

Reaping A Return On Your Investment Using Various Cover Crop Mixes

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Robison Farms – Central Indiana

- Long-term No-Tillers
– 45 years
- Owned 1st Tye No-Till drill in Indiana
- “Conservation” minded farmers



Cover Crop Experience

- Worked with Ed Ballard (U of I) on grazing cover crops beginning late 90's
- Work with hundreds of Midwestern and Canadian farmers
- “Accidental” cover crops in 70's-80's



Why Cover Crops?

- Improve Soil Health
- Reduce Erosion
- Reduce Compaction
- Increase Water and Nutrient Holding Capacity
- Increase Earthworm Populations



Why Cover Crops?

- Improve Soil Aeration and Percolation
- Reduce Run-off
- Reduce Nutrient Loss to Ground Water
- Improve Soil Biology/Health
- Improve No-Till Performance



“So What?”

- Brother Don asked these questions
 - So what if we have more worms?
 - So what if we reduce compaction some?
 - So what if we have Deep Roots?

***Don't expect a miracle the first year –
but look for one.***



Can We Get A Positive ROI?



Row Cropper questions...

- Can I spend \$30-60/acre on a cover crop I will not harvest?
- Can I afford to spend the “extra” time managing another crop?



“Does it pay *for us* to use Cover Crops?”

- If grazing cattle? Yes!
- On our long-term no-till
- soils? *I don't know...*



Research with Cover Crops



Robison Farms

2012 Cover Crop
Research Plots

Central Indiana



Research Goals

- Crop Health Differences?
- Compaction Differences?
- Yield Differences?
- Profit Differences?



Simulated Aerial Application

9/16/2011



Cover Crop Mixes and Straight Species

- ARg + Crimson Clover+ Radish
- Peas + Radish
- Oat + Rye + Turnip
- Crimson Clover + Radish
- Oats + Radish
- ARg Blend
- Winter Cereal Rye
- Check



Cover Crop – Fall Growth (5 weeks)



Cover Crop – Fall Growth (8 weeks)







Spring Corn Population

- Equal across all plots (32,000)
- Equal with check



Spring Weed Control

- Virtually perfect in all plots
- A few Annual Ryegrass escapes
- A few dormant Radishes came back



2012 Crop Conditions

- Rainfall from May 1 to July 31 was 2.24" (with only 0.75 from May 1 to July 19). There were 42 days over 90 degrees and 8 days over 100 degrees during that time. All time record dry and heat was recorded in July 2012 in the area.



