

2014

Center For Excellence Agriculture Field Plot Research



Table of Contents



Introduction: A Brief History.....	1
Host Farmers.....	2
2014 Farm Partners &Sponsors.....	3
2014 Clayton, Michigan Rainfall.....	4
Center for Excellence on the Road.....	5—7
Residue Management.....	8—13
Soybean Nutrient Uptake.....	14—15
Soil Biology	16—17
Cover Crops.....	18—19
Wheat Studies.....	20—22
Foliar Feed.....	23—25

A little about the statistics. All of the strip trials were designed based on randomized strip trials in the field. The variation within the strips is calculated and the standard deviation calculated from the mean of each trial. Large variations in the data indicates yields deviating from the mean due to field conditions, soils etc. and not what is being tested. Most of the strip trials are larger in size to facilitate planting and harvest equipment.

“Significant difference” is used to describe if the variation in yield is due to the actual trial that is being replicated at a 90% probability. There are many trials in the Center for Excellence report that have fairly large yield differences, but there may be no significant difference in the yield. Variations in larger size strip trials could be due to soil types, drainage, wheel track compaction or some other field variable.

INTRODUCTION A BRIEF HISTORY



Center for Excellence – Who would have thought

When Bakerlads Farm and Raymond and Stutzman Farms were approached with a request to be host farms to demonstrate applied research on their farms in 1997, they never considered that eighteen years later the Center for Excellence would have taken on a life of its' own.

During the first few years of existence Monsanto Company played a major role and the project was one of their Center of Excellence sites. In 2003 the project became an independent event as Monsanto's presence faded. The name of the event was altered to Center for Excellence to reflect the change.

No-till and conservation tillage is still a focus of the demonstration plots at Bakerlads Farm near Clayton, Michigan that hundreds of curious observers view during the annual Field Day each August. Guests discover new technology with high tech equipment demonstrations at the Raymond and Stutzman plots in Seneca, Michigan.

Applied research on the farm versus small acre plots is the foundation of the Center for Excellence. Each year the Center for Excellence Committee looks at the latest technology and research, conservation methods and residue management available in the agricultural industry. Bakerlads Farm demonstrates conservation tillage practices and the Raymond and Stutzman Farms illustrate new technology. An annual field day typically draws 300 to 500 people and offers high-quality, agriculture-oriented continuing education sessions and demonstrations for farmers and industry participants.

The Center for Excellence Committee consists of staff from the Lenawee Conservation District, Michigan Soybean Promotion Committee, Corn Marketing Program of Michigan, Michigan Wheat Program, Michigan State University, The Ohio State University, Lenawee MSU-Extension, The OSU-Extension, and agri-business representatives. The Center for Excellence focus on new technology and conservation tillage has expanded and we have added new partners and new ideas through this agricultural education endeavor over the years. In 2005 we added a dairy milkhouse sub-irrigation project component. In 2011 a "Center for Excellence On the Road" component was added which involved satellite farms implementing practices to reduce nitrogen application on the farms.

In addition to the annual field day held on the third Wednesday in August, a results meeting is hosted in January to present data collected from the projects. The winter meeting provides further education opportunities for the agricultural community along with yield results from the Bakerlads Farm, the Raymond and Stutzman Farms, and satellite Center for Excellence On The Road plots.

HOST FARMERS



Bakerlads Farm



Blaine Baker, host farmer from Bakerlads Farm, along with his brother Kim is part of the 5th generation in his family to run the nearly 140-year old farm. The Baker's home farm is located in Clayton, Michigan on Cadmus Road east of Morey Hwy.

Bakerlads Farm owns and operates 1600 acres of cropland with corn, soybeans, wheat, and alfalfa as part of their 400 cow dairy operation.

Blaine has been a no-till farmer for over twenty years and continues to "tweak" the system.

Morley and Blount loam 4-7 % slopes dominate the soils on the farm. These soils are somewhat poorly drained and offer many challenges to control erosion and soil compaction. Most of the field are tile drained every 40-50 feet. Soil erosion and nutrient management are primary resource concerns.

Raymond & Stutzman Farms, LLC

Tim Stutzman of Raymond and Stutzman Farms has been with the Center For Excellence for over 18 years. Tim is the owner operator and manager of the 6,000 acres of cropland and feeds 2,000 steers annually. He is constantly pushing the envelope with new technology and is a leader in the Ag community.

Tim's signature technology is with his twin row planter system for both corn and soybeans.

In addition, he is applying inputs for crop production on the go and by the foot. In other words, all his fertilizer, seed, and pesticides are applied geospatially based on the need.

The home farm has nearly level poorly drained Brady and Sebewa loams 0-2% slopes. The soils are very productive.

Soil compaction, drainage and nutrient management are the main resource concerns. The fields are patterned tiled where needed.



2014 FARM PARTNERS & SPONSORS



Partners

Lenawee Conservation District
Corn Marketing Program of Michigan
Michigan Soybean Promotion Committee
Michigan Wheat Program
Great Lakes Restoration Initiative

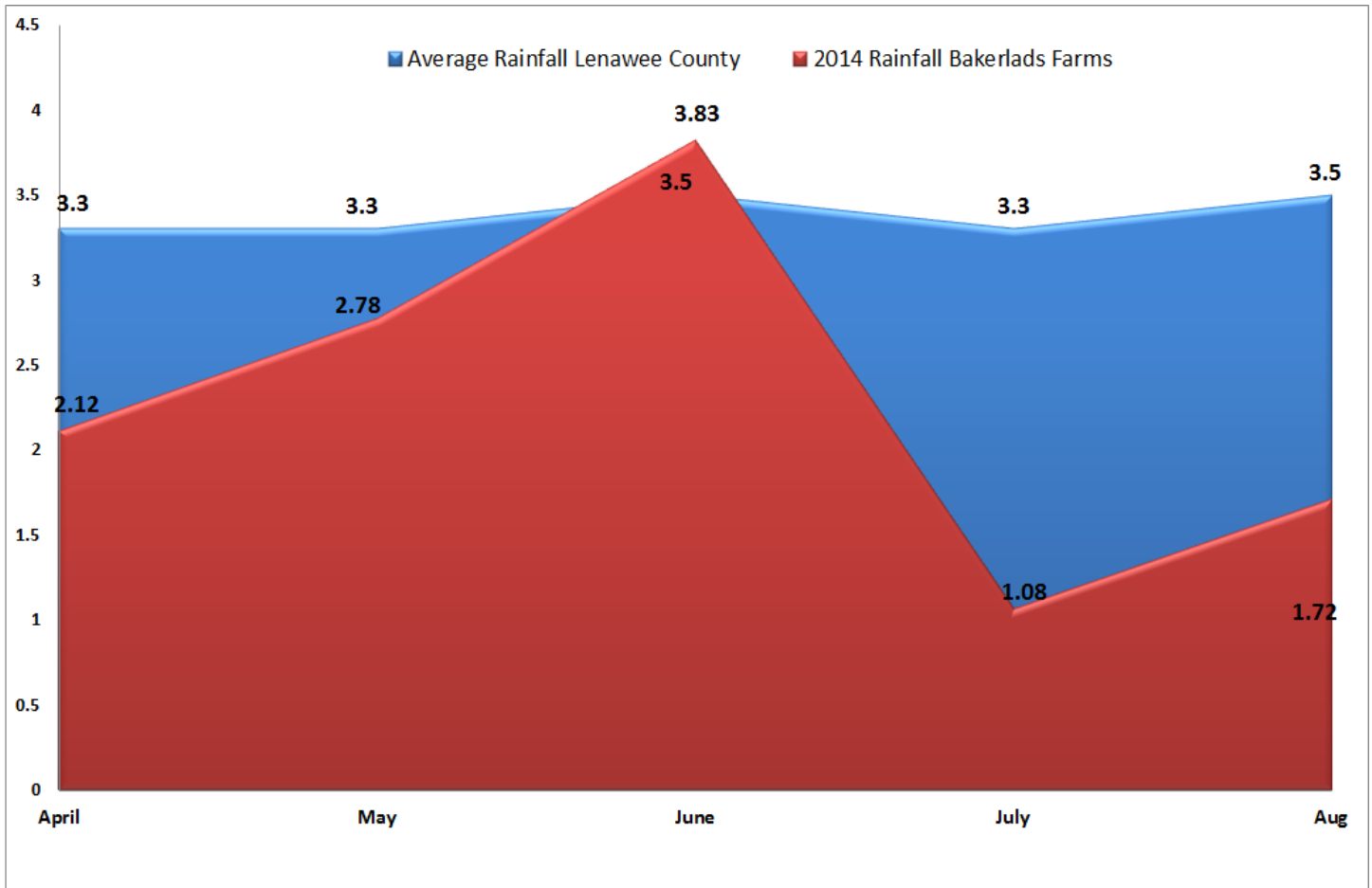
Additional Support

Ag Leader
Agri-Drain
Case IH
CTIC
J.A. Scott Farm, Inc.
John Deere
Novis Ag
Syngenta Seed
Environmental Protection Agency
MI Dept. of Agriculture & Rural Development
MI Dept. of Environmental Quality
The OSU-Extension

