

Evaluation of Biomass Production by Perennial Grasses in Eastern Ontario

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Introduction

The abundance of marginal land in eastern Ontario and its proximity to major industrial areas in the heart of North America could give this region a golden opportunity in the production of biomass crops. Perennial grasses are more efficient than corn or soybeans in reducing GHG emissions. Several species native to the tallgrass prairie might be promising for biomass production. The objective of this study is to evaluate the effect of planting densities and nitrogen fertilizer rates on biomass production from five prairie perennial grass species/varieties.

Results and Discussion

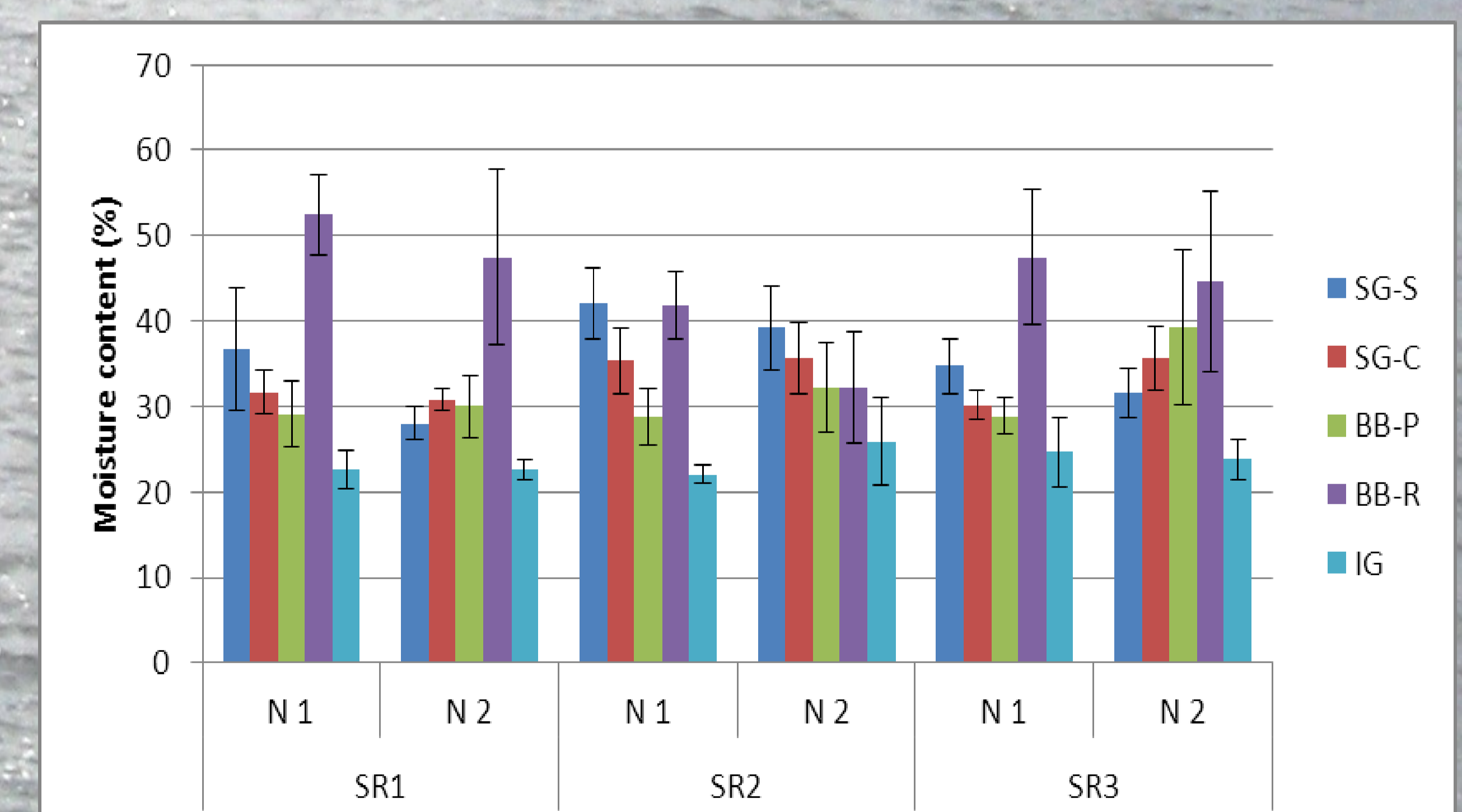
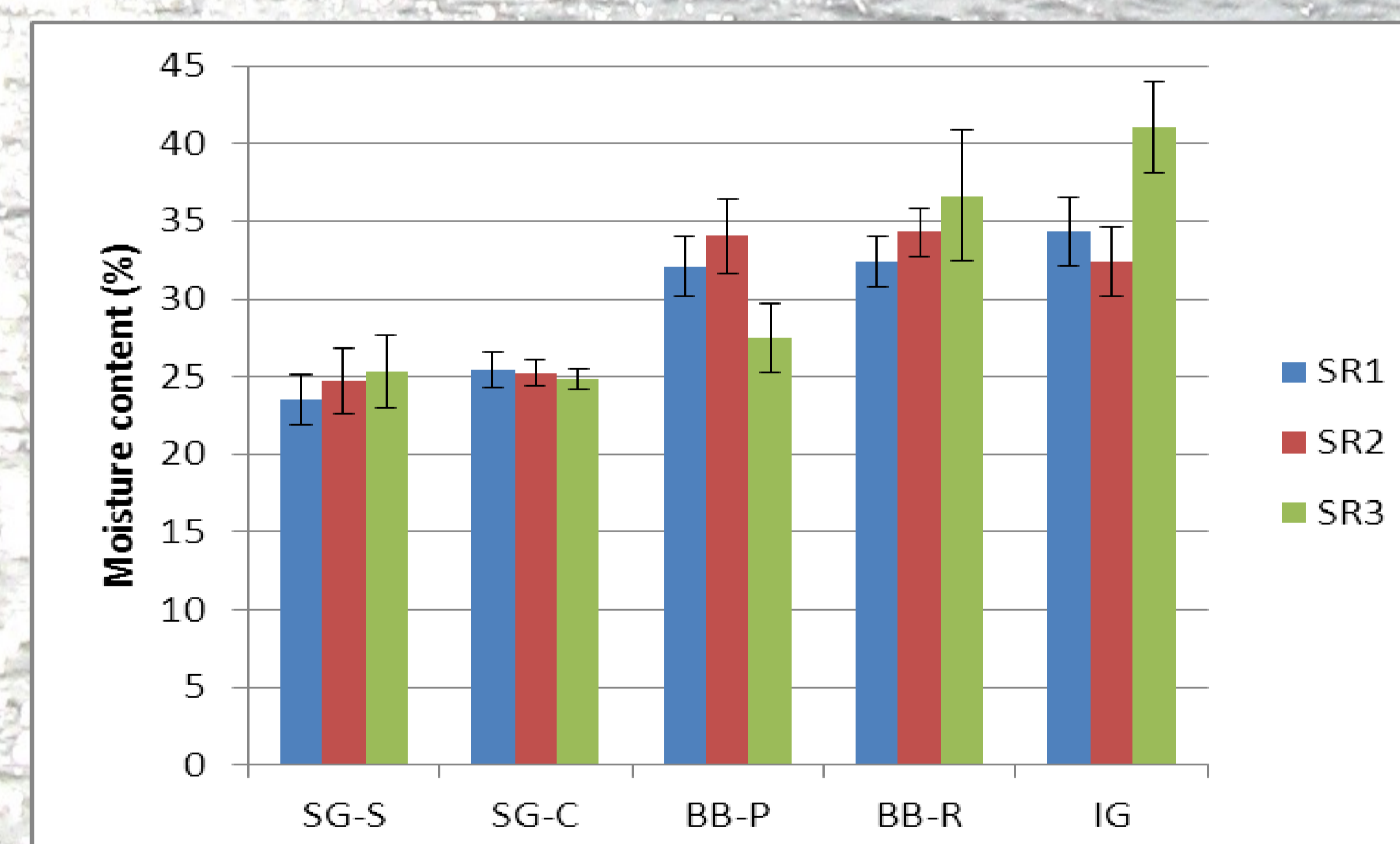
