Auburn University Crops:

Wheat and Feed Grains Research Report

2016

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Alabama Agricultural Experiment Station, 2017
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Auburn, AL

In cooperation with the Alabama Cooperative Extension System
(Alabama A&M University and Auburn Universit

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Abbreviations: ACES, Alabama Cooperative Extension System; AAES, Alabama Agricultural Experiment Station; AFNR, Agriculture, Forestry, and Natural Resources.

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Confidential Report

Contents

I. Cultural Management

Evaluating Cover Crop Mixtures for Conservation Tillage Corn Production

K. Balkcom, D. Delaney, A. Price, and L. Duzy

We have completed the first year of an experiment designed to compare cover crop mixtures and three nitrogen (N) application rates in Shorter, AL. The cover crop mixtures tested were: 1) fallow; 2) Mixture 1 (Rye - 30 lb/ac + Crimson Clover – 10 lb/ac; 3) Crimson Clover – 20 lb/ac; 4) Mixture 2 (Rye - 30 lb/ac + Crimson Clover – 20 lb/ac; and 5) Rye – 90 lb/ac. The corresponding N rates, applied to the corn, were 150 lb N/ac, 200 lb N/ac, and 250 lb N/ac. A 0 lb N/ac was also included for uptake and nitrogen use efficiency (NUE) calculations.

All cover crops were planted on November 23, 2015. Cover crop biomass samples, consisting of two 0.25 m^2 areas in each plot, were collected on March 23, 2016. The corn hybrid 'Pioneer 1197 YHR' was planted at 32,000 plants/ac on April 6, 2016. Due to extensive damage, attributed to crows eating the seedlings, the test was replanted on April 21, 2016. No initial N was applied until side-dress to determine early season corn response to cover crop treatments. At side-dress, N treatment specified rates were injected as 28% UAN solution. All plots were irrigated 6 times during the growing season for a total of 4 inches. Plots were harvested on September 1, 2016.

First year results indicate that cover crop biomass production was low, although treatment differences were observed (P = <0.0001) (Fig. 1). Rye, not surprisingly, produced the most biomass, but all measured biomass was below 1250 lb/ac. The measured biomass amounts, preceding corn, were not surprising, but the wetter than normal fall and winter likely contributed to reduced biomass production. Due to the low biomass production, average N content of the cover crops averaged < 20 lb N/ac, which reduced any potential N contribution from the cover crops.

Corn yield differences were observed for cover crop treatments (P = <0.0001) averaged over all N rates (excluding 0 N rate), but the fallow treatment resulted in the highest numerical yield, although rye and the Mixture 2 treatments were equivalent to fallow (Fig. 2). Corn yields were consistent across N rates, although small differences (P = 0.0245) among the 150, 200, and 250 lb N/ac rates averaged over cover crops were observed (Fig. 2). Despite the slight yield increase for the 250 lb N/ac rate, the 150 lb N/ac rate was the most productive for the growing conditions encountered at this site in 2016.

These results do not indicate a great benefit for any of the covers used in this experiment, but these are first-year results. The need to replant the corn may have contributed to reduced yields, but replanting was necessary to salvage the test. These results highlight the need for adequate biomass production preceding corn, which is typically a challenge for Southeast producers.

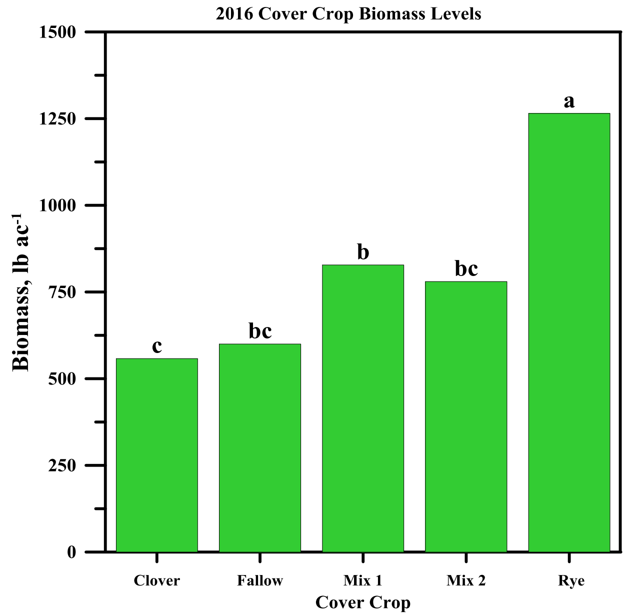


Figure 1. Cover crop biomass levels measured in March 2016 at the E.V. Smith Field Crops Unit in Shorter, AL.

