June 19, 2018

2018 Stiles Farm Field Day

The Department of Soil and Crop Sciences Texas A&M AgriLife Extension Service

2018 Luncheon Sponsors

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Texas A&M AgriLife Extension Service
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Texas A&M AgriLife Research
College of Agriculture and Life Sciences
Texas A&M University System

Stiles Farm is a not-for-profit, self-supporting institution established by bequest from the late J.V. and H.A. Stiles for the advancement of agriculture and the benefit of all Texans.

STILES FARM
TEXAS A&M AGRILIFE EXTENSION

55th Stiles Farm Foundation Field Day

June 19, 2018

For additional information contact:
Ryan Collett
rmcollett@ag.tamu.edu
5700 FM 1063
Thrall, TX 76578
512-898-2214

CEUs: 1 General, 1 IPM

7:30 a.m. CEU Registration Begins at Stiles Farm Foundation HQ - *No fee courtesy of Williamson County Farm Bureau*

Vendor booths open at Farm HQ

Morning Program

8:30 a.m. Field Tours Begin in Thrall ISD Buses.

Tips for Success with Feral Hog Trapping

Dr. John Tomecek, Asst. Professor & Extension Wildlife Specialist

Innovations in Cotton & Cotton Pest Management Update

Dr. Gaylon Morgan, Professor and State Extension Cotton Specialist;
Dr. David Kerns, Professor and Statewide IPM Coordinator

Can Soybeans work in the Blacklands? Fertility and Cover Crop Management

Dr. Ronnie Schnell, Assistant Professor , Extension Cropping Systems Specialist;
Dr. Jake Mowrer, Assistant Professor and Extension Soil Nutrient & Water Resource Management Specialist

Weed Identification and Extension Weed Control Result Demonstration

Dr. Scott Nolte, Assistant Professor and State Extension Weed Specialist

10:30 a.m. Browse vendor displays & equipment at Farm Headquarters

11:30 –11:45a.m.
Depart for KC Hall in Taylor

Luncheon

Courtesy of our listed sponsors

12:00-1:00
Farm Bill Update
Dr. Joe Outlaw; Regents Fellow and Extension Economist

1:00—1:30pm:
Scholarship and Awards Presentations

Afternoon Program

1:45—2:45 *At the Stiles Farm HQ*

Pecan Management in the Blacklands
Monte Nesbitt, Extension Program Specialist

Stay-Tuff Fence Building Demonstration

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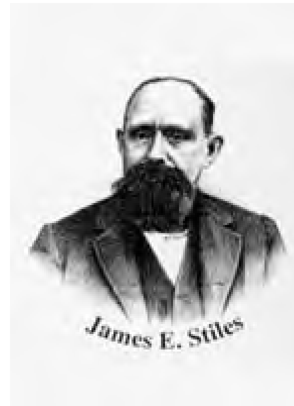
History and Future of the Stiles Farm Foundation

Ryan Collett
Stiles Farm Foundation Manager



The Stiles Farm Foundation originated with the visionary Stiles family at Thrall in Williamson County. Longtime farmers J.V. and H.A. Stiles wanted to commemorate their father, James E. Stiles, and the land he worked. They also wanted to help their neighbors and others in the Central Texas Blacklands learn about new farming practices. They envisioned a model demonstration farm where farmers could see such new practices in action. So in 1961, they established the Stiles Farm Foundation with its land holdings of about 3,000 acres as a bequest to the Board of Directors of the Agricultural and Mechanical College of Texas (now the Board of Regents of The Texas A&M University System).

As the Foundation's trustees, the Texas A&M Board of Directors asked Texas Cooperative Extension and the Texas Agricultural Experiment Station (now the Texas A&M AgriLife Extension Service and Texas A&M AgriLife Research) to manage the farm according to the expressed purposes. Since November 1985, the farm's operation has been under the auspices of the director of the Texas A&M AgriLife Extension Service. Current land holdings (about 2,800 acres) include some 1,800 acres of cropland and the remainder in pasture and stock ponds.

Among the expressed purposes of the Foundation are the following:

- To encourage and develop sound, profitable farm operations and land usage by practical demonstration.
- To stimulate and conduct demonstration, research, and experimental work for the study of any practical, economic, social, education, and scientific problem of importance to any substantial portion of the rural population of Texas.
- To disseminate educational and useful information developed as a result of any such study, demonstration, research, and experimentation.
- To promote and enlarge the intellectual and cultural interests and opportunities of the rural population of Texas.
- To establish, maintain, and operate a model or demonstration farm.
- To assist in the education or training of people engaged in agricultural production or in preparing themselves for careers in the field of agriculture.

Calvin Rinn was hired as farm manager in 1962 to work with Extension Specialists, Research Scientists and county agents to establish demonstration plots and also to manage most of the farm as a full-scale commercial operation. With money from that operation, scholarships and a chair of agricultural finance were established at Texas A&M University in 1969. Currently, two $4,500 Stiles Farm Foundation scholarships are given annually to outstanding Central Texas high school seniors to study some field of agriculture. In addition, support has been provided to the Stiles Chair in Agricultural Finance in the Department of Agricultural Economics at Texas A&M.

Over the years the farm has been a showplace for a wide ranging, diversified agriculture. New crops have been tried and new farming practices have graced the demonstration plots. Crops that have been planted on the farm, in addition to the traditional corn, grain sorghum, cotton, wheat and oats, include sunflowers, soybeans, peaches, grapes, Christmas trees, vegetables, and rapeseed. Of course, with these crops have come test plots with many different varieties available commercially as well as experimental types. The livestock component of the operation has included a cow-calf entity, stockers, swine, and catfish.

Overview of Operation

Various farming practices also have been demonstrated to determine their viability. For example, furrow diking and conservation tillage have been used to increase rainfall efficiency. Cropping systems have included narrow row cotton and broadcast grain sorghum, and there have been numerous demonstrations of different fertilizer sources, rates, and placements as well as seeding rates, methods, and planting dates. Various weed, disease, and insect control practices serve as longtime standards among demonstration plots at the farm. Stocker cattle and grazing studies have highlighted livestock operations along with a farrow-to-finish swine operation that was discontinued in 1992. Marketing of agricultural enterprises has also been explored, including such practices as forward contracts, futures, and options.

Information Outreach

Field days have been conducted annually at the farm since 1963 (except in 1996 when the event was cancelled because of drought conditions). The event attracts large groups, sometimes totaling more than 1,000 from across the Central Texas area to view the demonstrations and educational exhibits. Resource persons for the field day represent the various entities of the Agriculture Program in the Texas A&M University System. The field day also features equipment and machinery displays by area agribusinesses. A barbecue concluding the day's activities is sponsored by businesses in Williamson County and the surrounding area. The extraordinary support from local businesses and the community has provided the impetus for an ongoing partnership to fulfill the original purposes for the farm as envisioned by the Stiles family.

A handbook of the demonstration work under way at the farm has been published since 2002. This valuable reference for producers provides firsthand information on results of various farming operations that can serve as a management guide. The handbook is available from County Extension Offices throughout the Blacklands region and on the Stiles Farm website (http://agrilife-extadmin.tamu.edu/sff/handbook.htm). The farm is also open for individual and group visits, and tours are commonplace.

Past Leadership

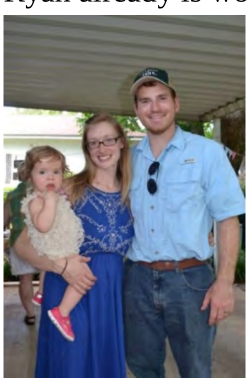
Calvin Rinn managed Stiles Farm until his retirement in January 1997. During his 35-year tenure, the farm was at the heart of agricultural innovativeness in the Central Texas Blacklands and a showplace for those who desired new knowledge.

Archie Abrameit became the farm manager in early 1997 after managing the Luling Foundation Farm for more than 18 years. His energy, enthusiasm, and cooperative spirit moved the Stiles Farm to new heights as a field laboratory for agricultural producers in the region. His vision was to make the farm a learning center that transfers the science and knowledge generated within The Texas A&M University System to practical applications that benefit producers and citizens regionally and state-wide.

After 18 years of service, Archie retired in March of 2015. But, his leadership of the Stiles Farm and its impact on agricultural producers throughout the Blacklands will be felt long into the future.

The Future

In April 2015, Mr. Ryan Collett became the new Farm Manager for the Stiles Farm Foundation. Ryan already is working to ensure Stiles Farm remains on the cutting edge of technologyworking in concert with local producers and industry partners. This will include utilizing the farm as a site for evaluating new products and technologies on a larger, whole-farm scale and giving producers a more realistic view of what might be incorporated into their own operations.



Stiles Farm is committed to fulfilling the vision of the Stiles family whose faith and trust in The Texas A&M University System inspired them to establish the farm foundation for the betterment of Central Texas agriculture. To that end, The Stiles Farm, along with the Texas A&M AgriLife Extension Service and The Texas A&M University System, will continue its commitment to strive for excellence in leadership and service.

Impact of Potassium Rate and Application Method on Cotton Yield and Fiber Quality

G.D. Morgan, D.A. Mott, D. Coker
Department of Soil & Crop Sciences
Texas A&M AgriLife Extension

A potassium trials was initiated in spring of 2017 in Thrall, TX. Soil samples were collected and analyzed prior to planting the plots. Adequate nitrogen and phosphorous was applied for 2 bale cotton yields. Stand establishment and early season growth was good. However, in July very little rainfall occurred in the trial, and much of the yield potential was lost due to moisture stress resulting in fruit loss. Leaf samples were collected at cut-out and were analyzed. The trial location received 8 inches of rain from Hurricane Harvey, which increased the amount of hardlock in the study. The trial was picker harvested, table-top ginned, and fiber samples sent to the Fiber and Biopolymer Institute at TTU.

In 2015 and 2016 soil test K levels were below threshold (125 ppm) at the Williamson county sites and soil test K levels were at or slightly above at the Wharton county sites. Figure 1 shows the lint yields for 2015 and 2016 in Wharton and Williamson counties for potassium rate and application method. A cotton yield response was observed at these locations, but not as dramatic yield responses as were observed in previous years. In 2017, the lint yields were between 750-800 lbs/acre (Figure 2), but had the potential to be much higher. An extended dry period in July decreased the yield potential considerably and hardlock cotton caused by Hurricane Harvey both decreased the yield. In 2017, soil test K levels were 190 ppm and above the current threshold level of 125 ppm. At the Williamson county location, a yield response to the application rate or method was not observed. Leaf tissue analysis for K or fiber quality have not been statistically analyzed at this time.

The three years of data from this location will be compiled with other single-site year locations across the Cotton Belt that occurred between 2015 and 2017. Currently, Katie Lewis and I are working to gather all the raw data and compile the data for analysis.

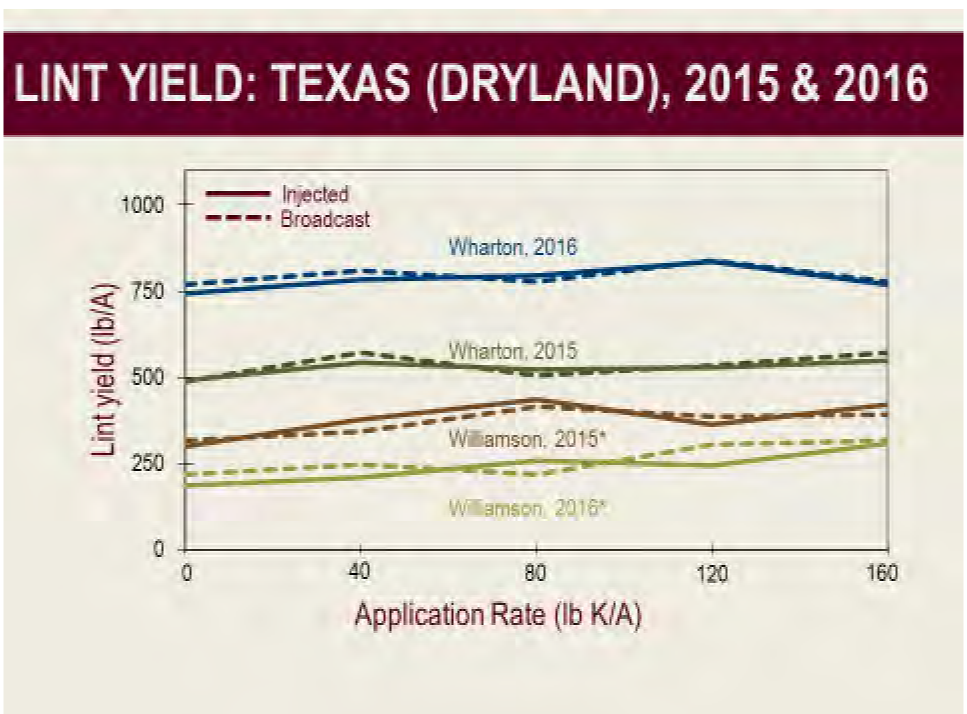


Figure 1. Cotton yield response to soil applied potassium (injected and broadcast incorporated) in 2015 and 2016 at Williamson and Wharton county locations.

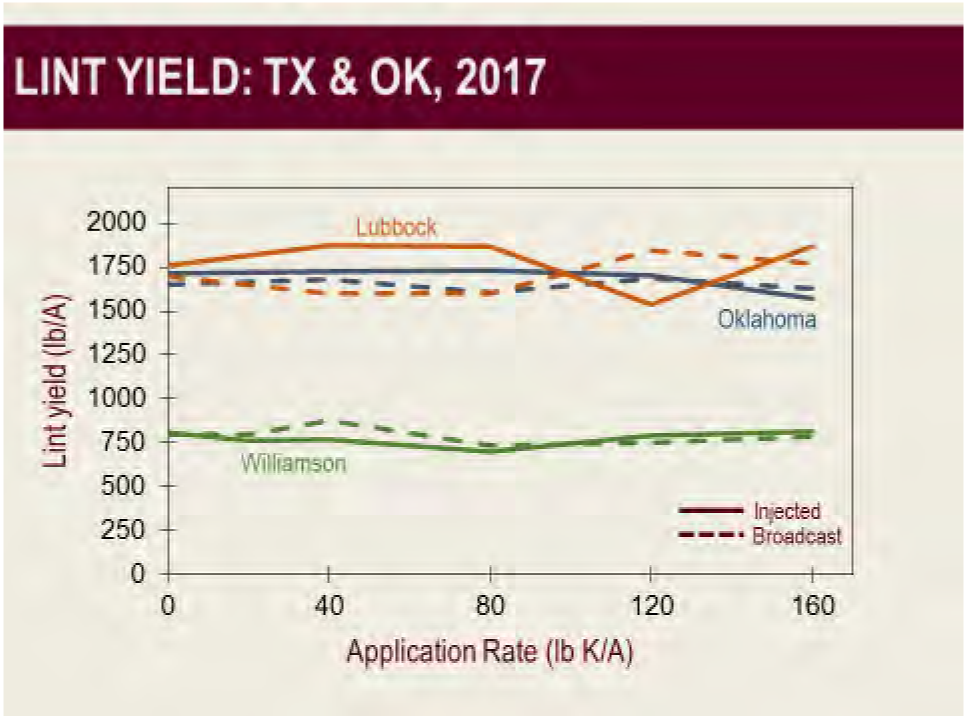


Figure 2. Cotton yield response to soil applied potassium (injected and broadcast incorporated) in 2017 at Williamson county location and other Southwestern locations.

