Investing In Our Future Through Conservation Tillage

Barry Fisher, Conservation Tillage Coordinator
www.agry.purdue.edu/cti/
Email: barry.fisher@in.usda.gov

Business Growth requires maximum utilization and efficiency of:

- Labor
- Management
- Equipment
- Infrastructure
- Production must increase

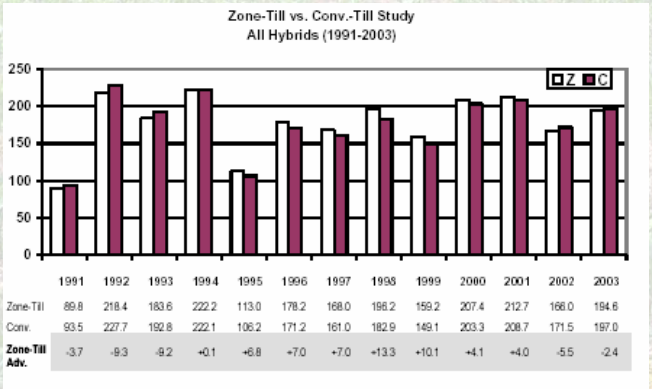
No-Till and Strip-Till systems may offer the greatest opportunities!

Side by side yield comparisons of no-till and conventional tillage systems have been done at many locations, on many soil types across the Corn Belt with few showing any statistical yield difference under a corn – soybean rotation.

Beck's Yield Averages

	Conventional	Zone-till
– **13yr**	**175.9**	**177.6**
– **10yr**	**177.3**	**181.8**

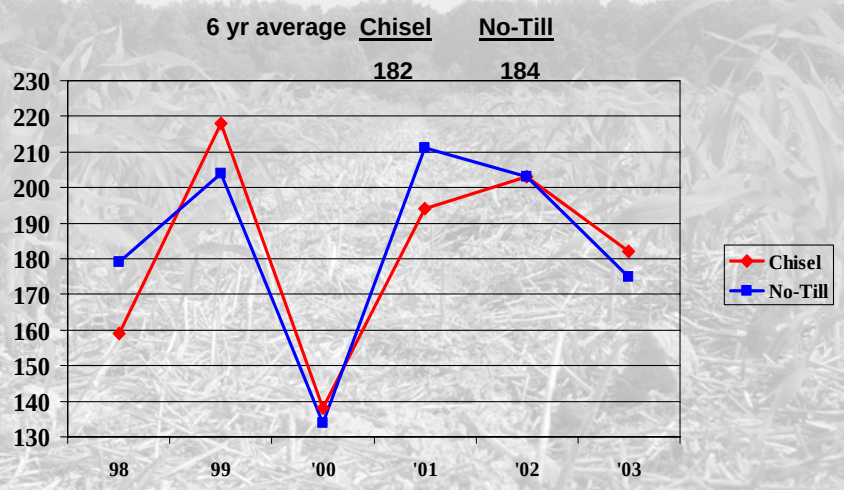
13 year No-till Advantage **+1.7 bu/ac**
10 year No-till Advantage **+4.5 bu/ac**



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Zone-Till	89.8	218.4	183.6	222.2	113.0	178.2	168.0	196.2	159.2	207.4	212.7	166.0	194.6
Conv.	93.5	227.7	192.8	222.1	106.2	171.2	161.0	182.9	149.1	203.3	208.7	171.5	197.0
Zone-Till Adv.	-3.7	-9.3	-9.2	+0.1	+6.8	+7.0	+7.0	+13.3	+10.1	+4.1	+4.0	-5.5	-2.4

Purdue Long-Term Tillage Study

(Corn after soybean yields bu/ac during 1998-2003)



