

# Establishment of Winter Forages into Summer Annual or Perennial Grass Sods

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## INTRODUCTION

Over 25 million acres of permanent sods could potentially be overseeded with winter annuals throughout the Southeast. Another 5 to 6 million acres are tilled prior to seeding winter annuals and produce no summer grass. Ideally, forage production year-round would involve summer grass production followed by robust winter annual production. Winter forage production on overseeded permanent sods, however, is half that of winter annual production on prepared seedbeds. Seedbed preparation on highly erodible soils, however, can be a violation of the sodbuster provisions of the 1985 and 1990 farm bills. Establishment of forage crops without tillage offers the opportunity to reduce seedbed preparation costs while conserving soil moisture and reducing soil erosion. Although conservation tillage seedings have increased with many examples of success, there is often a reduction in seedling vigor compared with conventionally plowed and disked seedbeds.

Sod-seeding winter annuals was pioneered in Mississippi over the past four decades (Dudley and Wise, 1953; Coats, 1957; and Thompson et al., 1961). Winter annual forage production in perennial sods is greatly reduced during the fall growth compared to forages sown in well prepared seedbeds. Research interest has recently been renewed at several locations in Mississippi. At Newton and Starkville, ryegrass sown in sod responded well to nitrogen applied from 0 to 150 lb/a. Ryegrass sown into annual sods yielded about

2/3 compared with annual sown in prepared seedbed while annuals sown in sod yielded about half (Lang, 1989). Ethylene evolution from annual sods was about 8 to 10 times higher than from well prepared seedbeds. Increased addition of nitrogen and higher levels of tillage appear to alleviate some of the early fall and suppression of winter annuals. The objective of this research was to compare the response of ryegrass sown in a permanent or annual sod with growth in a prepared seedbed.

## METHODS AND MATERIALS

Ryegrass was seeded into a bermudagrass sod or a prepared seed bed on September 24, 1991 at Starkville, MS. Nitrogen at 0, 50 and 100 lbs/acre was added at seeding and again in February. Stand cover and height were recorded in December and yields were taken in January, March, and April. At Newton, MS two pastures with annual grasses (crabgrass and broadleaf signalgrass) were disked in 80 foot strips with 20 foot strips left undisked. Ryegrass was then seeded into both strips.

The objective of the study at Raymond, MS was to compare reduced or minimum tillage methods for planting ryegrass for stocker calves. The two sod types utilized were coastal bermuda and summer annual grass sod. All treatments consisted of cutting hay prior to applying bumdown chemicals or drilling ryegrass. The following treatments were compared: (1) bermuda sod, paraquat bumdown, plant no-till (2) bermuda sod, disk lightly, plant with grain drill (3) bermuda sod, plant no-till (4) prepared seedbed (5) annual sod, paraquat burndown, plant no-till (6) annual sod, plant no-till. 'Marshall' ryegrass was seeded at 35 lb/a with either a 'Marliss' no-till drill or a John Deere

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8300' series grain drill. Nitrogen was applied at the following rates: 51-0-0 at planting, 34-0-0 mid-February, and 34-0-0 April 1. Each six-acre plot was initially stocked with nine English and Exotic Cross steer calves averaging approximately 450 lb/ha (650 lb/a) when forage growth reached six inches in height.

## RESULTS AND DISCUSSION

Ryegrass growth in either perennial or annual sods was much slower in the early fall growth period (Tables 1 and 2). Stands were excellent; however, ground cover was reduced for the sod plantings. Plant height was greatly reduced in sod compared with growth in tilled soil. Application of 100 lbs N per acre only slightly stimulated ryegrass growth when sown in sod.

Yield of ryegrass sown in sod was greatly reduced, particularly in the fall and early spring (Table 2). Nitrogen application stimulated growth of ryegrass to a much larger degree in tilled soil than it did in sod. It took 75-100 lbs N/acre in sod to equal the yield of ryegrass without N in tilled soil. This trend reversed as spring advanced. Yields in April and May favored the sod plantings. Factors other than nitrogen deficiency in sod in the fall may be operative.

Production of ryegrass on annual sods may be facilitated by tilling strips through the field leaving sod strips to reduce erosion. Stands and ground cover were enhanced in the tilled strips as compared with sod strips (Table 3). As with the perennial sods, however, this

Table 1. Ryegrass stands, cover and height when seeded into bermudagrass sod at Starkville, MS.

Nitrogen lbs/a	Stands		Cover		Height	
	Sod	Till	Sod	Till	Sod	Till
	----- % -----		-----		----- cm -----	-----
0	94	100	22	100	10.2	27.2
50	95	100	59	100	10.5	25.8
100	94	100	80	100	20.2	26.9
LSD <sub>(0.05)</sub>	6		4		2.5	

Date of Observation: 12-18-91.

