NO-TILLAGE PLANTING OF SOYBEANS AFTER WINTERGRAZED RYEGRASS PASTURE

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INTRODUCTION

Approximately 300,000 acres of ryegrass-legume or small grain combinations are planted annually for winter grazing beef cattle in Mississippi. These pastures are planted from mid-September to the end of November and grazed until the forage matures about mid-May. Areas used for winter pasture are sometimes fertilized to produce native grasses for grazing or hay but generally are untended until planted again for winter grazing.

These unused acres have a potential for soybeans production because termination of the wintergrazing season coincides with the optimum planting date for full season soybeans. The date of soybean harvest coincides favorably with the planting date of forage species used for wintergrazed pasture. In spite of the potential for planting soybeans after wintergrazed pasture, and the fact that many innovative producers are double-cropping, research on this subject has been very limited.

Due to the high cost of land, many farmers are planting soybeans after wintergrazed pasture to increase cash flow. When conventional tillage practices are used, acceptable grain yields are obtained: however, severe erosion problems can be encountered on the sandy soils and rolling terrain. Using no-tillage practices reduces the erosion problem, moisture loss and machinery trips across the field, but yields have been low because the soil is compacted by cattle grazing which makes proper seed placement and coverage difficult. Land preparation, soil compaction, and erratic moisture distribution delay planting and make it important to investigate the feasibility of no-tillage cultural practices in the production of soyeans after wintergrazing.

Experiments with no-tillage soybeans planted after wintergrazed ryegrass pasture were conducted for four years (1978-81) at the White Sand Unit of the South Mississippi Branch Experiment Station. Five tillage treatments (table 1) were evaluated on a Basin soil using a split plot statistical design with tillage treatments as main plot and row width as sub plot.

PROCEDURES

Cattle grazing winter pasture were removed in mid-May and soybeans planted the last week in May. The tillage treatments imposed were: chisel and disc, disc only, no-tillage with in-row subsoiling, no-tillage with

colter only, and no-tillage with an alfalfa tyne in row. In all instances a rippled colter was used. Two row widths (20 and 40 in) were imposed upon each tillage treatment. Disc and chisel/disc operations were done a week prior to planting with cultipacking and leveling done the day of planting. In-row subsoiling was accomplished by marking the rows, running a 1 row subsoiler 12 in deep and planting over the subsoiled area. No-tillage treatments were imposed at planting in a once-over operation.

Weed control was accomplished using a tank mix of 1.5 pt paraquat plus .25% VV surfactant for non-selective weed control (burn down). Preemergence weed control was 2 quarts of Lasso and 0.5 lbs Metribuzin 50 W applied in 35 gallons of water per acre. Post emergence weed control was accomplished by post directing 0.5 pt of paraquat plus .25% VV surfactant.

Seed yield was determined by harvesting four 40-inch rows or seven 20-inch rows 50 feet long. Plant height was determined by measuring from the soil surface to the terminal leader of four plants per sub plot at harvest. Plant stand was determined by counting two40 inch lengths of row per sub plot.

RESULTS

The major problems encountered in soybean seeding were colter penetration and seed placement in the no-till with colter and colter with alfalfa tyne treatments because of dry soil conditions and soil compaction by grazing animals. Seed placement in the other treatments was not a problem because of the amount of soil disturbed.

There were differences in plant stand attributable to tillage treatment ranging from 16.4 plants/40 inch of row for no-till with colter only to 21.7 for chisel and disc. Current research shows that these differences are not enough to affect yield.

Soybeans planted using conventional methods were taller at maiuiity than those planted using no-tillage without an in-row subsoiler. Soybeans planted using and in-row subsoiler were not significantly different in height from the other treatments.

There was no difference in yield between the conventionally planted and no-tillage in-row subsoiler planted soybeans but the other two treatments did produce lower yields.

There was no interaction between row width and tillage treatment. Soybeans planted in 20 inch rows produced higher plant stands, taller plants and yielded more than those planted in 40 inch COWS.

No-tillage practices in this case do not appear to be superior in yield to conventional land preparation and planting procedures. However, factors that should be considered in addition to bushels per acre are monetary returns per acre and conservation of resources such as soil, fossil fuels and labor. Cost and return budgets indicate that the cost of no-tillage soybean production is $17 to $20 per acre less than conventional

tillage. A quart of paraquat is substituted for numerous trips across the field with tillage machinery requiring both labor and high cost fuel. The savings in time and labor may also enable a farmer to put more acreage into production.

Table 1. Four year average of soybean plant stand, final plant height, and seed yield averaged over two row widths as affected by tillage treatment, MAFES South Mississippi Branch Station, Poplarville, Mississippi 1978-81.

Treatment	Plant stand	Final plant height	Seed yield
	plants/40"	in.	bu/ac
Tillage method			
No-tillage with in-row subsoiler	20.5^{ab}*	21.0^{ab}	21.0^{a}
Chisel and disc	21.7^{a}	27.9^{a}	21.1^{a}
Disc	18.2^{bc}	22.6^{a}	21.3^{a}
No-tillage with alfalfa tyne in row	18.2^{bc}	18.7^{b}	16.5^{b}
No-till colter only	16.4^{c}	17.8^{b}	15.7^{b}
Row width			
20"	19.6^{a}	21.9^{a}	20.2^{a}
40"	18.4^{b}	19.2^{b}	18.0^{b}

* Means followed by the same letter are not different at the 5% level of significance according to Duncan's multiple range test.