

Nitrogen addition and experimental drought simplify arthropod network in temperate grassland

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Researchers from the Institute of Applied Ecology of the Chinese Academy of Sciences (CAS) and the Nanjing University have found that

nitrogen (N) addition and experimental drought reduced the complexity of arthropod networks.

The study published in *Functional Ecology*.

Biodiversity is under threat from [global change](#). Efforts to elucidate the mechanisms underlying the influence of global change focus mainly on [species diversity](#), but neglect the network of their interactions, which is essential for maintaining biodiversity and ecosystem functions.

Moreover, multiple drivers of global change are typically studied separately, rather than in concert, which is more realistic in nature.

In this study, the researchers conducted a two-year field experiment at the Erguna Forest-Steppe Ecotone Research Station in northern China. They examined the relationship between the complexity and stability of arthropod networks with [plant communities](#) and microhabitats to elucidate the drivers of the changes in arthropod networks in grasslands under nitrogen addition, drought and delayed snowmelt.

According to the researchers, the effects of nitrogen addition and drought on the arthropod networks are different. Nitrogen addition decreased arthropod network complexity because increased foliar N and simplified plant communities strengthened trophic chains along a single pathway, weakening the net effect of other pathways. Experimental drought reduced network complexity by filtering out [plant species](#) and altering microhabitats.

They also found that delayed snowmelt significantly increased arthropod abundance only in [early spring](#), and showed mixed effects on arthropod diversity and abundance when combined with simulated nitrogen deposition and/or summer drought.

These results highlight the need to study multiple global change drivers

together, even if they occur in different seasons, to most realistically simulate their effects.

More information: Bingchuan Zhang et al, Nitrogen addition and experimental drought simplified arthropod network in temperate grassland, *Functional Ecology* (2023). [DOI: 10.1111/1365-2435.14341](https://doi.org/10.1111/1365-2435.14341)

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