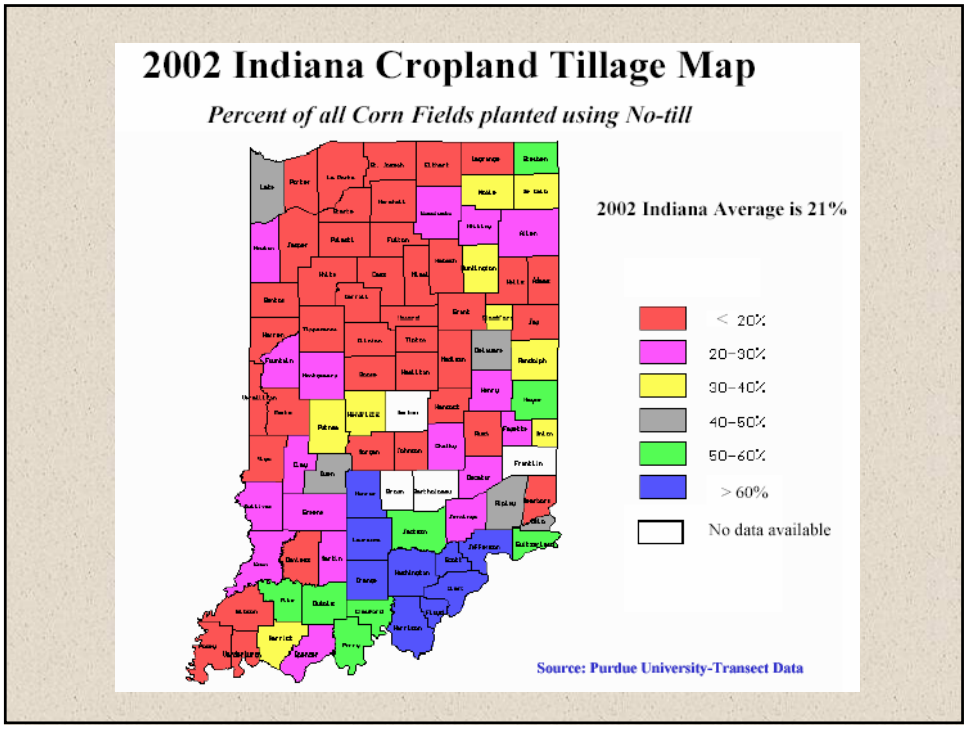
Agronomy Research Center- Purdue Chalmers si.c.l.

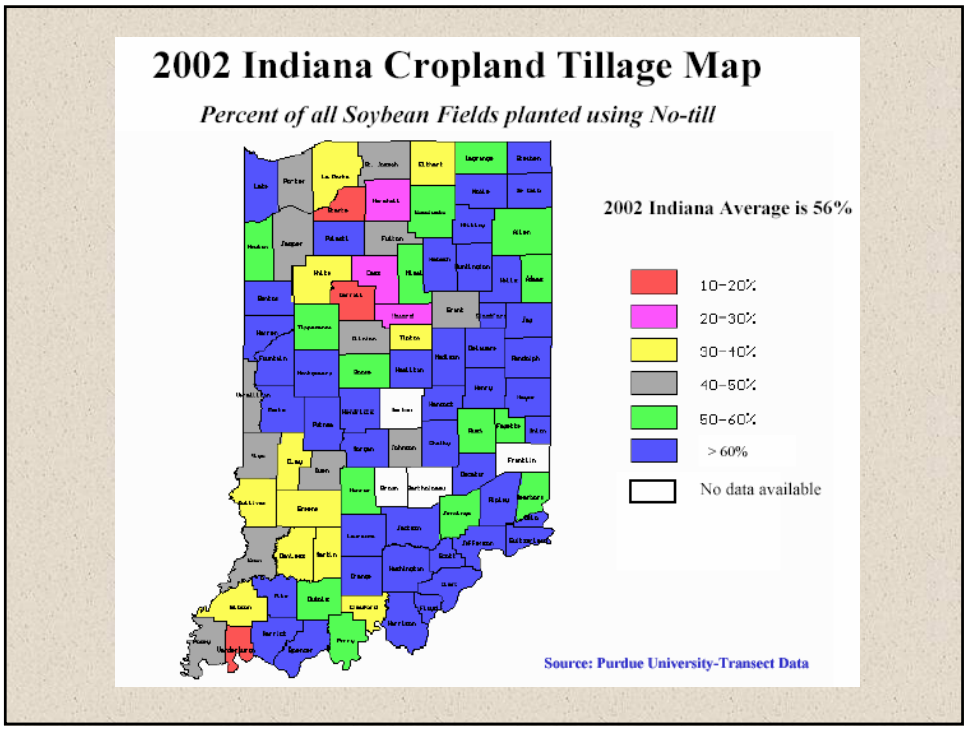
At the same time most economic analyses have shown input costs to be $12- $34/ac. less for no-till systems.