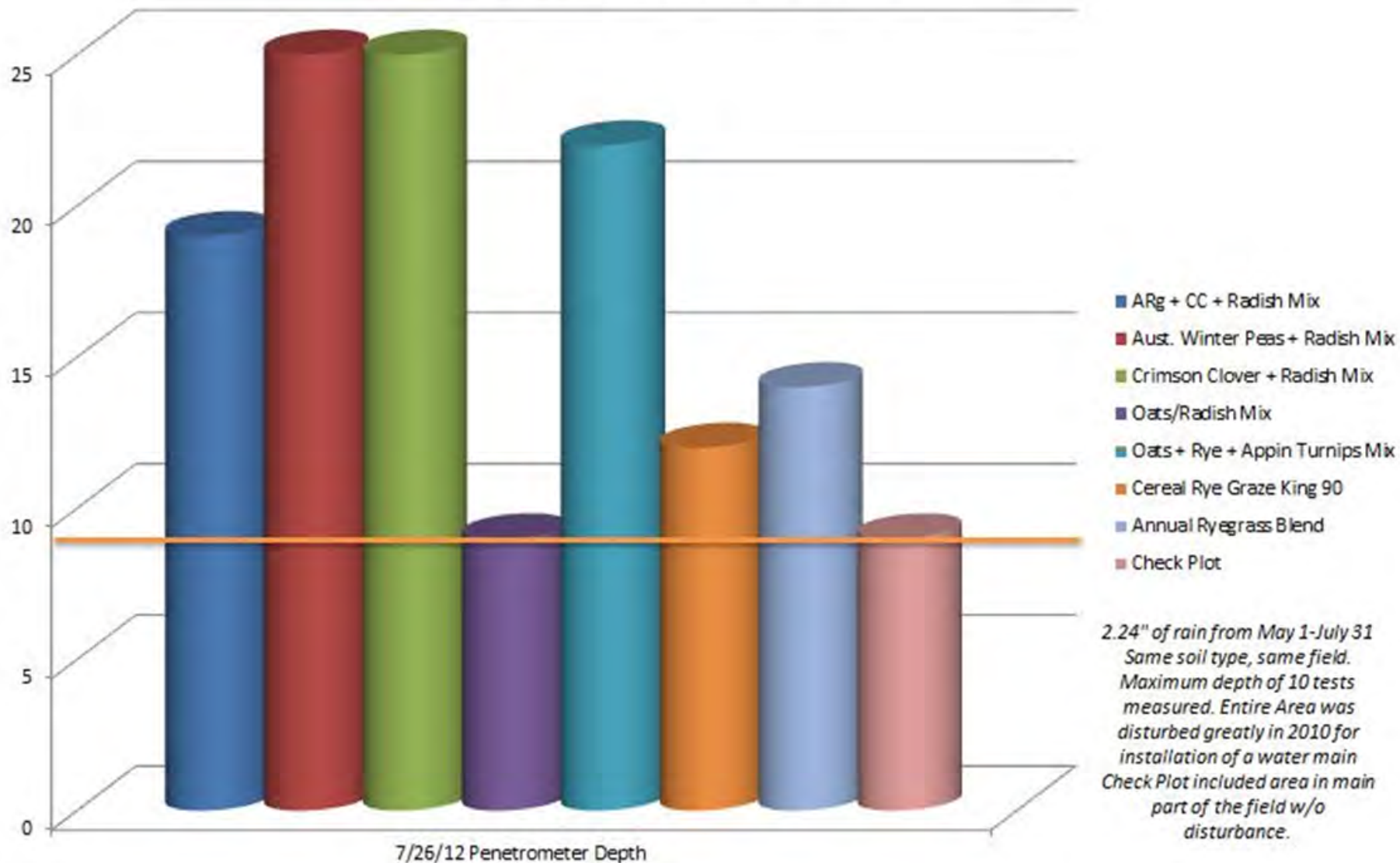
Tools



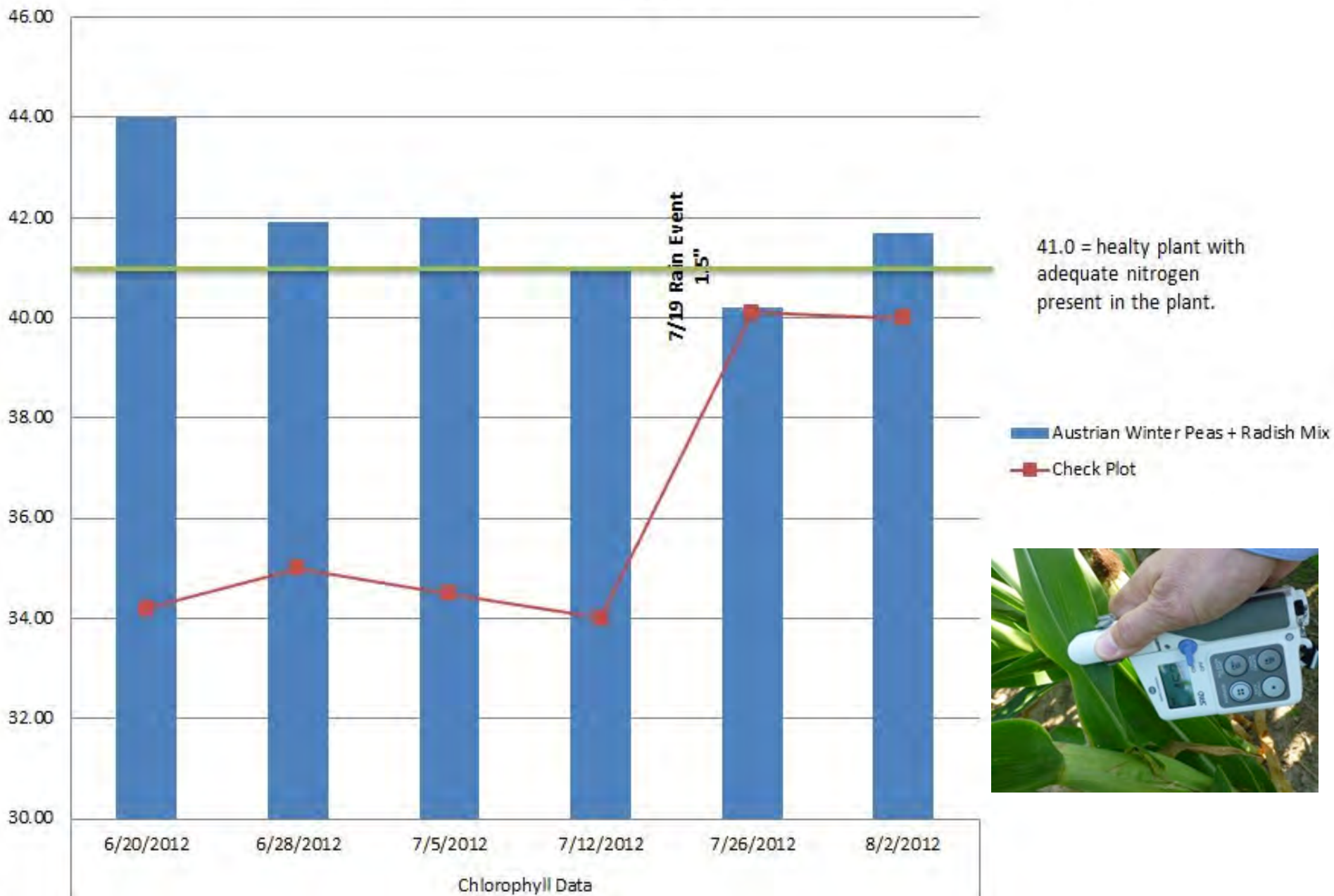
Measuring Soil Compaction After Different Cover Crops

