

BECK'S Corn After Cover Crop Study - 2012

Planted: April 10, 2012
Harvested: September 17, 2012
Population: 35,000 seeds/A.
Rows: Six 30" rows
Replications: Two (averaged)

Previous Crop: Cover Crop
Tillage: Fall Cover Crop / Spring Vertical Tillage
Herbicide: 8 oz. Verdict & 24 oz. Durango
Product Tested: BECK 4530HXR™

RAINFALL	
April	3.64 in.
May	2.20 in.
June	0.90 in.
July	1.15 in.
August	5.10 in.
Total	12.99 in.

Purpose: In this study we are evaluating the advantages of cover crops and their ability to increase yield, soil tilth, scavenge and produce nitrogen, and shatter compaction. Corn was planted into 5 different cover crops that were planted in the fall of 2011. In addition, we also evaluated 3 different nitrogen programs to evaluate nitrogen scavenging and sequestration. These nitrogen rates consisted of 180 lbs. (100%N program), 135 lbs. (75% N program), and 90 lbs. (50% N program).

Treatment	Cover Crop Cost	Percent Moisture	Bushels [†] Per Acre	Bu./A. +/-	\$ +/- N Reduction	Net [^] Return	\$ +/- Check
<u>N-Vest® Soilbuilder Annual Ryegrass</u>							
	\$16.00						
100%		16.4	154.1			\$772.59	+\$94.92
75%		16.4	152.3	-1.8	+\$19.53	\$792.12	+\$114.45
50%		16.4	148.6	-5.5	+\$27.85	\$800.44	+\$122.77
AVERAGE			151.7				
<u>Crimson Clover</u>							
	\$21.00						
100%		16.4	142.4			\$698.56	+\$20.89
75%		16.4	135.5	-6.9	-\$10.56	\$688.00	+\$10.33
50%		16.4	119.1	-23.3	-\$77.17	\$621.39	-\$56.28
AVERAGE			132.3				
<u>GroundHog™ Brand Radish</u>							
	\$20.80						
100%		16.3	147.7			\$730.03	+\$52.36
75%		16.4	133.0	-14.7	-\$56.58	\$673.45	-\$4.22
50%		16.3	118.5	-29.2	-\$111.98	\$618.05	-\$59.62
AVERAGE			133.1				
<u>Beck's Corn Champion Mix</u>							
	\$28.80						
100%		16.3	150.6			\$739.14	+\$61.47
75%		16.3	141.9	-8.7	-\$21.18	\$717.96	+\$40.29
50%		16.4	108.6	-42.0	-\$187.50	\$551.64	-\$126.03
AVERAGE			133.7				
<u>Beck's Bean Builder Mix</u>							
	\$24.00						
100%		16.3	148.8			\$733.32	+\$55.65
75%		16.3	145.5	-3.3	+\$10.68	\$744.00	+\$66.33
50%		16.3	127.7	-21.1	-\$64.19	\$669.13	-\$8.54
AVERAGE			140.7				
<u>No Cover Crop</u>							

100% (Check)		16.3	135.3				
75%		16.3	126.9	-8.4	-\$19.41	\$658.26	-\$19.41
50%		16.3	104.7	-30.6	-\$120.24	\$557.43	-\$120.24
AVERAGE			122.3				

[†]Bushels per acre corrected to 15% moisture.

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

[^]Net return based on gross return minus cost of cover crop. Corn \$5.90/Bu. 28% Nitrogen \$375.00/ton.

GroundHog™ Brand Radish is a trademark of Ampac Seed Company.

N-Vest Soilbuilder Annual Ryegrass Blend is a registered trademark of The Cisco Company.

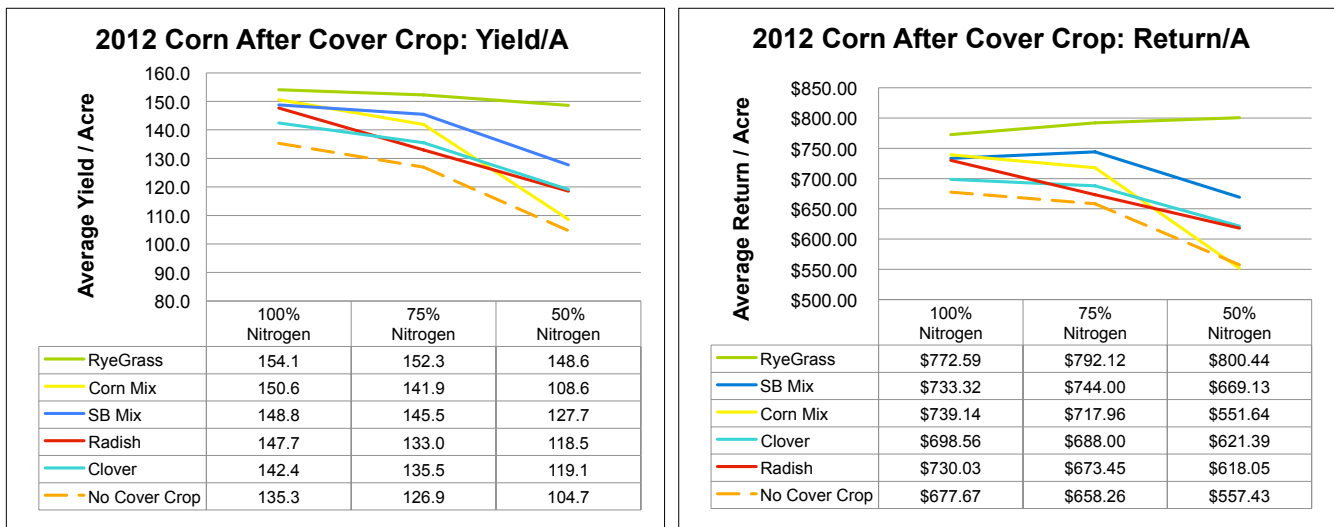
BECK'S Corn After Cover Crop Study - Continued

