

## Effect of tillage and annual ryegrass cover crop on corn yield

Michael Plumer  
Natural Resource Management Educator  
University of Illinois Extension

The site for this project was Ralph Upton farm, 10 miles south of Interstate 64 and about 20 miles from the Indiana border. This site was chosen because the soil is representative of large areas of Missouri, southern Illinois, Indiana and Ohio. The soil type (*Bluford silt loam, fine, smectitic, mesic Aeric Fragic Epiaqualfs*) is a moderate claypan soil, low in organic matter with acid subsoil. Further, the land is typically eroded and exhibits poor internal drainage, restricted crop rooting and is often highly-variable in yields. The Upton site was classified as a C3 with 6-8" of top soil over highly acidic subsoil; it had been no-tilled for 9 years.

### **Results and Discussion:**

The winter weather patterns in the Midwest were highly variable during the three years of the trial. In the first year, 2005-2006 weather was fairly typical with some cold conditions.

The second year, 2006-07, had very large temperature fluctuations with temperatures varying more than 60 degrees Fahrenheit over 2 - 3 day periods. This occurred five times, resulting in severe plant desiccation and dieback. Frequent regrowth and freezing depleted the plants' nutrient reserves. The 2007-08 growing season was similar to the average temperature, but had 300% greater rainfall than normal,

### **Yield Advantages:**

One of the main selling points of the use of annual ryegrass as a cover crop is its benefits to soil quality and the resulting increase in crop yields. After three years of replicated trials, the following tables show that effect on highly eroded Bluford soils on the Upton farm. Yield differences varied by year depending on soil type and rainfall.

**Yields at Upton Farm– Conv. till vs No-till with ARG  
2005 - 06**

| <b>Treatment</b>                | <b>mean yield in<br/>bushels/acre</b> |
|---------------------------------|---------------------------------------|
| <b>no-till w/<br/>ARG</b>       | <b>155.7</b>                          |
| <b>conventional<br/>tillage</b> | <b>102.0</b>                          |
| <b>LSD 0.05</b>                 | <b>12.3</b>                           |
| <b>LSD 0.1</b>                  | <b>9.9</b>                            |

**conventional tillage, disk  
in fall, disk field cultivate  
spring  
ryegrass planted Sept 29,  
2005 at 15#/a**

**corn planted May 4, 2006, at 30,000, harvested Sept. 18, 2006  
Rainfall–was 2.6 inches April to October  
Trial was 9 replications**

**Yields at Upton Farm– Conv. till vs No-till with ARG  
2006- 07**

**Corn Harvested 8-24-07**

| <b>Treatment</b>                        | <b>mean yield bushels/acre</b> |
|---|--------------------------------|
| <b>No-till</b>                          | <b>79.0</b>                    |
| <b>Conv. till. fall<br/>06/spring07</b> | <b>52.5</b>                    |
| <b>Conv. Till<br/>06/no-till 07</b>     | <b>61.5</b>                    |
| <b>no-till ryegrass cover</b>           | <b>121.0</b>                   |
| <b>LSD 0.05</b>                         | <b>16.3</b>                    |
| <b>LSD 0.1</b>                          | <b>13.4</b>                    |

**Ryegrass tillage trial -- ryegrass planted Sept.28, 2006 at 13#/a. .  
Soil type Bluford C3. Plot has been in no-till since 1995.  
Corn planted April 15th, at 32,000, Dekalb 63-81. rainfall was  
approximately 3 inches May to October.**

Fertility, popup, starter, 150# N. sidedressed mid May  
Trial was 8 replications

**. Yields at Upton Farm– Conv. till vs No-till with ARG  
2007- 08**

**Corn Harvested 9-24-08**

| <b>Treatment</b>                        | <b>mean yield bushels/acre</b> |
|---|--------------------------------|
| <b>No-till</b>                          | <b>128.4</b>                   |
| <b>Conv. till. fall<br/>06/spring07</b> | <b>102.3</b>                   |
| <b>no-till ryegrass cover</b>           | <b>130.9</b>                   |
|   | <b>LSD 0.05    14.7</b>        |
|   | <b>LSD 0.1     12.2</b>        |

**Ryegrass tillage trial -- ryegrass planted Sept.7 & replanted Nov. 1, 2007 at  
13#/a. .**

**Soil type Bluford C3. Plot has been in no-till since 1995.  
Corn planted April 15th, at 32,000, Dekalb 63-81. rainfall was  
approximately 21 inches May to October.**

Fertility, popup, starter, 150# N. sidedressed late June  
Trial was 9 replications