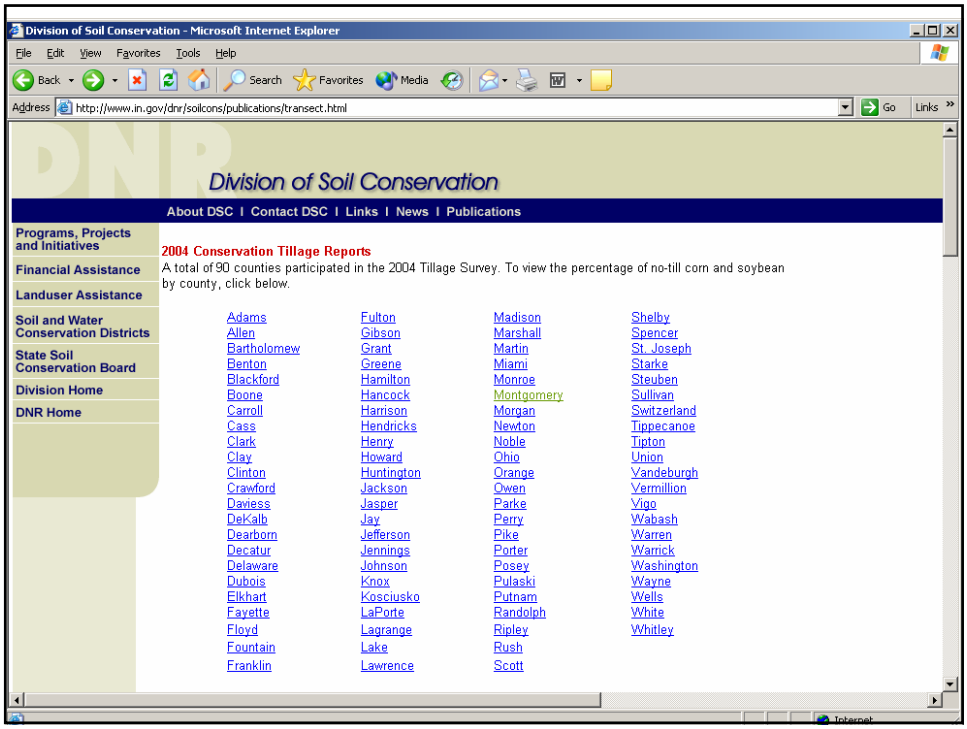
What does this mean for a 1000 ac. farm?

