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Seeding Rate Effects on Establishment Year Growth and Development and Long-term Forage Yield of Indiangrass

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Objective

To evaluate seeding rate effects on dry matter yield and tiller development of two indiangrass [*Sorghastrum nutans* (L.) Nash] cultivars.

Introduction

Continued development of cellulosic biofuels, forages, and conservation using perennial grasses depends on rapid production of high biomass yields and forage quality (Mitchell and Vogel, 2004). While there is much available information on other warm-season perennial grasses, there is little available on proper seeding rates for establishing indiangrass [*Sorghastrum nutans (L.)* Nash]. Recent increases in forage yield and nutritive value of indiangrass, along with its wide range of adaptation should enhance its bioenergy, forage, conservation, and reclamation use in the Central Great Plains.

Figure 1. Indiangrass sward sampling to determine tiller number and growth stage.

Materials and Methods

- Location: Mead, NE from 2003 to 2006.
- Two indiangrass cultivars (*NE54* and *Oto*) were seeded at a rate of 100, 200, 300, 400, or 500 PLS m^{-2}.
- Seeded May 15, 2003 using a Hegi plot drill with 15-cm row spacing.
- Plateau [(±)-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-5-methyl-3-pyridinecarboxylic acid]) was applied at 1.6 mL ha^{-1} as a pre-emergent weed control on the herbicide-treated plots.
- No fertilizer was applied during the establishment year.
- Plots were fertilized with 112 kg N ha^{-1} beginning the spring of the second growing season and each subsequent year.
- Vegetation was mowed to a 15-cm stubble height as needed on the non-treated plots.
- Forage yield was determined using a flail harvester at the end of each growing season.
- Tiller counts were determined by counting the tillers in a clipped 0.065 m^{-2} frame (Figure 1). Tillers were staged (Moore et al. 1991) to assess development during the establishment year.

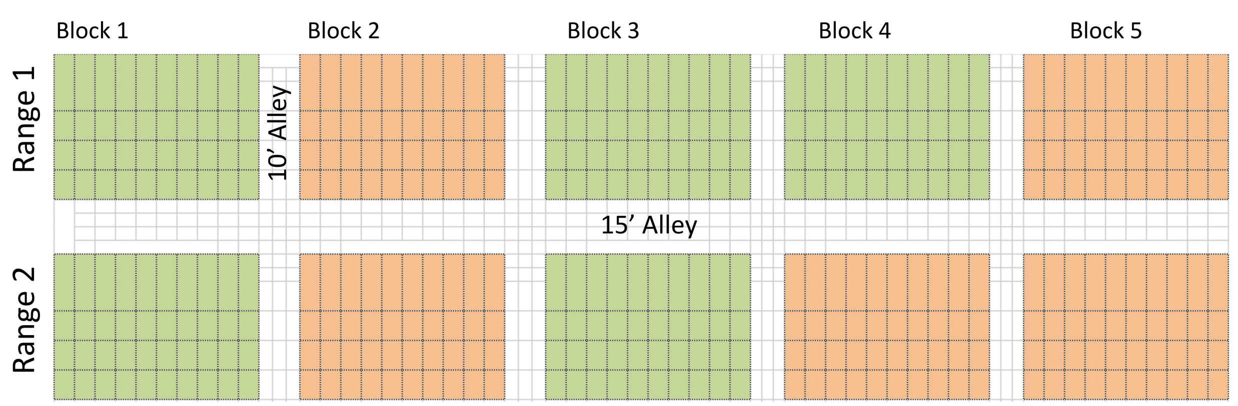

Figure 2: Field plot layout consisting of 2 ranges of 5 blocks with 10 rows to total 5 replicates for each treatment. Green blocks were Plateau treatments and orange blocks were mow treatments.