REPLICATED AGRONOMIC COTTON EVALUATION (RACE)
IN BLACKLANDS OF TEXAS, 2017

Dr. Gaylon Morgan, Professor and Extension Cotton Specialist
Dale Mott, Extension Program Specialist – Cotton
John Grange, County Extension Agent – Burleson County
Cooper Terrill, County Extension Agent – Williamson County
Floyd Ingram, County Extension Agent – Milam County
Shane McLellan, County Extension Agent – McLennan County
Page Bishop, County Extension Agent – Navarro County

Variety selection is the most important decision made during the year. Unlike herbicide or insecticide decisions that can be changed during the season to address specific conditions and pests, variety selection is made only once, and variety selection dictates the management of a field for the entire season. Variety decisions should be based on genetics first and transgenic technology second. Attention should be focused on agronomic characteristics such as yield, maturity, and fiber quality when selecting varieties. Figure 1 illustrates the cotton production regions of Texas.

From the latest data available, transgenic varieties accounted for 99% of the state acreage again in 2017. According to the USDA-Agricultural Marketing Service "Cotton Varieties Planted 2017 Crop" survey, the estimated percentage of upland cotton planted to specific Brands in Texas are as follows: Alltex/DynaGro had 10%, Americot/NexGen had 40%, Bayer CropScience – FiberMax had 15%, Bayer CropScience – Stoneville had 2%, Croplan Genetics had 1%, Delta Pine had 20%, and Phytogen had 11%. In Texas, 63% was planted in XtendFlex varieties and 3% was planted in Enlist varieties.

The details of the trails are listed in Table 1, including the cooperator and agronomic information. The rankings for the varieties in the Blackland locations, both irrigated and non-irrigated are listed in Table 2 and Table 3, respectively. The actual yields and fiber quality data are not included in this report, because of the space needed to present these data and the formatting challenges. The 2017 RACE trials results are available at http://varietytesting.tamu.edu/cotton/ for everyone to view and download. Additionally, the 2016 RACE trail results are available at the same webpage for growers to view and gain additional information on variety stability.

Table 1. Trial location, cooperator, planting date, harvest date, row spacing, plot dimensions and area of 2017 Texas A&M AgriLife Extension RACE Trials harvested.

County	Cooperator	Planting Date	Harvest Date	Row Spacing (inches)	Plot Dimensions	Irrigated or Dryland	Area harvested/plot (acres)
Burleson	AgriLife Research Farm	Apr 6	Sep 13	40	2 rows x 675 ft	Irrigated	0.08
Medina	Kriewald Farms	Apr 6	Sept 16	36	4 rows x 825 ft	Irrigated	0.23
Williamson	Adam & Ricky Krueger	Apr 5	Oct 11	38	6 rows x 1335 ft	Dryland	0.58
McLennan	Mark and Matt Wiethorn	Apr 22	Sept 27	30	8 rows x 1000 ft	Dryland	0.46
Navarro	Jacob Reed	Apr 26	Sept 26	30	12 rows x 813 ft	Dryland	0.56

Table 2. Mean location lint yield and variety ranking based on lint value for irrigated sites in Brazos Bottom and Winter Garden Regions, 2017.

Location	Burleson[1]	Medina[1]	Mean
Mean Yield (lbs/A)	753	2369	
Variety			
DP 1646B2XF	2	1	**1.5**
ST 4949GLT	1	4	**2.5**
PHY 330 W3FE	6	3	**4.5**
FM 1953GLTP	9	2	**5.5**
DP 1725B2XF	4	7	**5.5**
NG 5007B2XF	5	6	**5.5**
ST 4848GLT	3	9	**6.0**
PHY 340 W3FE	8	5	**6.5**
CL 3885B2XF	7	8	**7.5**

Table 3. Mean location lint yield and variety ranking based on lint value, non-irrigated Blackland Counties, 2017.

Location	Williamson	Milam	McLennnan	Navarro	Mean
Mean Yield (lbs/A)	761	1540	1130	1471	
Variety					
PHY 330 W3FE	2	1	7	1	**2.8**
DP 1646B2XF	3	6	1	4	**3.5**
ST 4848GLT		5	3	3	**3.7**
PHY 340 W3FE	1	3	5	6	**3.8**
ST 4949GLT	7	9	2	2	**5.0**
DG 3385B2XF	4	4	10	7	**6.3**
DP 1725B2XF	6	7	8	5	**6.5**
FM 1953GLTP	5	2	9	10	**6.5**
CL 3885B2XF	9	10	4	8	**7.8**
NG 4601 B2XF	10	8	6	9	**8.3**

EFFICACY OF RECOVERY SPRAYS TO AUXIN INJURY ON COTTON

James Griffin, Gaylon D. Morgan, Dale Mott, Seth Byrd, and Glenn Ritchie
Texas A&M AgriLife Extension Service
Texas A&M AgriLife Research

Abstract

Auxin resistant traits in cotton have become widely embraced across the Cotton Belt for management of glyphosate resistant and other troublesome weeds. With this new adoption, off target movement and spray tank contamination has become a major concern for growers, especially in South and East Texas where both XtendFlex and Enlist Cotton have significant market share. The objective of this project is to identify the efficacy of recovery sprays from induced injury of dicamba and 2,4-D. A Dicamba rate of 1.28 fl.oz/ac and 2,4-D at 0.08 fl.oz/ac were applied separately at first bloom stage of variety FM 1953 GLTP over the center two rows with a hand boom. Seven days later, numerous plant growth regulators, various nutritional and hormonal chemistries were applied with a four row hand boom.

Visual auxin injury ratings were conducted two weeks after application spray of the recovery treatments and again one week prior to application of harvest aids to assess both the amount of injury and recovery. Plant height, nodes, maturity, and planting mapping were conducted on five plants from each plot to identify exact vegetative and reproductive physiological impacts of the various treatments. Plots were mechanically harvested and fiber will be analyzed with HVI. Visual ratings of the dicamba portion resulted in less overall foliage injury but had more stunting than the 2,4-D treatments. There was no significant yield differences amongst the dicamba treatments, however the 2,4-D treatments did show more variation between treatments. The dicamba treatments had an average higher yield than 2,4-D.

Introduction

Since the release of the auxin resistant seed traits in cotton, their market share has grown to over 65% in Texas. Average yield loss from the simulated auxin injury research resulted in a yield reduction of 24%, with the 2,4-D injury being 10% greater than the dicamba injury. With more and more acres switching to the auxin resistant traits, the occurrence of off-site movement and tank contamination has risen accordingly. Herbicide off-site movement results in physiology injury of cotton plants which leads to a yield and economic loss for the cotton producer. If a product(s) can be identified to reduce herbicidal injury and yield loss, the producers will be able to recoup economic losses.

Materials and Methods

At first bloom, June 26th, dicamba and 2,4-D were applied separately at 1.28 (1/10th) and 0.08 (1/200th) fl.oz/ac rates, respectively, to mimic off-site and tank contamination scenarios. Over each of the injury induced fields, eight different products were applied, plant growth regulators, nutritionals and hormonal sprays. One week after the injury induced applications, all recovery treatments were applied to create a two row by 40 ft. plots with four replicates. Each trial had an untreated check (no auxin), auxin spray only, and then eight recovery treatments (Table 1).

Table 1. Treatments and rates applied 7 days after induced injury with 2,4-D or Dicamba.

Treatment No.		Products	Rate (FL OZ/AC)
Dicamba	2,4-D		
1	11	Untreated Check	
2	12	Auxin Herbicide	1.28, 0.08
3	13	Mepiquat Chloride	18

4	14	Pentia(Mepiquat Pentaborate)	24
5	15	Palisade (Trinexapac-ethyl)	23
6	16	Megafol (3-0-8)	24
7	17	Radiate (IBA & Kinetin)	5
8	18	CoRoN (25-0-0)	128
9	19	Finish-Line (8-4-6-.1B-.2Cu-1Mn-1Zn)	32
10	20	N-Demand 88 (10-8-8-2S-.25B-.06Cu-.25Mn-.25Zn)+	64
		Advantigro (Kinetin, IBA, GA)	4

Visual observations were made 14 days and 75 days (7 days prior to harvest aid application) after the recovery spray application. Following the harvest aid applications, five consecutive plants were removed from each plot for plant mapping. Plant mapping included the quantification of fruit position, internode length, heights, and node counts. Plots were harvested on September 27 with a 2 row spindle picker. Plot weights were recorded and subsamples obtained for fiber analysis. The cotton was ginned and fiber quality was quantified by HVI.

Results and Discussion

Visual injury ratings were higher for both treatments 14 days after the injury induced spray than the pre-harvest aid visual ratings for both Auxin herbicides. Dicamba treatments recovered and retained more foliage than the 2,4-D treatments but had a lower height to node ratio. Although there was only a statistical yield differences (P=0.05) observed between the untreated and treatments 15 and 20 for 2,4-D; there was a large numerical difference observed. Aggregating both scenarios, over a 24% yield loss occurred despite the 2,4-D being applied at a 20X lower rate of ai compared to dicamba. Despite both dicamba and 2,4-D being auxin herbicides different yield responses were observed between the recovery treatments. The assumption from this is the cotton plant physiologically processes each synthetic auxin molecule differently. The top yielding responses for dicamba were treatment 3, 7, and 10 while it was treatments 12, 17 and 18 for 2,4-D, with only the Radiate treatment (7&17) performing similarly. Interestingly, the 2,4-D alone treatment resulted in the second highest yield compared to the untreated.

The lower 2,4-D yield was due to the greater affect 2,4-D had on the foliage, shown by the visual injury ratings (Figure 2), and lower boll counts (Figure 3) compared to the dicamba treatments (Figure 1). The higher dicamba yield average was expected, as the pre-harvest aid visual rating drastically improved from the 14 days after application ratings (Figure 3).