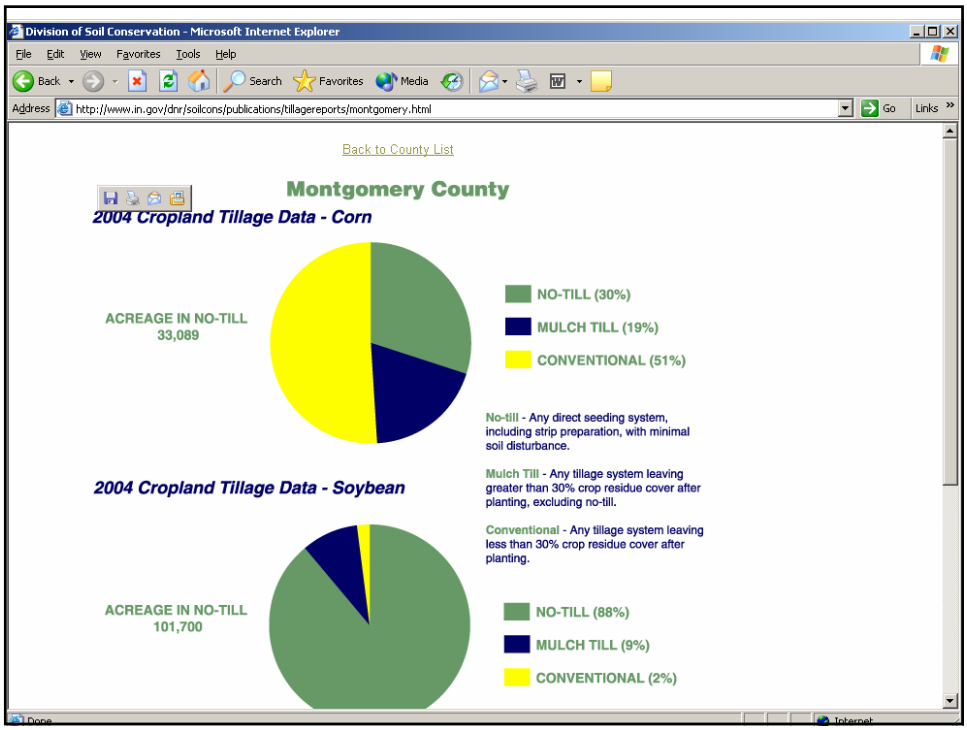
- A USDA study has shown a savings of 30 minutes/ac./yr. to prepare and plant a crop for no-till.
- That's 50 extra work days a year to devote to marketing, management, additional acres or, better yet, family.

What are the trends in your area?





