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Overton R18 Rose Clover Establishment

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Summary

Five planting methods and six seeding rates were evaluated for overseeding 'Overton R18' rose clover (*Trifolium hirtum* All.) on a 'Coastal' bermudagrass (*Cynodon dactylon* [L.] Pers.) sod at the Texas A&M University Agricultural Research and Extension Center at Overton for 3 years. Drilling seed in a short (2 in.) sod with or without desiccation or broadcasting seed on a disked sod resulted in the highest seedling densities. Seedling densities increased with seeding rates of 4 to 24 lb/acre. Over the 3 years, broadcasting seed on a disked sod produced the best yields. Seeding rates of 6 to 8 lb/acre are satisfactory if maximizing forage production during the establishment year is not critical. If good forage production is desired the establishment year, seeding rates of 12 lb/acre should be used.

Introduction

Overton R18 rose clover was released in 1991 (Smith et al. 1992). It matured 3 to 4 weeks later than 'Hykon' and 'Kondinin' rose clover and was twice as productive as Kondinin when grown at six diverse locations in Texas (Smith et al. 1987). Rose clover is well adapted to alkaline soils and has a high hard seed percentage, which enhances its reseeding potential (Evers 1989, Smith 1993). It should extend the annual clover-growing area westward to the 20- to 30-in. rainfall belt of central Texas and Oklahoma.

Establishment information is unavailable because rose clover has not been grown in Texas or in the southeastern United States. Obtaining stands of rose clover may be more difficult than of the other annual clovers because of its poor seedling growth (Evers 1993).

Four planting methods of overseeding Overton R18 rose clover in a Coastal bermudagrass sod at six seeding rates were studied for 3 years at the Texas A&M University Agricultural Research and Extension Center at Overton.

Procedures

The study was planted on a different Coastal bermudagrass site each year. The bermudagrass sod was mowed to a 1- to 2-in. height before planting. Experimental design was a split plot with four replications. Main plots were planting methods, which were (1) heavy disking, drilling seed, (2) light disking, broadcasting seed and dragging, (3) drilling seed into an undisturbed sod, and (4) drilling seed in an undisturbed sod and applying a grass desiccant after clover emergence. In the 1991-92 and 1992-93 studies, the heavy disking, drill seed planting method was replaced with broadcasting the seed on an undisturbed sod. Seeding rates of 4, 8, 12, 16, 20, and 24 lb seed/acre were subplots. Seeds were planted in 7-in. rows with a small-plot drill equipped with double disk openers. Seed drop tubes were removed from the openers and tied approximately 20 in. above the sod for the broadcast planting methods. Fusilade (1/4 lb/acre) was used the first year and Poast (1/8 lb/acre) the second and third year as the grass desiccant in the drill desiccation planting method.

The study was planted the second week in October of each year. Fertilization was 80 lb/acre of phosphorus and potassium and 1 lb/acre boron in the first 2 years and 60 lb/acre of phosphorus and potassium and 1 lb/acre boron the third year. Approximately 6 weeks after planting, seedling density was estimated by counting the number of seedlings in two 12- by 14-in. quadrants thrown randomly on each plot.

Plots were harvested once in 1991 and twice in 1992 and 1993 with a sickle bar mower at a 2-in. cutting height. A subsample of the harvested forage was collected from each plot to determine moisture content. Significance of main effects was determined by analysis of variance, and influence of seeding rate on seedling density and yield was determined by regression analysis.

Results and Discussion

Planting method had a significant effect on seedling density 2 out of 3 years (Table 1). In 1990-91, drilling into a short sod, with or without desiccation, resulted in the best seedling density. The heavy disk-drill method yielded the lowest seedling density. Attempted planting depth was 0.5 to 0.75 in., which apparently was too deep for good rose clover germination and emergence. The heavy disk-drill method was replaced with broadcasting the seed on an undis-

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turbed short sod the next 2 years. In 1992-93 drilling rose clover seed in a sod, with or without desiccation, resulted in the highest seedling density. Light-disk, broadcast method had a slightly lower seedling density, and the broadcast on an undisturbed sod had the poorest seedling density.

