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Effect of Planting Method and Seeding Rate on Overseeded Ryegrass Seedling Density and Yield

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Summary

Influence of four planting methods and four seeding rates of annual ryegrass (*Lolium multiflorum* Lam.) overseeded on a Coastal bermudagrass (*Cynodon dactylon* (L) Pers.) sod was investigated for 2 years at the Texas A&M University Agricultural Research and Extension Center at Overton. Drilling or broadcasting ryegrass seed on a lightly disked sod improved seedling density, early forage production, and total production compared with not disking the sod. Drilling instead of broadcasting seed on an undisturbed sod improved seedling density and early forage production at all seeding rates and improved total production at 15 and 25 lb seed/acre. Increasing seeding rate from 15 to 45 lb/acre resulted in a 3-fold increase in seedling density and a 2-fold increase in early forage production. Total yield increased 25 to 40% depending on planting method.

Introduction

Annual ryegrass acreage in Texas during the 1991-92 growing season was estimated at 900,000 acres; more than 95% of this acreage was used for winter pasture. Grazing in annual ryegrass can begin 2 to 4 months earlier than in the warm-season perennial grass alone and thus can reduce winter feeding expenses. Some ryegrass uses are for winter cover crop, roadside stabilization, overseeding lawns, and hay crop. Favorable attributes of annual ryegrass are ease of establishment, adaptability to a wide range of soils, high-quality forage, and ability to respond to nitrogen fertilizer.

Producers use various planting methods ranging from drilling into a well-prepared seedbed to broadcasting the seed on an undisturbed sod. Seeding rates range from 10 lb/acre when used as a carrier for small-seeded clovers to 100 lb/acre at dairies where early forage production is critical. A higher percentage of the seed is assumed to develop into established plants when drilled into a disked sod than when broadcast on top of a grass sod because of seed to soil contact.

The interaction of four planting methods and four seeding rates on ryegrass seedling density and forage production was investigated for 2 years at the Texas A&M University Agricultural Research and Extension Center at Overton.

Procedure

Test sites were a Coastal bermudagrass sod mowed to a 1- to 2-in. height before planting. Planting methods were (1) light disking (disking to a depth of approximately 2 in.), drilling seed, (2) light disking, broadcasting seed, (3) drilling seed in undisturbed sod, and (4) broadcasting seed on undisturbed sod. Seeding rates were 15, 25, 35, and 45 lb/acre. In the drilled treatment, seed were planted in 7-in. rows at a soil depth of approximately 0.25 in. All plots were dragged with a harrow to help cover the seed in the disked plots and to shake the seed to the soil surface in the broadcast plots. Plot size was 8 by 15 ft. Experimental design was a split-plot in a randomized complete block with four replications. Whole plots were planting methods, and subplots were seeding rates.

A preplant fertilization rate of 84 lb of phosphorus (P) and potassuim (K)/acre and 1 lb boron (B) and 16 lb sulfur (S)/acre was applied. The experiment was top-dressed with four applications of nitrogen (N) as ammonium nitrate at 50 lb/acre in February, March, April, and May.

Seedling density was estimated 6 weeks after planting by counting the number of seedlings in two 12- by 14-in. quadrates in each plot. Ryegrass plots were harvested with a Hege sickle bar harvester at a 2-in. cutting height.

Analysis of variance was used to determine significance of main effects and interactions. The relationship of seeding rate with seedling density, first-harvest yields, and total yield was determined through regression analysis.

Keywords: *Lolum multiflorum* / tillage method.

Results and Discussion

Planting method and seeding rate significantly affected ryegrass seedling density (P > 0.001). Seedling density increased as seeding rate increased for each planting method (Fig. 1). The highest seedling density was in the disk-drill planting method followed by the disk-broadcast. Differences between the two methods decreased as seeding rate increased to 45 lb/acre. Disking the bermudagrass sod enhanced the ryegrass establishment by reducing bermudagrass competition and providing some loose soil for more favorable seed placement. On undisturbed sod, drilling ryegrass seed always resulted in a higher seedling density than did broadcasting the seed. Drilling ryegrass seed provided better seed to soil contact, which probably improved seedling survival after germination.

Planting method and seeding rate significantly affected early forage production (P > 0.0001) with a planting method × seeding rate interaction (P > 0.01). Harvested forage at the first cutting increased as seeding rate increased (Fig. 2) but not as greatly as seeding rate increased seeding density. Ryegrass plants at the lower seeding rates probably compensated for low plant density by more tillering. Disking the sod improved early forage production more than did planting in the undisturbed sod. When the sod was disked, there were no differences between drilling or broadcasting the seed at any seeding rate. In the undisturbed sod, early forage yield increased slightly when seed were drilled but gradually decreased as seeding rate increased. Planting 25 lb/acre of ryegrass on disked sod produced as much early forage as did 45 lb/acre of ryegrass on undisturbed sod. When ryegrass seed sells for 35¢/lb, the difference in seed cost is $7.00/acre. Lacking a disk or if overseeding on a clay soil, which should not be disked because of the resulting rough surface, disking may not be an option.