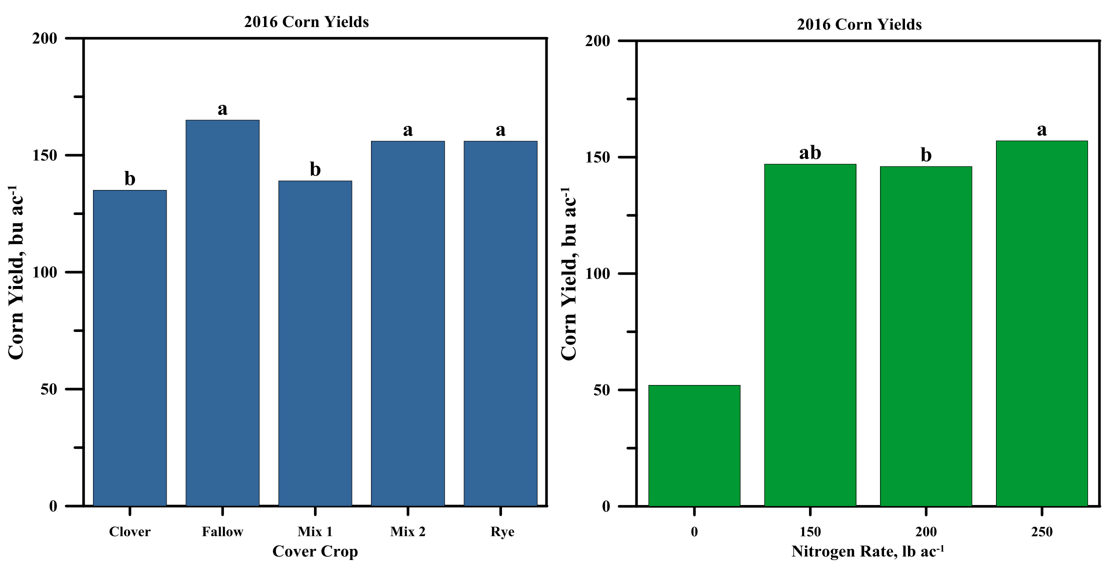


Figure 2. Corn yields measured across cover crops and nitrogen rates during the 2016 growing season at the E.V. Smith Field Crops Unit in Shorter, AL.

Weighing Grain Buggies for Large-Scale Tests

D. Delaney, R. Yates, C. Hicks, and K. Wilkins

OBJECTIVES:

Dependable means of measuring yields from large scale variety, fertility and other on-farm tests in Alabama are needed to accurately report results. When cooperators are ready to harvest test plots, it is important to have dependable equipment readily available when and where needed for timely harvest of trials.

PROCEDURES:

Funding was requested and provided for 2/3 of the cost of two new weighing grain wagons for use by Regional Extension Agents and Specialists in measuring yields from variety, pest management, fertility and other on-farm trials. Since these weigh wagons will also be used for soybean trials, the Alabama Soybean Producers was asked to share in the purchase cost (1/3). While the ASP agreed with the need for the wagons, their charter rules do not allow them to purchase equipment, and they were not able to fund the remainder of the equipment cost.

Alternative funding has been found for the remainder of the cost, and requisition is underway for the two buggies.

The Old Rotation

D. Delaney, K. Balkcom, and T. Cutts

The "Old Rotation" experiment (circa 1896) is the oldest, continuous cotton study in the world and the third oldest field crops experiment in the U.S. on the same site. With the renewed interest in cover crops, we believe that this is the oldest "cover crop" study in the U.S. and it is beginning to get more international attention. Many students at Auburn are using this study for special-problems research, as well as graduate students from other universities in Alabama, while soils from the Old Rotation have been shared with researchers in Ohio, Louisiana and Texas.

Corn and cotton yields reflect soil moisture and N availability more than any other factors. There was a response to irrigation in 2016 by cotton, corn and soybean. Wheat always follows corn and soybean is double-cropped behind wheat. Wet spring weather contributed to delayed planting of summer crops, while extremely hot and dry late summer weather contributed to lower yields for later planted crops, especially double-cropped soybeans.