Tiller Development

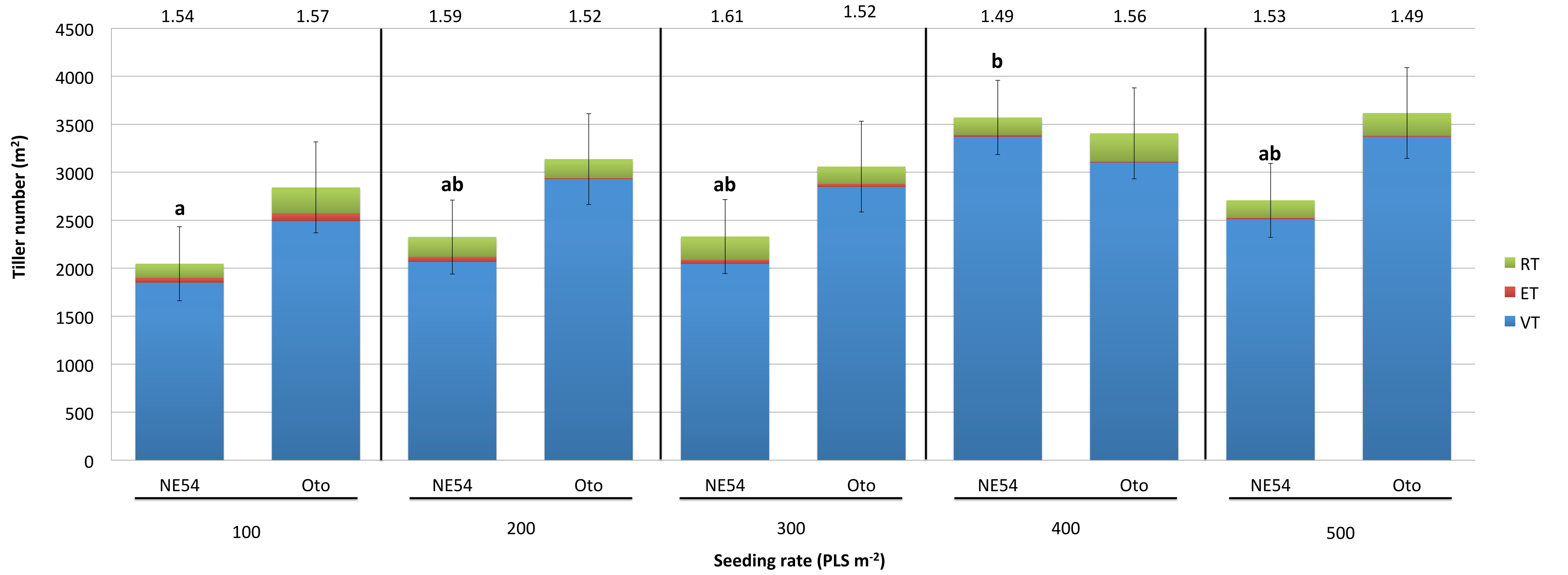

Figure 3: Tiller number and growth stage of *NE54* and *Oto* indiangrass during the establishment year. RT= reproductive tillers, ET= elongating tillers, VT= vegetative tillers. Values above tiller number are mean stage count .

Forage Yield

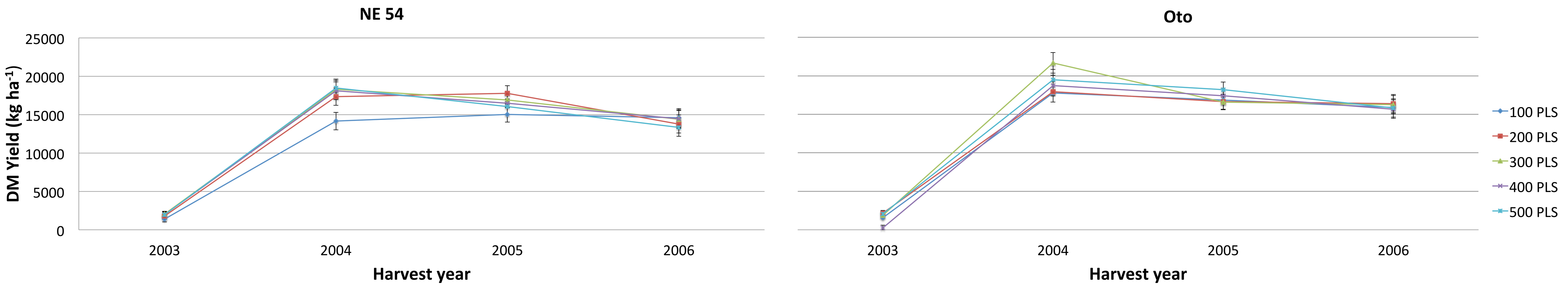

Figure 4: Seeding rate effects on dry matter yield of *NE 54* and *Oto* indiangrass averaged across weed control treatments

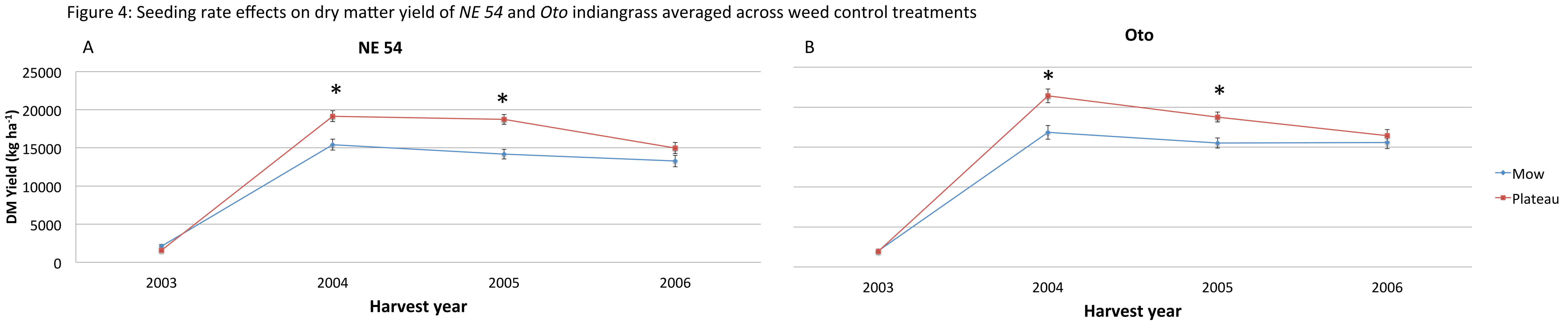

Figure 5: Weed control effects on dry matter yield of *NE 54* and *Oto* indiangrass averaged across seeding rate.

Summary and Conclusions

- Tiller number during the establishment year was nearly always greater for ***Oto*** than ***NE 54*** across all seeding rates.
- For ***NE 54***, tiller number was similar for the 100, 200, 300, and the 500 PLS m^{-2} seeding rates, with the 400 PLS m^{-2} seeding rate having 40% more tillers than the 100 PLS m^{-2} seeding rate during the establishment year.
- Dry matter yield was greater for ***Oto*** than ***NE 54*** across all seeding rates.
- Increasing seeding rates above 200 PLS m^{-2} did not increase DM yield.
- However, DM yield in the herbicide treatments was 20% greater compared with the mowed treatments for both cultivars in 2004 and 2005.
- Although seeding rate did not increase DM yield, the importance of early weed management at low seeding rates is clearly demonstrated in early stand production.

Literature Cited

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