



No-Till

- **Advantages of No-tillage include:** reduction of soil erosion, increased soil water use efficiency, improved soil quality, and time and labor savings.
- **Disadvantages:** High residue production systems can depress early-season plant growth and reduce nutrient uptake.



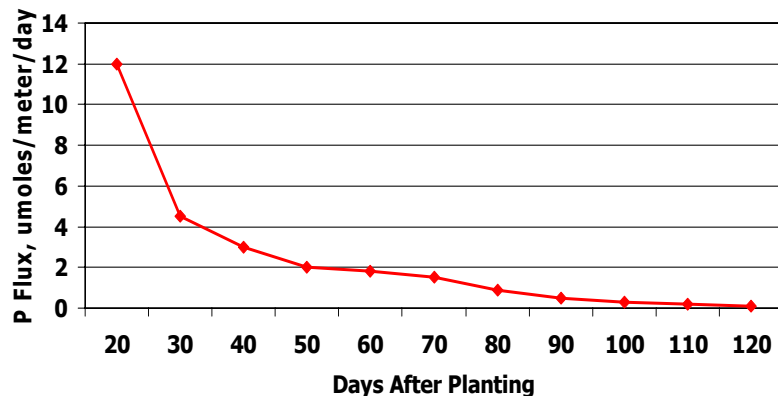
Effects of Soil Temperature

When soil temperature was reduced from 70 to 58 degrees Fahrenheit:

- Corn root growth decreased 5-fold
- P uptake by corn roots decreased 4-fold
(Mackay and Barber, 1984 Purdue)



P Flux into Roots of Corn and Plant Age





Strip-tillage

- Strip-tillage can provide an environment that conserves soil and water while establishing a seed-bed that is similar to conventional tillage.



Objectives

- Compare effectiveness of strip-tillage to no-tillage
- Assess the effects of fall vs spring applications of N-P-K fertilizers on growth, grain yield, and nutrient uptake of corn grown in strip-tilled or no-tillage production systems.



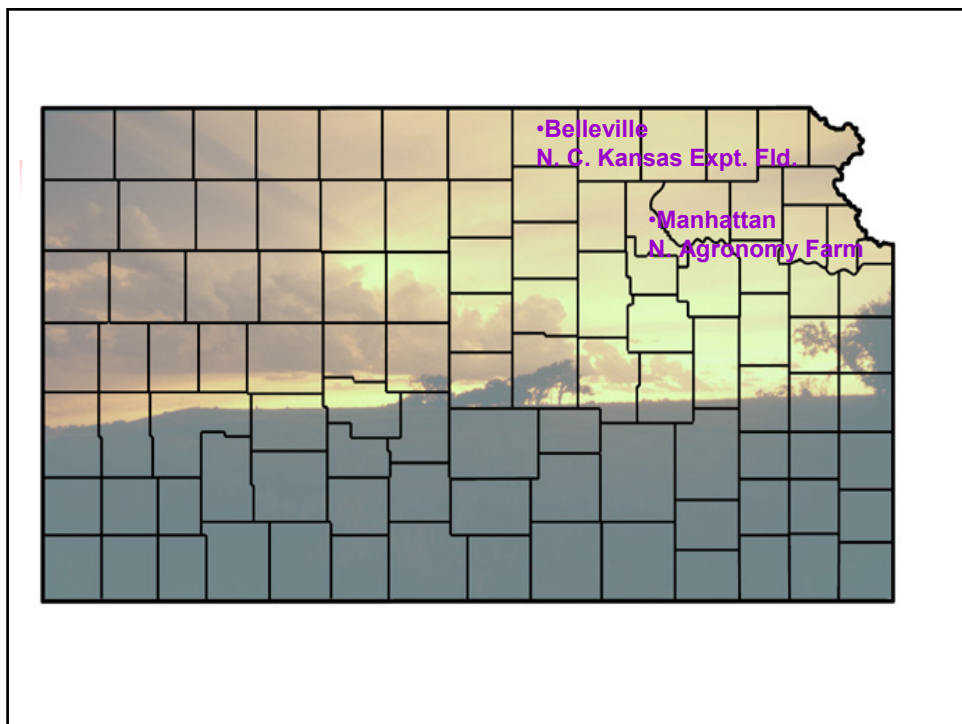
Tillage Treatments in Residue

- Strip-till in Fall: Fall applied fertilizer.
- Strip-till in fall: no fall fertilizer, spring applied fertilizer with planter.
- No-Strip-Till, spring applied fertilizer with planter.



