

Fertilization intensifies competition for light and endangers plant diversity

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When grasslands are fertilized their productivity is increased but their plant diversity is diminished. In the last 50 years levels of plant-available nitrogen and phosphorous have doubled worldwide. This additional supply of plant nutrients is predicted to be one of the three most important causes of biodiversity loss this century. The research, under the leadership of Professor Andy Hector from the University of Zurich, shows for the first time the exact mechanisms that lead to the loss of biodiversity from grasslands following fertilization.

Competition Following the 'Winner-takes-all' Principle

Different plant species profit from nutrient addition to different degrees with some species growing much faster than before. Consequently, some understory species are overgrown by their faster growing neighbours, shaded and without access to sufficient sunlight eventually die out. With the help Pascal Niklaus from the ETH Zurich, researchers from the University of Zurich established an ingenious experiment where they added artifical light to the understory of fertilized grasslands. This additional light countered the negative effects of fertilization and prevented the loss of plant diversity. Counter to earlier beliefs, competition for soil nutrients had no influence on changes in grassland diversity.

"This study is the first direct experimental proof that competition for



light is the main mechanism of plant biodiversity loss after fertilization," says Yann Hautier summarizing the results of his PhD work. "The addition of nutrients causes competition for the vital sunlight to follow a 'winner-takes-all' principle."

Consequences for Management of Grasslands

Competition for light following eutrophication is one of the main causes of the loss of plant diversity. The results of the work from Hector's research group have implications for sustainable management of <u>grasslands</u> and for the development of conservation policy. "Our research shows that it is necessary to control nutrient enrichment if plant diversity is to be conserved in the long term," concludes Andy Hector.

<u>More information:</u> Yann Hautier, Pascal A. Niklaus, Andrew Hector: Competition for Light Causes Plant Biodiversity Loss Following Eutrophication, in: *Science* (Volume 324, Issue 5927)

Source: University of Zurich

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