

Ecosystems cope with stress more effectively the greater the biodiversity

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Ecosystems with a high degree of biodiversity can cope with more stress, such as higher temperatures or increasing salt concentrations, than those with less biodiversity. They can also maintain their services for longer, as botanists and ecologists from the universities of Zurich and Göttingen have discovered. Their study provides the first evidence of the relationship between stress intensity and ecosystem functioning.

Higher [average temperatures](#) and increasing salt concentrations are stress factors that many ecosystems face today in the wake of climate change. However, do all ecosystems react to stress in the same way and what impact does stress have on [ecosystem services](#), such as biomass production? [Botanists](#) and ecologists from the universities of Zurich and Göttingen demonstrate that a high level of biodiversity aids [stress resistance](#).

Higher number of species leads to greater stress resistance

The scientists studied a total of 64 species of single-celled [microalgae](#) from the SAG Culture Collection of Algae in Göttingen. These are at the bottom of the food chain and absorb environmentally harmful CO₂ via photosynthesis. "The more species of microalgae there are in a system, the more robust the system is under moderate stress compared to those with fewer species," says first author Bastian Steudel, explaining one of the results. Systems with a higher number of species can thus keep their

biomass production stable for longer than those with less biodiversity.

In all, the researchers studied six different intensities of two stress gradients. In the case of very high intensities, the positive effects of biodiversity decreased or ceased altogether. However, increasing stress in systems with few species had a considerably more negative impact than in those with high biodiversity levels. "The study shows that a high degree of biodiversity under stress is especially important to maintain biomass production," says Steudel's PhD supervisor Michael Kessler, summing up the significance of the research project.

More information: Bastian Steudel, Andy Hector, Thomas Friedl, Christian Löffke, Maike Lorenz, Moritz Wesche, Michael Kessler. Biodiversity effects on ecosystem functioning change along environmental stress gradients. *Ecology Letters*. 4 September, 2012. [doi: 10.1111/j.1461-0248.2012.01863.x](https://doi.org/10.1111/j.1461-0248.2012.01863.x)

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