Sponsors

Ag Leader Technology
Andre Land Forming
Archbold Equipment Co.
Archer Daniels Midland Co.
Blissfield State Bank
Conservation Action Project (CAP)
Crop Production Services - Blissfield & Morenci
DuPont Pioneer
Forrest Auto Supply (NAPA)
Fulton County SWCD
Great Lakes Hybrids
GreenStone Farm Credit Services
Haviland Drainage Products
Kenn-Feld Group
Lenawee County Farm Bureau
Liechty Farm Equipment
Michigan Ag Commodities, Inc. (MAC)
Michigan NRCS
Monsanto BioAg
Prattville Fertilizer & Grain Inc.
Precision Ag Services, Inc.
The Andersons
The Cutler Dickerson Co. LLC
The Nature Conservancy
Triple K Irrigation

2014 RAINFALL



Rainfall is measured with a recording rain gauge at the Bakerlads Farm and reflects real time rainfall for both of the host farms. Monthly rainfall for May and June were normal levels but July and August had rainfall deficits of over 2 inches in each month. The crop yields on both farms reflected the lack of rainfall during the growing season especially in soybeans.

CENTER FOR EXCELLENCE ON THE ROAD



NITROGEN MANAGEMENT PLOTS

The nitrogen management field trials were centered on two types of studies: GPS application of nitrogen based on crop health (OptRx) and flat rate amounts. The strip trials were done on 9 different farms.

Trial Number	Trial Type	Nitrogen applied	Yield	Gross Revenues minus cost of Nitrogen ***
1	Irrigated strip trials	200 lbs.	218.8	\$ 611.00
1	Irrigated strip trials	160 lbs.	206.0	\$ 590.12
2	Flat rate strip trial non-irrigated	220 lbs.	218.8	\$ 612.04
2	Flat rate strip trial non-irrigated	120 lbs.	213.0	\$ 633.99
3	Flat rate with N-Serve	220 lbs.	221.7	\$ 621.61
	Flat rate with N-Serve	120 lbs.	209.9	\$ 632.67
4	With N Serve	170 lbs.	219.0	\$ 625.70
4	Without N Serve	170 lbs.	222.8	\$ 638.24
5	OptRx	34 gallons	173.3	\$ 508.82
5	Flat rate	40 gallons	172.8	\$ 496.19
6	OptRx	30 gallons	148.0	\$ 432.00
6	Flat rate	40 gallons	154.0	\$ 434.00
7	OptRx	39 lbs.	133.14	\$ 419.66
7	Flat Rate	120 lbs.	138.86	\$ 391.63
8	Flat Rates	10 gallons	131.0	\$ 415.95
8	Flat Rate	15 gallons	146.7	\$ 456.18
8	Flat Rat	20 gallons	147.0	\$ 448.00
9	Flat Rate	90 lbs.	209.9	\$ 647.67
9	Flat Rate	135 lbs.	225.6	\$ 676.98
9	Flat Rate	180 lbs.	229.9	\$ 668.67
9	Flat Rate	225 lbs.	235.0	\$ 663.00

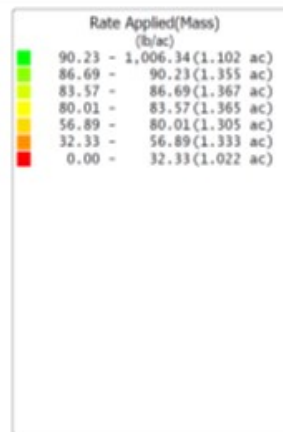
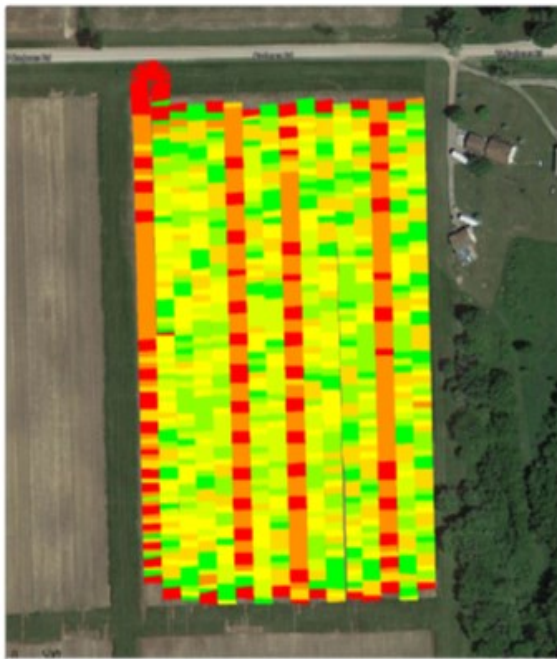
*** \$3.30 per bushel corn; Anhydrous Ammonia \$.50 per lb.; 28% Nitrogen \$.62/lb.; N Serve \$12/ac



All of the strip trials were replicated in the field a minimum of 4 times. Each of the strip trials had starter fertilizer or some additional nitrogen at planting time. The differences in yield value minus the cost of nitrogen is the net return to the operation.

- The lower application of side dress nitrogen in many of the trials realized the greatest return per acre to the operation.
- N serve that was applied in a side dress operation did not provide any yield benefit and produced a lower return to the operation.
- The OptRx GPS application based on crop health in all cases provided an increase in yield and had a 15-33 percent reduction in nitrogen applied compared to flat rate application and the PSNT soil test.
- Lowering the application of nitrogen while growing a competitive and economic crop could contribute to reducing the loss of soluble nitrates from surface runoff and subsurface drainage systems.

OptRx versus PSNT Flat Rate Nh3 Rate Application



Pioneer P0216AM was planted on 5-25-2014 at 32,000/acre. 3 gallons of 6-22-15 is applied in furrow. 15 gallons of 28% N (50lbs) are applied next to the row at planting. All other fertilizers were variable rate applied in the spring according to the soil tests on 2.5 acre grids.

The Bakerlads strip trial shows 4 strips using the OptRx applying 32-45 lbs. of actual Nitrogen. The other strips were as applied nitrogen based on the PSNT of 80 lbs. per acre. The strip trial demonstrates using 40 lbs./acre less nitrogen while producing 141 bu/acre corn. Yields were the same while saving \$20/acre in nitrogen fertilizer.

CENTER FOR EXCELLENCE ON THE ROAD



LCO PROMOTER AND BIOLOGICALS FOR PLANT FERTILITY TECHNOLOGY

The Center has been working with Monsanto BioAG with their line of products. In 2013 we used Tag Team LCO and Ratchet in the soybean crop and we expanded the use to both crops in 2014. The Corn plots tested : Jumpstart LCO, Quickroots and Soybeans: Tag Team LCO and Quickroots. The products are LCO promoters and biologicals for nitrogen and phosphate uptake by plants. Besides the host farms , there were several strip trials for corn and soybeans as part of the Center for Excellence on the Road. The plan is to do one more year of strip trials using this technology.