Robison Farms, Greenwood Indiana

Higher Numbers = Greater Depth in Inches = Less Compaction

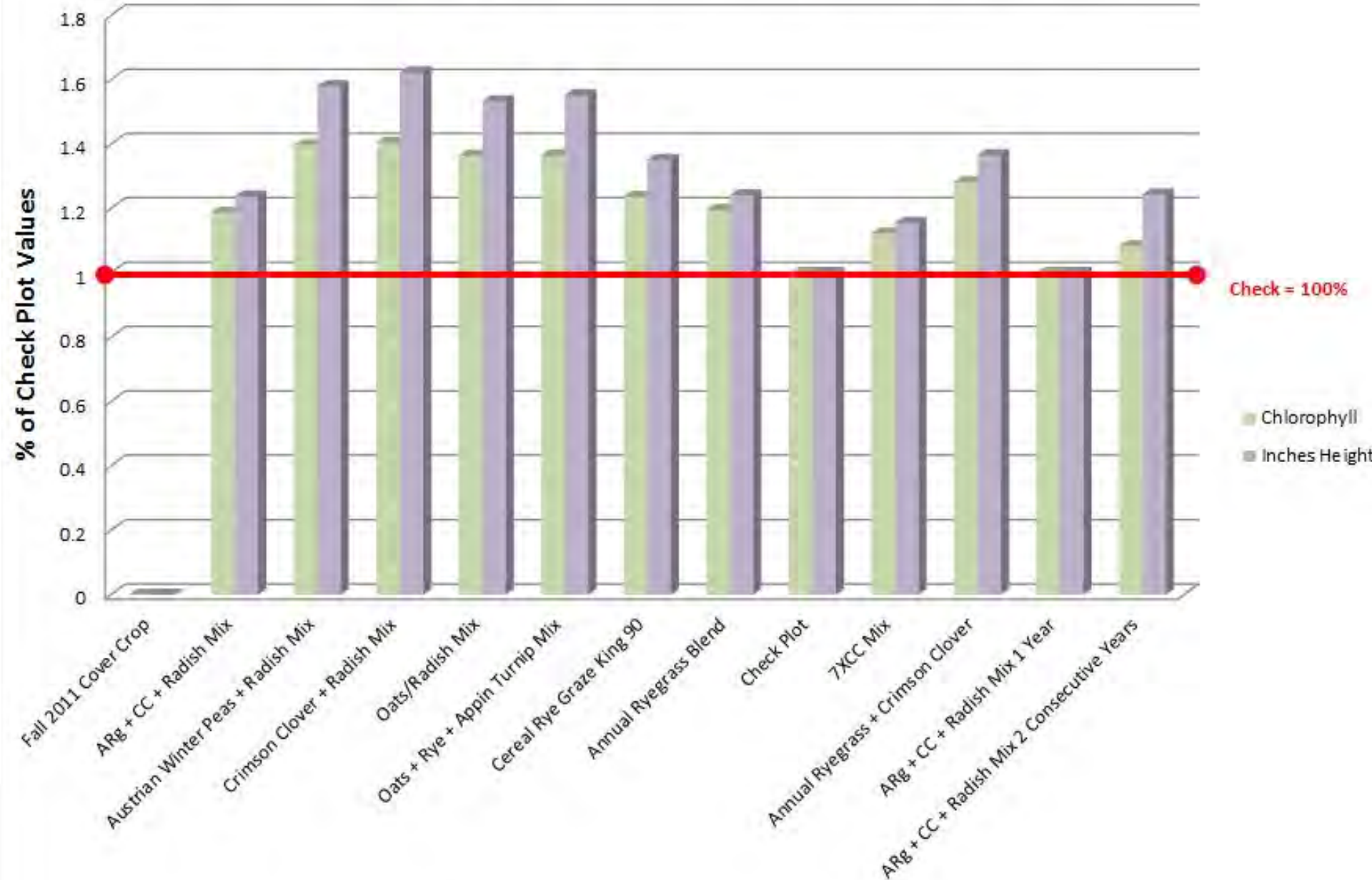


Austrian Winter Peas + Radish Mix vs Check Plot - Chlorophyll Data in Corn



Cover Crop Plots Compared to Check Plots in 2012 Drought

Chlorophyll Units and Height in Inches June 20-July 26



Observations

- The plot areas that rated healthier (more green-ness and taller) yielded the best.
- The plots areas where there was less compaction yielded the best



- The plots with annual ryegrass did not fare as well as some others in this drought year – yet was still considerably above the check.
- Not all plots with radish were “top” yielding – however two of the top three yielding plots had legumes plus radish.



- Plots with legumes were generally healthier all season long and their yield reflected that.
- The Austrian Winter Peas, Crimson Clover, and Appin Turnips overwintered and were growing aggressively when sprayed at burndown.



- There was a considerable amount of earthworm activity in the cover crop area but only a few earthworms were found in the “check” area.



- There were more corn roots in the plot areas we dug vs. the check area
- There was more moisture in the soil where the cover crop plots were compared to the check area.



More Root Mass Following Cover Crops



So What??



Robison Farms Yield with and without cover crops - 2012

Plot	Yield
check (no cover crop)	105.24
Annual Ryegrass + Crimson Clover + Radish	120.31
Winter Cereal Rye	126.86
Oats + Radish	138.79
Annual Ryegrass Blend	134.27
Annual Ryegrass + Crimson Clover	136.41
Crimson Clover + Radish	153.99
Oats + Rye + Appin Turnips	164.37
Austrian Winter Peas + Radish	164.82