Planting method and seeding rate significantly (P > 0.0002) affected total ryegrass forage production. Total season forage production increased with seeding rate (Fig. 3). Drilling or broadcasting ryegrass seed on a lightly disked sod was more productive than planting on an undisturbed sod. Half the yield difference between treatments for the total season occurred at the first harvest (Fig. 2). Justification for disking or higher seeding rates depends on the economic value of earlier forage production.

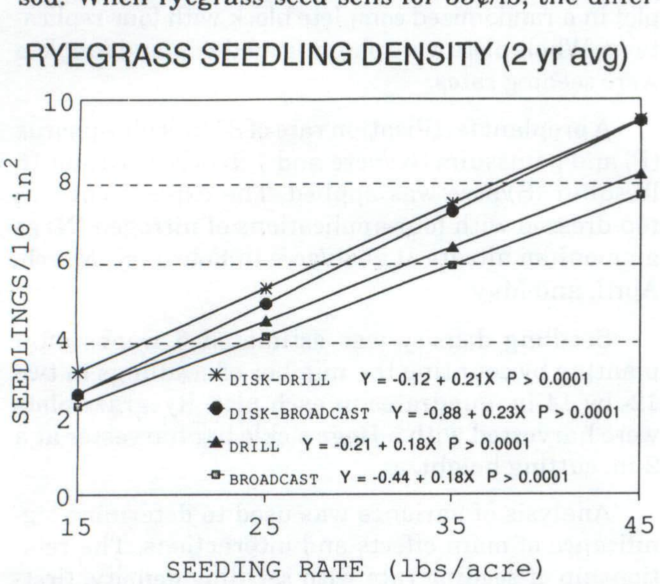

Figure 1. Influence of planting method and seeding rate on ryegrass seedling density.

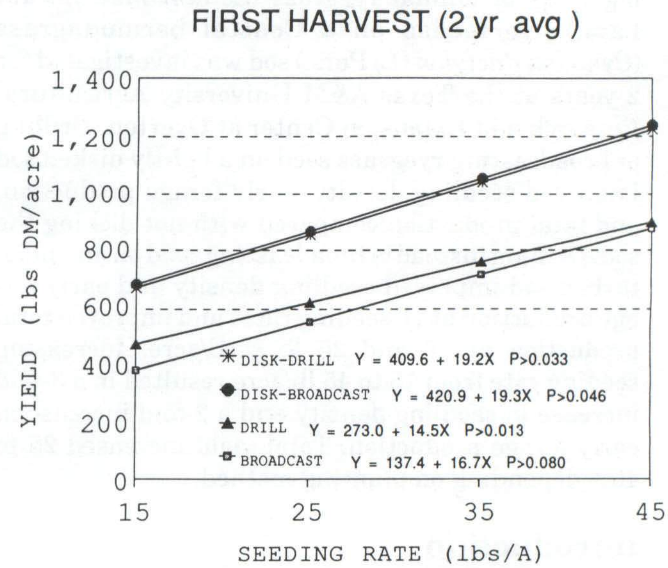

Figure 2. Influence of planting method and seeding rate on first-harvest ryegrass yields.

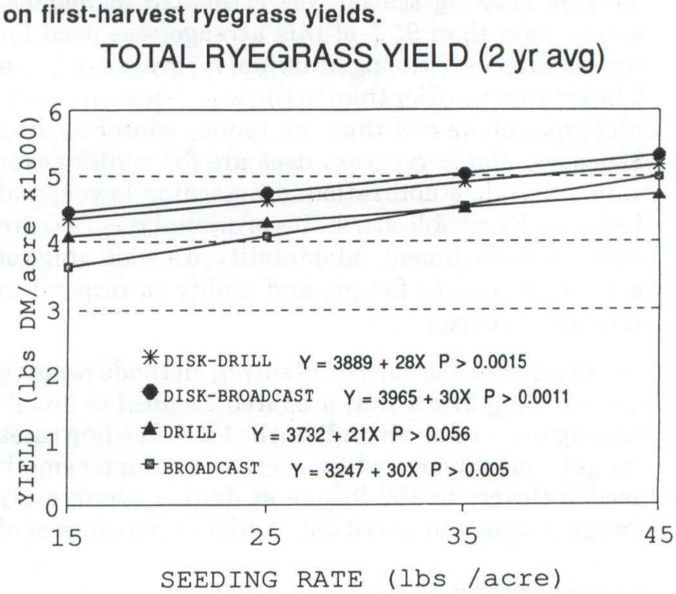

Figure 3. Influence of planting method and seeding rate on total ryegrass yields.