Productivity of “Tifton-9” Bahiagrass at Different Fertilizer Treatments and Cutting Intervals

C.B. Stewart¹, P.A. Beck¹, P.K. Capps¹, and R. Dollar²

Story in Brief

A small plot demonstration study was used to determine the dry matter yield of bahiagrass at different fertilizer treatments and harvest intervals. Half of the plots were fertilized using chicken litter and 1 of 4 fertilizer treatments supplying 0, 50, 100, and 150 lb N/acre from ammonium nitrate and 1 of 3 cutting intervals (2, 4, and 6 wk). The other half received the N treatments without litter. Yield/harvest was affected by the addition of chicken litter (P < 0.0001), harvest interval (P < 0.0001), (N) rate (P < 0.0001), and the interactions of (N) rate by harvest interval (P < 0.0001) and chicken litter by harvest interval (P = 0.0181). Cumulative yields increased linearly (P < 0.0001) with increasing rate of N. Cumulative yields were greater (P < 0.0001) when litter was added (3,511 vs. 3,016 lb/acre). Harvest interval cumulative yields were greater (P < 0.0001) for 6 and 4 week maturities than it was at 2 weeks (3,610, 3,475, and 2,706 lb/DM/acre, respectively). However, extending the harvest interval to 6 weeks did not increase yield significantly compared to a 4 week harvest interval. There were no interactions found (P > 0.1731) in cumulative yields.

Introduction

Bahiagrass (Paspalum notatum) is a hardy perennial forage that is productive throughout Florida and along the Gulf Coast. Bahia is tolerant of most soil conditions, but it is best adapted to sandy soils. A deep root system allows it to thrive on drought prone soils; however, it can also survive on poorly drained soils. It is more tolerant to acidic soils than most other warm season grass species, also.

Bahiagrass can spread by rhizomes or by seed. It is very aggressive and can grow to a height of 12 to 20 inches. It is mainly productive from April until October and can be used for pasture or hay production.

The purpose of this study was to determine if fertilization treatments had an effect on bahiagrass DM yield when harvested at different maturities. The study was also conducted to determine if split applications of N would be beneficial to forage growth during the later parts of the summer.

Materials and Methods

A field demonstration was conducted at Cornelius Farms near Prescott, AR with ‘Tifton-9’ (Tifton, Ga.) bahiagrass growing on a Kipling loam soil. Soils are deep, somewhat poorly drained, very slowly permeable, and nearly level to gently sloping soils that formed in acid clay underlain with chalk or marl (Hoelscher and Laurent, 1979). On May 12, 2005 thirty-two (10 ft × 20 ft) plots were mowed to a 2-in stubble height using a sickle bar mower. All (wet) clipped forage was weighed, and a subsample was collected and dried to 120°C to determine dry matter. This value was then used to determine yield in lb/acre.

Dry matter yield/harvest (DMY) lb/DM/acre was greater (P < 0.05) at 150 lb/N/acre than it was at 100, 50, and 0 lb/N/acre (1,159 vs. 987, 819, and 595 lb, respectively. Adding commercial fertilizer to plots that had already received chicken litter increased (P < 0.05) yields/harvest (958 vs. 823 lb). Analysis of litter was not collected, but forage responses were equivalent to 50 lb of commercial fertilizer.

Due to rate of N by interval and chicken litter by interval interactions, data were sorted by harvest interval and reanalyzed. Cumulative yield data were also analyzed using PROC GLM of SAS.

Yield harvest was greater (P < 0.05) at the 6 wk harvest interval than it was at the 4 and 2 wk interval (1,805 vs. 1,158 and 451 lb/DM/acre, respectively). Forage maturity was not affected by N-rate application (P = 0.67) or the additional application of chicken litter (P = 0.49). With increasing maturity yield increased (P < 0.05). Maturity stages were vegetative, late boot, and mid inflorescent emergence stages for 2, 4, and 6 wk harvest intervals, respectively. When maturities were compared to those in year 1, ‘Tifton 9’ matured slower (P < 0.05) than ‘Pensacola.’

Results and Discussion

Dry matter yield/harvest (DMY) lb/DM/acre was greater (P < 0.05) at 150 lb/N/acre than it was at 100, 50, and 0 lb/N/acre (1,159 vs. 987, 819, and 595 lb, respectively. Adding commercial fertilizer to plots that had already received chicken litter increased (P < 0.05) yields/harvest (958 vs. 823 lb). Analysis of litter was not collected, but forage responses were equivalent to 50 lb of commercial fertilizer.

