Row Crop Performance with Strip Tillage

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Field trials were conducted at the NDSU Carrington Research Extension Center to examine row crop response to tillage systems, with emphasis on strip till. Crop and test years included: soybean, 2005-06; sunflower, 2006-08; and corn and pinto bean, 2007-08. The dryland trials were established on a Heimdal Emrick loam soil with spring wheat as the previous crop. Conventional-till treatments were tilled at a 2- to 4-inch depth in the fall and spring before planting, and also between plant rows during the growing season. Strip-till treatments were established in the fall (October or November) and in the spring (April) using a Yetter strip-till unit set at a depth of 3 to 7 inches that produced 8- to 12-inch wide tilled strips. Corn and sunflower treatments included 5 gal/A of 10-34-0 liquid fertilizer applied deep-band (6-7 inches) in the fall, 2007, and in-furrow and 2- by 2-inch band during planting, 2008. Crops were planted with a John Deere 750 single-disk drill in 21-inch rows in 2005, and a Max-Emerge II planter in 30-inch rows in 2006-08.

Table 1 summarizes seed yield of the four crops. Corn, soybean, and sunflower seed yield were similar among tillage systems. However, soybean and sunflower average yield tended to be higher with fall strip till, and corn yield was highest with strip till in 2007. Fall strip-tilled pinto bean had a greater seed yield compared to other tillage treatments in 2007. Sunflower flowering was delayed one day with no-till compared to other tillage treatments in 2006 (data not shown). Corn silk date was delayed two to three days with no-till compared to other tillage treatments in 2007 (data not shown).

Table 1. Crop yield with tillage systems, Carrington, 2005-08.

	Soybean			Sunflower				Corn			Dry Bean
	2005	2006	Avg.	2006	2007	2008	Avg.	2007	2008	Avg.	2007
Tillage system	bu/A			lb/A				bu/A			lb/A
Conventional	21.7	16.2	19.0	1160	1040	1173	1124	155.8	109.5	132.7	1820
No-till	22.6	18.1	20.4	1338	956	1253	1182	140.1	104.0	122.1	1886
Strip till (fall)	23.4	18.4	20.9	1134	1086	1501	1240	160.8	96.2	128.5	2129
Strip till (spring)	x	18.4	x	1379	942	x	x	166.9	x	x	1745
LSD (0.05)	NS		x	NS		x		NS		x	209

Table 2 indicates 2008 sunflower and corn performance with tillage systems and fertilizer placement. Due to a very high level of soil phosphorus (20 ppm), crop response did not occur except with corn days to silk. Corn silk date was delayed one to two days without banded fertilizer.

Table 2. Sunflower and corn response to tillage systems and fertilzer placement, Carrington, 2008.

Tillage system/ fert placement[1]	Sunflower					Corn					
	Plant Emerge	Bloom	PM[2]	Stand	Yield	Plant Emerge	Silk Date	Stand	Yield	TW	Moisture
	Jday			plt/A	lb/A	Jday		plt/A	bu/A	lb/bu	%
Conventional/ band	150	218	266	24,570	1173	149	217	29,880	109.5	55.5	22.7
No-till/band	150	217	266	21,915	1253	150	218	27,890	104.0	54.6	22.5
Strip till	150	216	265	25,235	1259	150	219	26,560	92.8	54.5	24.4
Strip till/fall band	150	216	266	24,570	1457	150	218	26,560	95.6	54.0	24.2
Strip till/band	150	217	266	22,575	1501	150	218	31,875	96.2	54.9	23.6
Strip till/in-furrow	151	217	266	24,570	1520	151	217	24,570	100.5	55.1	21.9
LSD (0.05)	---------- NS ----------					NS	1	---------- NS ----------			

[1]Strip till = fall (October 23, 2007); 10-34-0 applied at 5 gal/A.

[2]PM = Physiological maturity.

Tillage and fertilizer placement trials have been initiated during the fall of 2008 for testing of corn, dry bean, and sunflower performance in 2009.

Strip-tilled sunflowers, July 2007.