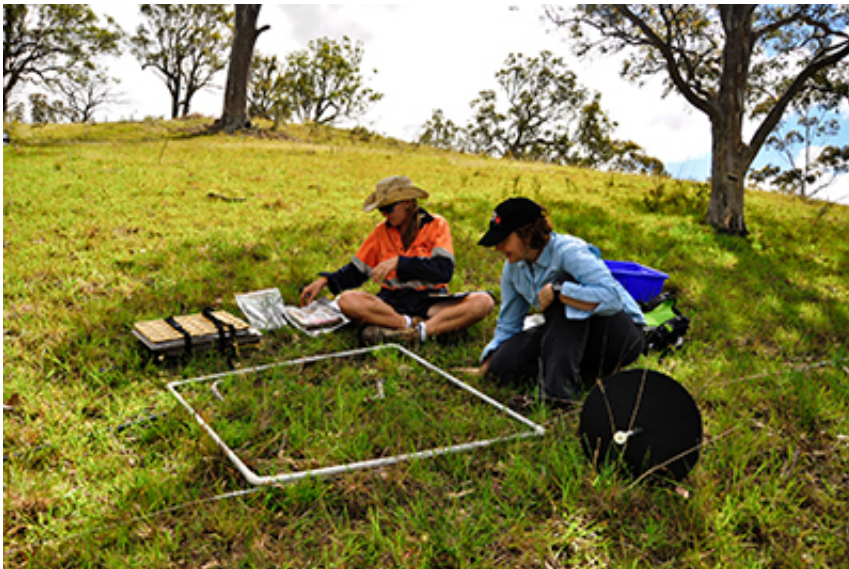


An unbalance in nutrients threatens plant biodiversity

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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: Queensland University of Technology

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 prestigious *Nature* journal.

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 aboveground for light.

"This will in turn evoke competition between species, leading to one [species](#) dominating the land area."



Australian native grasslands are some of our most threatened ecosystems as they are often wrongly perceived as empty but are instead highly biodiverse. Credit: Queensland University of Technology

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."

More information: W. Stanley Harpole et al. Addition of multiple limiting resources reduces grassland diversity, *Nature* (2016). [DOI: 10.1038/nature19324](https://doi.org/10.1038/nature19324)

Provided by Queensland University of Technology

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