Extending the Productivity of Bermudagrass Pastures by Overseeding with Ryegrass and Clovers
M. W. Alison, Macon Ridge Research Station

Findings

- Overseeding bermudagrass pasture with annual ryegrass or a mixture of annual ryegrass and red clover will extend the grazing season and can provide greater amounts of forage than fertilized bermudagrass.
- There are combinations of forages available for use in perennial warm-season grass based pastures that can provide a relatively stable level of production from late winter through summer.

Introduction

Sodseeding cool-season forage in bermudagrass swards provides a method for enhancing the productivity of the pasture resource. Cool-season forages can extend the grazing season and/or improve quality of available forage when seeded into warm-season swards. Cool-season forages are productive at a time that coincides with the breeding season for many cow/calf operations so the extended grazing season and possible forage nutritive value improvement can greatly impact livestock productivity. The dramatic increase in nitrogen fertilizer costs has enhanced the consideration of using clovers in pasture systems.

Annual ryegrass, red clover, and crimson clover can be productive forage crops throughout the southeast US. Productivity of annual ryegrass is greatly influenced by nitrogen (N) fertilization level and the most productive period of sodseeded ryegrass is February through April. Crimson and red clover do not require N fertilization but crimson clover is not productive for as long a period as annual ryegrass and red clover is not productive as early in the season as annual ryegrass. This study was conducted to evaluate productivity of bermudagrass swards fertilized with N or overseeded with crimson clover, red clover and annual ryegrass alone or in mixtures.

Experimental Approach

A field study was conducted for two years on a Gigger silt loam soil at the Macon Ridge Research Station near Winnsboro, LA. 'Gulf' annual ryegrass, 'Kenland' red clover, and 'Dixie' crimson clover were sodseeded with a drill planter into a common bermudagrass sward using seeding rates of 25, 10, and 15 lb/acre, respectively, in the fall of three consecutive years. Species were seeded alone and in all possible combinations in the same experimental areas each year. The experiment was arranged in a randomized complete block design with three replications.

Phosphorous and potassium were applied as recommended from soil tests. Plots sodseeded with ryegrass alone and bermudagrass plots that were not overseeded were fertilized with 0, 50, and 100 lb N/acre. Nitrogen was applied to ryegrass at appropriate rates in late February and to bermudagrass approximately May 1 in each year.

Plots were harvested to a two-inch stubble approximately monthly using a rotary disk mower. Whole plot weights were recorded and a subsample was taken from each whole sample and weighed, dried and reweighed to facilitate dry matter determinations. Data was analyzed using analysis of variance procedures and treatment means were compared using Fisher's protected least significant difference (LSD).
Results and Discussion

Overseeding bermudagrass with annual ryegrass alone fertilized at the rate of 100 lb N/acre or with a mixture of red clover and annual ryegrass provided more total forage mass than just fertilizing bermudagrass with 100 lb N/acre (Table 1). Total forage production from all sodseeding treatments, except crimson clover alone, was at least comparable to that from bermudagrass fertilized with 100 lb N/acre. Replacing N with clover has proven feasible in other studies but location can have an impact on productivity. Hoveland et al. (1971) reported differences among locations when comparing total forage production from a bermudagrass sward fertilized with at least 150 lb N/acre or overseeded with crimson clover and no N applied. Forage productivity from the two treatments was similar at one location while the N fertilized bermudagrass produced approximately 1 ton more forage than the overseeded sward at two other locations. Mooso (1991) found seeding ryegrass in a mixture with crimson or red clover into a bermudagrass sod resulted in total forage production similar to production from bermudagrass fertilized with more than 100 lb N/acre.

One potential attribute of overseeding perennial warm-season grass sods with cool-season forage crops is to extend the period of time forage is available for use by livestock. Sodseeding treatments that included annual ryegrass provided the most forage early in the season. Including red clover provided a spike in available forage in the April-May period. Nitrogen fertilization of bermudagrass significantly enhanced forage production during June and July. The cyclical pattern of forage production from most overseeding treatments indicates a depression in bermudagrass growth following the peak production period of an overseeded crop but the bermudagrass sward recovers in early summer. By July, available forage was primarily bermudagrass and previous treatments, whether sodseeding or N fertilization, had a minimal influence on subsequent forage production.

There are several points to consider when reviewing the results from this study. Overseeding cool-season forage crops into a bermudagrass sod does not necessarily provide more total forage than fertilizing bermudagrass with N but it does spread forage production over a longer period. At least 30 to 50% of the total annual forage yield occurred prior to June if a cool-season forage was overseeded while bermudagrass that was not overseeded provided less than 20% of its total forage during this period. Figure 1 displays seasonal forage production from some selected treatments. It is obvious from this chart that the primary growing season for annual ryegrass, red clover and bermudagrass differ and this information could certainly be beneficial when planning a forage production system. A forage plan could be designed utilizing N fertilized bermudagrass and overseeded annual ryegrass and red clover in different fields to provide a relatively uniform distribution of forage from March through July. Although overseeding crimson clover did not have a dramatic impact on forage production during any period in this study, Mooso (1991) found crimson clover to be slightly more productive than red clover in a study at Rosepine. This indicates the need to understand productive potential of various forages when grown on different soils or under different environmental conditions so informed decisions can be made concerning forages to use in production systems. Using forages with different peak growing seasons can help provide a more even distribution of available forage through the entire season. Results indicate overseeding bermudagrass with a cool-season forage, such as annual ryegrass and/or red clover as used in this study, would be an attractive management practice for livestock production since the potential grazing season would be extended and total forage production would not be sacrificed.
Table 1. Seasonal dry forage production from a bermudagrass sward when fertilized with N or overseeded with various cool-season forages alone or in mixtures.

<table>
<thead>
<tr>
<th>Clover &amp;</th>
<th>Ryegrass</th>
<th>N Rate (lb/ac)</th>
<th>Through March</th>
<th>April - May</th>
<th>June - July</th>
<th>Aug. - Sept.</th>
<th>Total Yield</th>
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<tr>
<td>Crimson &amp; Red</td>
<td>Yes</td>
<td>100</td>
<td>2720</td>
<td>3560</td>
<td>3890</td>
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<td>1480</td>
<td>3010</td>
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<td>3030</td>
<td>3530</td>
<td>1500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LSD (0.05) for comparisons among means within a production period = 690.
LSD (0.05) for comparisons among total annual yield means = 1390.
Figure 1. Seasonal dry forage production from a bermuda sward fertilized with N or overseeded with clover or clover and ryegrass or fertilized ryegrass.