Overseeding Eastern gamagrass with cool-season grasses or grass-legume mixtures

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Introduction

The Black Belt region, characterized by heavy clay soils with varying pH extremes, predominately features tall fescue. During the summer months, endophyte-infected tall fescue causes a decrease in animal productivity, specifically in grazing beef cattle. Native Warm Season Grasses (NWSG) are adapted to the Mid-South region of the US, with characteristics such as drought tolerance, high summer yields, and performance under reduced fertility inputs, and could alleviate effects of endophyte-infected tall fescue. Eastern gamagrass (EG) is a NWSG with adaptability to heavy soil types, a wide seasonal growth distribution during the summer months, and produces yields that can support high stocking rates relative to other NWSG. Overseeding Eastern gamagrass with cool-season annuals or cool-season annual-legume mixtures could extend the grazing season and provide a high-quality grazing system throughout the winter months. Following overseeding, it is important to determine the impacts on persistence of Eastern gamagrass and to identify an economical fertilization rate to increase response from the summer crop as it breaks dormancy.

Project Objective

To determine the effects of overseeding with cool-season forage mixtures and grazing management on forage production, nutritive value, and persistence of Eastern gamagrass in the Black Belt region.

Materials and Methods

A two year evaluation was conducted from 2015-2017. A 15 year old stand of Eastern gamagrass at the Black Belt REC in Marion Junction, AL was used for the study. Plots were 4m x 4m in a randomized complete block design with a factorial arrangement of treatments.

Overseeding Treatments:

1. Control (C; no overseeding)
2. Florida 401 Rye (F)
3. Wrens Abruzzi Rye (W)
4. Wrens Abruzzi Rye + AU 'Red Ace' Red Clover (W+C)*

*Red clover has a biennial life cycle in the southern region of Alabama.

Nitrogen Rate Treatments:

1. 67 kg N/ha (67 N)
2. 135 kg N/ha (135 N)

Forage samples collected approximately every 28 days to determine forage mass and nutritive value. Mob-stocking used to simulate rotational grazing.

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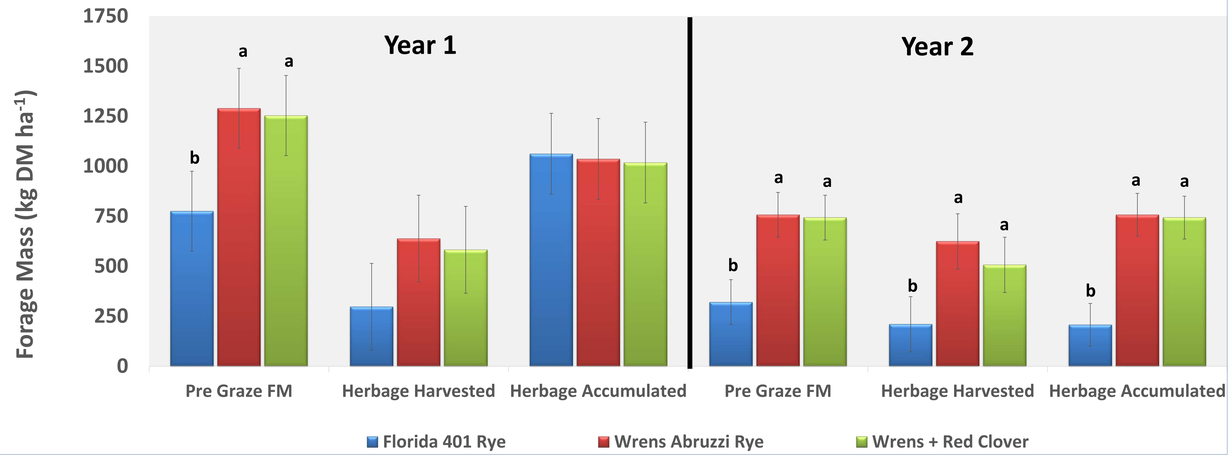
Figure 1. Variety effects on cool-season forage DM production (kg ha^{-1}) in overseeded Eastern gamagrass.



Within categories, by year, means differ $P < 0.05$.

Figure 2. Seasonal DM production (kg ha^{-1}) of Eastern gamagrass following overseeding with cool-season forages.

