

Science News

from research organizations

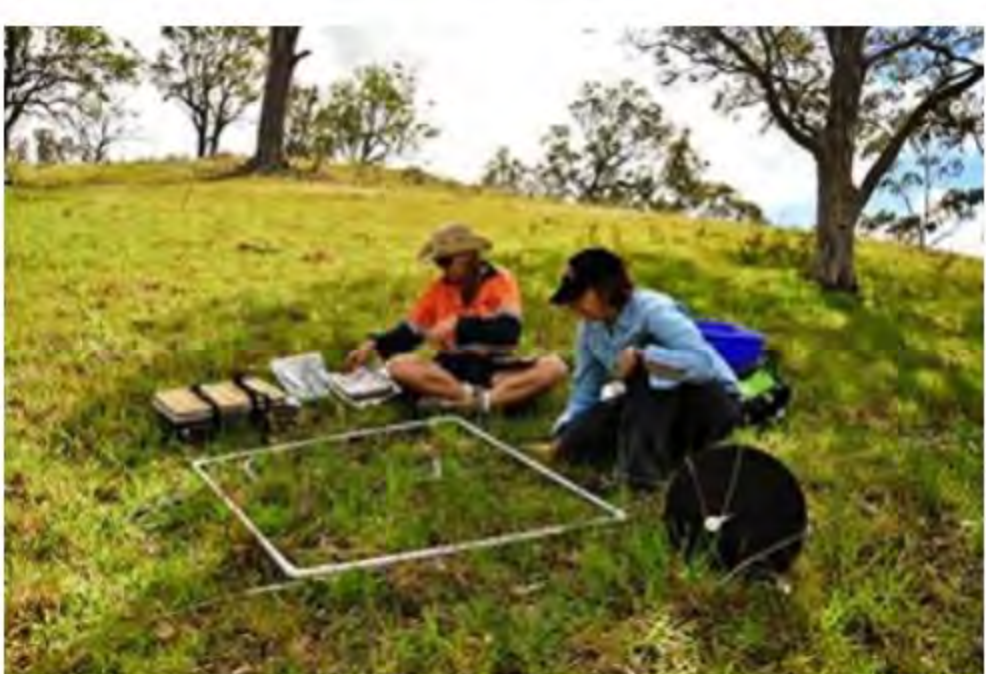
Print Email Share

An imbalance in nutrients threatens plant biodiversity

Date: August 29, 2016
Source: Queensland University of Technology
Summary: An unnatural balance of nutrients threatens biodiversity in a survival of the fittest scenario, according to new research. A global network of researchers who have tested the impact increased nutrient levels is having on grasslands across six continents.
Share: Facebook Twitter Google+ LinkedIn + Email

RELATED TOPICS

- Plants & Animals
- > Nature
 - > Ecology Research
 - > Endangered Animals
- Earth & Climate
- > Ecology
 - > Acid Rain
 - > Biodiversity



Professor Jennifer Firn, right, and colleague Emma La Douceur, are part of a global network of researchers testing the impact increased nutrient levels is having on biodiversity.
Credit: QUT: Jennifer Firn

An unnatural balance of nutrients threatens biodiversity in a survival of the fittest scenario, according to the results of a world-first global experiment published in the journal *Nature*. Professor Jennifer Firn, from QUT's Science and Engineering Faculty, is part of a global network of researchers who have tested the impact increased nutrient levels is having on grasslands across six continents.

The article is titled "Addition of multiple limiting resources reduces grassland diversity" and was led by Professor Stan Harpole from UFZ and iDIV, Germany.

"As part of the Nutrient Network, researchers tested the Charles Darwin 'entangled bank' observation which is used to explain how species can coexist even if they require the same limiting resources.

"This theory explains the mechanism of how a number of species should be competing for resources when they are actually coexisting because of the subtle differences in their resource needs.

"But what we found was that if you change the limiting resources and add an abundance of resources such as nutrients like phosphorus, nitrogen and potassium, it will lead to a favouring of some species over others because competition is then shifted above ground for light.

"This will in turn evoke competition between species, leading to one species dominating the land area."

The experiment was conducted across 45 grassland sites spanning the multi-continent Nutrient Network.

Professor Firn said the human influence on the nutrient cycle through greater globalisation, was having a damaging effect on ecosystem biodiversity.

"The loss of diversity was not driven by the addition of any single added resource for example nitrogen or potassium, we found greatest diversity loss occurred with the addition of a combination of two or more resources," she said.

"Simply put, the more nutrients, the less biodiversity."

She said many of the ecosystem functions that humans need to survive were provided by richly diverse ecosystems, such as oxygen production, water filtration, nutrient cycling, pollination, and carbon sequestration.

"The irreplaceable loss of native biodiversity is accelerating at an alarming rate globally," she said.

"What this research does is provide tangible evidence that global change is driving environmental conditions beyond our planetary boundaries."

The Nutrient Network is the only collaborations of its kinds in which individual researchers have set up the same experiments at sites around the world. It is coordinated through the US-based National Science Foundation's funding to biologists Prof. Elizabeth Borer and Prof. Eric Seabloom of the University of Minnesota.