Treatments

- | | |
|---|--|
| <ul style="list-style-type: none">■ <i>Fertility Treatments</i>1) 0-0-0 Check2) 40-30-5-53) 80-30-5-54) 120-30-5-55) 80-15-2.5-2.5(Fall)
+40-15-2.5-2.5(Spring) | <ul style="list-style-type: none">■ <i>Timing</i>1) Fall Strip-Till +Fall Applied Fertilizer.2) Fall Strip-Till + Planting Time Fertilizer.3) No-Till Planting + Planting Time Fertilizer. |
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Fall Strip-Tillage



Strip-Tillage





Belleville, 2002

Treat.	V-8 Dry wt, lb/a	Day to Mid-Silk	Moist, %	Yield, bu/a
Strip-Till	456	58	13.8	49
No-Till	296	65	16.6	37



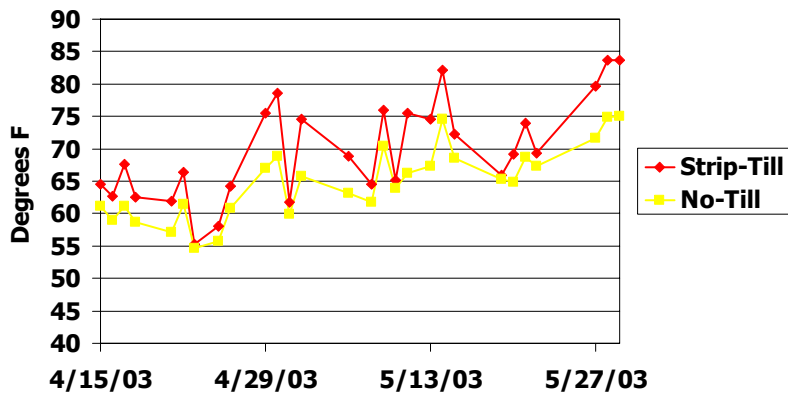
Tillage Effects on V6 Nutrient Uptake, Belleville

Treatment	N	P	K
	-----lb/acre-----		
Strip-Till	14	1.6	13
No-Till	9	1.0	9

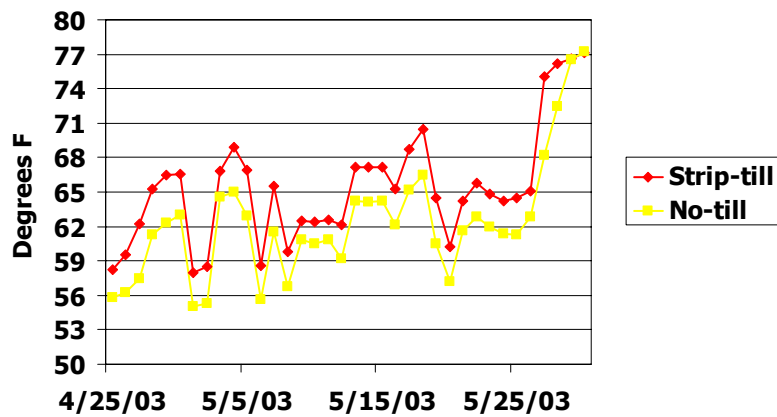
Manhattan, 2002

Treat.	V-6 Whole Plant lb/a				Yield bu/a
	Dry Wt.	N	P	K	
Strip-Till	490	17	2.0	13	58
No-Till	379	13	1.5	10	55

Soil Temperature at Planting Depth Manhattan, 2003



Soil Temperature at Planting Depth Belleville, 2003



No-Till Vs Strip-Till Early Season Growth





Strip-till vs No-till



Grain Yield, Belleville 2003

Fertilizer Treatment	Strip-Till	No-Till
	bu/acre	
40-30-5-5	52	45
80-30-5-5	60	48
120-30-5-5	71	51
Average	61	48



Grain Yield, Belleville 2003

Fertilizer Treatment	Strip-Till, Fall Fertilize	Strip-Till, Spring Fertilize
	bu/acre	
40-30-5-5	56	52
80-30-5-5	58	60
120-30-5-5	68	71
Average	61	61



Grain Yield, Belleville 2003

Fertilizer Treatment	Yield, bu/acre
120-30-5-5 Fall	68
120-30-5-5 Spring	71
120-30-5-5 Split (2/3 fall, 1/3 spring)	75



Belleville, 2003

Treat.	V-6 Dry wt, lb/a	Day to Mid-Silk	Moist, %	Yield, bu/a
Strip-Till	299	56	14.5	60
No-Till	168	66	17.5	45



Grain Yield, Manhattan 2003

Fertilizer Treatment	Strip-Till	No-Till
	bu/acre	
40-30-5-5	185	152
80-30-5-5	187	168
120-30-5-5	187	153
Average	186	158



Grain Yield, Manhattan 2003

Fertilizer Treatment	Strip-Till, Fall Fertilize	Strip-Till, Spring Fertilize
	bu/acre	
40-30-5-5	182	185
80-30-5-5	192	187
120-30-5-5	205	187
Average	193	186



Grain Yield, Manhattan 2003

Fertilizer Treatment	Yield, bu/acre
120-30-5-5 Fall	204
120-30-5-5 Spring	194
120-30-5-5 Split (2/3 fall, 1/3 spring)	186



Summary

- Early-season plant growth and nutrient uptake was greater with strip-till than no-till.
- Corn in strip-till plots reached mid-silk sooner and had lower grain moisture at harvest.
- Grain yields were improved with strip-tillage.
- Under Kansas conditions, fall applied fertilizer was as effective as spring applied.