Rose clover stands were best when the seed were drilled into a short sod where the seed was placed at the soil surface. Desiccating the sod after rose clover emergence improved seedling density 2 out of 3 years but not significantly more than the drilling-only method. The poor stands resulting from drilling seed to 0.5 to 0.75 in. in a well-prepared seedbed indicate that rose clover may be more sensitive to planting depth than are other annual clovers. Broadcasting rose clover seed on a lightly disked sod and dragging to cover the seed is an alternative if a drill is not available.

Seedling density increased directly with seeding rate each year (Table 1). The increase in seedling density was significant with each 4-lb increase in seeding rate in 1991-92 and 1992-93. The maximum seeding rate of 24 lb/acre used in this study was obviously not high enough to cause intraspecies competition that would result in seedling mortality. The highest seedling density observed for 3 years was 5 seedlings/16 sq in.

Table 1. Influence of planting method and seeding rate on Overton R18 rose clover seedling density for 3 years.

Treatment	1990-91	1991-92	1992-93
	Seedlings/16 in²		
Planting method			
Drill, undisturbed	11.7 a*	1.02	2.90 ab
Drill, desiccate	1.33 a	0.96	3.09 a
Light disk, broadcast	0.88 b	1.29	2.75 b
Heavy disk, drill	0.35 c		
Broadcast, undisturbed		1.07	2.07 c
Seeding rate (lb/acre)			
4	0.38 d	0.38 f	0.83 f
8	0.52 d	0.60 e	1.17 e
12	0.73 c	0.88 d	2.28 d
16	1.07 b	1.17 c	2.92 c
20	1.25 b	1.61 b	4.01 b
24	1.67 a	1.86 a	4.94 a

*Seedling densities within a year followed by the same letter are not significantly different at 0.05 level, Waller-Duncan multiple range test.

There was a significant ($P > 0.01$) planting method by seeding rate interaction for seedling density in 1990-91 and 1992-93. Regression of seeding rate on seedling density within each planting method was linear. In 1990-91 the advantage of drilling rose clover seed in a sod over broadcasting increased as seeding rate increased (Fig. 1). Drilling seed in a heavy-disked sod was always inferior to the other planting methods. In 1992-93, seedling density in the broadcast planting method was less than in the other planting methods as seeding rate increased (Fig. 2).

Planting methods caused significant differences in yields each year (Table 2). Plots in the heavy-disked, drill planting method were not harvested in 1990-91 because of the very poor stands. Yields were highest with the light-disk, broadcast planting method in 1990-91 and 1991-92 and not significantly different from the highest yielding planting method in 1992-93. The light-disk, broadcast planting method did not have the highest seedling density in 1990-91 or 1992-93 (Table 2). Light disking of the sod must have reduced bermudagrass competition sufficiently to enhance rose clover growth to be more productive than planting methods with higher seedling densities. Broadcasting rose clover seed on an undisturbed Coastal bermudagrass sod resulted in the lowest yields in 1991-92 and 1992-93. The heavy-disked planting method used in 1990-91 would probably have been successful if rose clover seed were drilled near the soil surface (< 0.25 in.) or broadcast on the soil surface and dragged to get some soil coverage of the seed.

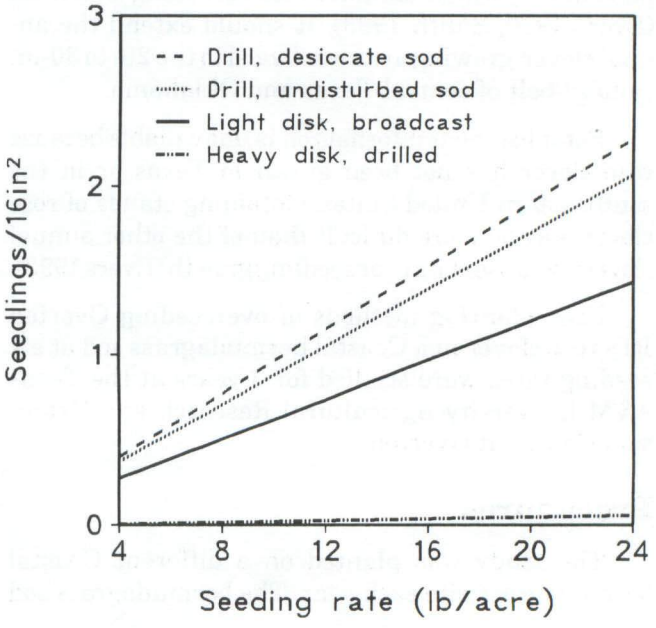

Figure 1. Interaction of planting method and seeding rate on Overton R18 rose clover seedling density in 1990-91.

