Overseeding Winter Annuals into Volunteer Summer Annual Sod

Bill Brock, Joey Murphey, Billy Johnson, David Lang, and David Ingram[1]

INTRODUCTION

The need for fall and early winter annual forage is very high in the Southeastern states, especially for dairy farmers and for beef farmers who graze stocker cattle. Ryegrass and cereals are the annuals most used to produce winter grazing. The success in establishment of winter annual pastures is always dependent on soil moisture. September and October are two of the driest months of the year and September is the normal planting time to produce early grazing of winter annuals. The recommended practice for many years to produce fall and early winter annual grazing has been to fallow the pastures 30 to 40 days prior to planting to accumulate moisture and obtain a firm seedbed. This practice allows for storing soil moisture to get the winter annuals up and growing. However, passage of the 1985 and 1990 Farm Bills makes plowing many acres of land that have been planted to winter annuals no longer an acceptable practice.

Research on practices that could be used to produce fall and early winter annuals under conservation practices was expanded in 1988 by the Mississippi Agricultural & Forestry Experiment Station. The Coastal Plain Branch Station, located in central Mississippi, pursued the objective of producing early winter annual grazing with no cultivation in a winter annual and volunteer summer annual continuous rotation. Grazing trials with dairy cows on research pastures that had been in ryegrass for many years and replicated plot trials were utilized. The system that was followed was to utilize summer volunteer annuals (broadleaf signalgrass and crabgrass) that volunteered after the winter annuals for both grazing and ground cover during the summers months, and to no-till plant the winter annual directly into the summer volunteer annual sod in an effort to produce early winter annual grazing.

METHODS AND DISCUSSION

To evaluate the success of establishing winter annuals in a no-till system, a herbicide study was conducted in 1988-89 and 1990-91 and a herbicide/tillage study was conducted in 1990-91 in randomized complete block trials. In the herbicide for annual grass control prior to planting ryegrass no-till study (Table 1) early winter forage was produced in one of the two years of the study. In these tests, the herbicides were applied immediately prior to planting. The first harvest was made on 12-01-88 in the 88/89 study and 2-12-90 in the 89/90 study. The tests were planted during the first week of October in both years. First harvest yields were greater and were more consistent across all treatments in 88/89 than in 89/90. Although the first harvest was much later in 89/90, herbicide treated seedbeds produced significantly more forage than the check.

In the tillage no-till study shown in Table 2, ryegrass was grown under conventional and reduced tillage following volunteer summer annuals. In this study, a seedbed was fallowed lightly (LD) or heavily (DD) in July and August prior to planting on October 9. In the no-till treatment, the summer annual vegetation was either harvested for hay or killed with a herbicide. A third system was harvested for hay and heavily tilled prior to planting. None of the systems in this study produced early winter grazing. Poor stands existed in the no-till treatments due to dry soil conditions at planting.

'Coastal Plain Branch, Agronomy Dept., Brown Loam Branch. Mississippi State University, Newton, MS 39345.

Table 1. Herbicides for annual grass suppression before planting ryegrass no-till and yield of volunteer summer annuals followino rvearass.

		Dry Matter Yield of Ryearass				Broadleaf
		First Harvest		Season Total		Signalgrass
Name	LBai/A*	12/01/88	02/12/90	88/89	89/90	7/19/90
Gramoxone	0.38	861	702	6253	5030	2914
Gramoxone	0.50	1021	678	6454	4771	2727
Roundup	0.50	919	959	7020	5714	2928
Roundup	0.75	1062	1240	6749	5636	2699
Check		1017	316	6928	4646	2899

* LBai/A = lbs of active ingredient per acre

Table 2. Ryegrass grown under conventional and reduced tillage systems following volunteer summer annuals and yield of volunteer summer annuals following rvearass.

	Dry matter yields - lb/A						
	Ryegrass				Brachiaria/Crabgrass		
	% Stand	% Cover	1st Harvest	Season			
Treatment	11-21-90	11-21-90	01-17-91	Total	7-09-91	8-30-91	Total
LD - J	33	13	842	6071	1715	*	1715
DD - J	70	49	1234	6409	1498	*	1498
LD - A	76	51	655	5977	1799	2024	3823
DD - A	53	33	1415	6361	1428	2132	3560
H - S	22	12	59	4261	1533	2113	3646
H - S+HB[1]	48	28	176	4752	1701	1708	3409
HB - S[1]	30	16	59	3844	1827	1645	3472
H - S - D D	36	20	1521	6605	1652	1992	3644
LSD			415	838	326	409	512
CV %			37.9	10.3	13.5	19.1	10.9

LD - Light disk
DD - Deep disk
H - Hay cut
HB - herbicide
J - Late July
A - Late August
S - Late September

• No harvest due to tillage treatment

1 Poor stand in no-till treatments due to mechanical problems at planting resulted in lower yield Roundup[R] herbicide was sprayed on herbicide treatments at the rate of 1 pt/A.