Table 2. Growth of ryegrass as affected by nitrogen and seeding into a bermudagraes sod or prepared seedbed at Starkville, MS.

Nitrogen	1/7/92		3/2/92		4/8/92		5/7/92	
	Sod	Till	Sod	Till	Sod	Till	Sod	Till
	----- lb A <sup>-1</sup> -----							
0	111	2967	490	965	439	661	1639	1219
50	302	3923	593	2699	1470	1303	1763	1254
100	734	3695	1229	3010	2489	1838	2087	1240
LSD <sub>(0.05)</sub>	315		458		216		356	

Nitrogen was applied in October and again in January.

early season difference was not evident in the spring.

The average daily gain at Raymond, MS ranged from 2.46 to 2.55 pounds/steer (Table 4). The gain per head was generally greater on annual sod than bermuda sod treatments. The

gain per head for bermuda sod ranged from 337 to 349 pounds and for annual sod ranged from 403 to 418 pounds. Total gain per acre was approximately 100 pounds greater for annual sod than bermuda sod. Animal grazing days ranged from 206 days for no-till bermuda sod to 232 days for prepared seedbed ryegrass. The initial

**Table 3. Ryegrass seeded into annual sods in 80/20 strips at Newton, MS.**

Pasture	Strip	1990		1991	
		Stand	Cover	Stand	Cover
		----- % -----			
89	80	74	42	94	56
89	20	31	18	85	41
	LSD <sub>(0.05)</sub>	20	16	6	14
19	80	97	92	97	51
19	20	75	63	86	38
	LSD <sub>(0.05)</sub>	8	15	6	17

Observations were in November of each year.

**Table 4. Animal performance on ryegrass overseeded into a bermudagrass or annual sod at Raymond, MS.**

Sod-Seeding Treatment	Animal Grazing Days	Initial Grazing Date	ADG	Gain/Head	Gain/Acre
			----- lbs -----		
Bermuda sod, Paraquat, NT	210	1/11/91	2.47	338	507
Bermuda sod, disk, drill	218	1/11/91	2.46	337	505
Bermuda sod, no-till	206	1/11/91	2.55	349	524
Prepared seedbed	232	11/23/90	2.56	418	626
Annual sod, Paraquat, NT	229	11/26/90	2.49	418	627
Annual sod, no-till	229	11/26/90	2.54	403	605

Ryegrass seeded at 35 lb A<sup>-1</sup> on September 10, 1990.

stocking dates for prepared seedbed and annual sod treatments occurred in late November whereas bermuda sod plots were not stocked until mid-January (Table 4). This difference in animal grazing days per acre was the reason for greater gain per head and *total* gain per acre. The carrying capacity for all treatments increased during the grazing season (Table 5). Where 650 pounds per acre were initially stocked, plots finished at 1250 to 1450 pounds per acre capacity in May. Bermuda sod treatments possessed the same carrying capacity as annual sod treatments but the reduction in grazing days resulted in less total beef produced per acre. Data from 1990-91 suggest that planting ryegrass on summer annual sod resulted in animal performance similar to prepared-seedbed planted ryegrass. Ryegrass planted into bermuda sod also produced satisfactory animal performance but gain per head and total gain per acre were somewhat less due to the reduced animal grazing days. Earlier planting dates on bermuda sod, increased nitrogen fertilization and pasture aeration are possible factors which could help improve early ryegrass performance on permanent sods.

## REFERENCES

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- Lang, D.J.** 1989. Comparative effects of tillage on winter annual forage production. In Proceedings 1989 Southern Conservation Tillage Conference. Special bulletin 89-1:62-64. Institute of Food and Agricultural Science, University of Florida, Gainesville.
- Thompson, W.P., C.M. Johnson, and T.N. Jones.** 1961. Sod seeding. Miss. Ag. Exp. Station Info. Sheet 728.

**Table 5. Carrying capacity of ryegrass seeded into bermudagrass or annual sods at Raymond, MS.**

Date	Prepared Seedbed	Bennudagrass			Annual Sod	
		Paraquat-NT	NT	Disk	Paraquat-NT	NT
	.....	hundred pounds/acre			.....	
November	6.5	0	0	0	6.5	6.5
January	8.3	6.5	7.0	6.8	8.3	8.4
February	9.2	7.8	8.1	8.0	9.2	9.3
March	10.4	10.0	10.2	10.8	9.8	10.1
April	13.1	12.2	11.8	13.5	11.5	11.6
May	14.2	12.2	12.1	13.8	12.9	12.7