Story Source:

The above post is reprinted from materials provided by **Queensland University of Technology**. *Note: Content may be edited for style and length.*

Journal Reference:

1. W. Stanley Harpole, Lauren L. Sullivan, Eric M. Lind, Jennifer Firn, Peter B. Adler, Elizabeth T. Borer, Jonathan Chase, Phillip A. Fay, Yann Hautier, Helmut Hillebrand, Andrew S. MacDougall, Eric W. Seabloom, Ryan Williams, Jonathan D. Bakker, Marc W. Cadotte, Enrique J. Chaneton, Chengjin Chu, Elsa E. Cleland, Carla D'Antonio, Kendi F. Davies, Daniel S. Gruner, Nicole Hagenah, Kevin Kirkman, Johannes M. H. Knops, Kimberly J. La Pierre, Rebecca L. McCulley, Joslin L. Moore, John W. Morgan, Suzanne M. Prober, Anita C. Risch, Martin Schuetz, Carly J. Stevens, Peter D. Wragg. **Addition of multiple limiting resources reduces grassland diversity**. *Nature*. 2016; DOI: 10.1038/nature19324

Cite This Page:

MLA APA Chicago

Queensland University of Technology. "An imbalance in nutrients threatens plant biodiversity." ScienceDaily. ScienceDaily, 29 August 2016. <www.sciencedaily.com/releases/2016/08/160829105742.htm>.

Powered by Google



Drinking more water associated with...



Don't drink the (warm) water, study says



Giant Ape Lived Alongside Humans



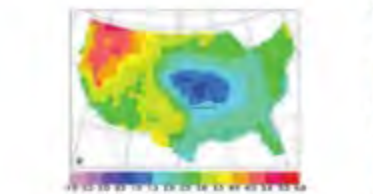
Why an ice age occurs every 100,000 years: Clim...



New type of antidepressant found to act quickly...



Vegetarian and 'healthy' diets could be more ha...



Researchers Discover 'Hole' In Global Warming...



Last dinosaur before mass extinction discovered

Recommended Articles

- Too Much Of A Good Thing? Excess Nutrients Or Water Limit Biodiversity
University of Minnesota, ScienceDaily, 2007
- Fertilization destabilizes global grassland ecosystems
University of Minnesota, ScienceDaily, 2014
- Researchers solve long-standing ecological riddle
University of Minnesota, ScienceDaily, 2016
- Human activity affecting microbes in soil
Iowa State University, ScienceDaily, 2015
- Biodiversity Is Crucial To Ecosystem Productivity
Brown University, ScienceDaily, 2008

- Nutrient criteria development with a linked modeling system: calibration of aquatox across a nutrient gradient [↗](#)
Park, Richard A. et al., Proceedings of the Water Environment Federation, 2005
- The functioning of European grassland ecosystems: potential benefits of biodiversity to agriculture [↗](#)
Asher Minns et al., Outlook on Agriculture, 2001
- Environmental impacts of nitrogen and phosphorus cycling in grassland systems [↗](#)
C. J. Watson et al., Outlook on Agriculture, 2001
- Will overpopulation lead to public health catastrophe? [↗](#)
David McNamee, Medical News Today, 2014
- Accelerating the Innovation Cycle [↗](#)
IEEE Pulse, 2013



Related Stories

Give and Take: Researchers Analyze How Nutrient Pollution Can Negatively Impact Important Ecological Relationships
Mar. 10, 2016 — Nature has its own economy, with trading as dynamic as that of any stock exchange. To cope with nutrient deficiencies in their respective habitats, certain plants, animals and fungi have evolved ... [read more »](#)

Biology Trumps Chemistry in Open Ocean: How Phytoplankton Assimilate Limited Concentrations of Phosphorus
Nov. 24, 2014 — Scientists laid out a new framework based on in situ observations that will allow them to describe and understand how phytoplankton assimilate limited concentrations of phosphorus, a key nutrient, in ... [read more »](#)

In Grasslands Remade by Humans, Animals May Protect Biodiversity: Grazers Let in the Light, Rescue Imperiled Plants
Mar. 9, 2014 — A study of grasslands on six continents suggests a way to counteract the human-made overdose of fertilizer that threatens the biodiversity of the world's prairies. The solution originates in ... [read more »](#)

Fertilization Destabilizes Global Grassland Ecosystems
Feb. 16, 2014 — Fertilization of natural grasslands -- either intentionally or unintentionally as a side effect of global farming and industry -- is having a destabilizing effect on global grassland ecosystems. ... [read more »](#)



Strange & Offbeat

PLANTS & ANIMALS

- Hiding in Plain Sight: Vast Reef Found Hiding Behind Great Barrier Reef
- A Mammoth Undertaking: Can De-Extinction Be Ecologically Responsible?
- 300 Teeth: Duck-Billed Dinosaurs Would Have Been Dentist's Dream
- Well-Wrapped Feces Allow Lobsters to Eat Jellyfish Stingers Without Injury

EARTH & CLIMATE

- Anti-Friction Solutions? Very Thin Layers of Water Can Become Ice-Like at Room Temperature
- More to Rainbows Than Meets the Eye
- X-Raying the Earth With Waves from Stormy Weather 'Bombs'
- Endangered Cuban Solenodon Evolved After the Extinction of Dinosaurs

FOSSILS & RUINS

- New Tiny Species of Extinct Australian Marsupial Lion Named After Sir David Attenborough
- 'Cyclops' Beetles Hint at Solution to 'Chicken-and-Egg' Problem in Novel Trait Evolution
- Ancient Air Pockets Changing the History of Earth's Oxygen
- Pre-Hispanic Mexican Civilization May Have Bred and Managed Rabbits and Hares



Print Email Share

Free Subscriptions

Get the latest science news with ScienceDaily's free email newsletters, updated daily and weekly. Or view hourly updated newsfeeds in your RSS reader:

- Email Newsletters
- RSS Feeds

Follow Us

Keep up to date with the latest news from ScienceDaily via social networks:

- Facebook
- Twitter
- Google+
- LinkedIn

Mobile Apps

Get the latest news from ScienceDaily via our free mobile apps, available for download on the following platforms:

- iPhone/iPad
- Android

Have Feedback?

Tell us what you think of ScienceDaily -- we welcome both positive and negative comments. Have any problems using the site? Questions?

- Leave Feedback
- Contact Us