	SIGNAL COMPOUND	BIOLOGICALS			+ Yield bu/ac	
					2013	2014
SOYBEANS	LCO	Rhizobia	Penicillium bilaii	Trichoderma Bacillus		
Tag team LCO		X	X	X	0	0
Quick roots				X	0	0- +1.1
Ratchet (foliar)	X				+2.7	0
CORN						
Quick Roots				X	ND	0
Ratchet (foliar)	X				ND	0
Jumpstart LCO	X		X		ND	0
WHEAT						
Jumpstart LCO	X		X		ND	+5
Quick roots				X	ND	ND

ND = No data 0 = no increase in yield

- LCO promoter is a molecule derived from the naturally occurring rhizobia signal system. When present at the time of planting the promoter enhances the plant's nutritional capabilities which drive natural growth process in root and shoot development.
- The biological components are a synergistic biological partnerships that improve nitrogen fixation, releasing phosphate fertilizer and secondary /micro-nutrient availability such as Ca, Mg, Cu, Zn, Mn.
- Quick roots is a microbial seed inoculant for improving availability of nitrogen, phosphorus and potassium.
- Tag Team LCO is a multi-action inoculant that combines the performance of the LCO molecule and the phosphate-solubilizing benefits of Penicillium and a selected rhizobia inoculant.

Working with these products over the past few years in corn, soybeans and wheat has not shown a consistent yield increase. We are going to do one more season of strip trial replications with Jumpstart LCO and quick roots for the 2015 crop season.

Data from a host farm did see a significant yield increase in soybeans in 2013 from the product Ratchet which is a shoot and root promoter but could not duplicate the same success in the 2014 campaign.

RESIDUE MANAGEMENT



RESIDUE MANAGEMENT SYSTEMS

It all started with tillage. Farmers were struggling with no-till corn on highly erodible land in the Western region of Lenawee County. The Center of Excellence was organized as a result of farmers wanting more information on tillage systems.

Over the past 18 years of doing tillage plots at the Center of and for Excellence there was never a trend established of increased yield due to different tillage operations. The first seven years of plots were at the skinner Highway farm and the past ten years at the Lidster farm. Over the years, the tillage operations have changed based on the equipment used in the industry. Examples include switching from a chisel plow to a disk-ripper or from a disk to a vertical tillage tool (turbo-till).

5 years of tillage data on the same replicated plots show no trend to a specific tillage system.

Cover crops were applied after silage harvest. Many of the yield differences were not significant and larger differences in yield were a function of plot variability; soil types, tile line locations, wheel track patterns.

CENTER FOR EXCELLENCE BAKERLADS FARMS 5 YEAR TILLAGE STUDY 2004-2008 CORN SILAGETONS/AC

Tillage	2004	2005	2006	2007	2008
In-Line Ripper	22.2	16.1	25.7	18.5	16.3
Disk Ripper	23.5	15.7	24.7	18.3	15.8
No-till	22.7	14.8	24.4	19.4	16.6
No-till w/gypsum	23.1	15.6	24.5	18.0	16.0
Strip Till	23.8	14.5	26.2	17.4	16.1
Turbo Till	ND	ND	ND	ND	ND

CENTER FOR EXCELLENCE BAKERLADS FARMS 5 YEAR TILLAGE STUDY 2007-2014 SHELLED CORN DRY BU/AC

Tillage	2007	2008	2010	2011	2012	2014
In-Line Ripper	133.2	115.9	163.5	149.1	ND	ND
Disk Ripper	120.2	102.8	167.6	145.4	30.6	119.4
No-till	133.7	115.6	166.5	146.6	51.8	121.1
No-till w/gypsum	130.6	103.2	ND	ND	ND	ND
Strip Till	ND	ND	ND	148.9	57	134.2
Turbo Till	ND	ND	ND	140.3	61.6	139.3

Once again the data indicates that yield differences were not a function of a tillage system but of plot variability. There is no trend towards any one system.

Note: in 2012, the lack of rainfall had a huge impact on soil moisture loss. All the tillage was done in the spring.

RESIDUE MANAGEMENT



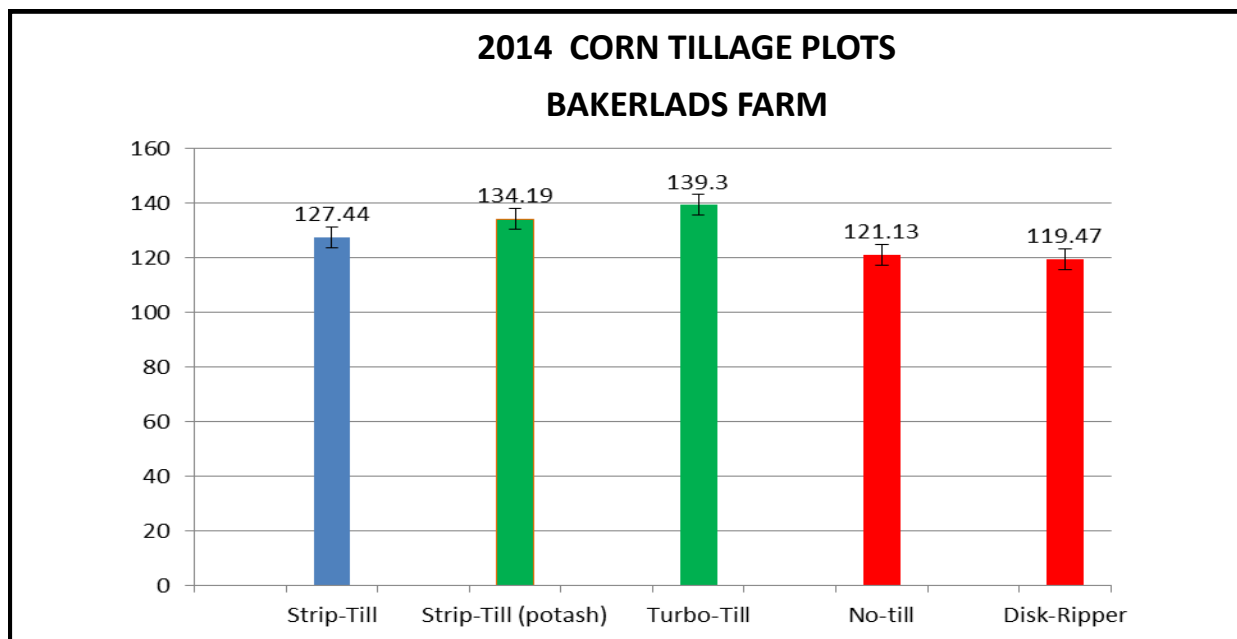
2014 Bakerlads Farms

Soil tests are done every four years on 2.5 acre grids.

Yield goal for the corn tillage plots are 160 bushel per acre. The soil test results and as applied fertilizer are listed in the chart below. The fertilizer application is designed for crop removal for a two year period of corn and soybeans.

Organic matter	PH	Avg. P1 ppm	Avg. K ppm	Lime /ac	14-52-0/ac	0-0-60/ac
3.167	7.3	36.3	123.2	0	70	283

Corn was planted on 05-25-2014 with Pioneer P0216 AM at 32,000 seeds/acre. Starter fertilizer is 3 gallons of pop up in furrow of 6-22-15 and 15 gallons of 28% (50 lbs. N) beside the row at planting time on all the plots.



The results of the replicated tillage plots for corn following soybeans include:

- The average for the entire 10 acre plot was 127.99 dry bu./acre.
- The results of the replicated tillage plots for corn following soybeans include:

The turbo-till & strip till (potash) had no significant yield differences.

The turbo-till & strip-till (potash) had higher yields than no-till and disk ripper.

The strip-till with and without potash had no significant yield differences.

The no-till and disk-ripper had no significant yield differences.

Why the differences in yield in 2014? Normal rainfall in May and June were way below average for July and August. Less tillage meant conserving moisture for later in the growing season. The no-till had competition problems from annual ryegrass that wasn't killed due to sprayer problem.

RESIDUE MANAGEMENT



Competition from annual ryegrass hurt the corn yields in the no-till system in a dry summer that was experienced in 2014.

