

Strip Tillage Effects on Crop Production and Soil Erosion, Crop Year 2002

Richard M. Cruse, Tel: 515-294-7850, rmc@iastate.edu

Iowa State University, 3212 Agronomy Hall, Ames, IA 50011

Demonstration Description

Knudt Miller Farm, Storm Lake, Buena Vista County

Two soil tillage systems were compared for corn production following soybeans: 1) chisel followed by field cultivation; and 2) strip tillage. In field areas of each tillage system two runoff collectors were installed to measure soil erosion and water runoff. Two run off collectors on chisel plow/field-cultivated areas (to the rear) and two on the strip tillage area (to the front) are illustrated in Picture 1. During the period, May-August, soil erosion and run off were reduced 25% and 27% respectively on strip tillage compared to the chisel plow/field cultivated areas.



Monsanto Farm, Newton, Jasper County

Two strip tillage demonstrations were established for corn and soybean production. Three tillage treatments were compared - conventional tillage (CT), strip tillage (ST), and no tillage (NT).

ST was applied on October 31, 2001. The distance between strips was 3 feet, and the residue-free strip was 1-foot wide. For CT, a field cultivation was conducted on November 2, a ripper operation on November 19, 2001 and field cultivation on April 3, 2002. No soil or residue management activities occurred NT from harvest to planting.

Corn planting date was determined based soil temperature at 2" and soil water content in the row zone. Soil temperature was monitored every hour from April 4 until the planting date. The lower plastic limit water content was selected as the criteria to define soil water content for planting. If the soil was more than 50 °F for twelve continuous hours and the soil water content was at the lower plastic limit (or lower), planting was conducted. Based on these criteria the planting dates were April 11 (for CT), April 16 (for ST) and May 6 (for NT). The planting rate was 31,102 seeds per acre and the corn hybrid used was Asgrow RX 30 RR/YG. Table 1 shows the average corn yield for each tillage system by planting date.

Table 1 Corn yield for each tillage system by planting date

	April 11	April 16	May 6	Average
	-----Bu/ac-----			
Conventional tillage	200.3	210.3	202.3	204.3
Strip tillage	188.5	198.8	199.9	195.7
No tillage	186.0	194.7	195.8	192.2
Average	191.6	201.2	199.3	

No significant differences were detected among tillage systems ($LSD_{(0.05)}=20$ Bu/ac). The first planting date in average had the lowest yield ($LSD_{(0.05)}=8.7$ Bu/ac). The interaction of tillage system * planting date was not detected. It must be noticed that the yielded obtained in all tillage systems were excellent in 2002.

To determine soybean planting date for each of the tillage systems the same criteria as for corn planting was used, but 65 °F instead of 50 °F was used as the soil temperature limit. Based on these criteria the planting dates were May 6 (CT), May 22 (ST) and June 7 (NT).

Table 2 Soybean yield for each tillage system by planting date.

	May 6	May 22	June 7	Average
	-----Bu/ac-----			
Conventional tillage	48	49	46	48
Strip tillage	47	48	46	47
No tillage	45	45	47	46
Average	46.7	47.3	46.3	

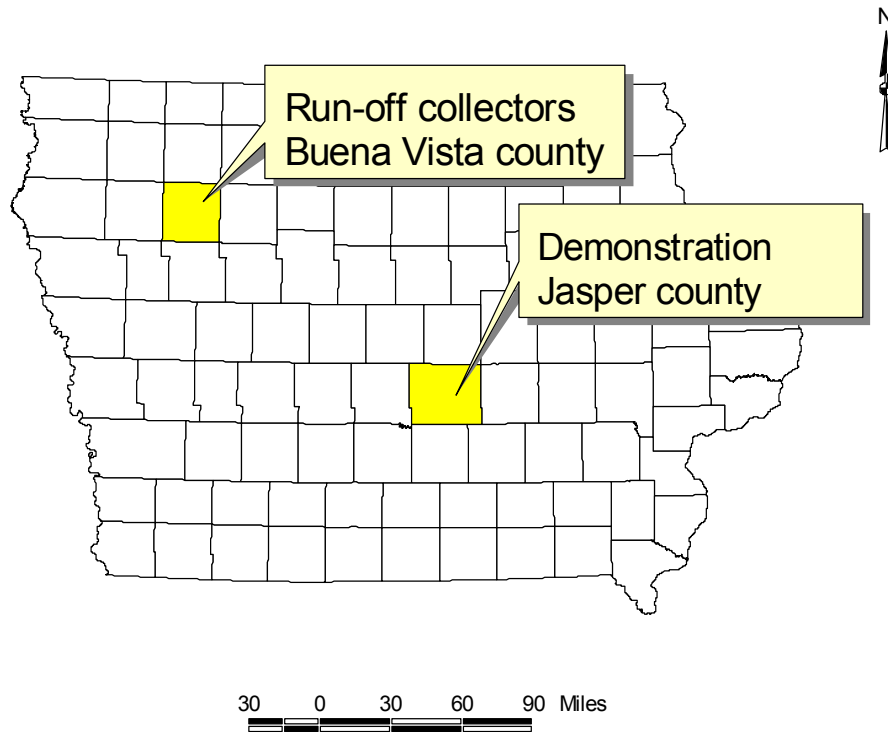
No significant planting date effects were detected ($LSD_{(0.05)}=3.9$ Bu/ac), nor were any significant tillage systems effects detected ($LSD_{(0.05)}=3.8$ Bu/ac). Neither corn nor soybean was affected by tillage systems in 2002 (Table 1 and Table 2).

The two demonstrations indicate that strip tillage reduces the soil losses and water run off, while it maintains high levels of corn and soybean production, at least in years with very favorable environmental conditions.

Number of Demonstration Sites and Locations

Producer	Town	County
Knudt Miller	Storm Lake	Buena Vista
Monsanto	Newton	Jasper

DEMONSTRATION SITES BY COUNTY



Educational Outreach

Field events: farmers, students, professionals:

July 22, 2002 - Corn States Field days for Monsanto employees,
Monsanto Farm, Newton - approximately 35 attendees

July 24, 2002 - Corn States Field days for Monsanto employees and public,
Monsanto Farm, Newton - approximately 30 attendees



July 28, 2002 - Monsanto field representatives field day, Knudt Miller farm,
Storm Lake -approximately 20 attendees

Class material/presentations:

July 16 & 17, 2002 - Iowa State University CCA presentations, ISU FEEL laboratory,
Ames - approximately 120 agronomists and crop consultants participated

Scientific publications:

Informational multipliers: Monsanto agronomists and field specialists; Crop consultants and
agronomists attending CCA short courses

An abstract was submitted to Congress of International Soil Tillage Organization Research,
which it will be held on Australia in July 2003.

Additional Partners

Iowa State University
Monsanto