

MINIMUM TILLAGE FOR CORN IN CENTRAL FLORIDA

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Interest in the minimum tillage concept in Florida has grown in recent years as a result of concern for energy saving economy and soil conservation. New techniques, materials, and equipment have given added impetus for further research and utilization of minimum tillage.

The objective of this study was to test the effects of minimum tillage planting and cultural practices versus conventional practices on field corn on old vegetable land in central Florida.

Materials and Methods

Corn (Zea mays, L.) was planted and grown under four different tillage treatments. The experiment was conducted at the University of Florida's Central Florida Research and Education Center at Sanford, Florida, on St. Johns fine sand (a Typic Haplaquod). The area used was in an old field adjacent to the center's farm on land which had lain idle for a number of years, but had been in soybeans in 1979. Soil test values were as follows:

pH	Extractable nutrients ¹			
	Ca	Mg	P	K
	ppm			
5.7	580	59	24	21

¹Mehlich I Extractant (0.05 N HCl in 0.025 N H₂SO₄) average of 4 replicates.

By the April 1980 planting date, a partial cover of broadleaf weeds had developed in the soybean stubble. Predominant were ragweed (Ambrosia artemesifolia) and dogfennel (Eupatorium capillifolium).

Tillage and cultural details are given in Table 1. The conventional tillage plots were given a light cultivation after side-dressing. No irrigation was applied. Corn was harvested July 15, 1980, and yields calculated at 15.5% moisture.

Results and Discussion

Fuel requirements for tillage operations are given in Table 2 and time requirements in Table 3. In both fuel used and time, the no tillage treatments were the most economical, giving considerable savings over conventional tillage. Corn grew well in all four treatments. Weed growth was controlled

sufficiently by the herbicide treatments and rainfall was enough to make the surface applied fertilizer available to the corn. Soil cover in the no-till treatments was maintained for protection against soil erosion.

Yield differences (see Table 4) did not prove statistically significant, but the overall average of 96.6 bu/A was considered creditable for the conditions of this trial. The subsoiling treatments appeared to be advantageous even on the sandy soil where this trial was conducted.

Summary and Conclusions

Results of this one season's trials are very encouraging. A considerable saving of tractor fuel and time in the field was gained by the no-till or minimum tillage treatments and yields were comparable to conventional cultural practices. The no-till or minimum tillage concept appears well adapted for this area and should come into wider usage.

Table 1. Minimum Tillage Corn, Treatment Description, and Cultural Details, Sanford, FL 1980.

Sanford, PE 1980.

Treatments

1. No-tillage, coulter-slot planting
2. No-tillage plus in-row subsoiling
3. Conventional tillage (harrow, plow, harrow)
4. Conventional tillage plus in-row subsoiling

Cultivar: Funk G 4507

Planting date: April 1, 1980 Harvest July 15, 1980

Plot size: 40 X 57.5' or .053 acre

Fertilization: At planting 425 lb/A 10-4-10 April 1, 1980
1st side dress 500 " " " 22, 1980
2nd " " 1000 " " May 6, 1980

Nematicides: carbofuran (Furadan) 10 G 20 lb/A

Herbicides: paraquat 0.375 lb ai/A, atrazine 2 lb ai/A
Ortho X-77 1 pt/100 gal water, metolachlor (Dual)
2 lb ai/A

Table 2. Fuel Requirements, Minimum Tillage Trial at Sanford, FL 1980.

Treatment	<u>Operation¹</u>				Total
	<u>Harrow</u>	<u>Plow</u>	<u>Harrow</u>	<u>Plant</u>	
	<u>gal/acre²</u>				
No-tillage	--	--	--	0.70	0.70
No-tillage + in-row subsoil	--	--	--	1.39	1.39
Conventional tillage	0.70	1.54	0.68	0.80	3.72
Conventional tillage + in-row subsoil	0.70	1.54	0.68	1.34	4.26

¹Ford 4600 tractor for all except plowing; plowed with Ford 5600.

²Average of 3 replicates.

Table 3. Time Required for Tillage and Planting, Sanford, FL 1980.

Treatment	Operation ¹				Total
	Harrow	Plow	Harrow	Plant	
	-----hours/acre ² -----				
No-tillage	--	--	--	0.39	0.39
No-tillage, in-row subsoil	--	--	--	0.50	0.50
Conventional tillage	0.28	0.63	0.27	0.40	1.58
Conventional tillage + in-row subsoil	0.28	0.63	0.27	0.52	1.70

¹Ford 4600 tractor for all except plowing; plowed with Ford 5600.

²Average of 3 reps.

Table 4. Corn Yields, Minimum Tillage Trial, Sanford, FL 1980.

Tillage treatment	Corn yields ¹ bu/A @ 15.5% moisture	
No-till	82.9	
No-till + subsoil	103.4	No till average: 93.2
Conventional	92.0	
Conventional + subsoil	108.2	Conventional average: 100.1
LSD 0.05	NS	
Overall average	96.6	

¹Average of 4 replicates.