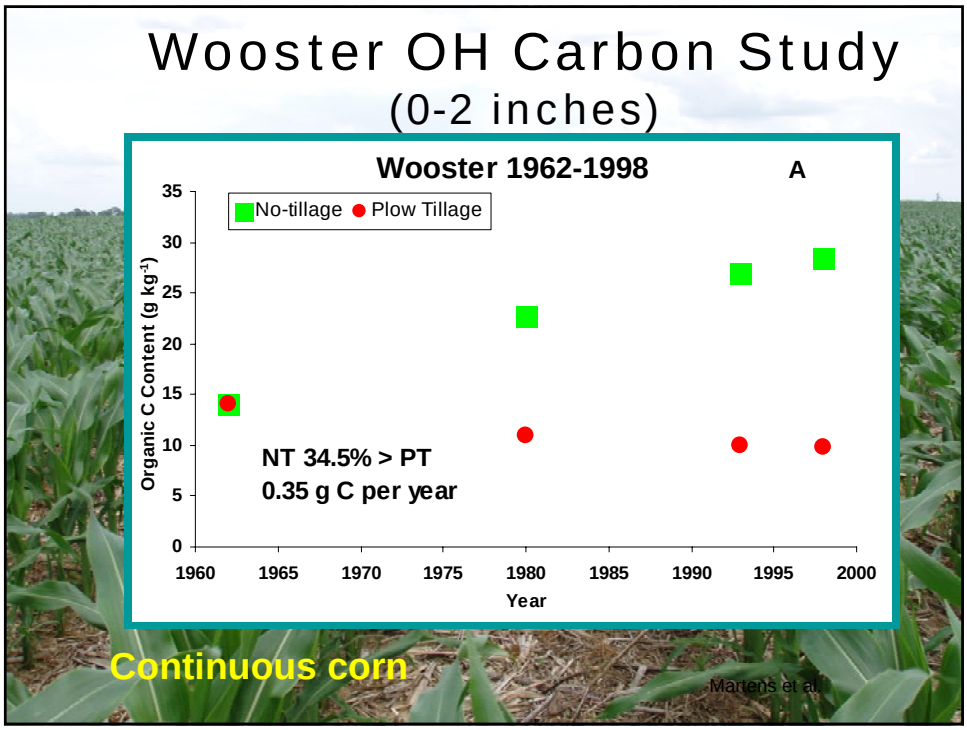




2004 Tillage Transect Results

2004 Corn – Ranked By Acreage of No-Till Acres					
Rank	County	Tillage Type (Acres)			
		No-till	Mulch-till	Reduced-till	Conventional
1	Randolph	39689	2111	14778	19844
2	Wayne	34870	2657	8635	15941
3	Jackson	33440	0	2623	21310
4	Montgomery	33089	21411	0	55473
5	Knox	30251	16806	0	79830
6	Rush	30197	2253	37408	40112
7	Delaware	29382	2784	16392	13299
8	Dubois	28111	2279	4052	22539
9	Washington	27712	1807	2811	4016
10	Putnam	27226	2723	10210	17697
11	Bartholomew	27193	7931	5288	26438
12	Shelby	22906	9432	9432	46710
13	Fountain	21017	1751	5692	64364