Roundup[R] herbicide was sprayed on herbicide treatments at the rate of 1 pt/A. Results from these replicated plot trials show a wide variation in production of early winter yields. Soil moisture at planting and during the seedling growth stage appears to be a major factor. Ethylene accumulation in the no-till treatments also may be a problem. Lang (1990) reported that a significantly high concentration of ethylene is present in the soil of both perennial and volunteer summer annual sods that were harvested for hay or killed with a herbicide immediately before planting. Concentrations of ethylene are higher in perennial sods than in a summer annual sod and appear to retard growth of ryegrass. All plot trials reported in this paper were planted where the no-till treatment was either harvested for hay or killed with herbicide immediately prior to planting.

Table 3. Forage yield from no-till oat planted in a chemically killed summer volunteer annual sod.

Date of Harvest	Dry Matter Yield lb/A
11-07-91	1044
12-11-91	783
01-13-92	485
03-04-92	1074
04-08-92	1008
Total	4394

Herbicide applied 08-06-91
Date planted 09-04-91

A grazing trial at the Brown Loam Branch Experiment Station conducted in 1991 compared grazing days, ADG, gain/hd and gain/acre in six different systems of producing ryegrass for stocker calves (Ingram et al., 1992). In the systems utilizing perennial sods (bermuda) adequate grazing was not available until January 11, 1991. In the prepared seedbed treatment grazing was available on November 23 and in the two volunteer summer annual sod no-till treatments, with and without Gramoxone burndown, grazing was available on November 26. Animal grazing days, ADG, total gain per head, and total gain per acre were simiiar between the prepared seedbed and the volunteer summer annual sod no-till treatment with Gramoxone burndown. In the second year of this study, currently underway, grazing was produced in early November both on the prepared seedbed and the volunteer summer annual sod no-till treatment.

A grazing study with lactating dairy cows was conducted in 1992, that involved spraying volunteer summer annual vegetation 30 days prior to planting cool season annuals. In this study (Table 3), volunteer summer annual grasses in a 20-acre paddock were sprayed with 0.75 lb ai/A of Roundup[R] on August 6, 1991. Oat was planted into this killed sod on September 4, 1991. Cage clippings from 4'X 4' cages were harvested initially and at 30 to 50 day intervals throughout the study.

Grazing began on this paddock on 11-01-91 and continued through 4-24-92. This paddock has been planted no-till in ryegrass since 1988. Each year grazing has been available within 60 days of planting except for 1990 when drought delayed growth of the ryegrass. In 1990, the paddock was planted on September 15 and grazing began on December 18.

The data from the four trials discussed in this paper varies widely among management practices used in establishing no-till cool season annuals following volunteer summer annuals. The critical factors in successfully establishing no-till cool season forages appear to be soil moisture and timing of herbicide application on the volunteer summer annuals prior to planting cool season annuals. In grazing trials at the Coastal Plain Branch Experiment Station, spraying volunteer summer annuals 30 days prior to planting has been a successful method of insuring an early stand of cool season annuals for the past three seasons in grazing trials using lactating Holstein cows and Holstein steers. Killing these summer annuals 30 days prior to planting allows the accumulation of soil

moisture, as does summer fallowing in a prepared seedbed system, with the added bonus of ground cover. As for the toxic effect from high levels of ethylene in the soil, more work is needed to determine how ethylene concentrations change in the soil over time after herbicides are applied. The data from these trials suggest that there is potential to produce early fall and winter forage following volunteer summer annuals, but more research is needed to refine the practice.

REFERENCES

Ingram, **D.M., E.G. Morrison, and R. Hardin.** 1992. Minimum tillage for planting winter pasture. Mississippi Agr. and For. Exp. Station Information Bulletin 218. pp 12

Johnson, B.B., and W.A. Brock. 1991. Herbicides for annual and perennial grass suppression before planting ryegrass. Mississippi Agr. and For. Exp. Station Information Bulletin 202. pp 77-78.

Lang, D.J. 1990. Utilization of crabgrass and broadleaf signalgrass following winter annuals. Proc. Southern Branch of the American Society of Agronomy. p13. abstr.