The NET PROFIT from Cover Crops

Robison Farms Cover Crop Research Plot	Revenue	(Revenue less Seed and application cost)	Net Advantage (extra profit)
check (no cover crop)	\$ 605.13	\$605.13	\$0.00
Annual Ryegrass + Crimson Clover + Radish	\$ 691.78	\$646.91	\$41.78
Winter Cereal Rye	\$ 729.45	\$696.97	\$91.84
Oats + Radish	\$ 798.04	\$733.29	\$128.16
Annual Ryegrass Blend	\$ 772.05	\$743.05	\$137.92
Annual Ryegrass + Crimson Clover	\$ 784.36	\$750.76	\$145.63
Crimson Clover + Radish	\$ 885.44	\$829.44	\$224.31
Oats + Rye + Appin Turnips	\$ 945.13	\$870.23	\$265.10
Austrian Winter Peas + Radish	\$ 947.72	\$892.07	\$286.94

Why the better yields during a drought year?

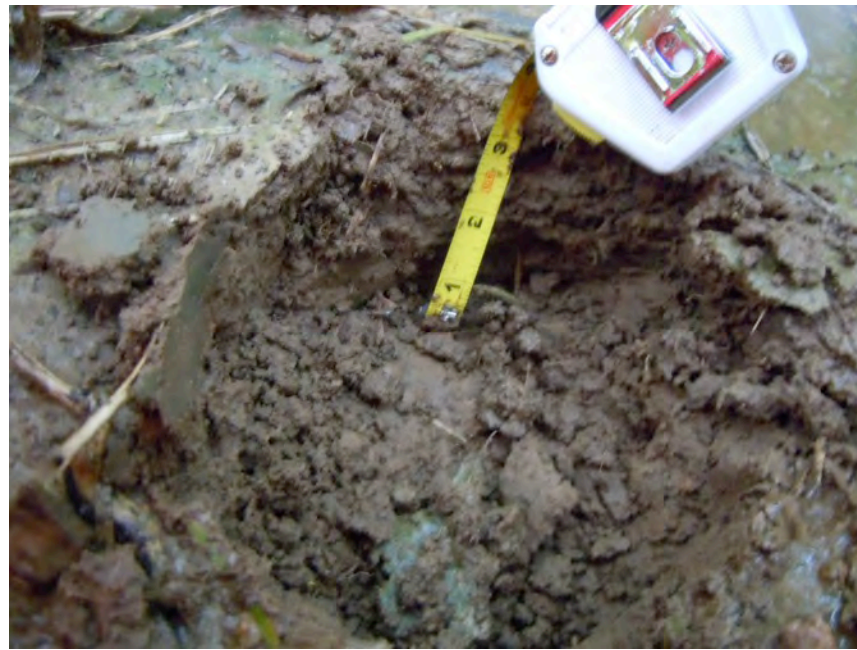
One Big Reason...Improved Water Infiltration in Drought Conditions With Cover Crops



After a 3" rain – tilled soil w/ no cover crop – Central IN



After 3" rain – no-till for 23 years no cover crop – Central IN



Why only 2 ½- 3” infiltration in the no-till only section?



- Hard pan at that level
- Note dry soil after 3” rain below the area where the radish starts to constrict



7" deep infiltration no-till 23 years w/ one year of cover crop – Central IN



Another Benefit– Warmer Soils in the Spring

Busting The ‘Colder, Wetter’ Myth With No-Till, Cover Crops

Scenarios in Indiana and Wisconsin seem to question the assumption that no-tilled fields with cover crops are slower to warm up and dry out than conventionally farmed soils.

By John Dobberstein, Managing Editor

according to compaction tests taken in 2012.



So...Yes! It Can Pay!

- Even after the first year...in long-term no-till
- Will it always work? No, not always.
 - Reports from some farmers showed yield reduction



Reports From Other Sources

2012 – 2013 Cover Crop Survey

June 2013 Survey Analysis



- 4L Farms
– Francesville, IN
- Red Barn Farms



Crops yield better after cover crops...