We should expect high yields with High Residue Cropping Systems

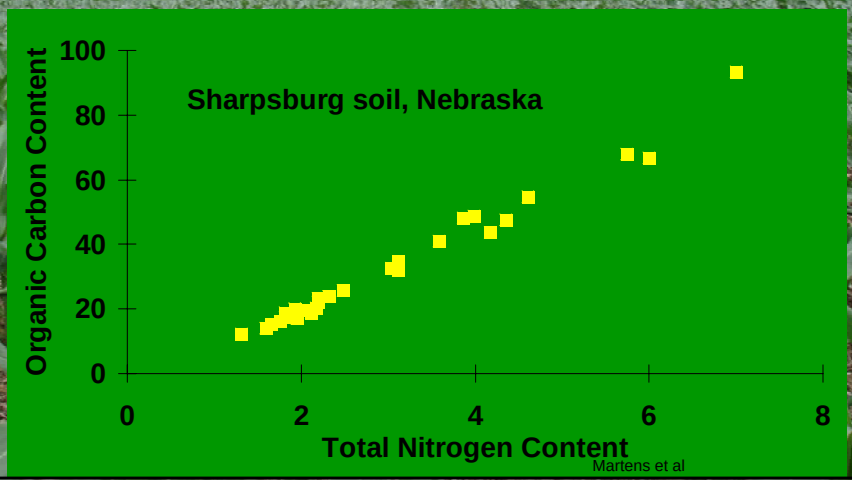


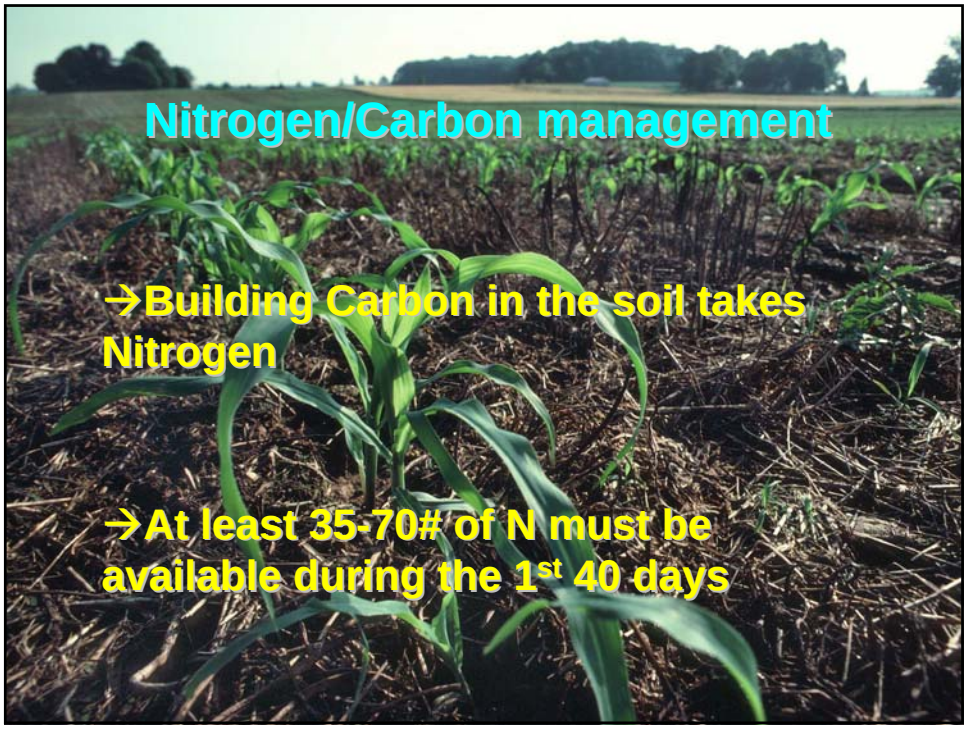
Corn Fertility

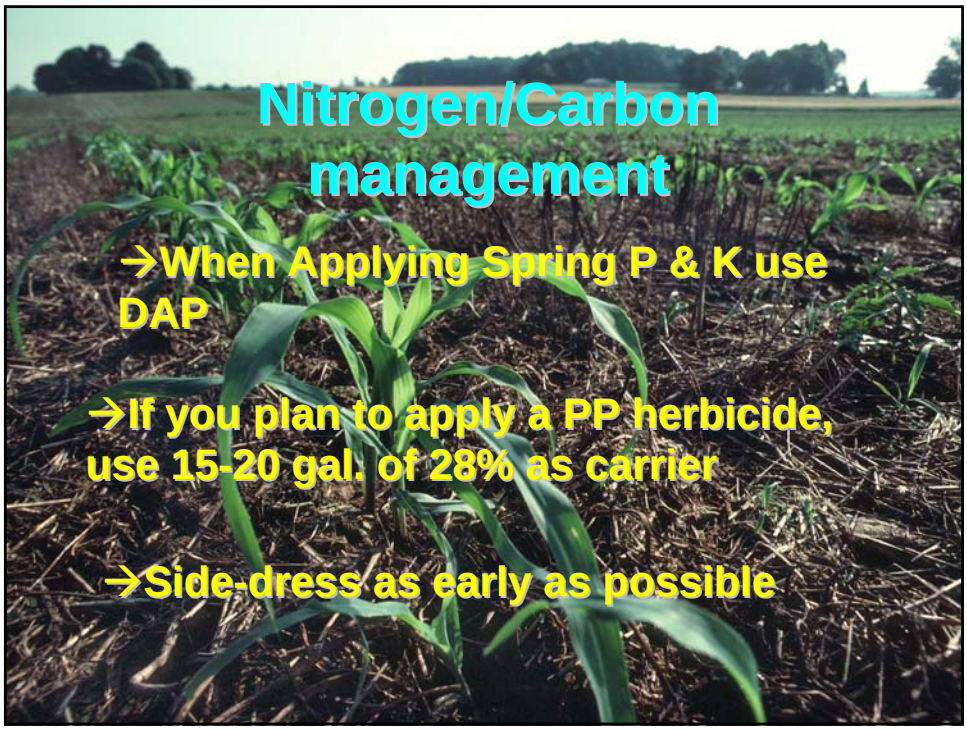
- General rule of thumb- 20# of N is mineralized from every 1% of organic matter.
- To get this mineralization a relative amount of CO_2 must be released
- Mineralization happens later in the season in No-Till

Organic Carbon to Total Nitrogen Relationship

(Silty soil, 130 years)





