

# Evaluation of Tetraploid Bahiagrass Lines Under Grazing

Haley A. Hayes<sup>1</sup>, Nicolas Caram Fernandez Villanueva<sup>1</sup>, Marcelo O. Wallau<sup>2</sup>, Lynn E. Sollenberger<sup>3</sup>, and Kevin E. Kenworthy<sup>1</sup>,

(1)Agronomy, University of Florida, Gainesville, FL, (2)PO Box 110500, University of Florida, Gainesville, FL, (3)3105 McCarty Hall B, PO Box 110500, University of Florida, Gainesville, FL

## Introduction

Bahiagrass is a prominent grazing forage in the southeastern US. Tetraploid types (i.e. 'Argentine') possess a high tolerance to heavy grazing and fewer inflorescences compared to diploid types (i.e. 'Pensacola'). However, Argentine is less productive in spring, and less cold tolerant. Given the apomitic nature of tetraploid bahiagrass, few number of cultivars available in the market.

The main **objective** of this study was to evaluate the agronomic performance and persistence of newly developed tetraploid lines under grazing for potential future cultivar release.

## Methods

Nine tetraploid bahiagrass lines (developed by UF forage breeder's) and Argentine were tested under grazing with a mob stocking technique. Trial was conducted at the UF-IFAS Beef Research Unit in Gainesville, FL from May/June-October in 2020 and 2021. Productivity, nutritive value, and persistence responses were measured.

- CRBD with split-plot arrangement, 4 replicates.
- Main plot: grazing treatment
  - "Intensive": 5-cm stubble, 2-week interval
  - "Moderate": 10-cm stubble, 4-week interval
- Sup-plot - 10 entries



Figure 1: Core sampling to assess root-rhizome mass and reserves.

## Forage Accumulation

Table 1 Breeder's lines annual forage accumulation for 2020 and 2021 and Intensive and moderate grazing

|                  | 3Fpen8               | A4EMS               | M6Alt               | M34                 | FPN1901              | M98Alt              | M27                  | Hybrid 3           | Hybrid 93         | Argentine           | SE  |
|------------------|----------------------|---------------------|---------------------|---------------------|----------------------|---------------------|----------------------|--------------------|-------------------|---------------------|-----|
| <b>Year</b>      | kg ha <sup>-1</sup>  |                     |                     |                     |                      |                     |                      |                    |                   |                     |     |
| <b>2020</b>      | 7900 <sup>Aab</sup>  | 7700 <sup>ab</sup>  | 7500 <sup>Ab</sup>  | 7600 <sup>Ab</sup>  | 7700 <sup>Ab</sup>   | 8300 <sup>Aab</sup> | 7400 <sup>b</sup>    | 7800 <sup>ab</sup> | 9000 <sup>a</sup> | 7000 <sup>Ab</sup>  | 282 |
| <b>2021</b>      | 5700 <sup>Bbc</sup>  | 6400 <sup>b</sup>   | 5000 <sup>Bc</sup>  | 5300 <sup>Bbc</sup> | 5800 <sup>Bbc</sup>  | 5800 <sup>Bbc</sup> | 6100 <sup>bc</sup>   | 8700 <sup>a</sup>  | 9300 <sup>a</sup> | 5100 <sup>Bbc</sup> |     |
| <b>Treatment</b> |                      |                     |                     |                     |                      |                     |                      |                    |                   |                     |     |
| <b>Intensive</b> | 7700 <sup>Abc</sup>  | 7600 <sup>c</sup>   | 7100 <sup>Ac</sup>  | 7500 <sup>Ac</sup>  | 7700 <sup>Abc</sup>  | 7100 <sup>c</sup>   | 7900 <sup>Abc</sup>  | 9000 <sup>ab</sup> | 9300 <sup>a</sup> | 7000 <sup>Ac</sup>  | 307 |
| <b>Moderate</b>  | 5800 <sup>Bcde</sup> | 6500 <sup>bcd</sup> | 5300 <sup>Bde</sup> | 5400 <sup>Bde</sup> | 5700 <sup>Bcde</sup> | 6900 <sup>bc</sup>  | 5600 <sup>Bcde</sup> | 7500 <sup>b</sup>  | 9000 <sup>a</sup> | 5100 <sup>Be</sup>  |     |

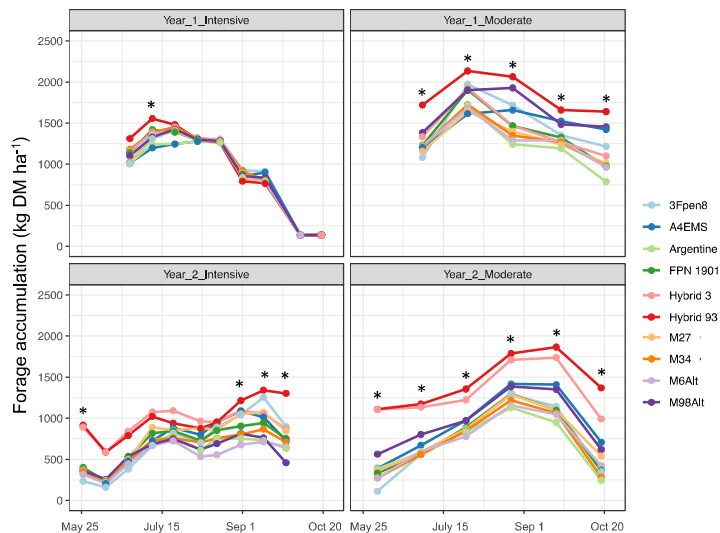


Figure 2 Breeder's lines annual forage accumulation for 2020 and 2021 and each grazing treatment.

## Biomass cover and tiller dynamics

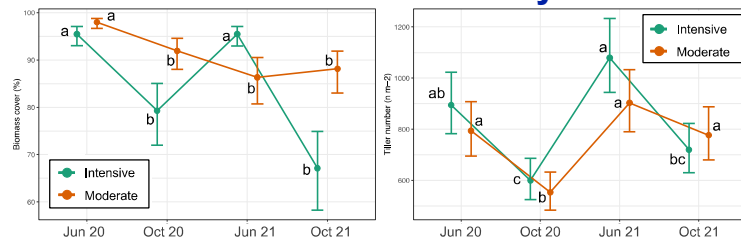


Figure 3 Seasonal biomass cover (left) and tiller number (right) for intensive and moderate grazing. Vertical bars indicate confidence interval and letters indicate statistical differences between seasons within grazing treatment.

## Results

- Intensive treatment resulted in more harvested biomass, but reduced bahiagrass cover after 2 years of grazing.
- Hybrid 93 and Hybrid 3 outperformed Argentine on biomass production, and had greater earlier and overall seasonal production.
- No major improvements were done in terms of nutritive value (not shown). Mostly affected by season (summer slump) and treatment.
- Total non-structural carbohydrates (TNC) on roots were dependent on season but not affected by treatment (not shown)



Figure 4: Cattle grazing intensive treatment main plot.

## Conclusions

- Multiple lines outperformed Argentine in forage accumulation and performed as well or better for nutritive value and persistence responses.
- Tilling and root-rhizome responses indicated that most entries are persistent under moderate and intensive grazing stress.
- Next steps: superior lines, including Hybrid 93 and FPN 1901, may be considered for additional field testing before cultivar release.

