Advances in *Miscanthus x giganteus* Planting Techniques May Increase Carbon Uptake in the Establishment Year

Background/Objective

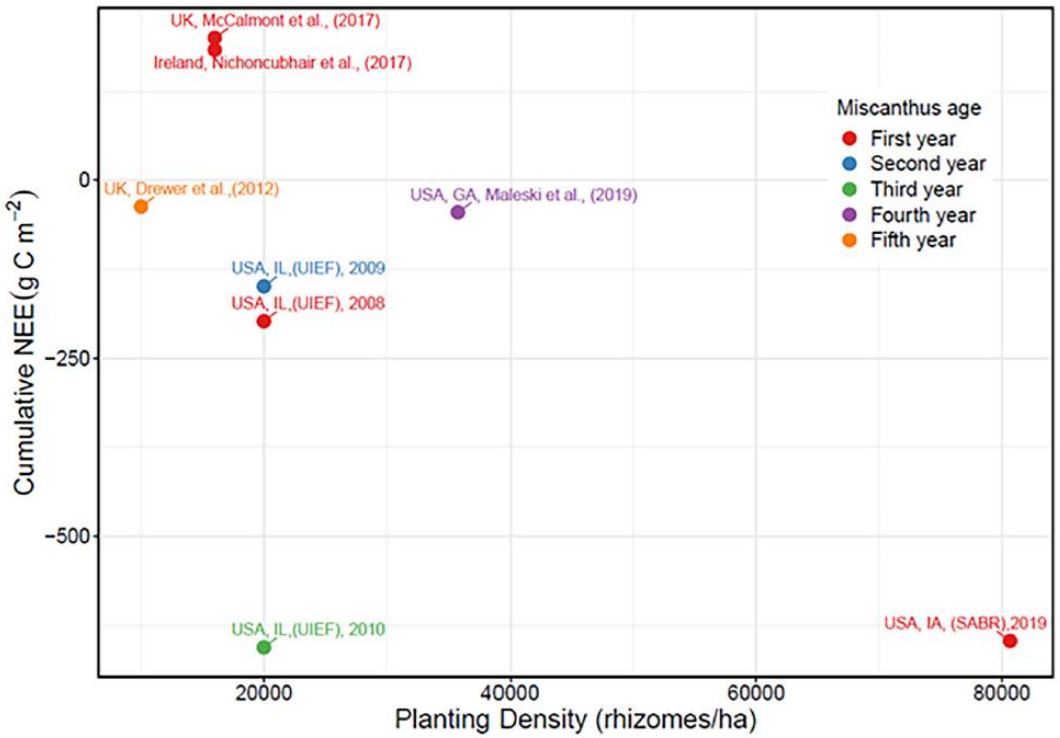
- Agricultural lands hold significant potential for carbon (C) sequestration, especially when utilizing biomass crops and agricultural residues.
- This study examines the C uptake potential of *Miscanthus x giganteus* (*mxg*), a perennial bioenergy grass at the Sustainable Advanced Bioeconomy Research (SABR) farm in IA, USA, where it was planted at a higher density than in previous studies.

Approach

Eddy covariance (EC) measurements were used to quantify the net ecosystem C exchange (NEE) and derive gross primary productivity (GPP) and ecosystem respiration (R_{eco}) for the first establishment year of *mxg* planted at the SABR site at a density of 80,000 rhizomes/ha.

Results

SABR *mxg* C uptake (-621g C m^{-2}) was approximately threefold higher than at a similar EC site at the University of Illinois Energy FARM (UIEF) which was established at lower planting density using pre-commercial planting equipment. Favorable growing conditions and advanced planting technologies likely contributed to the high C uptake at SABR. Comparison with other global EC studies of *mxg* indicated a strong positive correlation between planting density and C uptake.



Cumulative NEE values for *mxg* at different ages and planting densities as reported in the literature and including data from the first establishment year at SABR.

Significance/Impacts

This work demonstrates the potential of optimized *mxg* management to make significant contributions to CO_2 uptake and supports bioenergy with carbon capture and storage (BECCS) as a viable climate change mitigation strategy.

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