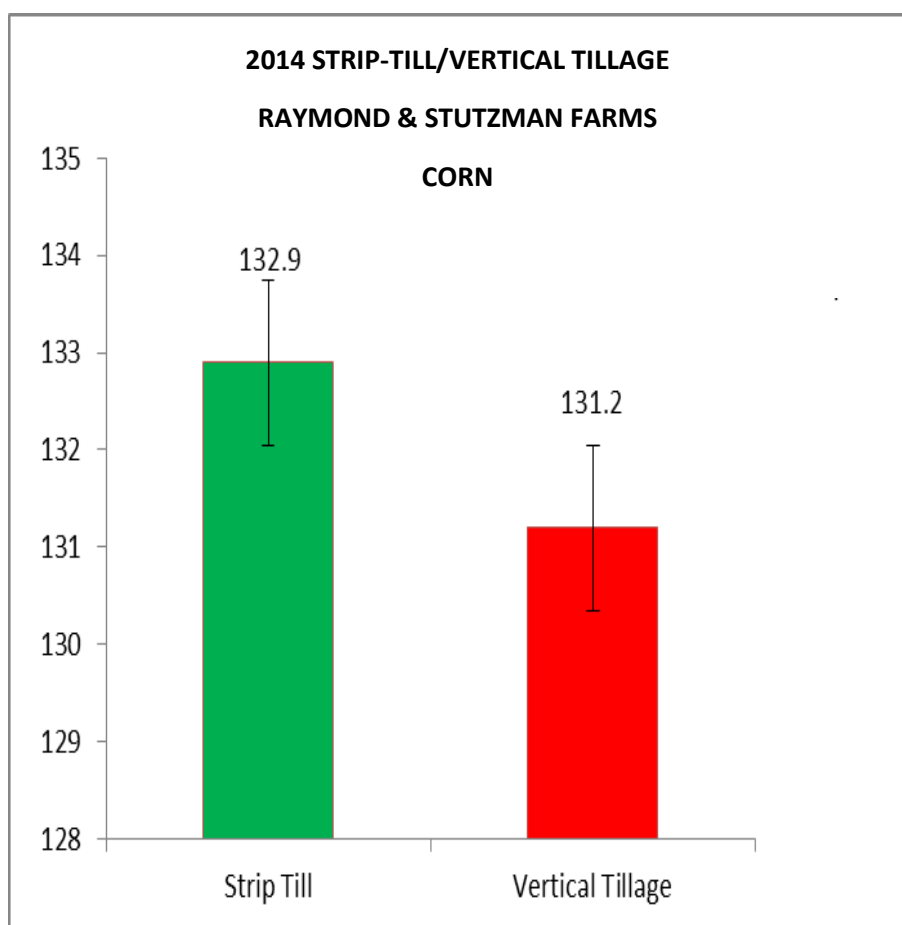
RESIDUE MANAGEMENT



RAYMOND AND STUTZMAN FARMS

The past two years, planting twin row corn and soybeans on a fall strip was compared to using a vertical tillage tool. The great plains twin row planter has two rows of corn 8 inches apart and 22 inches between the rows on 30 inch centers. Soil tests and as applied fertilizer are listed below.

Organic matter	PH	Avg. P1 ppm	Avg. K ppm	Lime /ac 2399 lbs.	10-52-0/ac 50 lbs.	0-0-60/ac 151 lbs.
3.15	6.03	111.76	129.77			



Replicated four times using the Orthman Strip till tool in the fall compared to the 330 IH Turbo till.

Corn was planted:

- May 5, 2014
- Golden Harvest 01 P52 variable rate planted: **average 31,000 /ac**
- 5 gallons in furrow 16-22-15 at planting
- Side-dressed anhydrous ammonia variable rate based on OM & CEC: Average 145 lbs. of actual N

RESIDUE MANAGEMENT



Center for Excellence Soybean Long Term Tillage & Yield Data 2006-2014 Bakerlads Farms								
Tillage	2006	2008	2009	2010	2011	2012	2013	2014
No-till	53.3	45.4	57.4	58.6	51.01	42.8	61.7	39.7
No-till w gypsum	54.4	45.7	56.2	57.3	**	**	**	**
Chisel (disk ripping)	58.8	46.7	61.5	62.7	50.4	39.1	61.2	38.31
In line ripper	51.9	44.5	56.8	58	50.94	**	**	**
Turbo till	**	**	**	**	51.48	39.8	65.2	38.42
Strip-Till	**	**	**	**	51.11	45.6	59.1	35.2
Strip-till Potash	**	**	**	**	**	**	58.8	31.7

** Not tested

Long term tillage yield data has been compiled for the Center for Excellence. Some of the tillage replications have been changed to reflect the equipment industry.

All the plots are 30 feet wide and 480 feet long and replicated at least three times. All the tillage replications are in the same location every year. Some of the conclusions and observations are:

- Yields have been dropping over the last decade on all of the plots with 2012 being an exception.
- Some type of tillage has proven to provide a small yield gain. From 2006-2010 the chisel plowing or disk ripping provided a 2 bu./ac plus yield advantage every year. From 2011 to 2014 this trend has changed. It appears that the yields aren't directly correlated to any specific type of tillage.
- The strip till plots are 30-inch rows and lower yields are a function of row spacing as observed in 2013 & 2014.

