Before we can even begin to hope to reduce the dramatic loss of species the world is currently experiencing, we need to first have a clear understanding of where we should and should not expect biodiversity to be high or low," notes author J.C. Cahill, professor in the University of Alberta's biological sciences department. "In this study, we were asking a very simple question: is there a consistent 'rule' governing how grassland plant diversity varies with local productivity? We are trying to determine how many regions of the world operate in the context of biodiversity patterns."

Cahill views this critical step in understanding as similar to learning how an engine operates before trying to fix a car.

"Leaning under the hood without any clear vision of what parts should be connected will cause all sorts of frustration. It is much easier to make the

necessary adjustments once you learn how the system operates."

Cahill and his University of Alberta colleagues Jonathan Bennett, Edward Bork, Cameron Carlyle, and Gisela Stotz conducted field work at the Roy Berg Kinsella and Mattheis research ranches in Alberta, while their other 57 co-contributors collected samples from locations all over the world.

Ecosystem productivity, one factor considered responsible for regulating [plant biodiversity](#), has long been a subject of debate. This new research is groundbreaking in that it reaffirms a foundational theory and effectively refutes a prior article in Science that purported to disprove the theory.

"As the underlying causes of [biodiversity loss](#) are highly contentious, this will be an active area of research for decades," concludes Cahill. "We are hopeful that by understanding the core relationships between land productivity and [biodiversity](#), we can then refine management recommendations for land users with the goal of enhancing both economic and environmental outcomes."

**More information:** Worldwide evidence of a unimodal relationship between productivity and plant species richness, [www.sciencemag.org/lookup/doi/ ... 1126/science.aab3916](http://www.sciencemag.org/lookup/doi/.../1126/science.aab3916)

Provided by University of Alberta

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