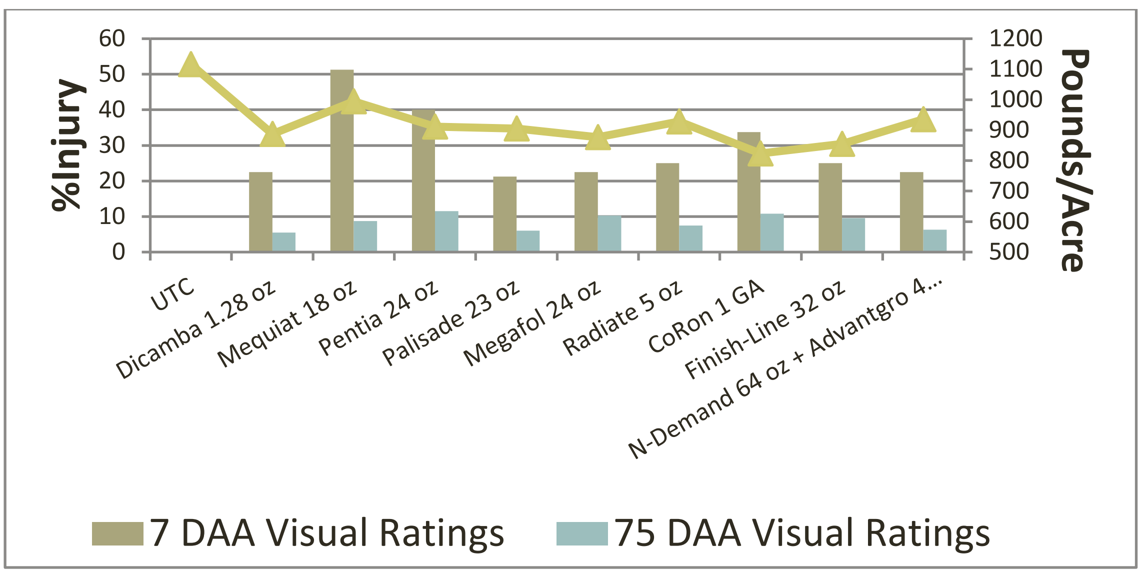


Figure 1: Visual Ratings and Yield Response from Dicamba Treatments

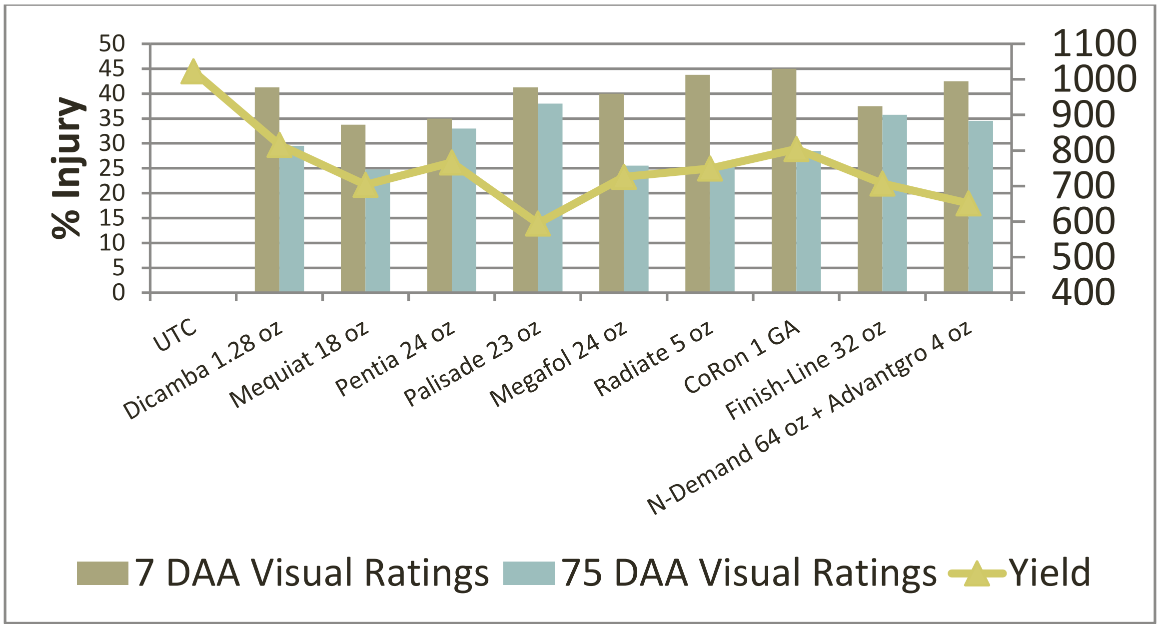


Figure 2: Visual Ratings and Yield Response from 2,4-D Treatments

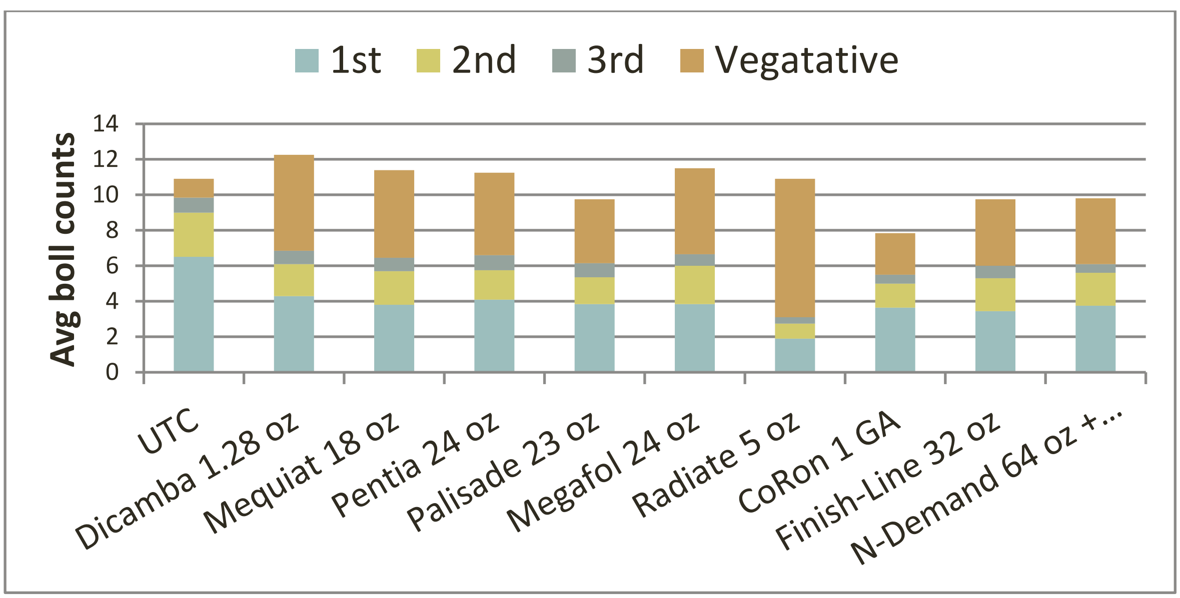


Figure 3: Average Boll Counts by Plant per Replicated Dicamba Treatment

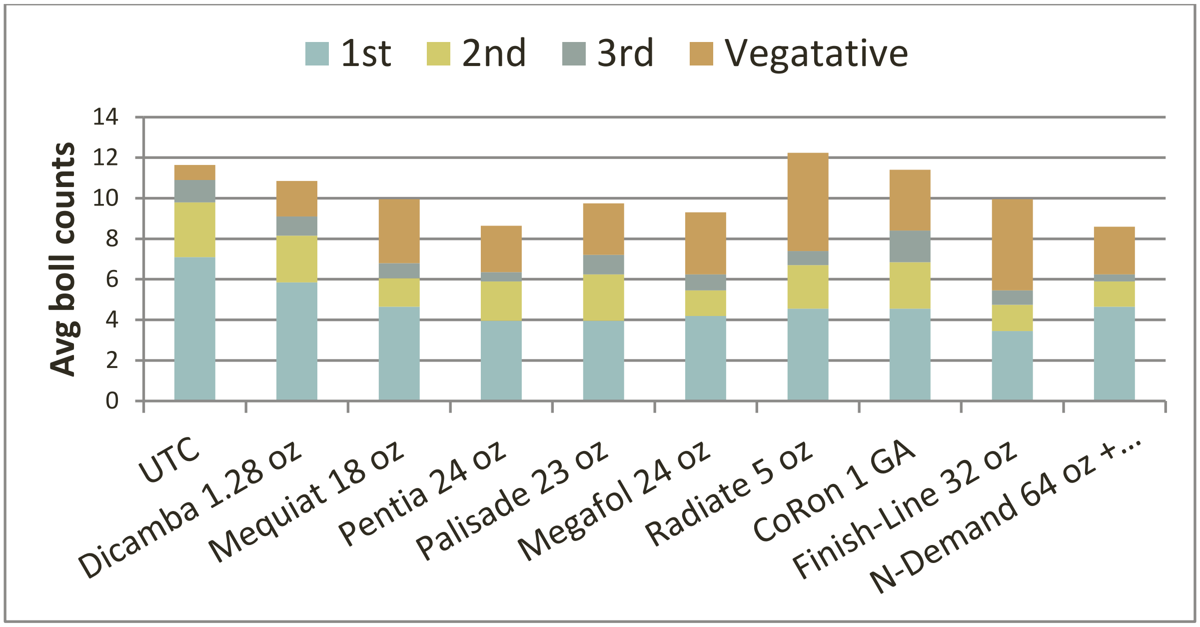


Figure 4: Average Boll Counts by Plant per Replicated 2,4-D Treatment

An interesting aspect of the study was the amount of compensation the vegetative bolls had to yield (Figure 3 & 4). This was most likely due to the study being furrow irrigated allowing the vegetative branches to continue to grow after the fruiting branch's sustained injury. It could be presumed this would not occur under greater water stress. Fiber quality values were also evaluated but any discounts or premiums associated with individual treatments were overshadowed by individual yield results.

Summary

The 2,4-D treatments obviously injures cotton greater than dicamba even at a 20X lesser rates. Dicamba recovery treatments have shown no statically yield difference at this time, although there is a legitimately large numerical difference. 2,4-D recovery treatments Palisade® & N-Demand® tank mixed with Advantigro® did show a statically difference and need to be evaluated further. Treatment Radiate® was the only treatment in the top four yielders for both dicamba and 2,4-D trials. Hormonal recovery treatments appear to have a greater response than the nutritional treatments and need to be investigated further.

Acknowledgements

I would like to give special thank you to Cotton Incorporated for their sponsorship. Also I appreciate the companies who donated products used in this trial.

Nitrogen Fertilizer Evaluation in Spatially Derived Soil EC Management Zones

Brady Arthur, Gaylon Morgan, Ronnie Schnell, Tony Provin, Jake Mowrer, Dennis Coker, and Dale Mott
Texas A&M Agrilife Extension Service, College Station, TX

Introduction

In recent years there has been a push to develop precision nutrient management techniques for both economic and environmental benefits. Using spatial data to aid in variable rate nutrient application can reduce runoff and leaching of fertilizers as well as lower input costs. Using available technology from Veris®, soil EC, soil pH, and soil color spatial maps can be used to classify soil characteristics, such as the strong correlation between clay content and soil EC values. Therefore, a spatial soil EC map has the potential to identify nutrient management zones. Other soil characteristics highly correlated with clay content are nutrient holding capacity and water movement, which both influence residual nitrogen retention in the root zone. Since nitrogen is the most common yield limiting nutrient in corn and cotton, determining how soil EC can be related to residual nitrogen will allow producers to use the spatial maps to variable rate nitrogen fertilizers and will refine residual nitrogen recommendations.

Objectives

Determine how nitrogen management recommendations can be refined to increase nitrogen use efficiency using soil characteristics and implementing variable nitrogen rates.

Materials and Methods

Veris® 3100 was pulled across a 38 acre center pivot irrigation field in the Brazos Bottom of Burleson County, TX to produce a spatial soil EC map in 2014 (Image 1). Using this interpolated soil EC map, the field was delineated into three zones (Image 2). The mean EC values are 68.3, 43.6, and 24.4 mS m-1 for high, medium and low EC zones, respectively. Additionally, a 1.8 acre sampling grid was established in the same field with soil samples collected at one foot increments to a depth of 48 inches prior to crop planting. The soil samples were analyzed by the Texas A&M Soil Testing Laboratory for soil nitrate levels at each incremental depth. Zone differences in residual nitrogen content were compared using Tukey-Kramer HSD in JMP. At the 13 starred locations in Image 2, four row plots were arranged in a RCBD with a minimum of 3 replications in each EC zone. Nitrogen rates from 0-225 lbs/a for corn and 0-120 lbs/a for cotton were applied after crop emergence at a depth of 6 inches (Table 1). Harvest data were collected on the two inner rows. Grain moisture and weight were taken on the corn in 2014 and 2016 and was corrected to a uniform moisture of 15.5%. In 2015 and 2017 seed cotton weight was taken and 140 g sample was collected and ginned from each plot for fiber analysis.

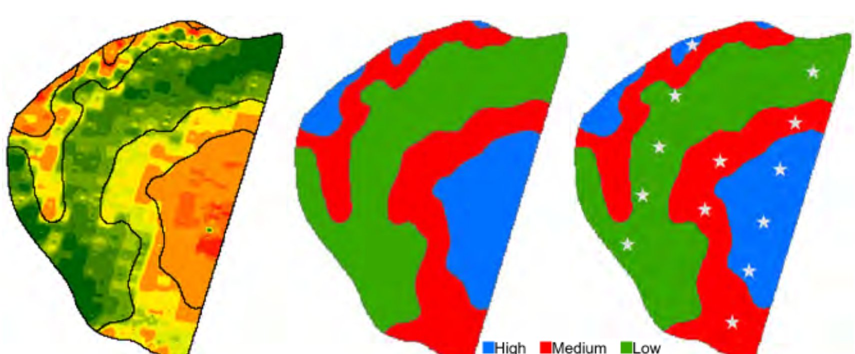


Image 2: Interpolated map, EC Zones, and grid sample points, from left to right, respectively.

Results and Discussion

Comparing the residual nitrogen by depth in figures 1a-d, the higher EC zones contained more nitrate within the top 12 inches than the sandier soil. The majority of the nitrate found in the profile was below 12 inches for all three management zones in all four years. Mean residual nitrogen differences by soil type were not observed in either of the corn trials (Figure 1a and 1c). However, differences between the residual nitrogen in 2015, following the 2014 corn crop, were observed. Numerical trends in 2014, 2016 and 2017 did show the high EC zone had higher residual nitrate content than the low EC zone. When comparing yield to the total nitrogen in figures 2a-d, the yield peaked in high EC zone below the maximum amount of nitrogen in all four years. The medium EC zone showed peak yield before the maximum total nitrogen in two of the four years. The low EC zone shows a linear relationship in 2014. Figure 2a-c shows the calculated yield compared the total nitrogen and are fitted with a quadratic fit line to show nitrogen response. The response curve follows the quadratic regression model in the medium and low EC zones in corn years. The 2015 cotton yield shows that the high and low EC zones differ by less than 480 lint lbs/ acre through the range of nitrogen applied. This is likely the result of high levels of residual nitrogen that particular year. There is an inverse response to applied nitrogen in 2017 in the higher two EC zones. This could be due to in season mineralization and soil ammonium.

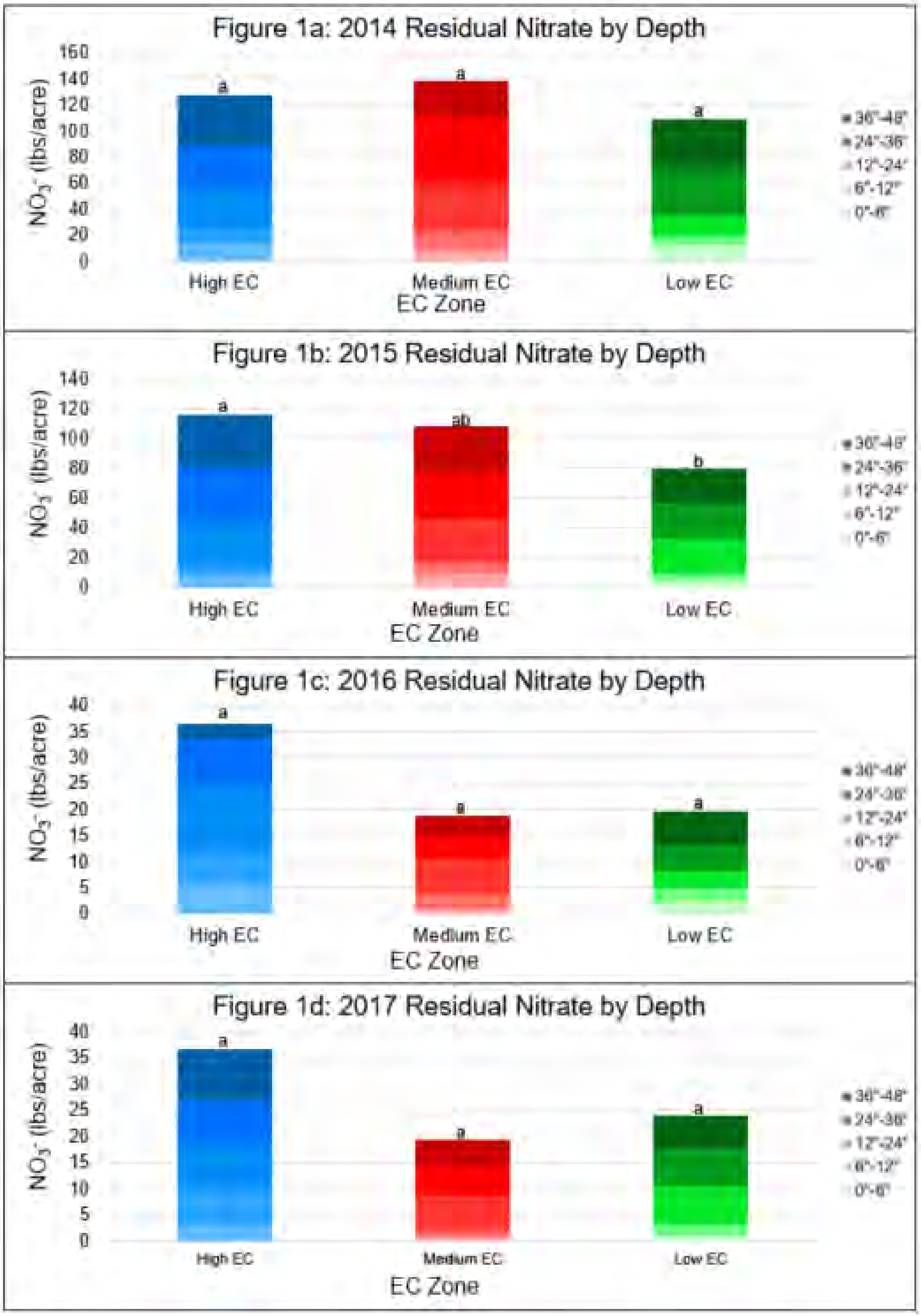


Figure 1a-d: Residual nitrate by depth in high, medium and low EC zones. Letters show statistical differences between totals.