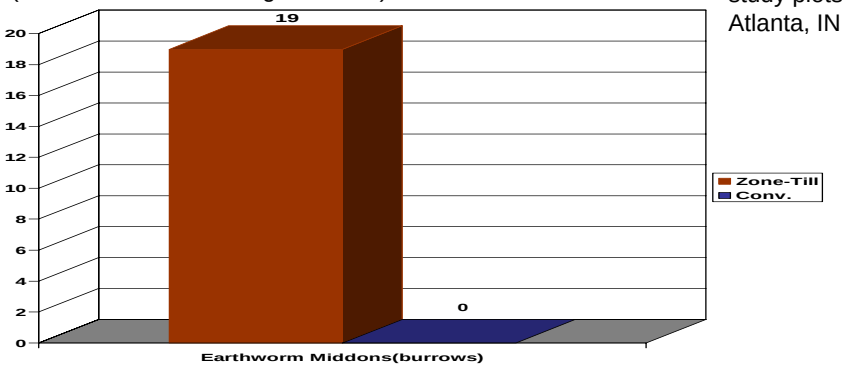


Soil Quality is improved by no-till and use of cover crops.
How…?

- Improve soil structure
- Improved soil drainage
- Increased organic matter
- Improved soil tilth
- Reduced erosion
- Reduced weed pressure
- Improved soil moisture.

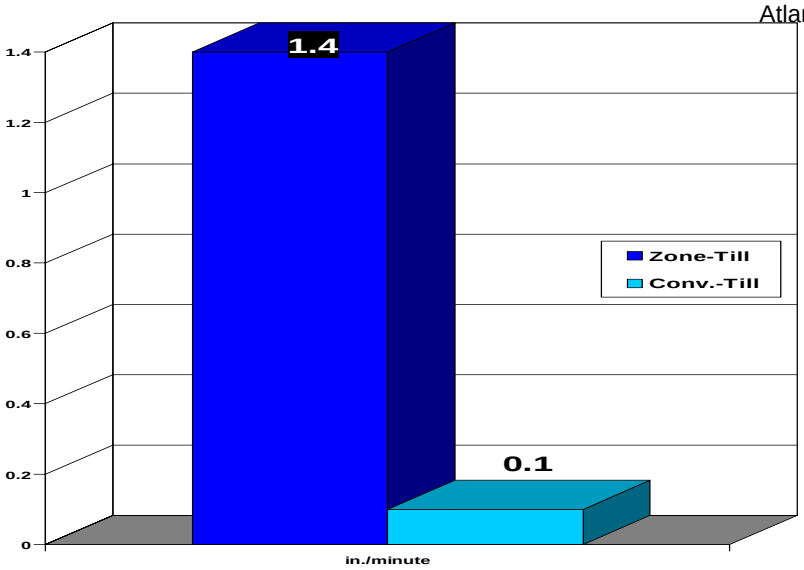
Earthworm Burrows per 8' of Row

(Lumbricus terrestris- night crawler)



Beck's long term tillage study plots- Atlanta, IN

Infiltration Rate- inches/minute

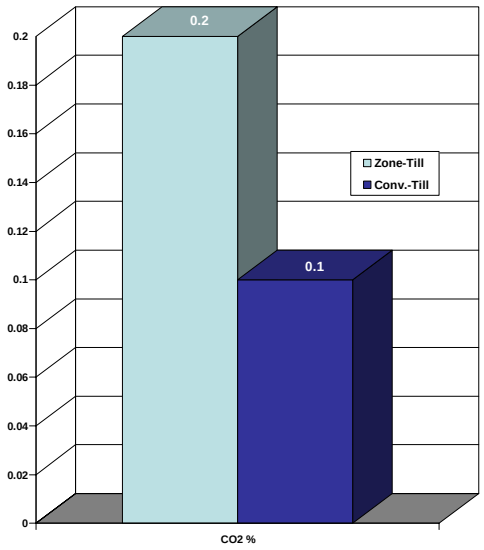


Beck's long term tillage study plots- Atlanta, IN

14X more H_2O in the soil with Z-T

Soil Respiration

Beck's long term tillage study plots- Atlanta, IN



Annual Ryegrass Cover Crop

"Two Dans Diggin"

Drilled at 15 lbs./ac.

