Elevated carbon dioxide suppresses dominant plant species in a mixed-grass prairie

A large field experiment conducted in a northern U.S. Great Plains mixed-grass prairie was led by a research team from the University of Wyoming. The scientists tested the effects of elevated carbon dioxide, warming, and summer irrigation on plant community structure and productivity. This study sought to understand changes to stability in the community's composition and to biomass production.

Investigators found that (1) the independent effects of carbon dioxide and warming depend on interannual variation in precipitation and (2) the effects of elevated carbon dioxide are not limited to water saving because they differ from those of irrigation. Also shown was that production in this prairie ecosystem is not only relatively resistant to interannual variation in precipitation, but also rendered more stable under elevated carbon dioxide conditions. This increase in production stability resulted from altered community dominance patterns; that is, community evenness increases as dominant species decrease in biomass under elevated carbon dioxide.


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