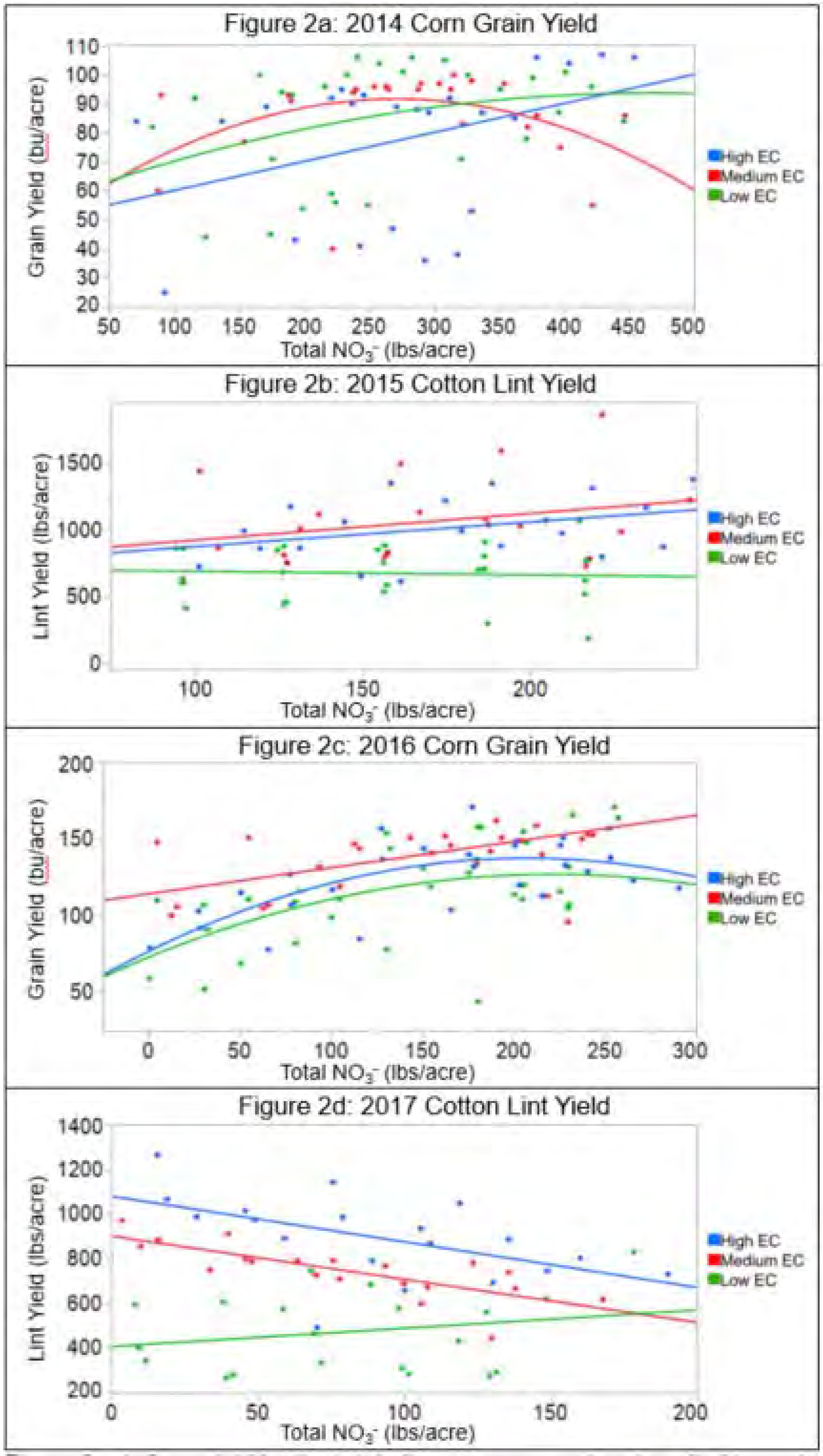


Figure 2a-d: Crop yield by the total nitrogen measured and applied in each of the EC management zone

Conclusions

- Areas of a field with higher mean soil EC will have a higher potential for retaining residual nitrogen that can be used for the following crop

- Using Veris® technologies to create spatial maps of fields could identify areas that have higher nutrient holding capacity and the potential for variable rate nutrient management
- As EC readings increase the rate of nutrient infiltration decreases holding residual nitrogen higher in the profile

Evaluation of Non-Traditional Products to Improve Cotton Stand Establishment

Jennifer Dudak, Gaylon Morgan, Brady Arthur, and Dale Mott

Introduction

Cotton seed cost are one of the major expenses in growing cotton and are expected to continue to increase as new traits are integrated into cotton varieties (Robinson, et al., 2017). However, this large investment in seed and latest traits cannot be realized by the farmer, if an adequate cotton stand cannot be established. Many factors can contribute to poor cotton stand establishment, and cotton is notorious for its weak seedling vigor (Bennett et al.. 1964). Soil crusting can be a major factor hindering cotton seedling emergence in many cotton production regions of the US and the world. Crusting is mainly an issue in silty soils and saline soils but can be problematic in many major cotton production regions in Texas and the Cotton Belt (Lemos and Lutz, 1957). Poor stand establishment can negatively impact cotton yields and can increase input costs if replanting is required (Wanjura, 1982). As indicated from the literature cited in the introduction, soil crusting is an old problem. However, reduced soil organic matter, increased salinity levels, and other things have further increased the incidence of soil crusting. Additionally, new products and application technologies have created new opportunities to potentially reduce soil crusting and increase cotton stand establishment.

Objective:

Identify products not currently used in cotton production that can be feasibly used to reduce soil crusting and increase cotton stand establishment.

Methods and Materials:

The original plan was to apply various hydromulches five days prior to planting cotton. However, due to Hurricane Harvey and over 25 inches of rain, the timing of the hydromulch treatments were modified to accommodate the situation and resulted in two application timings of the hydromulch. On August 23, 2017 and 26 days before planting, the five hydromulch products were applied using a Turf Maker®. Due to inclement weather, cotton was not able to be planted within the desired window of 5 days. On September 14, 2017, a second application of hydromulch products were applied, including two of the same hydromulches applied on the August 23rd timing, including the sorghum based and guar based hydromulches. Air conditioner filter paper was placed within each hydromulch treatment and were later dried and weighed to determine the actual application rate within each plot. The trial was arranged in a randomized complete block design with four replications with two twenty foot rows length. Stoneville 4949GLTP was planted on September 18, 2017 using a John Deere vacuum planter at a rate of 160,000 seeds per acre into a Weswood Silty Clay Loam. At the time of planting, the granular insecticide boxes were used to apply the soil amendment, AquaSmart™ (treatments 8 & 9), into the seed furrow at rates of 26 lbs/a and 52 lbs/a. The slit biodegradable plastic was applied over to the top of the seed beds immediately after planting. After planting, .5 inch of over head sprinkler irrigation was applied to all the treatments using a Valley linear irrigation system. Stand count data was collected based on 1/ 1000th of an acre at five, eight and thirteen days after planting (DAP). Lastly, the treatments were rated based
on stand and visual seedling vigor at 13 days after planting.

Results:

For all the hydromulch and in-furrow treatments, no statistical differences were observed some numerical differences in some of the early and later applications of the hydromulches at the 5 DAP rating. By the 13 DAP rating, only marginal differences were observed in the stand establishment. Comparing the average seedling emergence data, treatment 7, HydroStraw ® with Guar late application, showed the highest initial emergence at the five days after planting collection (Figure 2). It continued to have the highest emergence until the final rating, where the drop in the last data collection was negatively influenced by wild hog damage (Figure 3). The hydromulch treatments did show a consistent numerical benefit for seedling vigor; however, none of these differences were statistically significant (Figure 4). The application timings (A and B) of the comparable hydromulch treatments did not have a consistent impact, positive or negative, on early stand establishment or seedling vigor (Figurue 1-3). The in-furrow applications of AquaSmart™ do show some variance in outcome between the two application rates. Treatment 8 was the low rate application, 25lbs/acre, when the average seedling emergence was calculated it fell towards the bottom. Treatment 9 was the high rate application, at 52 lbs/acre, numerically stands in the top three in overall treatments. When comparing the two together for emergence, the high rate consistently shows a higher median, upper quartile and wider variety of data. When comparing these treatments to the entire study, treatment 8 had one of the lowest medians in both treatments and treatment 9 consistently had one of the highest. Statistically, at 5 DAP, treatment 9 had some variation from the check; while at 13 DAP, treatment 8 showed some variation (Figures 2-3). Treatment 11, biodegradable plastic, was consistently low in seedling emergence and ended up having the lowest average emergence rate. This material also, consistently showed significant variation from the check when comparing seedling emergence. At 5 and 13 DAP, it had the lowest median compared to the rest of the treatments. Observations from this treatment indicated the seedlings were having a hard time pushing through the slits in the plastic. Additionally, air temperatures were above 90^{0} F, and soil temperatures beneath the clear plastic may have detrimentally impacted the seedling vigor.

Conclusions:

- Applying HydroStraw® with Guar and HydroStaw® Cellulose could help reduce soil crusting on silty clay loam soils and increase seedling emergence when applied weeks before planting or just prior to planting. However, a more user friendly hydromulch applicator would be necessary to be feasible for producers to apply products.
- AquaSmart™ was fairly user friendly but did not have a recommendation for crop production systems. More research in agronomics could provide a better understanding to producers. From our data, I can conclude, the higher rate of application was more beneficial to the cotton seedlings.
- A more precise method of planting and covering the seeds with biodegradable plastic could increase the seedling emergence.

Table 1. Treatment number, treatment, application timing and rate.

Treatment Number	Treatment	Timing	Application Rate
1	Safe Slope® Extreme	A	222.6 g/ft
2	Safe Slope® Extreme	A	198.9 g/ft
3	Hydrostraw® with Guar	A	54.5 g/ft
4	Hydrostraw® with Cellulose	A	104.3 g/ft
5	Hydrostraw® All in 1	A	97.6 g/ft
6	Safe Slope® Extreme	B	38.7 g/ft
7	Hydrostraw® with Guar	B	60.0 g/ft
8	AquaSmart™	A	26 lbs/a
9	AquaSmart™	A	52 lbs/a
10	Check	A	NA
11	Biodegradable Plastic	A	NA

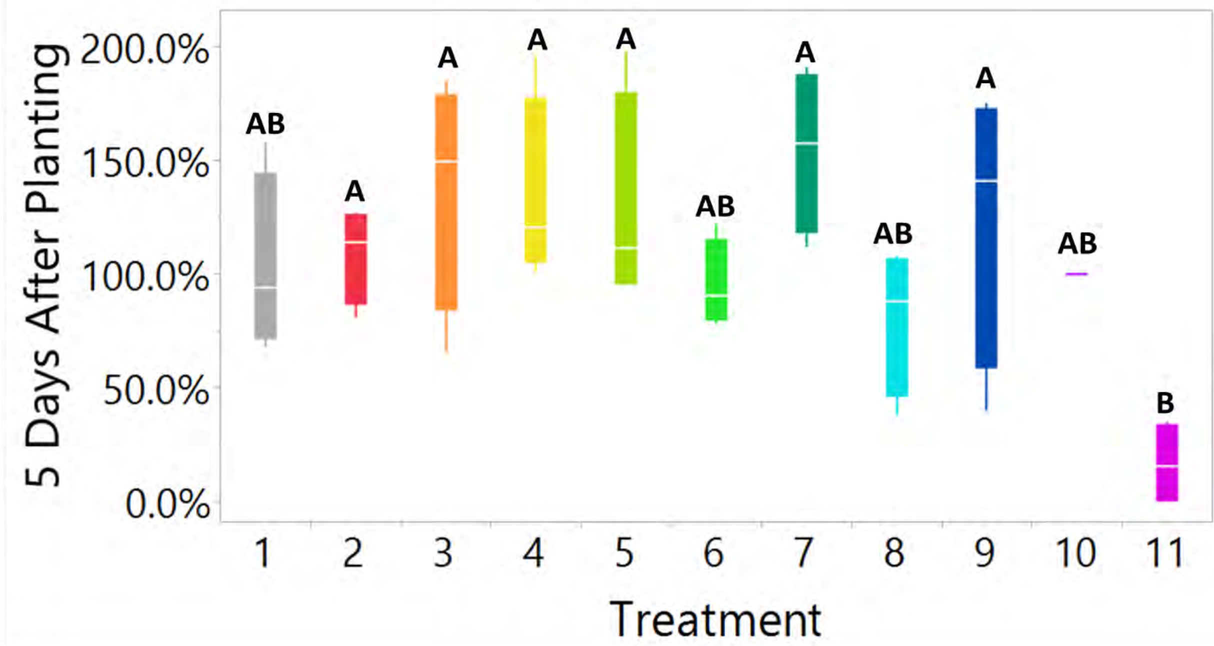


Figure 2. Average emergence at 5 DAP relative to the Untreated Check treatment in Snook, Texas in 2017.

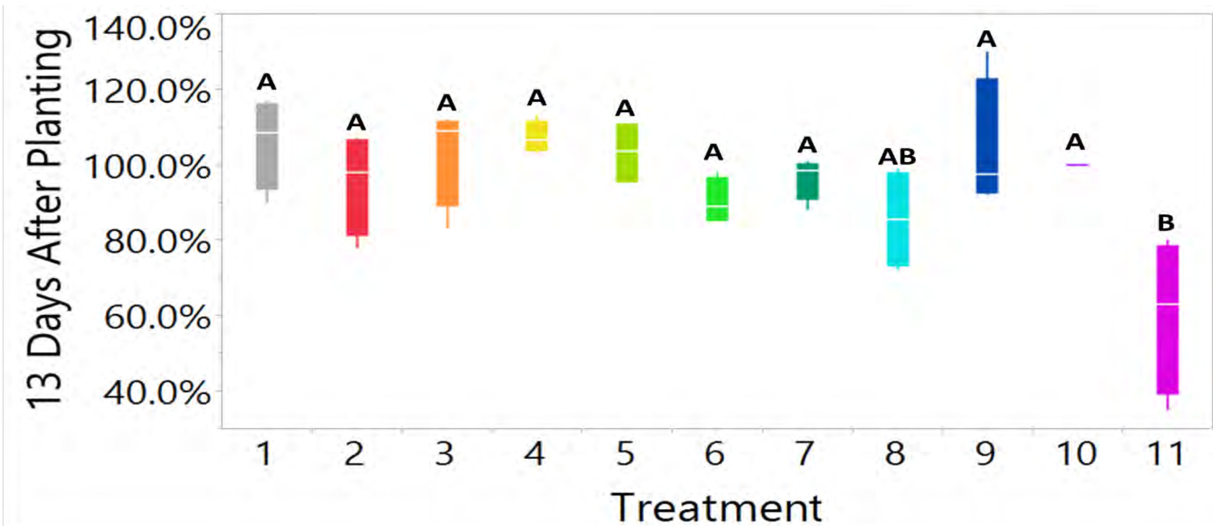


Figure 3. Average emergence at 13 DAP relative to the Untreated Check treatment in Snook, Texas in 2017

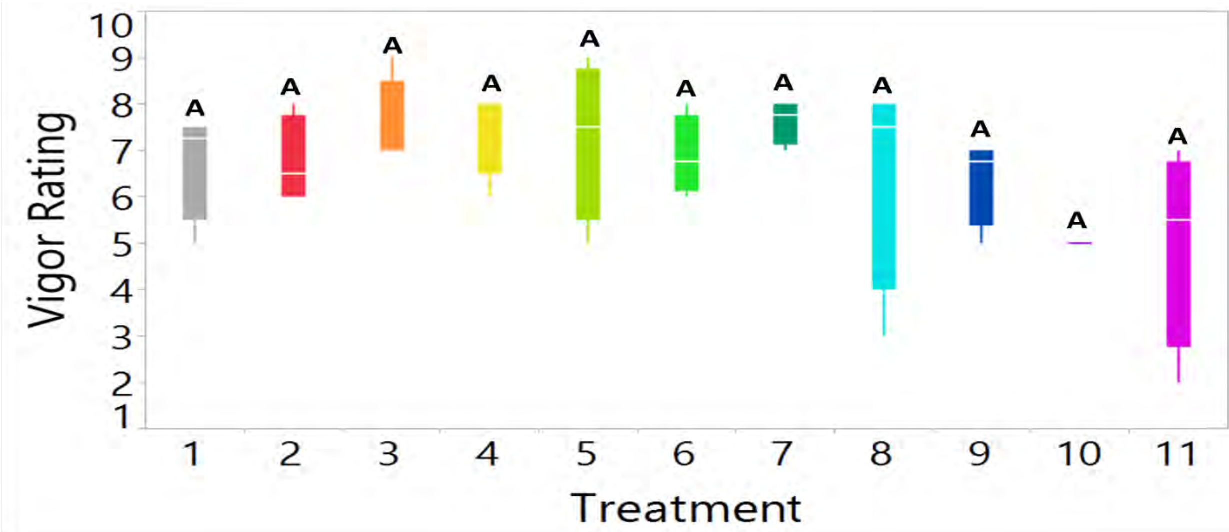


Figure 4. Average seedling vigor ratings 17 DAP relative to the Untreated Check treatment in Snook, 2017.

