YIELD AND QUALITY OF LIMPOGRASS IN THE AUTUMN-WINTER

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SUMMARY

Most tropical grasses show a marked decline in digestibility with age, thus a system of field stockpiling is not suitable. The purpose of this research was to investigate the use of three limpograss cultivars as autumn-winter conserved forage. 'Redalta' had higher yields than 'Greenalta' or 'Bigalta' in both years, but dry matter accumulation patterns were similar for all grasses. In vitro organic matter digestion (IVOMD) of Bigalta was higher than Redalta or Greenalta at all sampling dates in both years. The decay in crude protein (CP) occurred rapidly in all grasses and by the time the grasses would be consumed as a stockpiled forage, it had dropped below the level necessary to maintain zero nitrogen balance in the grazing animal. No meaningful differences in CP among grasses were observed. Our results suggest that Bigalta limpograss has potential for autumn-winter stockpiling, but Redalta and Greenalta are probably not acceptable.

INTRODUCTION

Most of peninsular Florida receives sporadic but frequent rainfall from May through September. This unpredictable rainfall pattern prevents most beef producers from storing excess summer forage as hay. Some low quality mature grass is made into hay during the dryer months of October and November. Research with the temperate grass tall fescue has shown that this grass had excellent quality when accumulated in early autumn for autumn-winter utilization. Most research on tropical grasses has indicated digestibility of 50% or less at 8–10 weeks of age. In a preliminary study, Bigalta limpo- grass was compared with three digitgrasses and three bahiagrasses. Bigalta had significantly higher digestibility after four weeks regrowth. A series of experiments to evaluate the differences among Redalta, Greenalta, and Bigalta limpograss as an autumn-winter stockpiled forage were initiated.

OBJECTIVES

The objectives were to monitor yield, in vitro organic matter digestion (IVOMD), and crude protein (CP) of the three cultivars of limpograss as affected by maturity and freezing temperatures in the autumn-winter.

PROCEDURES

The experiments were conducted during the late summer, autumn and winter of 1976–77 and 1977–78. The experimental area was well established sods of Redalta, Greenalta, and Bigalta limpograss on the Green Acres Farm about 12
miles west of Gainesville, Florida. In 1976-77, all plots were mowed off (staged) on July 29, 1976. Autumn-winter harvests were taken on September 23, 1976, November 4, 1976, December 16, 1976, January 27, 1977, and March 10, 1977. In addition to these yield and quality samples, small samples for quality analyses were taken from each main plot at biweekly intervals during August and September. These were considered as additional harvest dates for quality components. In the second year, all plots were staged on August 1, 1977. The five autumn-winter harvest dates were September 26, 1977, October 24, 1977, November 29, 1977, December 20, 1977, and January 18, 1978. Additional small samples for quality analysis were taken at 5, 6 and 10 weeks after staging. The experiment was replicated three times in both years. Plots were fertilized uniformly at the rates given in Table 1.

**Table 1. Dates and Rates of Fertilizer Used on All Stockpiling Plots**

<table>
<thead>
<tr>
<th>Date</th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>FTE 503+</th>
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<td>60</td>
<td>54</td>
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<td>15</td>
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<td>July 21, 1976</td>
<td>64</td>
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<td>4</td>
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<td>Aug. 3, 1976</td>
<td>30</td>
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<td>15</td>
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<td>Apr. 20, 1977</td>
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<td>18</td>
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<td>0</td>
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<td>Aug. 3, 1977</td>
<td>64</td>
<td>8</td>
<td>30</td>
<td>4</td>
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<tr>
<td>Sept. 7, 1977</td>
<td>48</td>
<td>6</td>
<td>22</td>
<td>3</td>
</tr>
</tbody>
</table>

†Each kg of FTE 503 contains 3% B, 3% Cu, 18% Fe, 7.5% Mn, 0.2% Mo and 7% Zn in a chealed form.

**In vitro** organic matter digestion was determined by a modified Tilley and Terry two stage digestion method. Nitrogen was determined by aluminum block digestion and analyzed with a Technicon nitrogen autoanalyzer and converted to CP by multiplying by 6.25.