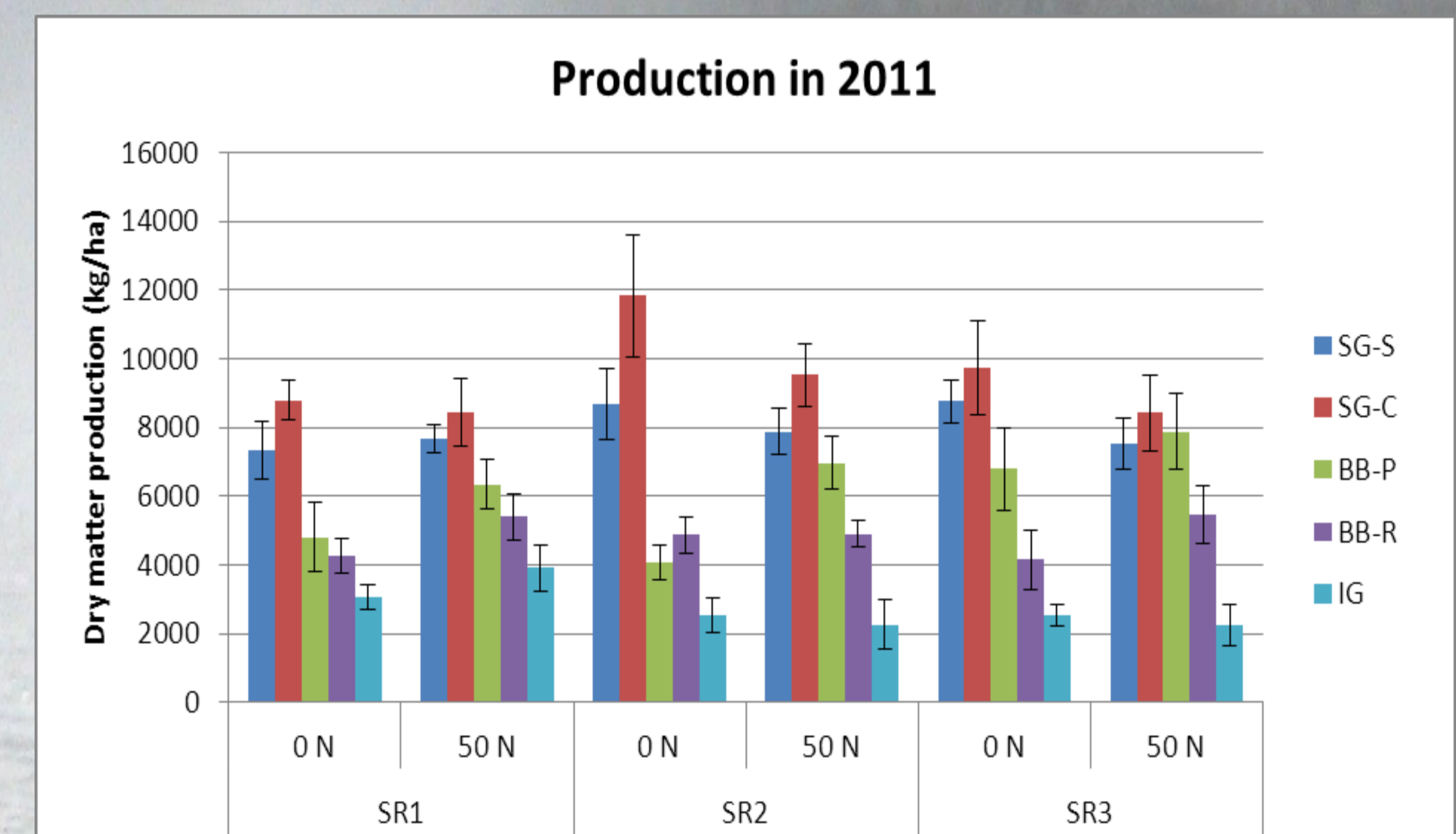
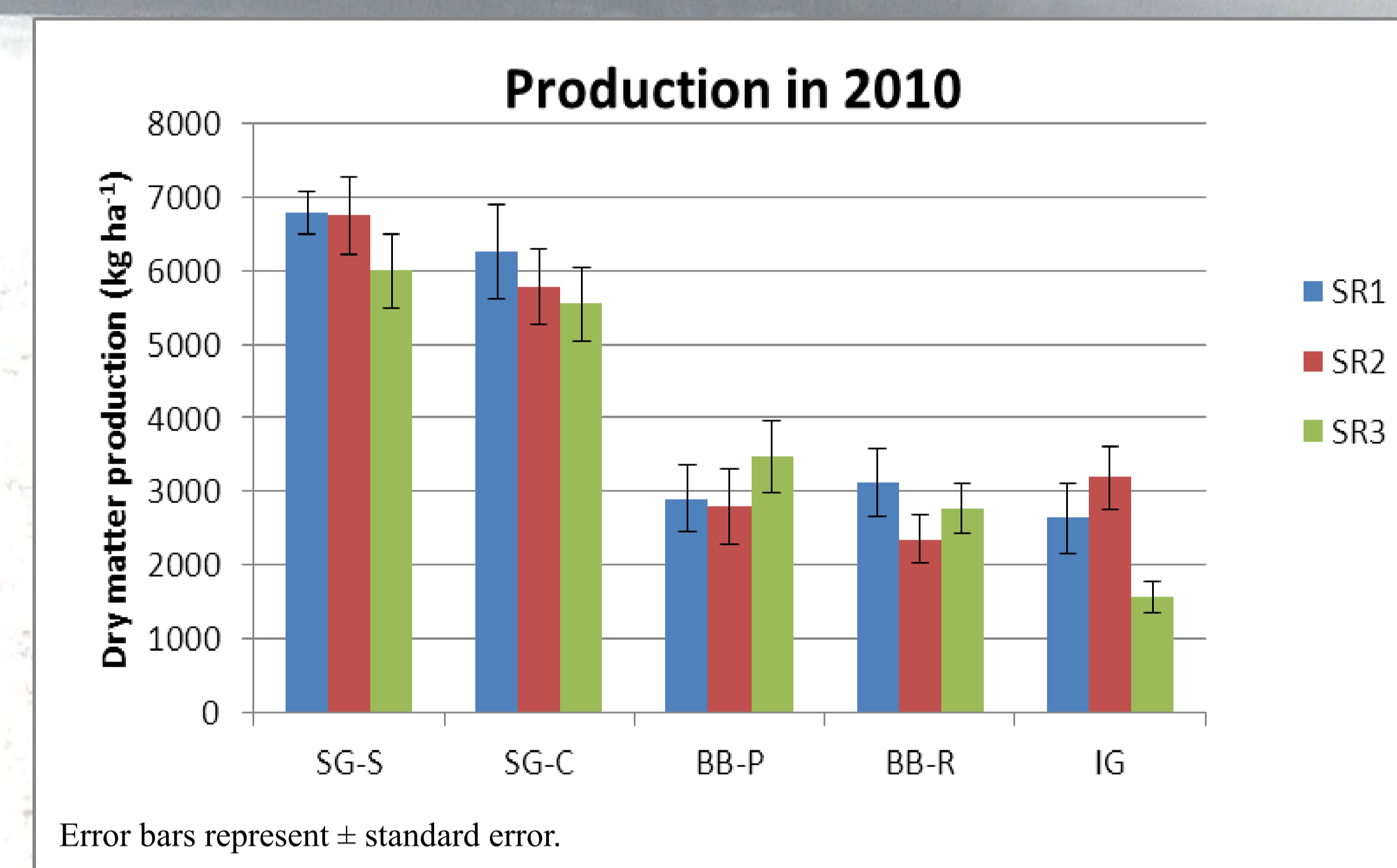
SG-S was the highest producer in 2010 with an average biomass production of 6.51 Mg/ha, followed by SG-C (5.86 Mg/ha). Big bluestem varieties produced around 3.00 Mg/ha, while Indiangrass averaged only 2.56 Mg/ha. In 2011, biomass production jumped in all grasses, especially in BB-P (+98%) and SG-C (+62%). SG-C topped all grasses, with 11.8 Mg/ha for treatment SR2-N1. SG-S had an earlier senescence than SG-C. BB-P ranked third in terms of production with 7.88 Mg/ha for treatment SR3-N2. Seeding rate did not affect production except for SG-C in 2011, where the medium seeding rate resulted in the highest biomass yields. N application increased production only in big bluestem. Moisture content at harvest was species dependent and