Effects of Cottonseed and Early Season Growth from Low Rates of Dicamba Herbicide Overspray on Susceptible Cotton at Various Timings in Southeastern Texas

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Abstract

Two, multi-year trials were conducted in the Southern and Eastern portions of Texas on non-dicamba tolerant cotton to assess the effects from a simulated improper herbicide tank cleanout of the herbicide dicamba on the cottonseed produced by the susceptible variety and the effects of early season crop growth and development.

Conventional cotton varieties are relatively sensitive to injury from various synthetic auxin herbicides such as 2,4-D and dicamba. The physical injury from dicamba herbicide is very noticeable, even if the damage symptoms are not always the same. The variability of the damage often depends the rate of dicamba exposure and on the growth stage of the cotton when the exposure occurred.

With the development of transgenic dicamba-tolerant cotton by Dow AgroSciences, and subsequent availability of commercial varieties to producers, the potential for non-tolerant cottons to be exposed to drift, volatilization, or even in-advertent exposure due to improper tank clean-outs will increase significantly.

Objective

The objectives of this study were to determine what effects can be expected from different rates of dicamba herbicide accidently over-sprayed onto a susceptible cotton variety at various stages of its development have on the seed and subsequent early season growth characteristics of plants contaminated by the dicamba and then planted the following season.

Materials and Methods

A two-gene, glyphosate and glufosinate tolerant transgenic (non-dicamba tolerant) variety was planted at 2 locations in 2016. A standard dicamba rate for weed control is 16 oz/ac (X rate = 16 oz/A). On the center 2 rows of each plot, dicamba was applied at one of four rates (1/10X, 1/50X. 1/100X and 1/500X) plus a NIS at 0.25 %v/v, at first square (FS), FS + 2 weeks, first bloom (FB), and FB + 2 weeks (Table 1). Also included was an untreated check. Treatments were applied using a 2 row, 2 nozzle per row, CO2-pressurized backpack sprayer calibrated to deliver 15 GPA at 3 MPH. Treatments were arranged in a randomized complete block (RCB) design and were replicated three (College Station (CS), TX) to four (Corpus Christi, TX) times. Various physiological data measurements were assessed during the growing season and each plot was harvested.

The seedcotton from each plot was ginned, acid de-linted, stored, and then planted again in a RCB design in 2017 (Table 2). This poster summarizes those results.

Data collected included three stand count timings, early season plant height at two timing intervals and two early season square counts. Statistical analysis of data were conducted using JMP, using LSD (P=0.05).

Table 1. 2016 dicamba application timing and rates.

Timing	Timing Code	Rate
First Square	FS	1/10(X) 1/50(X) 1/100(X) 1/500(X)
First Square + 2 weeks	FS + 2 wk	1/10(X) 1/50(X) 1/100(X) 1/500(X)
First Flower	FF	1/10(X) 1/50(X) 1/100(X) 1/500(X)
First Flower + 2 weeks	FF + 2wk	1/10(X) 1/50(X) 1/100(X) 1/500(X)

Table 2. Information on plot design for Corpus Christi and College Station, TX sites.

	Corpus Christi	College Station
Rows/plot	4	4
Row Length (ft)	35	40
Row Spacing (in)	38	40
Plant Date	Mar 22, 2017	May 8, 2017
Previous Crop	grain sorghum	corn

Results and Discussion

There were no differences in stand counts between treatments at the Corpus Christi site at 7 DAE (Days after Emergence) (Figure 1). At the College Station location, there was a significant difference in stand counts at 10 DAE. At 10 DAE, stands ranged from 22,333 to 46,000 squares per plant for the 1/500X rate at first square and 1/50X rate at first square timings, respectively. In general, the greatest differences in stands were at the lower rates of dicamba applied prior to first flower. Stand counts as a result of the dicamba overspray were not observed following applications to cotton that had reached first flower or later.

No differences were observed in plant height among any of the treatments at either location throughout the trial evaluation period (Figure 2). Mean plant height at Corpus Christi ranged from 5.0 to 6.1 at 28 DAP and at College Station range from 6.7 to 8.7 at 31 DAP.

Figure 1. Mean stand counts for Corpus Christi (7 DAE) and College Station (10 DAE). Columns of same site containing same letter are not significantly different, LSD (P=0.05%).

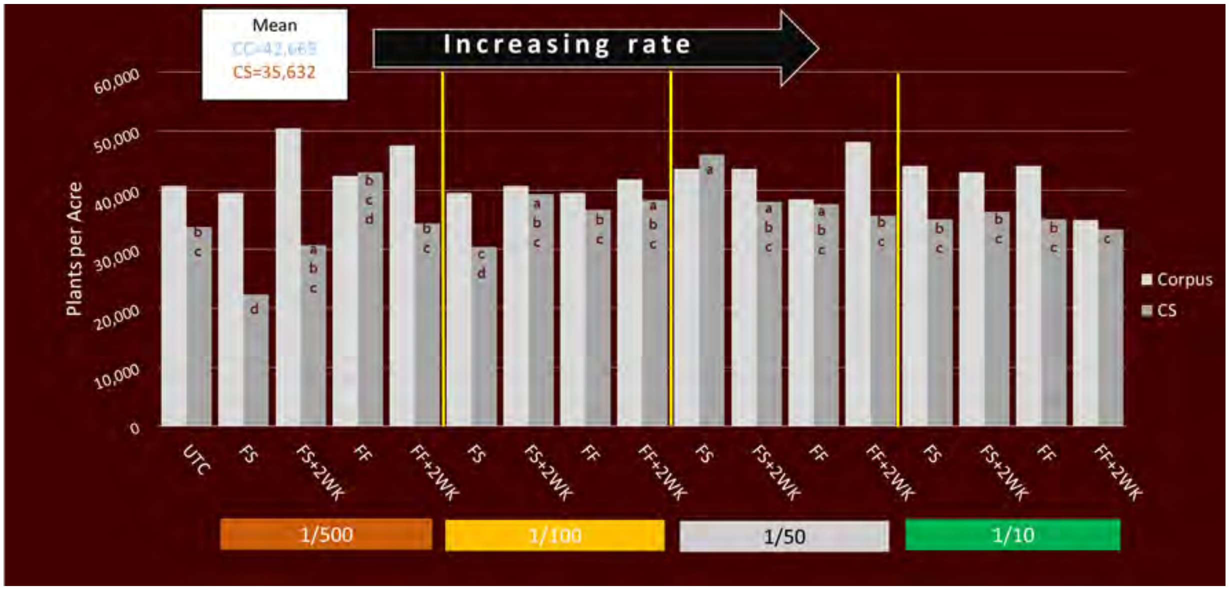
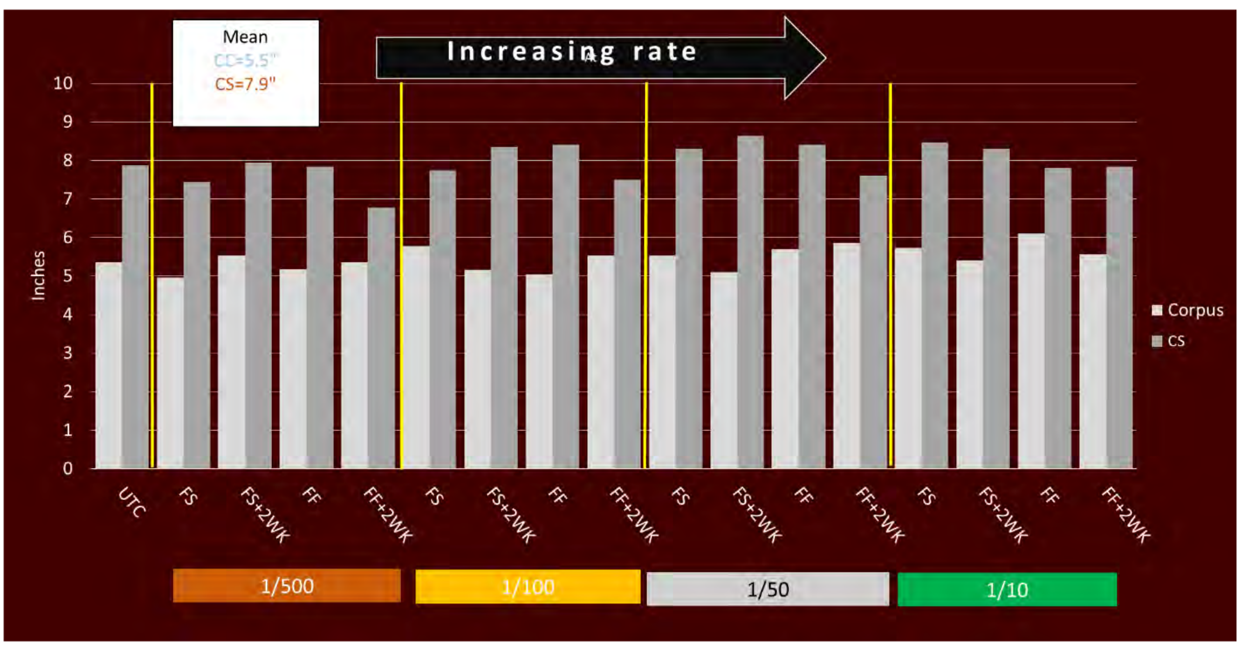
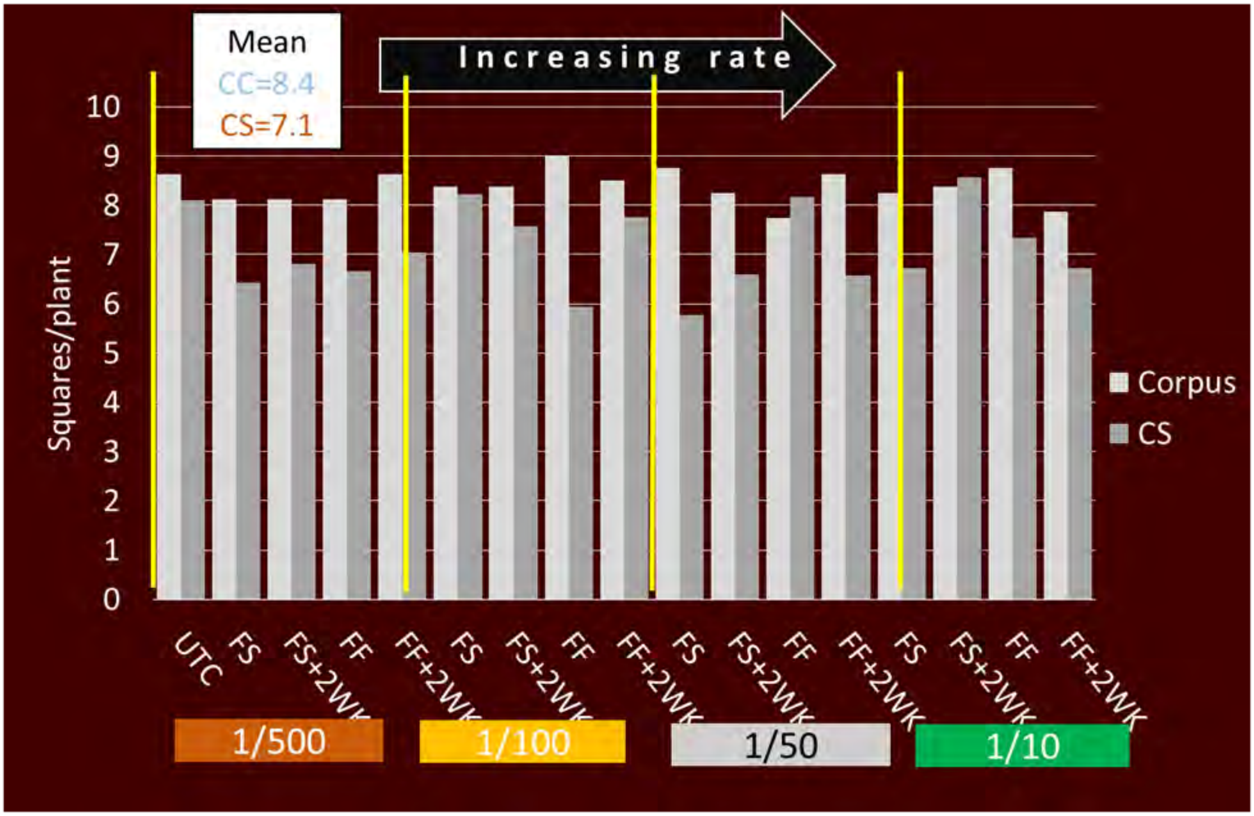


Figure 2. Mean plant height for Corpus Christi (28 DAE) and College Station (31 DAE).



Mean squares per plant were assessed multiple times during very early fruiting. There were no differences between treatment in number of squares per plant at any of the assessment timings. Figure 3 shows the results from the final assessment date for both the Corpus Christi (49 DAP) and College Station (31 DAP) Location, respectively. Mean squares per plant at CC ranged from 7.8 to 9 at the 1/50X rate at first flower + 2 weeks and the 1/100X rate at first flower timings, respectively. Mean squares per plant at CS ranged from 5.8 to 8.6 at the 1/50X rate at first square and 1/10X rate first square + 2 weeks timings, respectively.

Figure 3. Mean squares per plant for Corpus Christi and College Station, 28 and 31 days after planting, respectively, TX sites.



