

# Multi-year and Multi-site Establishment of the Perennial Biomass Crop *Miscanthus × giganteus* Using a Staggered-Start Design to Elucidate N Response

## Background/objective

*Miscanthus × giganteus* yield response to nitrogen (N) fertilization remains poorly understood. We used a novel experimental design to clarify understanding of *M. × giganteus* N needs.

## Approach

❖ We conducted a staggered-start experiment with three planting years and five N rates at three sites across Iowa (Fig. 1) in order to separate previously confounded environmental and stand-age effects.

## Results

❖ N response is strongly influenced by establishment conditions such as location but also rhizome quality, weather, soil, and crop husbandry (Fig. 2).

## Significance

❖ Staggered-start experiments can be useful in assessing sources of variability in perennial crop performance and reducing uncertainty in bioenergy crop assessments.

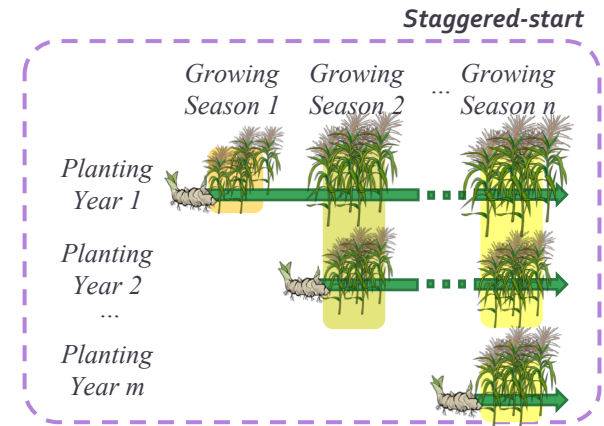


Figure 1: Schematic of experimental design.

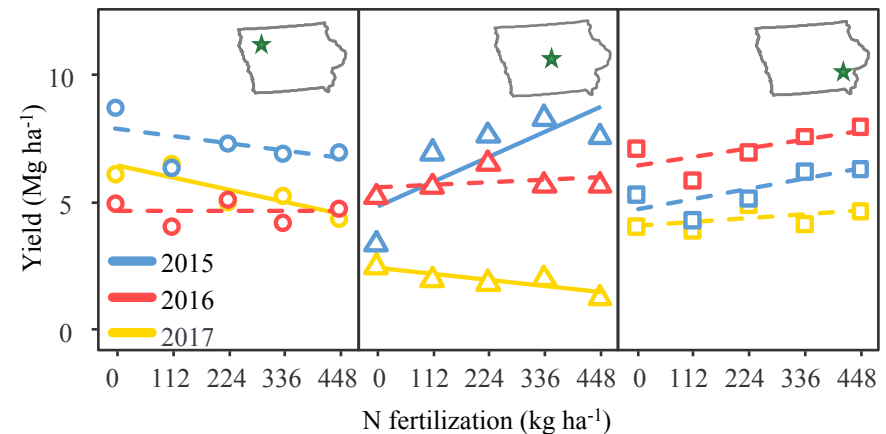


Figure 2: One-year-old *M. × giganteus* yield response to N fertilization at three sites across Iowa from three consecutive planting years.