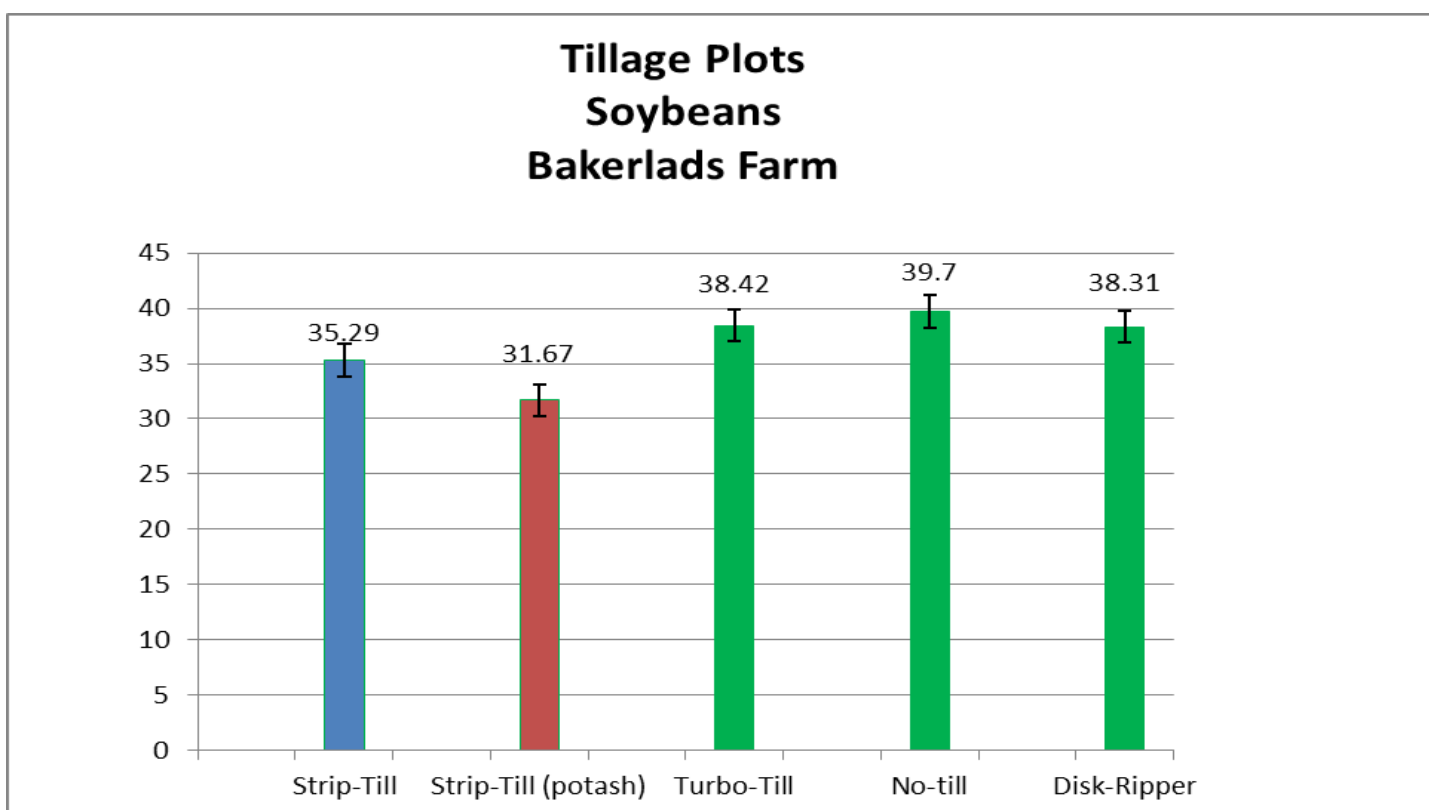
RESIDUE MANAGEMENT



SOYBEANS

Pioneer 32T25R2 were planted June 6, 2014 at 160,000 seeds/acre in 15 inch rows. The field was fertilized for a 50 dry bushel/ac yield goal. P was applied the year before in the corn crop. Cover crops of annual ryegrass and rapeseed were aerial seeded last fall. All tillage was done in the fall prior to spring planting.

BAKERLADS FARM



- ◆ The average yield for the 10 acre plot was 34.14 dry bu./acre
- ◆ There was very little variability in the replicated plot data for each tillage type.
- ◆ The lag in yield for no-till soybeans was not realized in this year's strip-trials. It was an extremely dry July and August.
- ◆ Turbo-till, No-till, Disk-Ripper are statistically the same in yield but are higher in yield than the 30-inch strip till plots. The strip-till plots are planted in 30-inch rows and may be the cause of yield reduction.
- ◆ There seems to be a statistical increase in strip-till verses strip-till with potash. Crop removal for potash was applied in the strip the fall prior (100 lbs. of 0-0-60) Can't explain, why the yield reduction?

SOYBEAN NUTRIENT UPTAKE



Three locations were set aside this year for Michigan Soybean Promotion Committee's (MSPC) "Nutrient Uptake Study," and Bakerlads Farm in Clayton, Michigan was one of these locations. This was the first year for MSPC to conduct this study and this location in Lenawee County would have been impossible without the help from Blaine Baker and Tom Van Wagner.

What the Nutrient Uptake Study consisted of was eight different maturity groups ranging from 0.8 to 3.0 which were planted on Friday, June 6th, 2014. The main goal of this study was to determine what the nutrient uptake curves were throughout the growing season as well as different growth stages, and to determine if the right product and the adequate amount needed to reach the target yield were being applied.

Baker's farm was visited on a weekly basis once the crop was planted until harvest to collect weekly growth stages and take any necessary notes. Plant samples were required at the V4, V7, R2, R4, R5.5, R6.5, and R8 growth stages. Five feet of plants were harvested in each plot at each timing and were bagged in a burlap bag for transportation purposes.

Once the plants were back to the office, student employees began partitioning the plants, which consisted of hand separating the leaves, petioles, and pods from the stalk and placing them in separate bags. After which, the plant matter was dried down using Michigan State University's plant dryers at the Agronomy farm. Dry weights on all of the samples are now being taken before being shipped off to the laboratory for the final testing which will provide the results this winter.

This study should provide some interesting results from multiple locations, in state as well as out of state, and information will be provided on the Michigan Soybean Promotion Committee website as soon as results are received. The MSPC will be conducting this study again next year and comparing the results.

Brian Stiles II
Research technician
Michigan Soybean
Promotion Committee



SOYBEAN NUTRIENT UPTAKE



SOIL BIOLOGY



Soil Quality and Soil Health

Currently, there are stories in the media, agencies are funding initiatives, experts are giving talks on the topic, and agronomists and farmers are being trained on soil quality. Farmers really want to know what steps they can take to improve soil quality and how does it link to increased profitability on the farm. Soil quality is the function of its biological, chemical and physical properties of the soil and it attempts to estimate the capacity of the soil to function in crop production. We know that soil quality has declined because of erosion, compaction, excessive tillage and organic matter loss but yet agriculture is as productive as it ever has been. The 2013 crop season produced the best on farm yields ever experienced by long time farmers.

The Center For Excellence is attempting to quantify soil health as a function of tillage and rotations. Soil samples from the host farms at the Center were sent to Ward Laboratories, Inc.. The soil samples were tested and a Biological Soil Analysis Report with the Haney-Soil Health Analysis was completed. The results of the testing is quantified in the chart on the following page.

Cover crops provide biological diversity in the soil, scavenge excess nutrients and improve the over all health of the soil.



SOIL BIOLOGY



Microbial Community Analysis

The biological soil analysis report provides numerical ratings. Microbial biomass is rated by total biomass along with a diversity index. The higher the biomass the better but it must be diversified! The diversity index ranges from <1 for poor and > 1.6. Samples taken in mid-June at the Center for Excellence show no real pattern in the higher microbial biomass and diversity index. Wheat following soybeans had the lowest biomass and diversity which was somewhat surprising.

Biological Community Ratings

These ratings look at the populations of bacteria and fungi in the soil. A soil with a lot of bacteria is usually under intensive tillage and has a low carbon: nitrogen ratio. Higher fungi populations correlate with less tillage, diverse rotations and cover crops. The samples with intensive tillage had poor fungi to bacteria ratio.

Soil Health Analysis

This number is calculated as 1-day CO₂-C divided by organic C: N ratio plus a weighted organic carbon and organic N addition. It represents the overall health of your system. A number above 7 is desired as a minimum. Keeping track of this number will allow you to gauge the effects of your management practices over the years. Testing at the Center for Excellence does show a consistently higher numbers for no-till corn and soybeans with cover over a conventional tillage system although all systems measured were above 7. The challenge at the Center for Excellence is to evaluate and correlate the soil health numbers from biological sampling. Farmers could use this as a tool to make decisions on production issues that face them on the farm.

System	Total Microbial Biomass	Functional Group Diversity Index	Biological Community Composite Ratings	Soil Health Calculation	Haney Nitrogen Savings
Wheat no cover	1045.1	1.164	Very poor: Fungi to bacteria ratio	7.95	47.7
No-till with cover: Corn	2814.6	1.281	Fungi to bacteria ratio: poor; Below average predator: prey ratio	8.38	59.4
Disk-Ripper Corn	2856.8	1.531	Average: Fungi to bacteria ratio; Poor predator: prey ratio	7.35	72.4
No-till with cover: soybeans	1712.54	1.424	Average Fungi to bacteria ratio; Above average predator: prey ratio	8.51	56.1
Disk-Ripper Soybeans	1829.97	1.204	Very poor fungi: bacteria Ratio; balance bacteria community	7.2	57.2

COVER CROPS



COVER CROPS

Cover crops have become a headline in every major farm magazine in the country. Our host producers at the Center For Excellence have taken the challenge to try to quantify cost, soil health and yield increase or decrease that might occur. In partnership with the CTIC (Conservation Technology Information Center), Blaine Baker is in the first year of a project where annual ryegrass and crimson clover were over-seeded on corn at V4 stage of growth.