Yield differences between years were due to the weather. Autumn and winter of the 1990-91 season were very wet, which is unfavorable for rose clover growth. Yields were limited during the 1991-92 season by a very dry spring. Favorable moisture conditions and a mild winter caused the high yields in 1992-93.

Influence of seeding rate on yield varied among years (Table 2). In 1990-91, yield increases were not significant above 16 lb/acre, whereas in 1991-92, yield increase was significant up to the maximum seeding rate of 24 lb/acre. With the favorable growing season in 1992-93, a planting rate of 12 lb/acre was satisfactory for maximum yields. There were no significant planting method by seeding rate interactions for yield.

Seed cost and the amount of forage needed will influence the optimum seeding rate. Overton R18 is a new variety with a limited seed supply, and therefore the seed is more expensive than other clover seed at this time. Seeding rates of 6 to 8 lb/acre should be adequate if maximum forage production in the establishment year is not critical. If Overton R18 is allowed to produce a good seed crop, a satisfactory volunteer stand should develop the next autumn. If forage production is essential the establishment year, Overton R18 rose clover should be seeded at 12 lb/acre. Drilling seed into a short sod or broadcasting on a disked sod, followed by dragging for shallow seed burial will enhance seedling density and forage production.

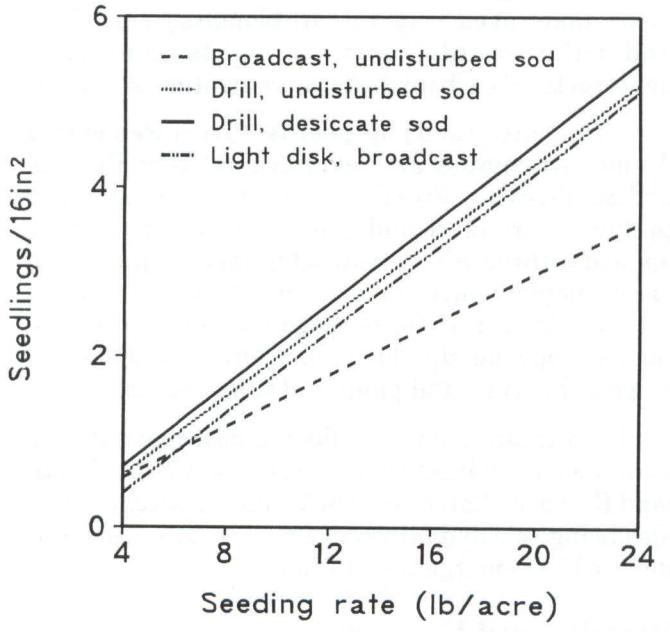

Figure 2. Interaction of planting method and seedling rate on Overton R18 rose clover seedling density in 1992-93.

Table 2. Influence of planting method and seeding rate on Overton R18 rose clover forage production for 3 years.

Treatment	1990-91	1991-92	1992-93
Planting method	..... Dry matter yield (lb/acre)		
Drill, undisturbed	591 b*	1618 b	4208 a
Drill, desiccate	830 ab	1437 bc	4094 ab
Light disk, broadcast	881 a	2168 a	4012 ab
Broadcast, undisturbed		1170 c	3390 b
Seeding rate (lb/acre)			
4	435 c	600 f	2373 c
8	543 bc	1017 e	3451 b
12	676 b	1643 d	4309 a
16	889 a	1870 c	4323 a
20	1086 a	2108 b	4560 a
24	973 a	2352 a	4541 a

* Yields within year followed by the same letter are not significantly different at 0.05 level, Waller-Duncan multiple range test.

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