- During the fall of 2012, **corn** planted after cover crops had a **9.6% increase** in yield compared to side-by-side fields with no cover crops. Likewise, **soybean** yields were **improved 11.6%** following cover crops.
- In the hardest hit drought areas of the Corn Belt, yield differences were *even larger*, with an 11.0% yield increase for corn and a 14.3% increase for soybeans.

<http://www.northcentralsare.org/Educational-Resources/From-the-Field/Cover-Crops-Survey-Analysis>



4L Farms – Corn Silage 2010

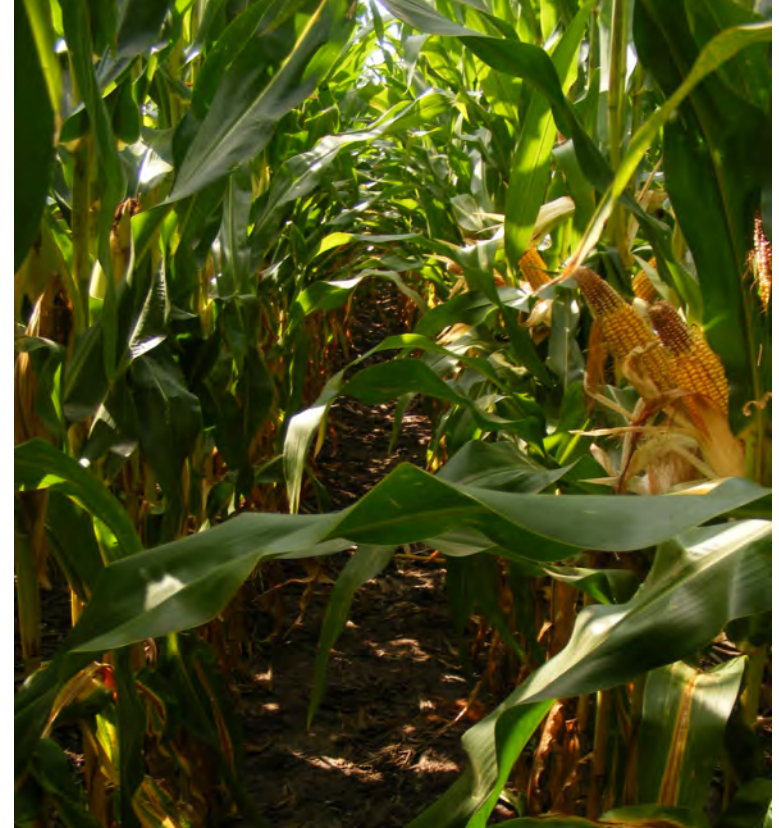


- Improved Silage Quality
- Improved Grain Yield





**No-Till –No Cover Crop
With Manure**



**No-Till with Cover Crop
With Manure**



No-Tilling into “Out of Control” Peas (Red Barn Farms -2011)



Red Barn Farms – Rockford Ohio

- Austrian Winter Peas + Radish
- 2011- Exceptionally Wet Spring
- +10-15 b/a on corn (~215 b/acre)