Conclusions

Seedcotton produced from a cotton crop that had been oversprayed by reduced rates of dicamba herbicide up to 1/10X the labeled rate, which had been harvested, ginned, acid de-linted and subsequently planted the following year, showed very little effects of any herbicide carryover during early season development processes. There were no differences observed in plant stand, number of squares per plant or plant height through 6 weeks after planting at the CC location. At the CS location, the only significant difference that was observed was at a slight effect on plant height, but even then there was no definitive trend on rate or timing. There were no differences observed in number of squares per plant or plant height among treatments at the CS location.

From these results, it is fair to say that one would not expect to see any significant impact to cotton grown from seed that was produced from a crop had dicamba drift onto it at rates up to 1/10X the previous season.

Acknowledgements

These projects were supported with funding from The Texas State Support Committee - Cotton Incorporated and Bayer CropScience.

2017-18 Stiles Farm Small Grains/Oilseeds Research

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http://varietytesting.tamu.edu/oilseed

The crop year of 2017-18 turned out to be an excellent production year for grain production of cool-season crops in the Blacklands. However, little rainfall in the fall provided very little grazing opportunity. Despite dry conditions in September and October, there was enough rainfall in November to get most fields established. Temperatures were much below average for much of the winter and spring leading up to May, which was above normal. The cool spring likely helped with seed fill by lowering heat stress at this critical stage. Precipitation was slightly below normal for much of the region throughout the growing season, but was timely when it did arrive, limiting drought stress. The cool, dry conditions led to very low incidence of leaf and stripe rust this season, though powdery mildew was prevalent February through early April. The following paragraphs outline research implemented at the Stiles Farm this growing season and the outcomes of those research trials. The variety trials listed below are part of larger experiments grown over numerous locations in Texas. The goal of all of the variety studies is to determine the best varieties that are adapted to the environments in and around Williamson County.

<u>Winter Wheat Variety Trial:</u>
This winter wheat trial is part of a uniform variety trial that is grown throughout the state of Texas in approximately 30 locations annually. The trial this year combined varieties from both hard and soft red winter wheat trials and had 40 total entries consisting of 10 experimental lines, 8 soft and 16 hard red winter wheat commercially available varieties, and four seeding rates of 'TAM 304' and 'WB 4303' each. The trial was planted October 30, 2017 and harvested May 18, 2018. Only trace amounts of stripe rust were detected early in the season, which did not spread. Leaf rust was present at moderate levels on susceptible lines, but came in late in the season. Hessian fly was detected in the trial, but no lodging was observed. All entries received two management treatments – intensive input and standard input. Entries with the intensive input treatment received an additional 35 lb/a of N at topdress (105 lb/a N total) along with a topdress application of Tilt (4 oz/a) on February 16 and an application of Quilt Xcel (14 oz/a) on April 2, 2018. The standard input treatment received a total of 70 lb/a of N and no fungicide throughout the season.

The trial average for 2018 (67.5 bu/a for standard input treatment) was 31% higher than the four year trial average (46.6 bu/a). Intensive management improved yields by 5.3 bu/a on average, but had no significant impact on protein or test weight. When averaged across management treatments, the top yielding entries included 'LA14066DH-88', 'AGS 2055', 'Gallagher', 'TAM 304' (1.8 million seed/a), 'TAM 204', 'WB 4418', 'LA14066DH-64', and 'TAM 304' (450,000 seed/a). 'Dyna-Gro Savoy', 'TX13A001169', 'TAM 204', and 'WB Cedar' all showed the largest yield response to the intensive input treatment ranging from 20.4 to 30.4 bu/a. Current Picks List varieties include Gallagher, WB Cedar, TAM 304, and Greer. The list will be revised once all 2018 data has been received and processed.

2018 Uniform Wheat Variety Trial: HRWW, Thrall, TX									
				Yield (bu/a)†				Test Wt (lb/bu)	Protein (%)
Rank	Variety	Class	Source	AVG†	Intensive‡	Standard§	Difference	AVG	AVG
1	LA14066DH-88	SRWW	LSU	99.2	101.8	97.5	4.3	60.1	11.2
2	AGS 2055	SRWW	AgSouth Genetics	94.8	93.8	97.8	-4.0	60.3	10.8
3	Gallagher	HRWW	OSU	93.7	90.0	101.2	-11.3	62.6	11.6
4	TAM 304 (1.8 million seed/a)	HRWW	TAMU	90.5	93.3	87.7	5.6	60.4	11.7
5	TAM 204	HRWW	TAMU	89.5	103.1	75.9	27.2	57.2	11.5
6	WB 4418	HRWW	Monsanto/Westbred	88.8	94.2	83.4	10.9	60.8	11.1
7	LA14066DH-64	SRWW	LSU	86.7	85.2	88.2	-3.0	61.1	11.8
8	TAM 304 (450,000 seed/a)	HRWW	TAMU	86.6	92.8	80.4	12.4	60.6	11.7
9	TAM 304 (750,000 seed/a)	HRWW	TAMU	83.7	84.5	83.0	1.6	60.0	11.9
10	TX-EL2	SRWW	TAMU	83.7	81.8	85.7	-3.9	60.1	11.1
11	TX12M4068	HRWW	TAMU	81.8	84.4	79.3	5.2	62.1	13.1
12	GO Wheat 2032	SRWW	Stratton Seed	81.1	84.6	77.6	7.0	62.2	11.8
13	AGS 2038	SRWW	AgSouth Genetics	80.7	81.7	79.8	1.9	61.5	11.0
14	TAM 304 (1.3 million seed/a)	HRWW	TAMU	80.7	83.5	77.9	5.6	60.5	12.2
15	TAM 114	HRWW	TAMU	79.7	84.1	75.3	8.8	61.2	10.5
16	WB-Cedar	HRWW	Monsanto/Westbred	78.6	88.8	68.5	20.4	61.4	11.8
17	TX13M5625	HRWW	TAMU	77.1	77.7	76.6	1.2	60.6	13.2
18	SY Flint	HRWW	Syngenta	76.8	80.2	73.4	6.9	60.3	10.6
19	PGX16-1	HRWW	Progeny Seed	76.4	70.9	82.0	-11.1	61.5	11.8
20	USG 3120	SRWW	UniSouth Genetics	76.1	69.2	82.9	-13.7	61.8	11.1
21	TX13A001169	HRWW	TAMU	74.8	89.4	60.2	29.2	61.0	13.2
22	Dyna-Gro Savoy	SRWW	Dyna-Gro	73.2	88.4	58.0	30.4	60.9	11.6
23	AGS 3000	SRWW	AgSouth Genetics	72.2	74.1	70.4	3.7	62.1	11.4
24	WB 4303 (450,000 seed/a)	HRWW	Monsanto/Westbred	70.0	73.9	66.1	7.8	59.7	12.7
25	WB 4303 (750,000 seed/a)	HRWW	Monsanto/Westbred	66.3	71.2	64.6	6.6	59.3	12.0
26	WB 4269	HRWW	Monsanto/Westbred	65.5	70.1	60.9	9.2	61.4	12.3
27	AGS 2024	SRWW	AgSouth Genetics	63.9	59.3	68.6	-9.3	60.7	12.1
28	SY Razor	HRWW	Syngenta	60.2	69.4	51.1	18.3	62.5	12.9
29	WB 4303 (1.8 million seed/a)	HRWW	Monsanto/Westbred	59.1	63.0	55.3	7.7	58.5	12.9
30	Greer	HRWW	Syngenta	58.1	58.0	58.2	-0.2	60.3	12.9
31	GO Wheat LA754	SRWW	Stratton Seed	57.9	64.7	51.2	13.6	60.3	12.4
32	TAM 401	HRWW	TAMU	56.3	60.1	52.5	7.6	58.6	13.6
33	WB 4303 (1.3 million seed/a)	HRWW	Monsanto/Westbred	55.2	55.1	55.3	-0.3	59.2	12.2
34	TX12A001638	HRWW	TAMU	50.3	49.8	50.8	-1.0	62.7	12.8
35	WB 4515	HRWW	Monsanto/Westbred	49.9	57.5	42.3	15.2	60.5	13.5
36	Fannin	HRWW	Syngenta	47.8	51.6	44.0	7.6	62.1	13.7
37	TX12V7415	HRWW	TAMU	43.8	42.2	45.4	-3.2	60.3	13.7
38	TAM 305	HRWW	TAMU	41.1	39.2	46.8	-7.6	61.5	13.4
39	TX11A001295	HRWW	TAMU	38.0	45.8	35.3	10.5	60.8	13.3
40	TAM W-101	HRWW	TAMU	31.6	27.9	35.2	-7.3	55.0	13.9
	LSD			**13.3**	**20.8**	**18.1**	--	**1.2**	**0.7**
	CV			**13.5**	**13.8**	**12.9**	--	**1.4**	**4.1**
	Mean			**70.6**	**73.6**	**67.5**	**5.3**	**60.6**	**12.2**

†Varieties ranked according to average yield across management treatment.

‡Intensive Input treatment received 105 lb/a N total and fungicide at topdress (Tilt @ 4 oz/a) and again at flag leaf (Quilt Xcel 14 oz/a).

§Standard input treatment received 70 lb/a N total and no fungicides.

While individual varieties did not statistically differ in grain protein between input levels, there was a general trend showing that higher input or more nitrogen (shown in blue) increased protein levels over lower nitrogen (shown in red) from roughly 0.5% to around 1.0% units as yields increased. Producers should note there is generally a strong relationship between yield and grain protein, where higher yields generally dilute protein content, which is evident in Figure 1.

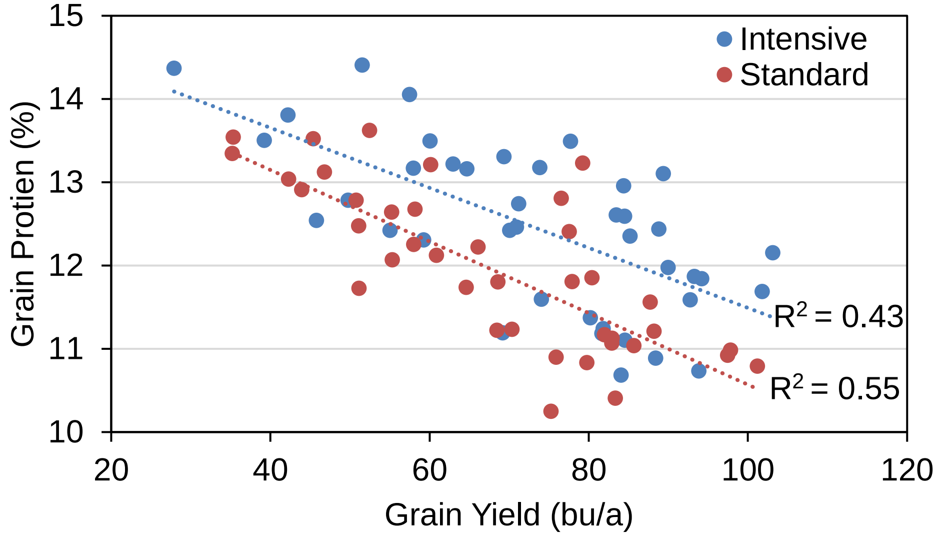

Figure 1. Relationship between grain protein and grain yield across HRWW and SRWW varieties and two management levels (Intensive and Standard) at Thrall, TX in 2018.

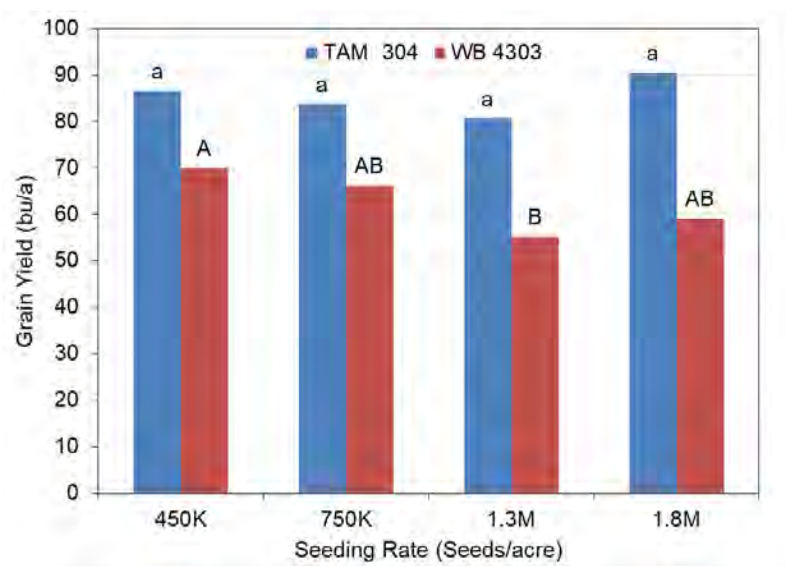

Figure 2. Impact of seeding rate on grain yield of HRWW varieties 'TAM 304' and 'WB 4303' in Thrall, TX in 2018.

A seeding rate trial was embedded within the variety trial at Thrall in 2018. Two cultivars – 'TAM 304' and 'WB 4303' – were planted at four seeding rates of 450,000, 750,000, 1.3 million, and 1.8 million seeds/a. Results are shown in Figure 2. There were no significant differences across seeding rates for TAM 304 while WB 4303 showed a significant decrease from 450,000 down to 1.3 million seeds/a. Both varieties are considered low tillering. Current Texas A&M AgriLife Extension recommendations are to plant wheat at 750,000 seeds/a. Despite no advantage planting above 450,000 in this trial, data from previous years did indicate a yield benefit in some environments by increasing to 750,000 seeds/a. So far, there has not been a yield advantage observed by planting above 750,000 seeds/a across 9 site-years in the Texas Blacklands and South Texas for winter wheat.

Spring Canola Variety Trial:

Canola is a cool-season oilseed crop commonly grown in Canada and the northern US. Texas commonly grows 20,000 acres or more, but acreage is generally located in the northern Rolling Plains. Previous trials evaluating winter canola at Thrall and College Station indicated vernalization issues during mild winters, so testing has now shifted to fall-planted spring canola. A fall-planted spring canola variety trial was repeated at three sites across central Texas in 2018. This year, the trial consisted of 17 entries - 12 commercially available and 5 experimental lines. The trial was planted at 3 lb/a on 7.5” row spacing on October 30, 2017 and harvested May 1, 2018. An application of 60 lb/a N was applied on November 30 and another 35 lb/a N was topdressed February 16 using 32-0-0. Insect pressure was abnormally low and no insecticide was applied to the trial. Despite below normal temperatures during the winter months, no cold damage was observed. The top-yielding cultivars at Thrall in 2018 included ‘DKL 70-10’, ‘InVigor 252’, and ‘InVigor 230’.