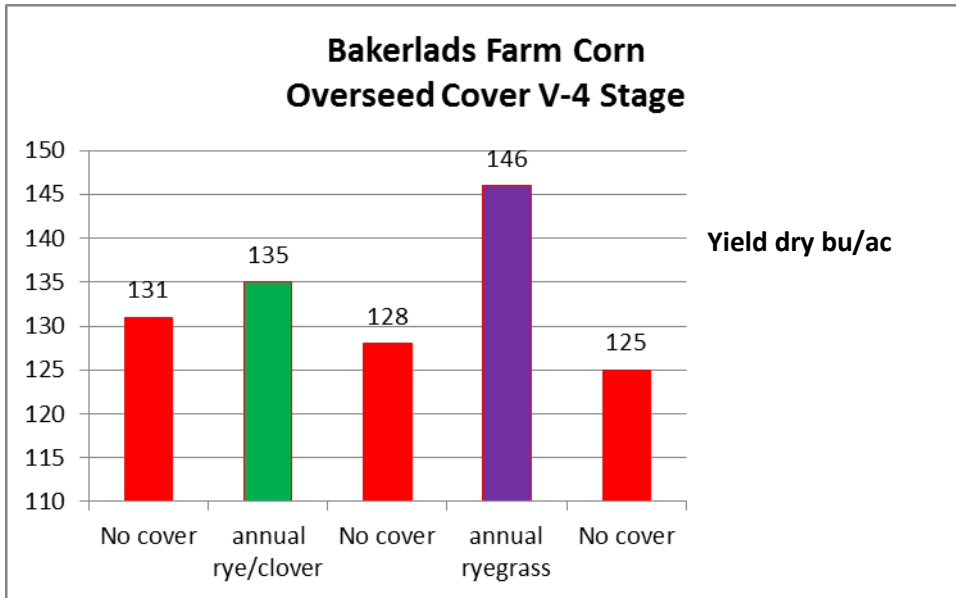


Blaine Baker over-seeding annual ryegrass and crimson clover in corn at the V4 stage.



Bakerlads Farms: Annual Rye Grass growth in corn at VT to R1 stage of growth after being over-seeded at V4 stage.

COVER CROPS



Corn was planted in late May with Pioneer P0216AM at 32,000/ac.

Strips 80 feet wide were seeded and alternated with no cover crop.

A thirty foot wide sample was taken for yield check.

The yield was not reduced by the early over-seeding application of the cover crop.

High Boy Cover Crop Applicator retro-fitted by Bakerlads Farms for over-seeding cover crops from V10-R1 in corn.

Over 1800 acres of cover crops were seeded in September on their land and other local farms.



WHEAT STUDIES



Introduction

In Ohio, wheat acreage has decreased since the 1970s. Soft red winter wheat is an integral component of Ohio's economy and baking industry. Acreage is decreasing partly due to an increase in corn and soybean prices as well as a reduction in equipment inventory. However, wide-row wheat may increase overall farm profitability by allowing for modified intercropping of soybean.

Objectives

The objectives of two experiments were to:

1. Evaluate the effect of row width and wheat variety on grain yield (Experiment #1).
2. Identify the optimum seeding rate for wide-row wheat (Experiment #2).



Methods

Experiment #1:

- ◆ Field trials were established fall 2012 and fall 2013 at the Northwest Agricultural Research Station in Custar, OH and Wooster Campus in Wooster, OH.
- ◆ Trials were a split-plot randomized complete block design with four replications of treatments. Main plot factor was row width (7.5- and 15-inch). Subplot factor was wheat variety (Rupp 935, Rupp 972, Syngenta W1104, and Syngenta SY483).
- ◆ Wheat was seeded at 25 seeds/foot row regardless of row spacing.
- ◆ Number of heads, lodging, height, test weight, and yield were recorded.
- ◆ Data were analyzed using the mixed procedure in SAS. Factors were considered statistically significant at $\alpha = 0.05$. If factors were found significant, paired t-tests were used to separate treatment means.

Experiment #2:

- ◆ Three commercial, on farm research plots were established in the fall of 2013 in Fulton County, OH.
- ◆ Trials were identical, randomized complete block design with four replications of treatments. Plots were 30 feet wide by a minimum of 1,000 feet long.
- ◆ Main plot factor was row width (7.5- and 15-inch). Subplot factor was seeding rate per acre (1.0 million, 1.5 million and 2.0 million).
- ◆ Spring stand, number of heads per square foot, moisture and yield were recorded.
- ◆ Data were analyzed using a simple ANOVA procedure. Factors were considered statistically significant at $\alpha = 0.05$.

WHEAT STUDIES



Effect of Row Width and Variety Results (Experiment #1)

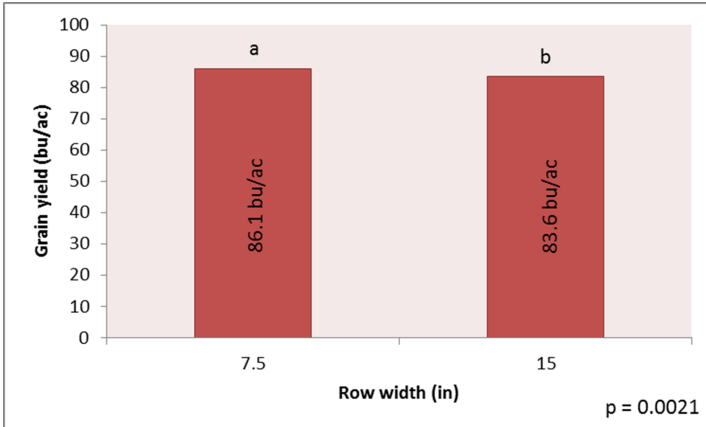


Figure 1. Wheat grain yield by row spacing averaged across variety for four site-years.

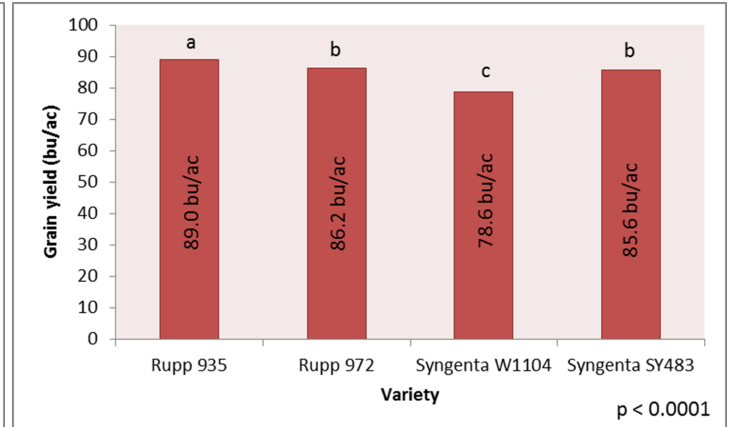


Figure 2. Wheat grain yield by variety averaged across row width for four site-years.

	Head count	Height	Lodging	Grain moisture	Test weight
Row width (inch)	Number/ft row	inch	%	%	lb/bu
7.5	56.8 b	33.6 a	23.6 a	13.6 a	58.4 a
15	71.3 a	33.1 b	8.7 b	13.5 b	57.9 b
Variety					
Rupp 935	61.1 b	31.7 d	3.0 c	13.4 b	56.7 b
Rupp 972	61.8 ab	34.8 a	16.4 b	14.0 a	58.1 a
Syngenta W1104	66.9 a	33.1 c	32.0 a	13.3 b	57.9 a
Syngenta SY483	66.5 ab	33.8 b	13.1 b	13.5 b	57.9 a

Table 1. Head count, plant height, lodging score, grain moisture, and test weight by row width and variety averaged across four site-years.

There was no significant row width by variety interaction; therefore, only main effects are presented averaged across four site-years. Grain yield was 2.5 bu/ac greater when grown in 7.5-inch row width compared to 15-inch row width (Fig. 1). Although there were half the number of plants in 15-inch row width, the wheat plants compensated by increasing the number of grain-producing heads (Table 1). There was also reduced lodging associated with 15-inch width.

Rupp 935 was the highest yielding variety (Fig. 2). There was a 10.4 bu/ac difference between the highest and lowest yielding variety indicating that variety selection is an important consideration.