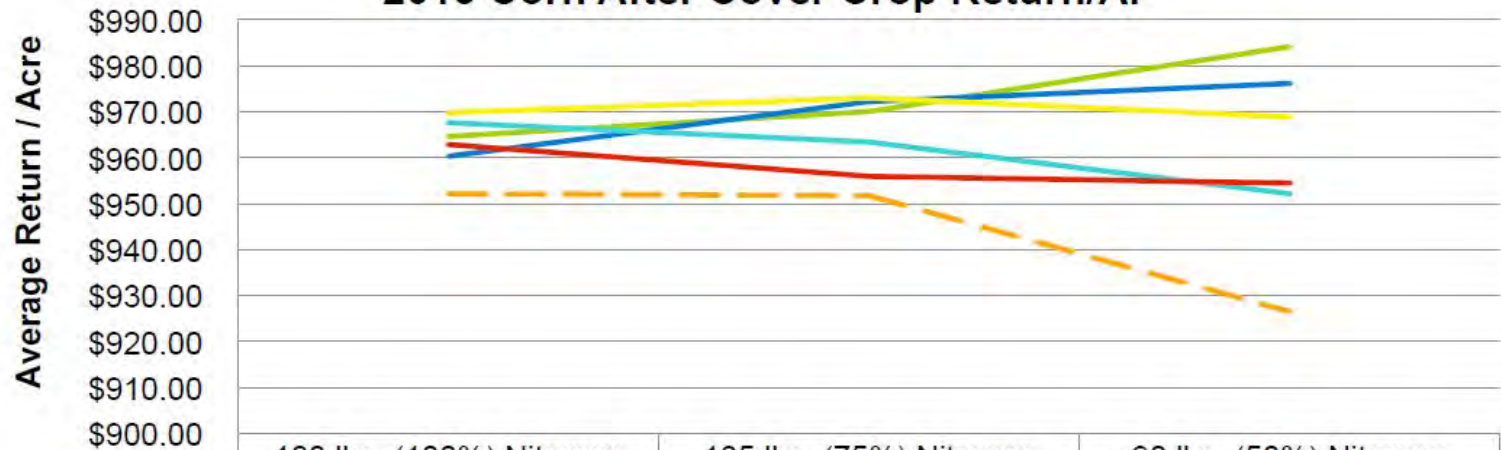
Other Testimonies

- Eric Franzenburg from East Central Iowa
 - Corn +40 bushels/acre following Cereal Rye (with Manure)
- Ed Ballard -Grazing Cover Crops
 - Cattle gain 3.5# weight gain/head per day in winter while feeding no hay



Other Research – Corn after Cover Crop Beck's PFR

2013 Corn After Cover Crop Return/A.



	180 lbs. (100%) Nitrogen	135 lbs. (75%) Nitrogen	90 lbs. (50%) Nitrogen
RyeGrass	\$964.66	\$970.15	\$984.28
SB Mix	\$960.36	\$972.33	\$976.20
Corn Mix	\$969.80	\$973.13	\$968.90
Clover	\$967.68	\$963.45	\$952.20
Radish	\$962.96	\$956.03	\$954.50
No Cover Crop	\$952.20	\$951.75	\$926.46



Other Research – Soybeans after Cover Crop -Beck's PFR

Treatment	Percent Moisture	Bushels [†] Per Acre	Bu./A. Difference	Net [^] Return	Return on Investment
Soybeans after Corn	11.3	51.5	----	\$624.38	----
Soybeans after Beck's Soybean Builder Mix	11.4	58.2	+6.7	\$676.23	+\$51.86

[†]Bushels per acre corrected to 13% moisture.

^{*}XL[®] brand seed is distributed by Beck's Superior Hybrids, Inc. XL[®] is a registered trademark of DuPont Pioneer.

[^]Cover crop net return based on :\$12.65/Bu. soybeans, cover crop planting \$16.40, seed \$21.00, spring vertical-till \$12.60 and burndown \$10.00 = \$60.00. Non cover crop net return based on: \$12.65/Bu. soybeans, chisel plow \$14.50 spring vertical till \$12.60 = \$27.10.

Roundup PowerMAX is a registered trademark of Monsanto Technology LLC. Durango is a registered trademark of Dow AgroSciences LLC. Exceleator is a registered trademark of Krause Corporation. GroundHog is a trademark of AMPAC Seed Company.



Following Cereal Grains

- Harvest cover crop in fall
- Grow more nitrogen
- Larger and deeper roots developed
- Sequester more nutrients



Another Major Benefit...

Grazing Cover Crops

- Extend the Grazing Season
- Less compaction than grazing stalks w/o cover crops
 - Virtually NO compaction



Oats, Rye, and Turnips 10/03

Pana, IL - Dudley Smith Farm





Robison Farms 2014 Research Underway



- 5 Acres of plots
- Planted 9/23/13
- Triple replicated w/ checks
- 10 entries




Don't expect a miracle the first year – but look for one.



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Are Cover Crops Profitable to the Farmer?

DECEMBER 29, 2012

Cover Crops:
Will I Get a
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Thank You!

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