Comparison of No-till/Strip-till and Conventional Tillage Yield Trends in the NCGA Corn Yield Contest

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Introduction

- Corn grain yields have increased due to both genetic and management factors
- Era studies have determined rate of yield increase
  - Hybrids representing a wide range in release dates
- Adoption of no-till and strip-till systems is growing
  - Era studies have not been conducted with no-till or strip-till systems

Objective

- Compare grain yield increases for no-till/strip-till vs. conventional systems

Method

- Linear regressions determined for National Corn Growers Association (NCGA) contest-winning yields
  - No-till/Strip-till and Conventional Tillage
  - Ten classes in seven Midwest states,1983 to 2006

Table 1. Statistical significance of linear regression slope differences between no-till/strip-till and converntional tillage for ten contest divisions in seven states; NCGA corn grain yield contest, 1983 to 2006.

State - Division	Tillage	Slope	Slope differs from zero P > F	NT/ST slope differs from Conv. P > F
South Dakota - Dryland	NT/ST	3.93	<0.0001	0.0999
	Conv.	2.69	<0.0001	
South Dakota - Irrigated	NT/ST	3.38	<0.0001	0.0093
	Conv.	1.67	0.0009	
Nebraska - Dryland	NT/ST	3.60	<0.0001	0.5894
	Conv.	4.07	<0.0001	
Nebraska - Irrigated	NT/ST	3.68	0.0115	0.0134
	Conv.	-1.22	0.3790	
Kansas - Dryland	NT/ST	4.08	<0.0001	0.4939
	Conv.	3.45	<0.0001	
Kansas - Irrigated	NT/ST	3.70	<0.0001	0.2829
	Conv.	2.70	0.0004	
North Dakota - Dryland	NT/ST	4.00	0.0005	0.1024
	Conv.	1.93	0.0176	
Minnesota - Dryland	NT/ST	2.20	0.0006	0.7188
	Conv.	2.45	<0.0001	
Wisconsin - Dryland	NT/ST	3.99	<0.0001	0.3996
	Conv.	4.90	<0.0001	
Illinois - Dryland	NT/ST	2.49	0.0013	0.4026
	Conv.	1.54	0.0999	

Summary

- Contest-winning yields increased in all classes
  - Except for Nebraska Irrigated, Conventional Tillage

  Average increase = 3.0 bu acre^{-1} year^{-1}

- Rate of increase was higher for No-till/Strip-till than for Conventional Tillage in four of ten classes evaluated
  - Average increase when there were differences:

  No-till/Strip-till = 3.7 bu acre^{-1} year^{-1}

  Conventional Tillage = 1.3 bu acre^{-1} year^{-1}

  - Difference may be due to
    - Genetic enhancements such as stress emergence tolerance and disease resistance
    - Development of improved no-till management practices by corn growers

Figure 1. Relationship between year (1983 to 2006) and NCGA contest-winning corn grain yields for no-till/strip-till and conventional tillage in ten divisions in seven Midwestern states.