WHEAT STUDIES



Effect of Row Width and Seeding Rate Results (Experiment #2)

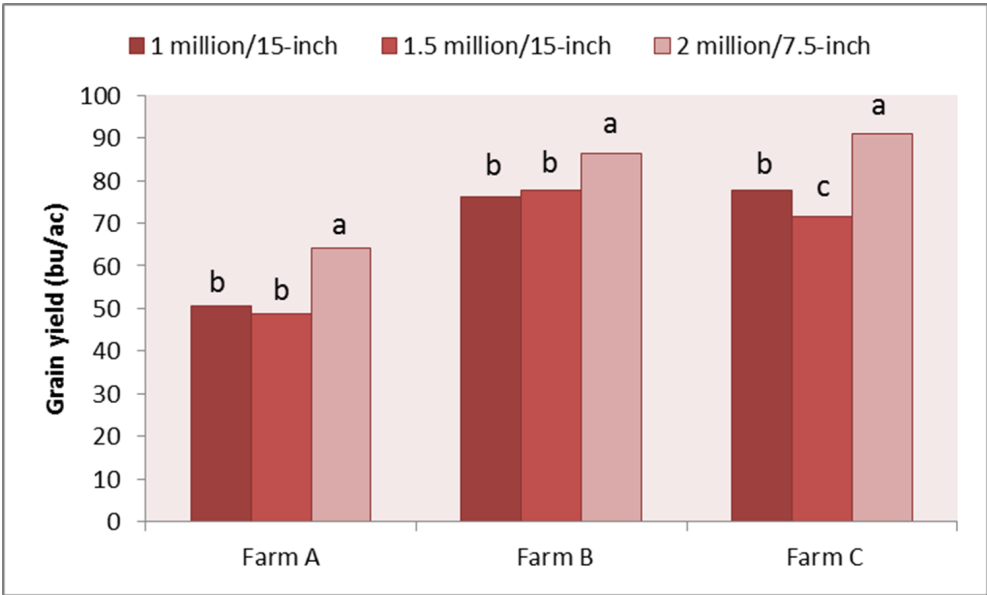


Figure 3. Wheat grain yield by variety averaged across row width for four site-years.

Discussion/Conclusions:

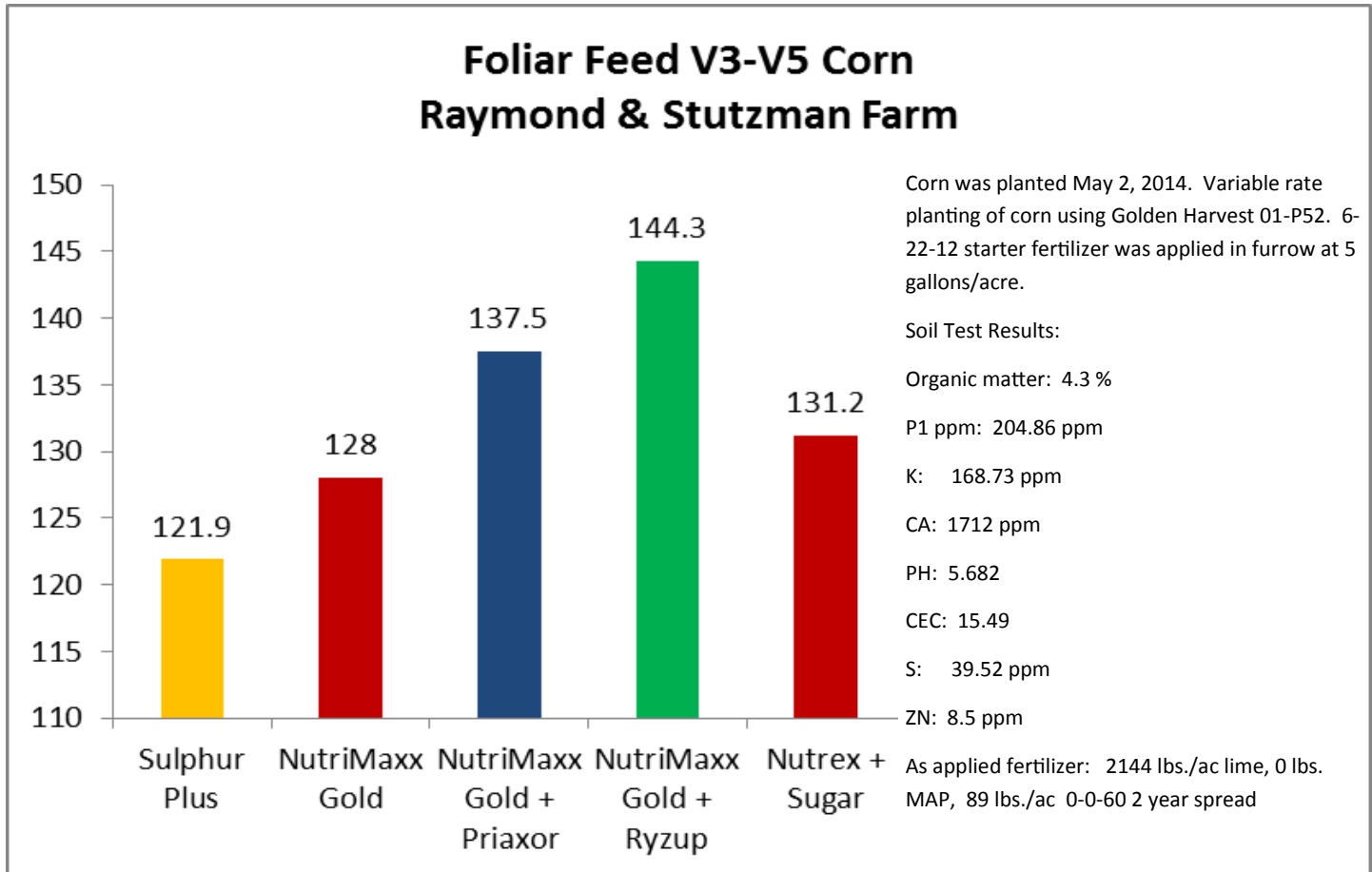
In all three on-farm trials, narrow row wheat (7.5 in) out-performed wide row wheat (15 in) in both head county per square foot and grain yield. However, in some lower productivity areas, wide row wheat offers seed cost savings and the opportunity to inter-seed soybeans. There was no significant difference between seeding wide row wheat at 1.0 million or 1.5 million seeds per acre and in one farm, yield was significantly reduced at the higher wide row rate.



FOLIAR FEED



Corn Foliar Feeding Application



NutriMaxx Gold can give plants a balance of nutrients and biologicals for better nutrient uptake. It provides plant sugar and biological stimulation for better leaf expansion and stress relief during dry years. It is a 6-18-5 with secondary and micronutrients. Applied at 1 gallon/acre.

Nutrex is similar to NutriMaxx Gold with a 3-3-2 formulation with additional secondary and micronutrients. Applied at 1 gallon per acre with 1 quart/acre sugar. The product provides quick response to plant nutrient needs while minimizing effects of glyphosate can have with immobilization of nutrients with a plant.

In addition RyzUp and Priaxor were added to the NutriMaxx Gold. RyzUp is a plant growth regulator and stimulates early-season growth and vigor in plants. This creates a stronger, more stress-tolerant corn crop.

Priaxor® is a fungicide designed to protect a number of crops from a large variety of diseases.

There was a 6-9 bushel increase by added Nutrex or NutriMaxx gold as a foliar feed compared to the corn sprayed with Sulphur plus.

The NutriMaxx Gold with Priaxor fungicide had a 6 bushel plus advantage to just the foliar feed which is not unexpected. This increase is due to the fungicide application.

The NutriMaxx Gold with Ryzup had the highest yield advantage compared to all of the other trials by 8-22 bushel. It would have been interesting to see this treatment as compared to adding a fungicide treatment.