Annual Ryegrass

April 8

Dan DeSutter Farm, Fountain Co.

Annual Ryegrass Cover Crop

Aerial seeded Sept. 9

30 lbs./ac.

Stand less uniform than drilled

Top growth and root growth on 4/8/04 similar to drilled

Annual Ryegrass Cover Crop

DeSutter Farm-Fountain Co.

Drilled on Oct. 1 at 15 lbs./ac.

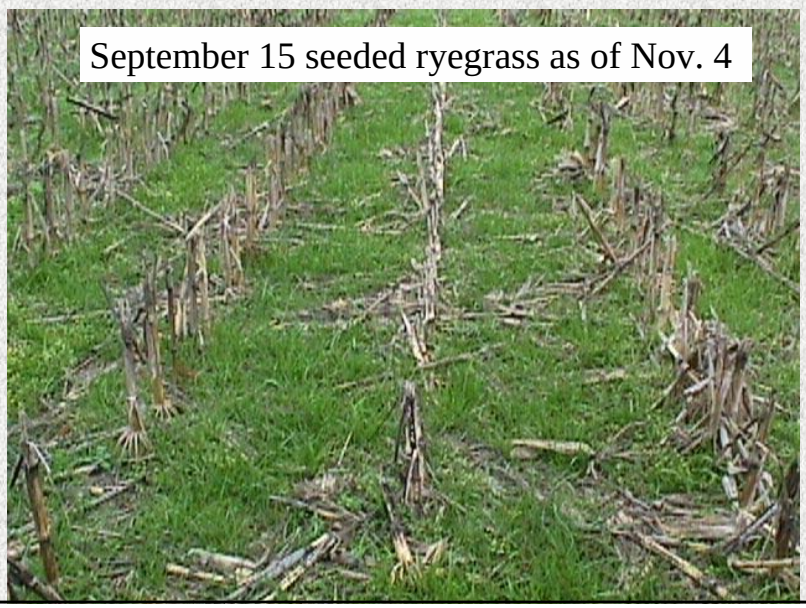
Roots down to 51" on April 8

Annual Ryegrass Cover Crop

Benefits reach maximum at 9" of growth –on or around 4/8/04

- Maximum N content of top growth- + or – 18%
- Maximum root growth- 30" +

Cover crop work by Mike Plumer
University of Illinois Extension



Soybean root development under ryegrass cover

Soybean root following previous root channel

Corn root mass in Bluford soil under no-till and vetch/ryegrass cover crop

Corn root mass under ryegrass cover crop in drought year

20 to 23”

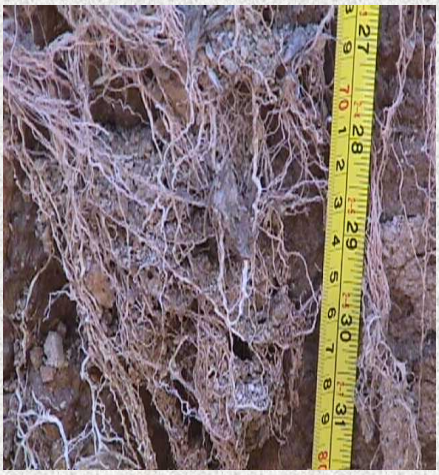
37 to 43”

23 to 28”

46 to 50”

6 years of cover crops plus no-till effects on corn root development

Disk and field cultivate



6 years no-till plus cover crop of hairy vetch

New Research for Soybeans

- White mold can be significantly reduced by cover crops.
- Many *Brassicas* (canola, radish, etc.) are natural nematicides.

  Using them in rotation or as a cover crop can greatly reduce soybean cyst nematode populations.