Summary: Corn planted into cover crops in general, posted average increased yields of 16 Bu./A. over the non-cover crop control. Average overall net returns from cover crops were \$72.20/A. This return only calculates cost of seed and does not include tillage and/or herbicide system costs. At 100% rates of nitrogen, cover crops posted average increased yields of 13.4 Bu./A. and net returns of \$57.06/A. over the non-cover crop control at 100% nitrogen. To fully evaluate a cover crop's ability to scavenge nitrogen, we then backed nitrogen rates to 75% of the control. Cover crops with these 25% nitrogen reductions offered yield increases of 6.3 Bu./A. and net returns of \$45.44/A. over the non-cover crop control at 100% nitrogen. We went even further and compared a 50% nitrogen reduction. This large nitrogen deficit proved too much as cover crops yielded -10.8 Bu./A. less and offered negative net losses of -\$25.54/A. compared to the 100% nitrogen non-cover crop control.

Soilbuilder Annual Ryegrass posted the highest yields over the control at 18.8 Bu./A. Even at 75% nitrogen, ryegrass yielded 17 Bu./A. over the control. When the nitrogen program was reduced by 50%, yields only fell an additional 3.7 Bu./A. This proved to be the highest net return in the study at \$800.44/A. Data results such as this are exactly what we were trying to accomplish with a cover crop system. Not only did we increase yields, but we reduced the amount of nitrogen applied and at the same time increased total net profits from the system.

At the 25% nitrogen reductions all cover crops, with the exception of the GroundHog Radish, offered higher net returns than the non-cover crop control with 100% nitrogen applied. At 50% nitrogen reductions ryegrass was the only cover crop to offer higher net returns versus the non-cover crop control with 100% nitrogen applied. All other cover crops sustained too large of yield decreases to offset the lower cost of nitrogen.

More research needs to be done to fully understand the true benefits of cover crops and their ability to sequester nitrogen, offer yield benefits and increasing net returns as a result.



The graphs above represent the data from the previous page for both yield and return per acre.

BECK'S Cover Crop Study - 2012

Location: H2 Plot **Previous Crop:** Various Cover Crop
Planted: April 24, 2012 **Tillage:** No-Till
Harvested: October 4, 2012 **Herbicide:** Burndown: 22 oz. Roundup PowerMAX®, 8 oz. 2,4-D
Population: 35,077 seeds/A. 32 oz. Roundup PowerMAX, 1 qt. Class Act
Rows: Four 30" rows Pre: 2.3 qt. Bicep & 1 qt. Princep
Replications: Three (averaged) Post: 1.67 qt. Lexar & 1 qt. Class Act
Product Tested: BECK 6733HXR™

RAINFALL	
April	2.83 in.
May	2.00 in.
June	1.47 in.
July	2.70 in.
August	4.49 in.
Total	13.49 in.

Purpose: This study was started to determine the benefits that cover crops provide to the following year's grain crop. Six cover crops were planted and replicated three times to show the different attributes of each.

Treatment	Application Rate/A.	Harvested Population	Percent Moisture	Bushels [†] Per Acre	Cost/A.	Net [^] Return
N-Vest® Soilbuilder Annual Ryegrass	15 lbs.	27,333	24.5	206.5	\$12.00	\$1,206.35
Soybean Bean Builder Mix	18 lbs.	28,833	23.9	189.9	\$21.60	\$1,098.81
Austrian Winter Peas	35 lbs.	31,667	23.7	182.4	\$35.00	\$1,041.16
GroundHog™ Radish	5 lbs.	30,500	23.7	176.8	\$13.00	\$1,030.12
Crimson Clover	25 lbs.	30,333	23.1	169.6	\$35.00	\$965.64
Corn Champion Mix	15 lbs.	29,833	23.1	164.1	\$27.90	\$940.29
AVERAGE		29,750	23.7	181.5	\$24.08	

[†]Bushels per acre corrected to 15% moisture.

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

[^]Net return based on gross return minus cost/A. of cover crop.

GroundHog radish is a trademark of Ampac Seed Company. N-Vest is a registered trademark of the Cisco Company. Roundup PowerMAX is a registered trademark of Monsanto Technology LLC.