2018 Spring Canola Variety Trial: Thrall, TX

Rank	Variety	Source	Yield (lb/a)	Yield (bu/a)	Test Wt (lb/bu)	Height (inch)	Bloom† (%)	Maturity† (Date)
1	DKL 70-10	Dekalb/Monsanto	2551	52.7	48.4	44.0	98	27-Apr
2	InVigor 252	Bayer	2521	50.0	50.4	46.6	70	27-Apr
3	InVigor 230	Bayer	2343	47.6	49.2	45.9	87	28-Apr
4	HyCLASS 955	Croplan	2268	45.7	49.6	38.1	100	26-Apr
5	DKL 71-14BL	Dekalb/Monsanto	2257	45.2	49.9	42.7	100	26-Apr
6	InVigor 233P	Bayer	2226	47.0	47.4	50.5	80	28-Apr
7	DKL 35-23	Dekalb/Monsanto	2118	42.4	50.0	42.0	100	26-Apr
8	InVigor 140P	Bayer	2010	43.4	46.5	46.6	53	30-Apr
9	HyCLASS 930	Croplan	2005	40.4	49.7	39.4	100	27-Apr
10	Empire	Univ. of Idaho	1938	39.7	48.8	38.1	100	28-Apr
11	HyCLASS 970	Croplan	1937	39.1	49.6	44.0	100	28-Apr
12	CC SP 7	Caldbeck Consulting	1788	37.3	47.9	44.0	43	30-Apr
13	InVigor 255P	Bayer	1784	36.4	49.0	45.3	43	30-Apr
14	CC SP 16	Caldbeck Consulting	1637	37.4	43.7	48.6	85	30-Apr
15	CC SP 15	Caldbeck Consulting	1616	35.0	46.2	48.6	77	30-Apr
16	CC SP 6	Caldbeck Consulting	1473	32.1	45.8	47.9	37	3-May
17	CC SP A	Caldbeck Consulting	1285	28.2	45.5	47.9	37	4-May
	LSD		**230**	**5.2**	**1.0**	**3.0**	**21**	**1.6**
	CV		**6.9**	**7.6**	**1.3**	**4.0**	**16.1**	**24.3**
	Mean		**1994**	**41.3**	**48.2**	**44.7**	**78**	**28-Apr**

†Bloom notes taken on March 2, 2018 and maturity notes taken April 25.

A special thanks to Ryan Collett, Farm Manager for Stiles Foundation Farm, for land access and Daniel Hathcoat for planting, maintaining, and harvesting trials. Funding for the wheat variety testing provided by the Texas Wheat Producers Board and canola funding came from USDA-NIFA.

Evaluation of Chemical Stalk Destruction Options for Killing Enlist Cotton

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Texas A&M AgriLife Extension Service

Cotton is the sole host for the Boll Weevil, which devastated the cotton industry since its migration through Texas and into the U.S in the 1800s. It is estimated that the boll weevil reduced yield potential by an excess of 10% annually and increased input costs by $30/a in Texas. The estimated economic loss of the Boll Weevil presence was $2.62 million annually. Additionally, the funds invested by the state government and grower fees to eradicate the boll weevil exceeded $22 million annually over the past decade, with the line share coming from grower fees. Cotton is a tropical perennial plant that is grown as an annual crop. In much of the CottonBelt, the cotton plant is not sufficiently cold tolerant to survive the winter. However, in Southern Texas, the cotton plant does survive and continues to develop fruit, which is the food source for the boll weevil. Removal of living cotton plants in late-summer and fall has proven to significantly decrease boll weevil survivability through the winter, and stalk destruction is a major component to the success of the boll weevil eradication program.

As reduced tillage systems have increased and farmers have gotten larger, the adoption of chemical (herbicide) stalk destruction has become more common. It is estimated that over 70% of southern Texas cotton acreage receives a herbicide application to kill cotton stalks. With the development and release of the auxin-tolerant cotton (Enlist and XtendFlex) varieties, no currently labeled herbicide is available to kill both Enlist and XtendFlex cotton. So, the objective of this research is to evaluate herbicide efficacy to prevent hostable fruit development of Enlist and XtendFlex cotton following cotton harvest in South Texas using novel herbicides and tankmixtures.

Plots were arranged in a randomized complete block design with 25 ft x 4 row plots, while the two center rows were treated. The first trial (Figure 1) was mowed and treated with the herbicides within 18 hours of mowing. The second trial (Figure 2) was mowed and treated 17 days later after some regrowth had occurred. Plots were rated for efficacy at 14, 28, and 42 days after shredding. Hostable plants and percent survivability were rated at 42 days after shredding. Dichlorprop was the focus of the trial, including an ester and amine formulation, and various tankmixtures.

For the trial with treatments immediately following shredding, the ester formulation of the dichlorprop provided more consistent control than the amine formulation (Figure 1). The tankmixture of dichlorprop with dicamba and dichlorprop with thidiazuron improved the efficacy compared to dichlorprop alone.

For the trial where regrowth was allowed to occur before herbicide applications were made, the efficacy of all the treatments were very high (Figure 2). The application timing had a significant impact on the herbicide efficacy for killing mowed and standing stalks.

Figure 1. The effectiveness (% efficacy, % living plants, and % hostable plants) were evaluated in Snook, TX and reported at 7 weeks after treatment. The herbicide treatments were applied 18 hours after shredding.

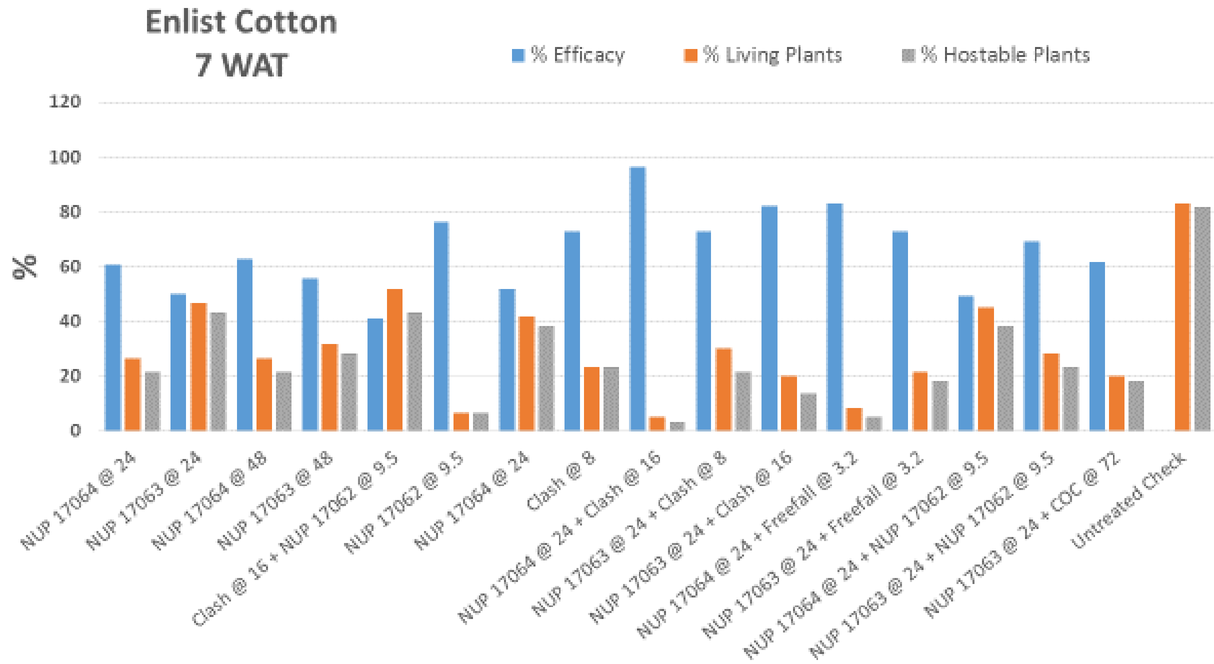
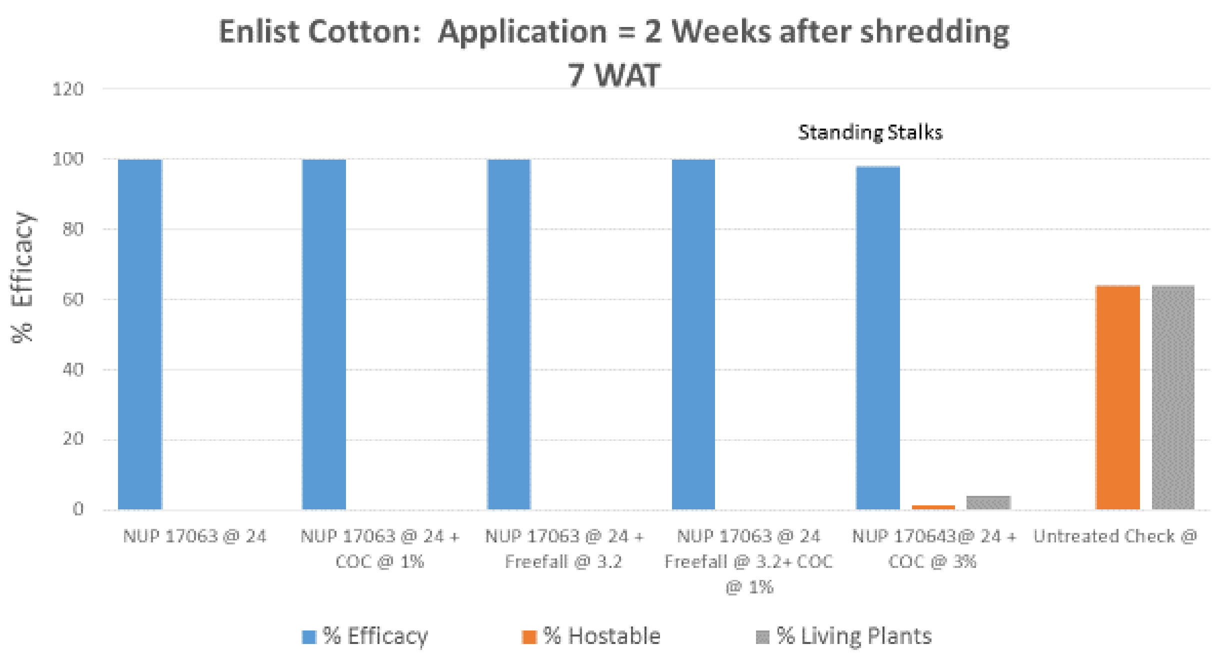


Figure 2. The effectiveness (% efficacy, % living plants, and % hostable plants) were evaluated in Snook, TX and reported at 7 weeks after treatment. The herbicide treatments were applied 18 hours after shredding.



Grid Soil Sampling and Variable Rate Nutrient Application

in the Texas Blackland Prairie

Dr. Ronnie Schnell, Dr. Tony Provin, Dr. Jake Mowrer, Dr. Gaylon Morgan

Composite soil sampling has historically been used to determine average soil nutrient status of fields or sampling units within fields. This information is used to determine the appropriate application rate of nitrogen (N), phosphorus (P), potassium (K) and other nutrients to be applied uniformly across the field. With advancements in precision agriculture technologies, producers can now exploit spatial variation in soil nutrient status within fields and apply nutrients on a site-specific basis. Site-specific nutrient application, or variable rate application, automates the change in fertilizer application rates as application equipment moves through the field based on prescription fertilizer application maps.

Figure 1. Systematic grid soil sampling pattern on Stiles Farm. Grid are arranged systematically based on a sampling density of 1 acre.

Prescription maps can be generated from many different data sources. Potential data sources include soil maps, yield maps, remote sensing data, zone or grid soil sampling maps. Grid soil sampling is one of the simplest ways to get started in precision agriculture and variable rate fertilizer application. No additional data layers or information is needed. Simply layout a systematic grid (Figure 1), collect and label soil samples, and generate prescription fertilizer maps. Many commercial software products and third party service providers can assist with soil sampling and developing prescription fertilizer maps. Soil samples are submitted and analyzed by University (Texas A&M AgriLife Extension Soil, Water, and Forage Testing Laboratory) or commercial soil testing laboratories.

2017 Variable Rate Demonstration at Stiles Farm

A demonstration of grid soil sampling and variable rate application of phosphorus fertilizer was initiated at Stiles Farm during 2017. The field area is 35 acres and was planted to corn or grain sorghum. A composite soil sample was collected near the center of each 1-acre grid (figure 1). Eight soil cores, to a six-inch depth, were collected from within 10 ft of the grid point. Cores were combined, mixed and bagged and labeled according to the grid point ID. The process was repeated for each grid point. Soil samples were submitted to the Texas A&M AgriLife SWFTL in College Station for routine nutrient analysis, including pH, extractable Nitrate-N, Mehilich III extractable phosphorus (P) and potassium (K). Results of each soil sample were attached to the corresponding grid point using commercially available software. Maps representing soil test results for P were generated (Figure 2) and used to create a variable rate prescription map for P applied using 11-37-0 (liquid fertilizer).

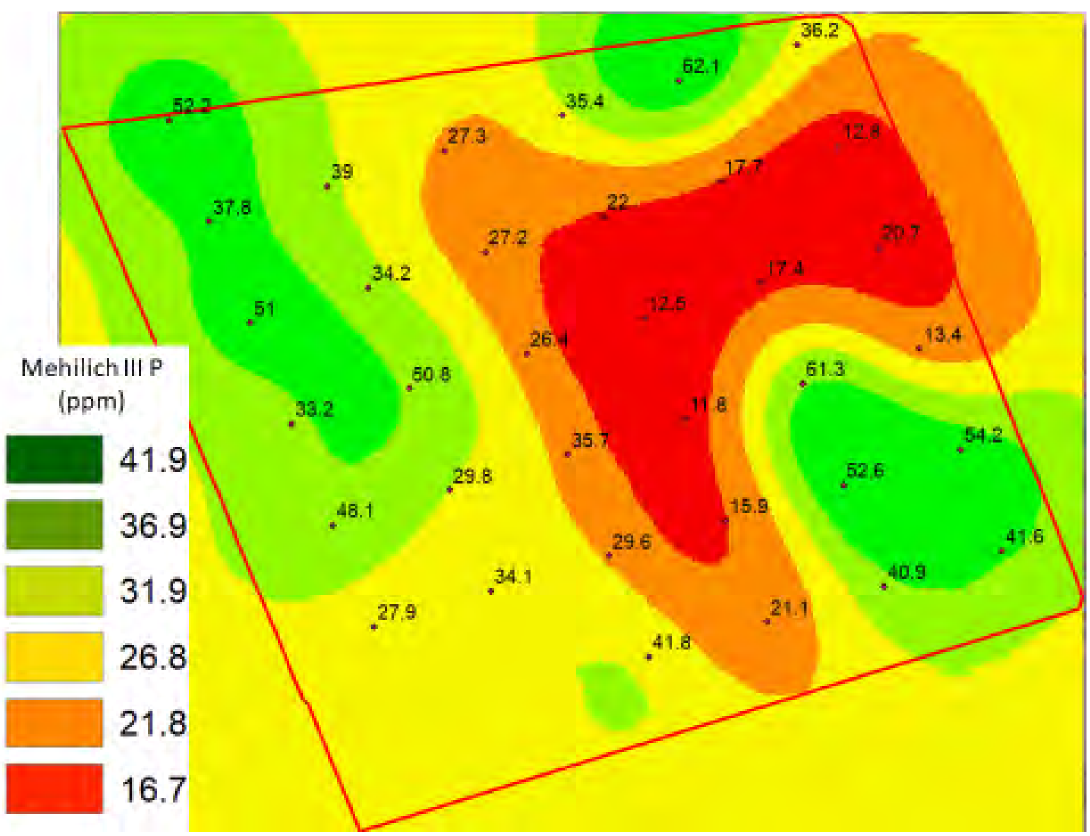


Figure 2. Map of soil test P (Mehlich III) generated from grid soil samples for corn and sorghum field at Stiles farm.

