BRC Science Highlight
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Comparative Establishment and Yield of Bioenergy Sorghum and Maize Following Pre-Emergence Waterlogging

Background/objective

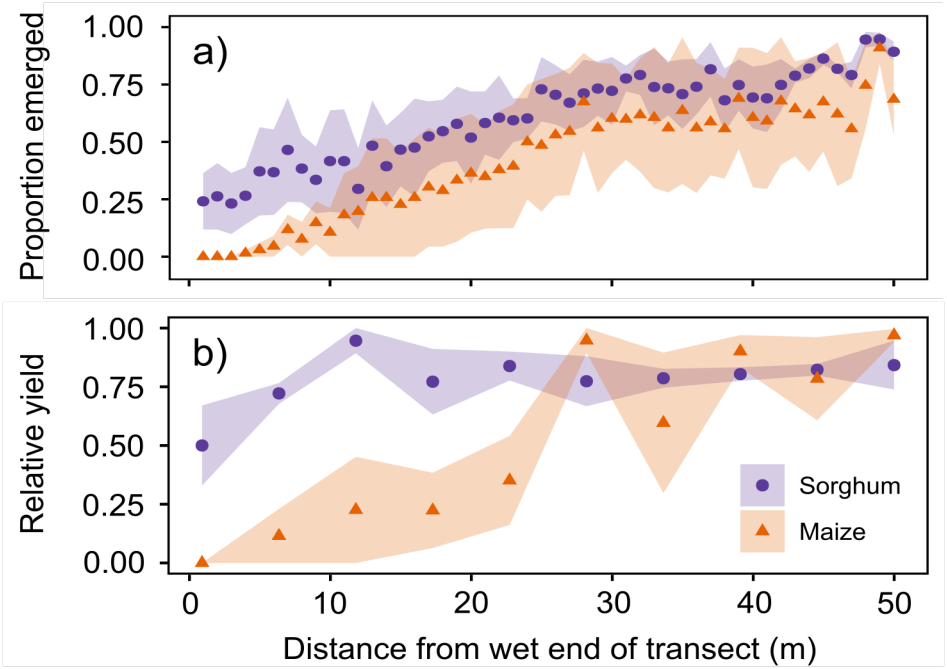
Early-season soil waterlogging, which often occurs in low-lying landscape areas, is expected to increase in the U.S. Midwest as a result of greater springtime precipitation. Soil waterlogging often leads to reduced plant establishment and yields in annual cropping systems, but bioenergy sorghum has seldom been studied within this context. Our objective was to compare the establishment and yields of bioenergy sorghum and maize following severe pre-emergence soil waterlogging.

Approach

- Transects were established in maize (*Zea mays* L.) and bioenergy sorghum (*Sorghum bicolor* (L.) Moench) at the University of Illinois Energy Farm.
- The transects spanned from low-lying waterlogged to higher well-drained areas.
- Plant emergence, leaf area index, stem count, and yields were assessed.

Results

- In the severely waterlogged areas, bioenergy sorghum emergence rates were about 25% of those in well-drained areas, and maize did not establish (a).
- Sorghum yields in the waterlogged areas were 50% of those achieved in the well-drained areas (b), which was greater than expected based on establishment (a).
- Greater leaf area index per plant help explain the sorghum yield compensation in the waterlogged areas.



Proportion of plants emerged (a) and relative total dry biomass yield (b) of bioenergy sorghum and maize. The most severe waterlogging occurred near the wet end of the transect (left), while further distances remained well-drained (right).

Significance

- Compared to maize, bioenergy sorghum appears better suited for cultivation in low-lying areas that are prone to ephemeral soil waterlogging.
- Future studies evaluating the waterlogging tolerance of bioenergy sorghum could help select for varieties that have greater potential on low-lying, marginal soils.

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