

Phosphorus threatens existence of endangered plants

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Plant species that persist in areas with low availability of phosphorus invest little in sexual reproduction. Due to the increase of phosphorus in their habitats and the fragmentation of low-phosphorus areas, these plant species, which already are on the 'red list', are under threat of going extinct. This issue was raised by researchers of Utrecht University, Wageningen University and other universities in their publication in *Nature*.

Professor Martin Wassen (Universiteit Utrecht), research leader, had already pointed out in a 2005 issue of *Nature* that dozens of [plant species](#) on the 'red list' were threatened with extinction by the increase of phosphorus in their habitats. These species are common in low-fertility soils, such as dune valleys, wet grasslands and peat bogs. It was, however, unclear why these particular species were so vulnerable. The first author Dr Yuki Fujita and her colleagues investigated this further with 491 plant species in 599 (semi-) [natural ecosystems](#) in 9 countries across Europe and in Siberia.

Extra vulnerable

Fujita: "We discovered that plants that are able to survive in low-phosphorus soils invest little in [sexual reproduction](#). They flower in a short period of time or they do not produce many seeds. That is a useful adaptation in those conditions, as sexual reproductive organs require lots of phosphorus".

This adaptation makes these plant species extra vulnerable, since phosphorus-poor ecosystems are becoming scarcer and more scattered. "These species produce so few seeds that they have difficulty spreading out across large distances. This means they are essentially trapped in the few low-phosphorus areas that are still around. In order to prevent them from going extinct, we need to take urgent measures," says Wassen.

Necessary measures

Many soils are phosphorus-saturated and it will take decades to recover the original levels. As with nitrogen, there should be statutory regulations for phosphorus, according to the researchers. Furthermore, the existing low-fertility natural ecosystems should be adequately protected. In a number of areas with high levels of [phosphorus](#), the soil can be restored through water management and sod-cutting. Wassen: "In the end, we can preserve these unique plant species only if Europe is going to invest in a sufficiently robust and close-knit network of low-fertility nature reserves."

More information: "Low investment in sexual reproduction threatens plants adapted to phosphorus limitation." Yuki Fujita, Harry Olde Venterink, Peter M. van Bodegom, Jacob C. Douma, Gerrit W. Heil, Norbert Hölzel, Ewa Jabłońska, Wiktor Kotowski, Tomasz Okruszko, Paweł Pawlikowski, Peter C. de Ruiter, Martin J. Wassen, *Nature* (2013) [DOI: 10.1038/nature12733](https://doi.org/10.1038/nature12733). 17 November 2013

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