Expansion of Reduced Tillage Research Including Strip Till

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Less tillage for crop production is a rapidly growing trend in our region. The NDSU Carrington Research Extension Center has conducted a cropping systems study for 20 years that includes comparisons of crop performance based on three tillage systems: conventional till, reduced till and no-till. Recently, the Carrington Center has expanded research work with reduced tillage. Numerous trials are currently direct-seeded into small grain stubble such as selected small grain and oilseed variety tests, wheat nitrogen management, and weed management.

Another area of growth is research work with strip tillage for corn, soybean, sunflower and onion production. Paul Hendrickson, agronomy research specialist at the Carrington Center, has been recently exploring the use of strip till for onion production. Walt Albus, agronomist at the Oakes Irrigation Research site, has initiated work in 2006 to compare performance of corn in strip-till with conventional- and no-till systems. The following is a description of initial work and results at the Carrington Center with strip-tilled soybean compared to conventional- and no-till systems.

The two-year dryland trial was established on a Heimdal loam soil with 2.9 to 3.1% organic matter. Conventional-till plots were tilled during the fall (and spring in 2006) to reduce crop residue cover to about 30% or less. The strip-till treatments were applied during mid fall using a Yetter strip-till opener with a 22-inch row spacing in 2005 and 30-inch row spacing in 2006 using a 2- to 5-inch tillage depth that established a berm up to 12-inches wide. The spring strip-till treatment in 2006 was applied about one month before planting. Inoculated soybean ('RG200RR' in 2005 and 'RG600RR' in 2006) was planted in 21- or 30-inch rows in mid-May and harvested in mid-September.

Plant development and growth generally were similar among tillage systems (data not shown). An optimum soybean stand was established in all tillage systems, with stands tending to be highest with conventional till (Table). Seed yield tended to be greater with reduced-till treatments compared to yield with conventional till. This likely was due to soil moisture conservation with reduced tillage. Seed quality, including protein content, was similar among treatments.

Table. Soybean response to tillage systems, Carrington, 2005-06.

Treatment	Plant stand			Seed yield			Protein		
	2005	2006	2-yr average	2005	2006	2-yr average	2005	2006	2-yr average
	plants/acre			bushels/acre			%		
conventional till	252330	190240	221290	21.7	16.2	19.0	35.5	36.6	36.1
no-till	230510	184930	207720	22.6	18.1	20.4	34.8	36.1	35.5
strip till - fall	238100	181280	209690	23.4	18.4	20.9	35.2	36.4	35.8
strip till - spring	x	179950	x	x	18.4	x	x	36.3	x
Mean	240310	184100	212900	22.6	17.8	20.1	35.2	36.3	35.8
CV (%)	13.1	10.3	x	11.2	9.4	x	1.1	1.3	x
LSD (0.05)	NS	NS	x	NS	NS	x	NS	NS	x

In 2007, strip-till work will continue with the above-listed crops but will also include pinto bean. An analysis is also needed to examine if potential agronomic benefits with reduced-till systems translate to economic benefits.

Establishing strip till plots.

Plots established fall of 2005 (foreground): left = conventional till, center = no-till, right = strip till.