GroundHog™ Radish: This radish produces large root masses that can shatter compaction and scavenge nitrogen and nutrients deep within the soil. Radishes can capture up to 150 - 200 lbs. of nitrogen before winter killing.

Beck's Corn Champion Mix: A combination of Crimson Clover, GroundHog Radish and Appin Turnips. This mix has the ability to produce, store, and release large amounts of nitrogen while also breaking up layers of compaction.

Crimson Clover: An aggressive clover that overwinters well and has the ability to produce large amounts of nitrogen.

Beck's Soybean Bean Builder Mix: A combination of annual ryegrass, GroundHog Radish and Appin Turnips. This mix is a combination of fibrous roots and tubers, which allows the Soybean Bean Builder Mix to break up layers of compaction.

N-Vest® Soilbuilder Annual Ryegrass Blend: A combination of two deep rooted annual ryegrass varieties with exceptional winter hardiness.

Summary: Due to the mild weather conditions that we experienced this winter the cover crops continued to grow longer into the winter and spring. This allowed them to grow larger than normal, which was a good thing so they could contribute more organic material and nitrogen back into the soil. However, it posed an issue because they were harder to kill and took longer to decompose. Since this is a no-till field that has firm soils, we expected to see a larger response from the tillage action of the radishes. We saw the largest yield increase of 25 Bu./A. compared to the plot average with the use of Annual Ryegrass. We plan to make this into a multi-year study to continue to evaluate the benefits of cover crops.

BECK'S Cover Crop Study - 2012

Planted:	April 19, 2012	Tillage:	Various
Harvested:	September 7, 2012	Herbicide: Burndown:	64 oz. Glyphosate & 16 oz. Sterling Blue
Population:	34,000 seeds/A.		
Rows:	Six 30" rows	Post:	3 oz. Capreno & 1 qt. Atrazine
Replications:	Two (averaged)	Product Tested:	BECK EX 0219 (6543 Genetics) ^{™*}
Previous Crop:	Soybean		

RAINFALL	
April	0.91 in.
May	2.02 in.
June	0.25 in.
July	3.28 in.
August	<u>5.68 in.</u>
Total	12.14 in.

Purpose: This study was designed to evaluate various cover crop products for use in a corn following soybean rotation. For this year's study, soybeans were harvested in late September (2011) with the cover crop being no-tilled with a drill within a couple of days of harvest. The cover crops that did not winter kill were burned down in mid to late March. Corn was then no-tilled into the remaining cover crop residue. The following products were used as cover crops in this study.

GroundHog[™] Brand Radish: This radish produces large root masses that can shatter compaction and scavenge nitrogen and nutrients deep within the soil. Radishes can capture up to 150 - 200 lbs. of nitrogen before winter killing.

Beck's Corn Champion Mix: A combination of Crimson Clover, GroundHog[™] Brand Radish and Appin Turnips. This mix has the ability to produce, store, and release large amounts of nitrogen while also breaking up layers of compaction.

Crimson Clover: An aggressive clover that overwinters well and has the ability to produce large amounts of nitrogen.

Beck's Bean Builder Mix: A combination of Annual Ryegrass, GroundHog[™] Brand Radish and Appin Turnips. This mix is a great combination of fibrous roots and tubers, which allows the Bean Builder Mix to break up layers of compaction.

N-Vest[™] Soilbuilder Annual Ryegrass Blend: A combination of two deep rooted annual ryegrass varieties with exceptional winter hardiness.

Treatment	Seeding				
	Rate Lbs./A	Seed Cost/A.	Percent Moisture	Bushels [†] Per Acre	Net [^] Return
GroundHog [™] Brand Radish	5.0	\$13.00	20.8	162.6	\$946.34
Beck's Corn Champion Mix	15.5	\$27.90	22.0	159.7	\$914.33
Crimson Clover	15.0	\$21.00	22.2	156.6	\$902.94
Beck's Bean Builder Mix	18.0	\$22.20	22.1	120.2	\$686.98
N-Vest [™] Soilbuilder Annual Ryegrass Blend	15.0	\$12.00	20.5	117.2	\$679.48

[†]Bushels per acre corrected to 15% moisture.

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

[^]Net return based \$5.90/Bu. corn minus the cost of cover crop seed.

GroundHog is a trademark of AMPAC Seed Company. N-Vest is a trademark of CISCO Companies.

Summary: The warm temperatures and dry conditions that accompanied the spring of 2012 led to above average growth for this year's cover crops. This allowed the entries containing annual ryegrass to produce deep roots for breaking compaction, while the entries containing crimson clover had ample opportunity to produce more nitrogen for the following corn crop. A glyphosate burndown was sprayed on March 13th resulting in a good kill on the annual ryegrass; however, the Crimson Clover continued to grow. The Clover was later killed with an application of dicamba closer to the time of planting. The GroundHog[™] Brand Radishes provided both the highest yields and net return in this year's study followed by Beck's Corn Champion Mix. Both entries containing annual ryegrass showed significantly lower yields than the remaining entries. We will continue to evaluate this in future studies.