To create the prescription fertilizer map, values from the soil test P map were used to calculate the amount of fertilizer needed to meet crop P requirements. This accomplished by calculating the pounds P_2O_5 per acre needed and then converting pounds of P_2O_5 to pounds or gallons per acre of fertilizer product needed to achieve the target rate. In this example, pounds of P_2O_5 per acre needed were converted into gallons per acre of 11-37-0. 10 gallons per acre of 11-37-0 provides about 44 pounds per acre of P_2O_5. Most rate controllers are capable of accepting application rates as weight (pounds) or volume (gallons). Polygon features created from soil test maps were assigned the appropriate fertilizer rate, representing gallons per acre of 11-37-0 (Figure 3). The file is then exported and loaded in the rate controller software for variable rate fertilizer application.

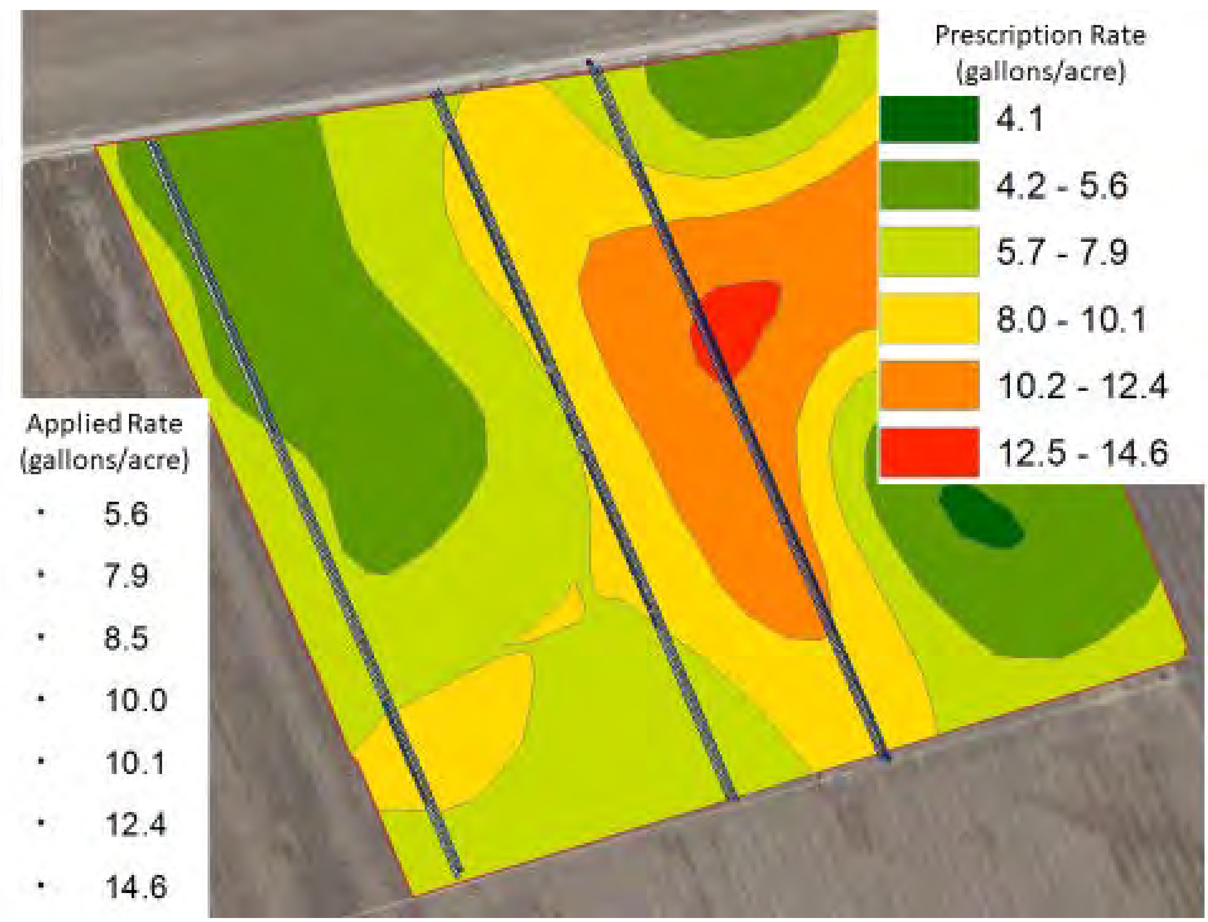


Figure 3. Prescription map for variable rate P application using 11-37-0 in gallons per acre. Actual applied rate is shown as blue colored points, which represent the three strip where uniform and variable rate P fertilizer was applied as paired strips.

For the demonstration plots, liquid fertilizer (11-37-0) was applied in a 4-row strip using the variable rate prescription map and the adjacent 4 rows had liquid fertilizer applied using a uniform rate of 8.5 gallons per acre. Liquid fertilizer was applied at planting in a 2x2 placement using a John Deere rate controller (Figure 4). The strips were replicated three times within the corn portion of the field.

Figure 4. Variable rate liquid application system for applying fertilizer during planting.

Results

From Figure 2, it is apparent that significant variation in soil test phosphorus is present within the field. Soil test values range from very low to moderate within the field. Thus, rates of 11-37-0 in the prescription application ranged from 5.6 to 14.6 gallons per acre for the whole field. For the experimental plots, variable rate P application averaged 9.4 gallons per acre compared to an average of 8.7 for variable rate application to the entire field (Figure 5). Cost per acre for the application of 11-37-0 was based on $430/ ton or $2.57/gal. Whole field variable rate application averaged $22.36/acre while the experimental test strips averaged $24.16/acre. This is compared to $21.85 for the uniform rate of 8.5 gallons per acre. For the entire field, total application of 11-37-0 did not differ much. Applying a uniform rate to the whole field, 298 gallons ($21.85/acre) of 11-37-0 would be used compared to 305 gallons (average of $22.36/acre) using a prescription map based rate. Although there was not significant savings on P fertilizer expenses, P fertilizer would be redirected to areas within the field with greater fertilizer needs.

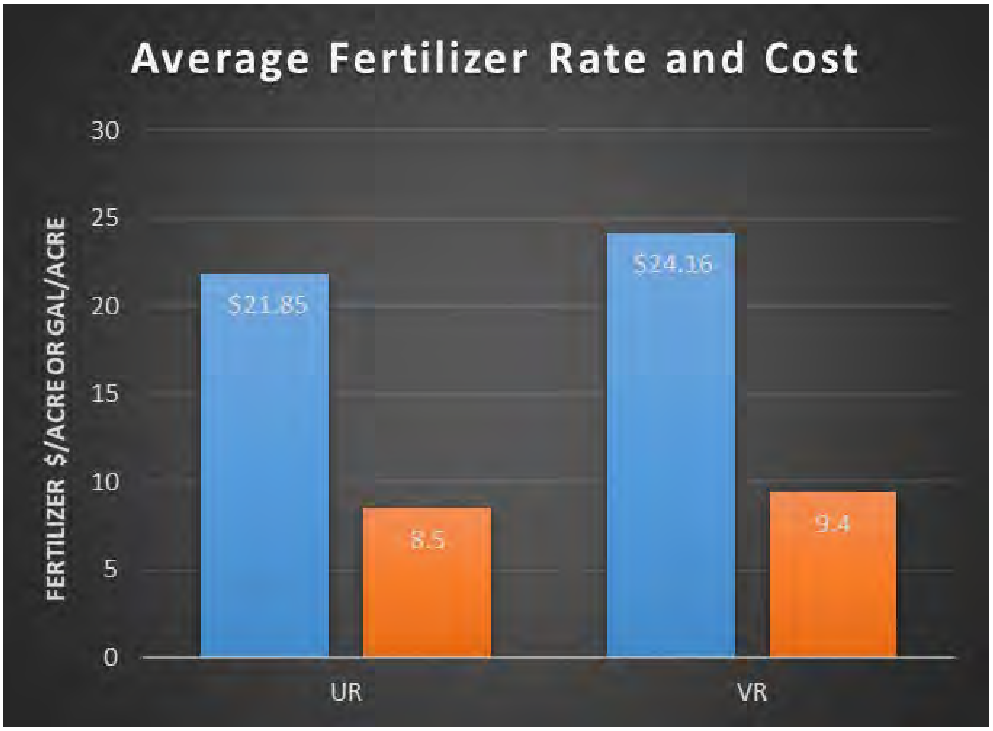


Figure 5. Average rate and cost of variable rate and uniform application of 11-37-0 within test strip areas of the field.

Grain yield was low at the test site due to inadequate rainfall, especially during grain fill. Kernel size was very small. Grain yield within the uniform P application averaged 63.5 bu/acre compared to an average of 66.3 bu/acre for variable rate P (Figure 6). Yields were not significantly different. As a result, average grain value per acre was not significantly different. Deducting the cost of fertilizer, net return for the uniform P application was $187/acre compared to $194/acre for the variable rate application (Figure 7).

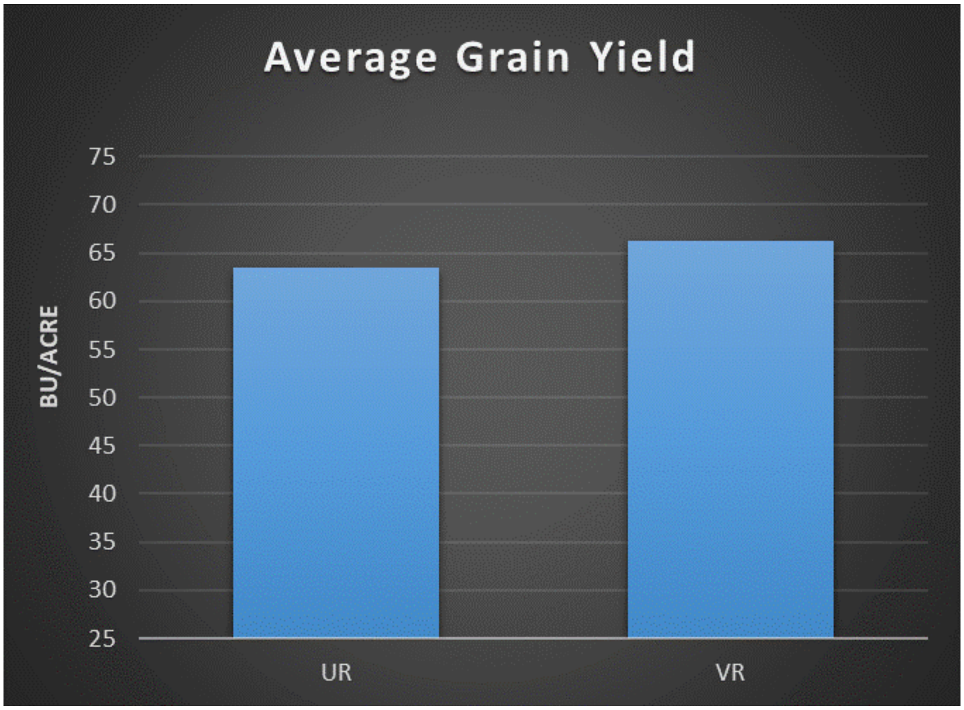


Figure 6. Average grain yield for uniform P application (UR) and variable rate P application (VR).

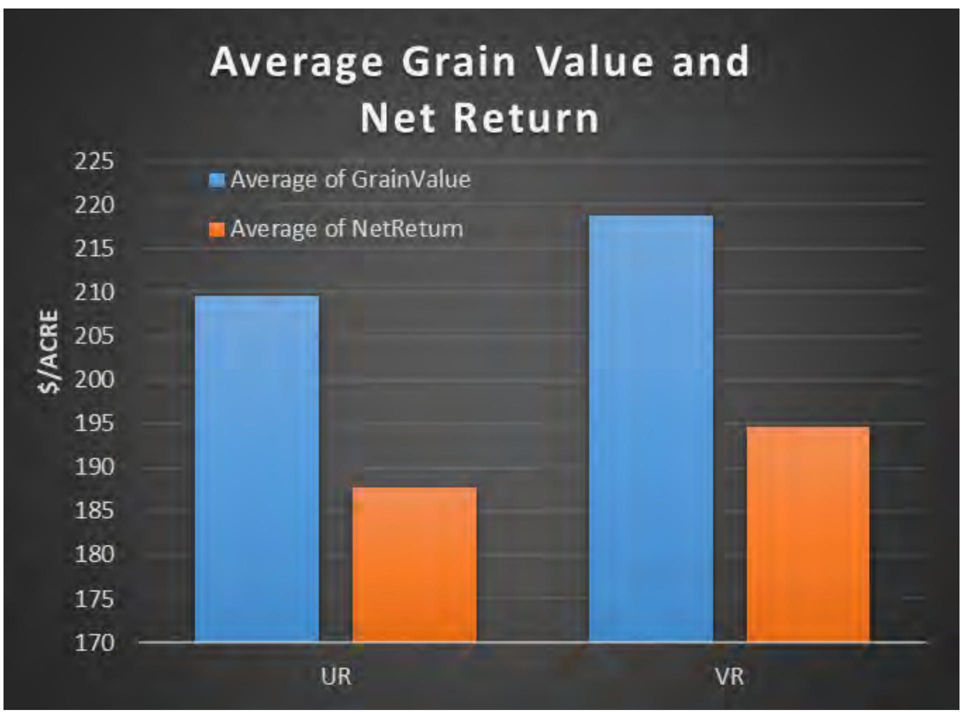


Figure 7. Average grain value and net return ($/acre) for uniform P application (UR) and variable rate P application (VR).

Summary

Grid soil sampling and variable rate application of nutrients has the potential to improve fertilizer efficiency compared to uniform application of nutrients across the field. During 2017, a study was conducted to evaluate uniform P application and variable rate P application based on grid soil sampling. Significant variation in soil test P was observed within the field with soil samples from individual grid points representing the very low, low, moderate and sufficient categories for P. However, the total amount of P fertilizer used for the entire field did not differ much between the variable rate and uniform application. Grain yield and economic return did not differ significantly for variable rate and uniform application of P fertilizer. However, yield potential was reduced due to extreme dry weather during grain fill. Net return (grain value – fertilizer cost) for variable rate P application was about $7 per acre greater than uniform P application. The potential for variable rate applications to improve yield performance and economic return will depend on the range of soil test values within the field, distribution of low and high soil test values, and yield potential.

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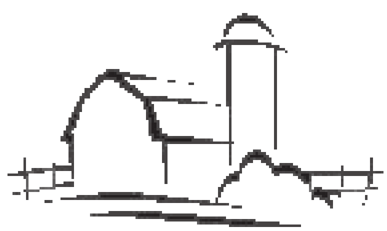

2016