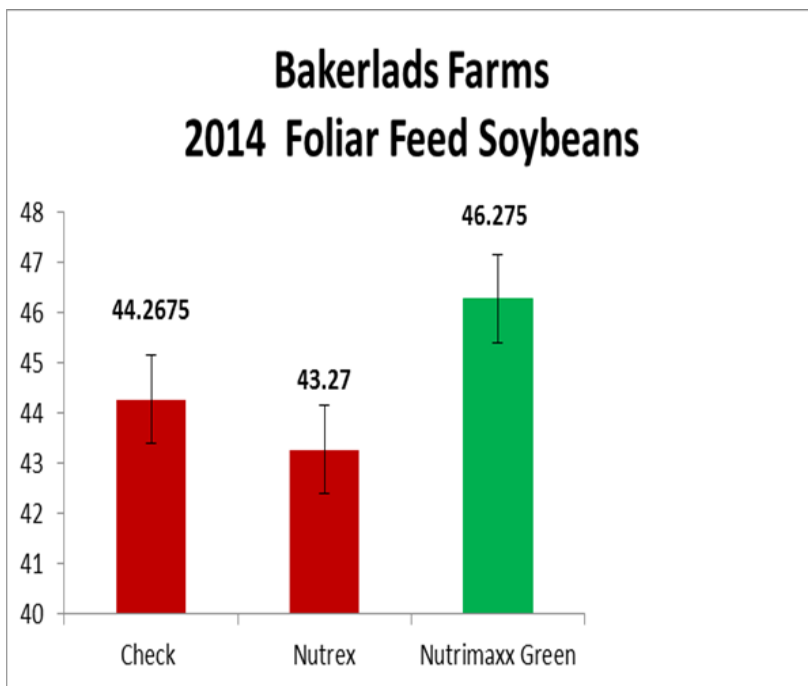
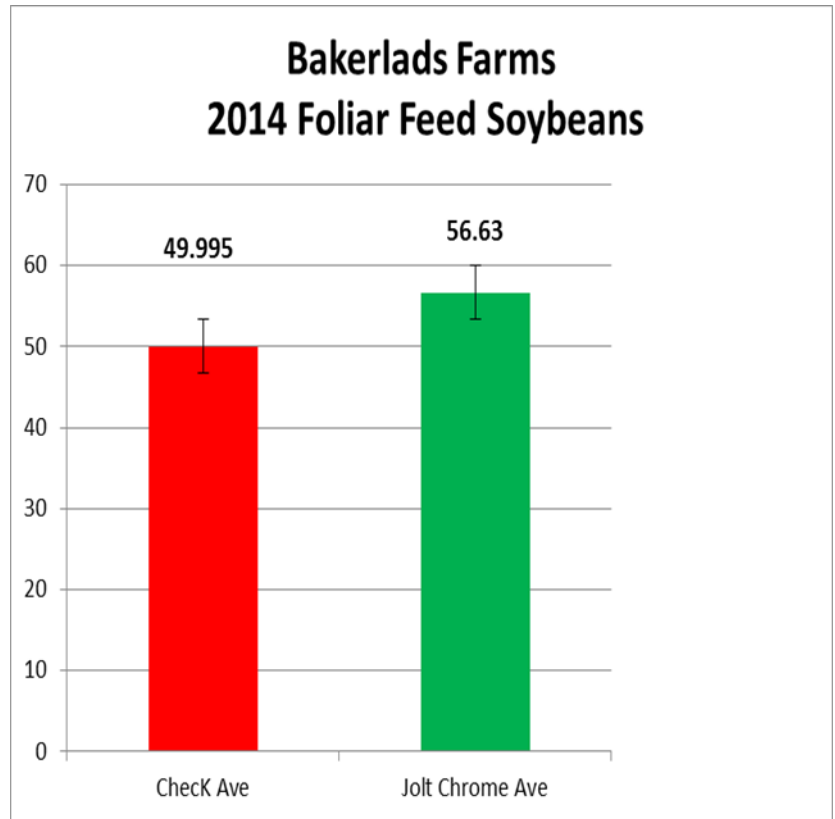
FOLIAR FEED



An application of Jolt prevents flower and pod abortion in soybeans and makes corn silks receptive to pollen for up to two weeks longer. It also enables more water recovery from dry soil and shields the plant from intense sunlight and heat. Applied at the R3 stage at 1 gallon/acre.

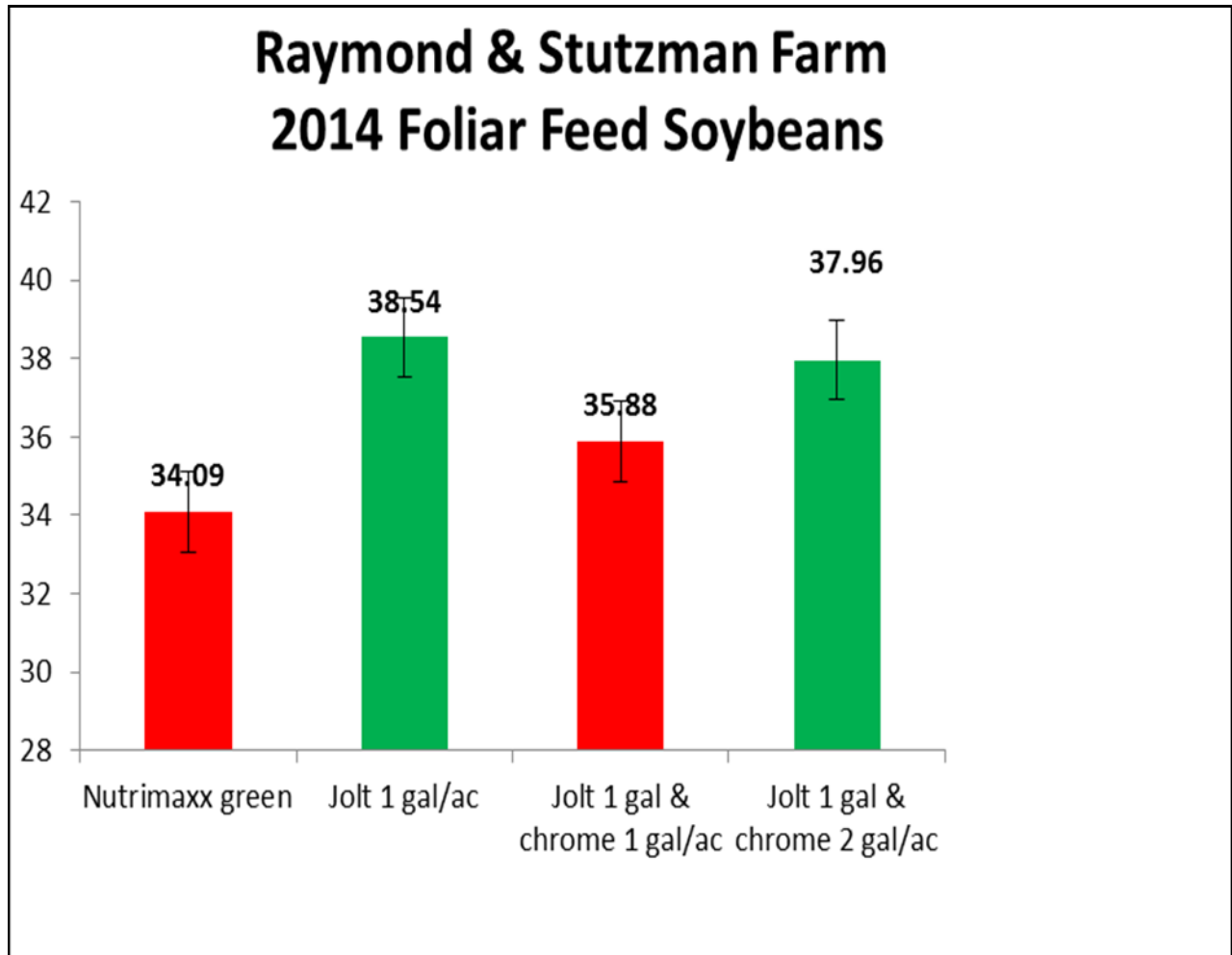
Chrome gives plants entering the reproductive phase a strategic, quick and highly efficient nitrogen source when demand is most crucial, improving plant performance while complementing a good fertilizer program. Applied with jolt at 2 gallon per acre rate.

It appears that the foliar feeding of jolt and chrome increased the yield by a significant amount.



Strip trials show a significant yield difference in the Nutrimaxx green as compared to the check and the Nutrex treatment. Nutrimaxx green has similar nutrients as Nutrex but contains some biological for improved nutrient uptake. Both products are applied at a 1 gallon/acre rate.

FOLIAR FEED



Soybeans were foliar fed at the R3-R4 stage with Jolt and Jolt/Chrome mix with different rates. The Jolt and Jolt chrome mix had a significant yield increase of 1.9- 4 bushels/acre over the Nutrimaxx green fertilizer application.