**RESULTS AND DISCUSSION**

Dry matter accumulation of the three limpograsses from July 29, 1976, and August 1, 1977 are presented in figure 1. Dry matter accumulation continued in all grasses until first severe frost. In 1976, a minimum low temperature of -2 C occurred on November 9 which likely terminated photosynthesis in the upper canopy due to freezing of leaf lamina. Harvestable dry matter decreased after frost. The increase in dry matter by Redalta and Greenalta at the March 10, 1977 harvest date is attributable to new growth in late winter. The more cold susceptible Bigalta had not begun to regrow by this date. The highest yield in 1977-78 was obtained at the November 29 harvest. The first frost severe enough to curtail photosynthesis did not occur until December 7, 1977. Since the last harvest was on January 10, 1978, no increase from late winter regrowth was observed in 1977-78.
FIGURE 1. SEASONAL YIELD CHANGES IN REDALTA, GREENALTA AND BIGALTA LIMPOGRASS FOR TWO YEARS.
Dry forage yield of any grass is influenced by soil fertility and water availability as well as other environmental factors. Thus, absolute yield levels are not of major concern in a study of the feasibility of utilizing a grass as an autumn-winter stockpiled forage. In this study, Redalta limpograss had greater yields than either Greenalta or Bigalta limpograss, but in other research on soils with high water table, Bigalta yielded equal to or greater than Redalta. Redalta has been shown to be better adapted to the drier sandy soil types where these experiments were conducted than either Greenalta and Bigalta.

Yields the second year when staged on August 1, 1977 were less than when staged on July 29, 1976. However, if limpogras is allowed to begin regrowth by August 1, there should be adequate time for accumulation of forage for utilization as a stockpiled autumn-winter feed. A period of 8-10 weeks of optimum growth conditions will probably be needed to accumulate sufficient amounts of forage.

The results of the quality analysis of forage harvested in the autumn-winter of Redalta, Greenalta, and Bigalta are presented in figures 2, 3, and 4. The rate of decline of IVOMD with time was similar among the limpograses, however, the IVOMD of Bigalta was about 13 percentage units above Redalta and Greenalta. By 12 weeks after beginning accumulation, IVOMD of Redalta and Greenalta had dropped below 43%. Bigalta limpogras has one of the highest digestibility levels known among the tropical grasses. The values of 55-62% at 14 weeks regrowth suggest that this grass may be a superior forage for utilization at mature stages. With an IVOMD of 45 to 50% at 16-20 weeks regrowth this grass could serve as a source of roughage into early winter.

![Diagram showing IVOMD and CP over time](image)

**FIGURE 2. DIGESTIBILITY (IVOMD) AND CRUDE PROTEIN (CP) OF STOCKPILED REDALTA LIMPOGRASS FOR TWO YEARS.**
FIGURE 3. DIGESTIBILITY (IVOMD) AND CRUDE PROTEIN (CP) OF STOCKPILED GREENALTA LIMPOGRASS FOR TWO YEARS.

FIGURE 4. DIGESTIBILITY (IVOMD) AND CRUDE PROTEIN (CP) FOR STOCKPILED BIGALTA LIMPOGRASS FOR TWO YEARS.
Crude protein content of grasses can be influenced by nitrogen fertilizer, but it has often been slightly less in limpograss than other tropical grasses fertilized at the same rate. The levels of N fertilization in these experiments were immediate and probably similar to those a producer might be expected to use. At these levels, CP of all grasses was near or below 7% (the level required to meet maintenance requirements in cows consuming tropical grasses) at the time stockpiled grass would begin to be utilized. Thus, some protein supplementation may be required if limpograss is the sole source of feed for cows in the autumn-winter.

These results suggest that Bigalta limpograss can be utilized as a stockpiled forage for autumn-winter grazing. Furthermore, these results indicate that Redalta and Greenalta would not be acceptable for autumn-winter utilization as a stockpiled forage. This study did not include any evaluation of animal acceptance of mature limpograsses. Some instances of poor acceptance of mature Redalta have been reported, but other observations have indicated good cattle acceptance of mature Bigalta in late summer. More information is needed on acceptability and consumption of frosted Bigalta as well as animal performance on mature Bigalta limpograss.