Grassland restoration reveals the importance of ecotypic variation on community assembly along a longitudinal aridity gradient

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The problem:

- Two dominant species, *Andropogon gerardii* and *Sorghastrum nutans*, have a wide distribution across the Great Plains (USA) and are widely used in restorations
- Although genotypic and phenotypic differentiation among the ecotypes of dominant species have been studied, it is still uncertain how ecotypic diversity affects grassland community assembly

What we did:

- We established reciprocal common gardens at four sites across a 1048.70 km aridity gradient from 520 mm·yr⁻¹ precipitation in the west (Colby, KS) to 1201 mm·yr⁻¹ in the east (Carbondale, IL)
- Ecotypes of the two dominant species were seeded along with a prairie seed mix according to a randomized complete block design
- Species composition was measured after 4 and 8 years

What we found:

1. Community diversity:

species richness decreased significantly at the site with lowest aridity stress (Carbondale, IL) while phylogenetic and functional diversity maintained at the same level among ecotypes of dominant species along the aridity gradient

2. Community structure:

We found community structure differed among dominant species' ecotypes and restoration stages in all sites along the aridity gradient by applying a combination of multivariate analyses (PERMANOVA & NMDS).

A common garden in Hays, KS, USA
Colors represent different ecotypes:
●: SIL; ●: EKS
●: CKS; ●: MIX

Questions & more info?

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The questions:

How do dominant species' ecotypes influence:

- community diversity?
- community structure?

What it means: Because ecotype significantly affected species richness and shaped community structure, restorations should consider ecotypic variation as a critical biological filter to community assembly in grassland ecosystems