was not affected by the seeding rate or nitrogen application. With the stands reaching their peak production, this study shows the high production potential for some of these grasses under Ontario conditions. Among the studied species and varieties, SG-C proved to be the most promising thanks to its high productivity and low moisture content at harvest. The effect of nitrogen will be monitored for a longer period of time given the increasing nutrient removal by the crop.

Materials and Methods

Five perennial species/varieties were seeded in June 2009 in eastern Ontario to evaluate their biomass production potential. The plant material included:

- Two switchgrass (*Panicum virgatum* L.) varieties: Sunburst (SG-S) and Cave-in-Rock (SG-C),
- Two big bluestem (*Andropogon gerardii* Vit.) varieties: Prairie-View (BB-P) and Rountree (BB-R), and
- Indiangrass (*Sorghastrum nutans* Nash.) variety Holt.

The crops were seeded in a loamy sandy soil with three seeding rates; 10, 14 and 18 lb PLS/ac, referred to as SR1, SR2, and SR3, respectively. No fertilizer was added in 2010. In 2011, treatment N2 received 50 kg N/ha while no nitrogen was applied to treatment N1. The crop biomass production and harvest moisture content were determined in November 2010 and December 2011.



Conclusions

Biomass production and moisture content at harvest were species dependent. Cave-in-Rock switchgrass production outperformed all other entries, with some plots exceeding 12 Mg/ha. Seeding densities and nitrogen applications did not have significant effects on biomass production.

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