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Due to rate of N by interval and chicken litter by interval interactions, data were sorted by harvest interval and reanalyzed. Interactions on yield/harvest between rate of N and interval are shown in Table 1. Yields at the 2-wk harvest interval was greater (P < 0.05) for rate 150 than at rates 100, 50, and 0 (587 vs. 506, 422, and 290 lb/DM/acre, respectively). Yield was greater (P < 0.05) for rate 150 than at rates 100 and 50 which were greater than rate 0 (1,547 vs. 1,270, 1,050, and 767 lb/DM/acre, respectively) at the 4-wk harvest interval. Yield was greater (P < 0.05) for rates 150 and 100 than at rates 50 and 0 (2,294 and 2,009 vs. 1,665 and 1,253 lb/DM/acre, respectively).

1 University of Arkansas Southwest Research and Extension Center, Hope, Ark.
2 Farm Credit Services of Western Arkansas, Mena, Ark.
respectively) at the 6-wk harvest interval. Yield/harvest interactions between litter application and interval are shown in Table 2. The additional application of chicken litter produced more yield ($P < 0.05$) at all 3 harvest intervals. Yield was 479 vs. 423, 1,252 vs. 1,065, and 1,953 vs. 1,657 lb/DM/acre for litter vs. no litter at 2, 4, and 6 wk harvest intervals, respectively. The application of chicken litter was estimated to supply the equivalent of 50 lb commercial N/acre.

Cumulative yield results are shown in Figs. 1, 2, and 3. Rate of N effects were greater ($P < 0.05$) for rate 150 than at rates 100, 50, and 0 (2,420, 3,621, 3,003, and 2,181 lb/DM/acre, respectively) (Fig. 1). Yields increased linearly ($P < 0.05$) with increasing rate of N. Yields were greater ($P < 0.05$) when litter was added (3,511 vs. 3,016 lb/DM/acre) (Fig. 2). Harvest interval yields were greater ($P < 0.05$) for 6 and 4 wk maturities than it was at 2 wk (3,610, 3,475, and 2,706 lb/DM/acre, respectively) (Fig. 3). However, extending the harvest interval to 6 wk did not increase yield significantly compared to a 4 wk harvest interval. There were no interactions found ($P > 0.17$).

### Implications

When Tifton-9 was grown on a loamy soil, increasing N fertilization up to 150 lb/acre continued to increase forage cumulative yield. The application of this poultry litter supplied the equivalent of 30 lb of commercial N. Analysis of litter is recommended to determine how much if any commercial fertilizer is needed. Extending the harvest interval from 4 to 6 wk was not beneficial with regards to forage yield.

### Acknowledgements

Special thanks go to Mr. James Roy Cornelius for allowing us to use part of his ‘Tifton-9’ bahiagrass hay meadow for this study.

### Literature Cited

West C.P. 1990. Page 38-42 in Proc. AFGC.

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**Table 1. Yields/harvest between rates of nitrogen for each interval. Interaction ($P < 0.05$).**

<table>
<thead>
<tr>
<th>Interval</th>
<th>Level of nitrogen (lb/acre)</th>
<th>0</th>
<th>50</th>
<th>100</th>
<th>150</th>
<th>SE</th>
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</thead>
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<tr>
<td>2 Weeks</td>
<td>290 d</td>
<td>422 c</td>
<td>506 b</td>
<td>557 a</td>
<td>165.4</td>
<td></td>
</tr>
<tr>
<td>4 Weeks</td>
<td>767 c</td>
<td>1,050 b</td>
<td>1,270 b</td>
<td>1,547 a</td>
<td>417.9</td>
<td></td>
</tr>
<tr>
<td>6 Weeks</td>
<td>1,253 c</td>
<td>1,665 b</td>
<td>2,009 a</td>
<td>2,294 a</td>
<td>445.7</td>
<td></td>
</tr>
</tbody>
</table>

a,b,c,d Means in a row with no letters in common differ ($P < 0.05$).

**Table 2. Yields/harvest between litter applications for each interval. Interaction ($P < 0.05$).**

<table>
<thead>
<tr>
<th>Interval</th>
<th>Litter</th>
<th>No Litter</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Weeks</td>
<td>479 a</td>
<td>423 b</td>
<td>165.3</td>
</tr>
<tr>
<td>4 Weeks</td>
<td>1,252 a</td>
<td>1,065 b</td>
<td>417.9</td>
</tr>
<tr>
<td>6 Weeks</td>
<td>1,953 a</td>
<td>1,657 b</td>
<td>445.7</td>
</tr>
</tbody>
</table>

a,b Means in a row with no letters in common differ ($P < 0.05$).
Fig. 2. Effect of the application of chicken litter on cumulative yield of ‘Tifton 9’ bahiagrass.

Fig. 3. Effect of harvest interval on cumulative yield of ‘Tifton 9’ bahiagrass.