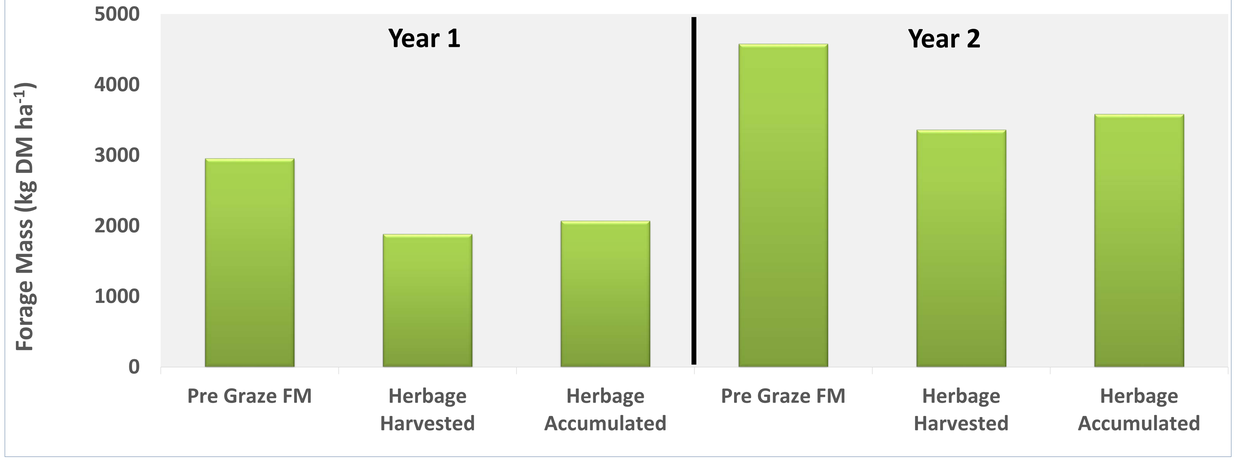


Table 1. Variety effects on cool-season forage nutritive value.

Treatment	CP (g kg^{-1} DM)	IVTD (g kg^{-1} DM)
Year 1		
Florida 401	163	816^{b}
Wrens Abruzzi	151	866^{a}
Wrens + Red Clover	172	878^{a}
SEM	6	7
Year 2		
Florida 401	171^{b}	827
Wrens Abruzzi	204^{a}	861
Wrens + Red Clover	216^{a}	840
SEM	9	15

Within a column, by year, means differ $P < 0.05$.

Ground Cover

- Percent ground cover of **rye** was greatest in March and April (7.3%) and then declined to 0% later in the year ($P < 0.0001$). It did not differ among overseeding treatments F, W, and W+C ($P > 0.05$).
- **Eastern gamagrass** ground cover increased to 81% and 57% in Yr 1 and Yr 2, respectively, during the summer growing season. W+C had less ground cover by EG than C, F, or W.
- Ground cover by **clover** was only present in W+C treatment, and was greatest (14%) in May and June ($P < 0.0001$).
- Presence of **weeds and bare ground** decreased from 66% to 31% throughout the year. Overseeded treatments F, W, and W+C had less weeds/bare ground than the control ($P < 0.0001$).

Table 2. N rate effects on Eastern gamagrass forage nutritive value.

Treatment	CP (g kg^{-1} DM)	IVTD (g kg^{-1} DM)
Year 1		
67 N	128^{b}	660^{b}
135 N	152^{a}	683^{a}
SEM	1	4
Year 2		
67 N	136	634
135 N	136	631
SEM	3	14

Within a column, by year, means differ $P < 0.05$.

Cattle mob-grazing Eastern gamagrass

Results and Discussion

- In Yr 1, there were differences detected among forage variety treatments for pre-graze forage mass ($P = 0.02$) for cool-season forages (Figure 1). There were no differences for herbage accumulation or herbage harvested ($P > 0.05$). In Yr 2, there were differences detected among treatments for pre-graze forage mass ($P = 0.0018$), herbage accumulation ($P = 0.02$), and herbage harvested ($P = 0.01$) for cool season forages.
- There were no differences ($P > 0.05$) among N fertilization treatments for pre-graze forage mass, herbage harvested, or herbage accumulation of Eastern gamagrass in Yr 1 or 2 (Figure 2).
- In Yr 1, no differences ($P = 0.12$) were detected among forage treatments for CP concentration in cool-season forages (Table 1). There were differences ($P = 0.0012$) among forage treatments for in vitro true digestibility. In Yr 2, differences were detected among treatments for CP.
- In Yr 1, N rate had an effect ($P = 0.0006$) on CP concentrations and IVTD ($P = 0.03$) of Eastern gamagrass (Table 2). In Yr 2, there were no differences.
- In Yr 1 and 2, there was a harvest date × treatment interaction effect on for ground cover by forage species during transition months.

Implications and Conclusions for Beef Producers

- Small-grain mixtures with legumes may fit with NWSG based on their growth distribution. Forage mass of cool-season forages was low, which is characteristic of overseeded forages compared with those planted into a prepared seedbed, but still provided some winter grazing.
- Overseeded grasses and clover could provide ground cover to reduce weed pressure during the transition from spring into summer.
- Overseeding did not have a negative effect on Eastern gamagrass persistence. Eastern gamagrass will provide sufficient forage with reduced N fertility inputs. However, NWSG forage mass was low in this study compared with other studies.
- Results demonstrate that producers in the Black Belt can use NWSG overseeded with cool-season annuals to create a longer grazing season, reduce winter feed needs, and reduce fertilizer inputs.