Six soil moisture monitors were installed and monitored again in 2016 to optimize irrigation amounts and timing. A camera overlooking the Old Rotation allows visitors to the Old Rotation web site to view a live image of crops growing on the Old Rotation.
http://cses.auburn.edu/old-rotation/live-cam/

Table 1. Crop yields on the Old Rotation in 2016											
Plot No.	Description	Clover dry matter* (lb/a)		Wheat (bu/a)	Corn (bu/acre)		Cotton lint (lb/acre)		Soybean (bu/acre)	
		Irrigated	Non-irrigated		Irrigated	Non-irrigated	Irrigated	Non-irrigated	Irrigated	Non-irrigated
1	no N/no legume	0	0				723	334		
2	winter legume	1764	3900				1389	798		
3	winter legume	1232	2549				1389	854		
4	cotton-corn	2066	2967				1690	1014		
5	cotton-corn + N	1388	3203				1342	1023		
6	no N/no legume	0	0				685	404		
7	cotton-corn	1271	2901		44.3	65.5				
8	winter legume	1140	2665				1333	967		
9	cotton-corn + N	1597	2370		178.8	74.6				
10	3-year rotation	-	-	45.6*					50.3	25.9
11	3-year rotation	0	0				1183	835		
12	3-year rotation	3039	3217		188.7	73.5				
13	cont. cotton/no legume, +N	0	0				798	826		
	Mean	1687	2971		137.3	71.2	1170	784		

*Winter legume and wheat are not irrigated. Average total N fixed by legume is 60 lb. N/acre.

Cullars Rotation

D. Delaney, K. Balkcom, and T. Cutts

The Cullars Rotation (circa 1911) is the oldest, continuous soil fertility study in the southern U.S. This study is non-irrigated and yields reflect growing conditions during the season.

While some differences due to fertilization were observed, unusually sustained hot, dry weather limited yields and fertility responses on this sandy soil in 2016. Corn and soybean yields were adversely affected by hot, dry late summer weather. Conversely, clover and wheat yields were affected by wet soils in the early spring, which also delayed planting of summer crops.

All P and K fertilizers are applied to the cotton and wheat crops. Corn receives 120 lb. N/acre in addition to the fixed N by the winter legume cover crop. Wheat is top dressed in late winter with 80 lb. N/acre. The Cullars Rotation Experiment is an excellent site to see dramatic nutrient deficiencies compared to healthy crops each year. This type of comparison does not exist anywhere else in the USA. Numerous national and international groups were hosted at this experiment and 3 A.U. classes visited the site in 2016.

Table 1. Crop yields on the Cullars Rotation in 2016

Plot	Treatment description	Clover/Vetch dry wt.	Wheat	Corn	Cotton lint	Soybean
		-lb/acre-	-bu/acre-	-bu/acre-	-lb/acre-	-bu/acre-
A	no N/+legume	1736	13.1	39.9	864	8.2
B	no N/no legume	0	7.3	25.6	929	6.7
C	Nothing added	0	0.0	0.0	0	1.6
1	no legume	0	44.7	45.7	929	7.1
2	no P	489	15.8	6.9	629	7.5
3	complete	2687	33.9	35.8	864	9.1
4	4/3 K	2249	53.9	21.2	554	11.7
5	rock P	2249	41.9	27.1	995	9.6
6	no K	628	33.2	0.0	0	6.0
7	2/3 K	2998	44.0	26.0	638	10.0
8	no lime (pH~4.9)	0	0.0	0.0	0	0.6
9	no S	1309	52.2	27.1	648	10.5
10	complete+ micros	1153	43.8	37.7	695	10.4
11	1/3 K	1672	45.2	31.8	338	11.6
	Mean of all treatments	1226	30.6	23.2	577	7.9

On-Farm Evaluation of Wheat Varieties

B. Ortiz, B. A. Dillard, R. Yates, K. Wilkins, C. Hicks, and T. Sandlin

Wheat seed from five commercial companies was obtained for four trials that were expected to be planted in November 2015. A total of 10 varieties per trial were available per trial/location. Four on-farm trials were planted but one of them was not harvested and the other had a heavy weed pressure that severely impacted final yield. The trial in Macon county (12 varieties –Shorter, AL) yielded from 71.2 to 44.4 bu/A and the trial in Henry county (8 varieties – Headland, AL) yielded from 55 to 17 bu/A.

The yield results of the harvested tests were distributed to farmers at production meetings and individual visits. Results were made available on the internet through the AlabamaCrops.com website.

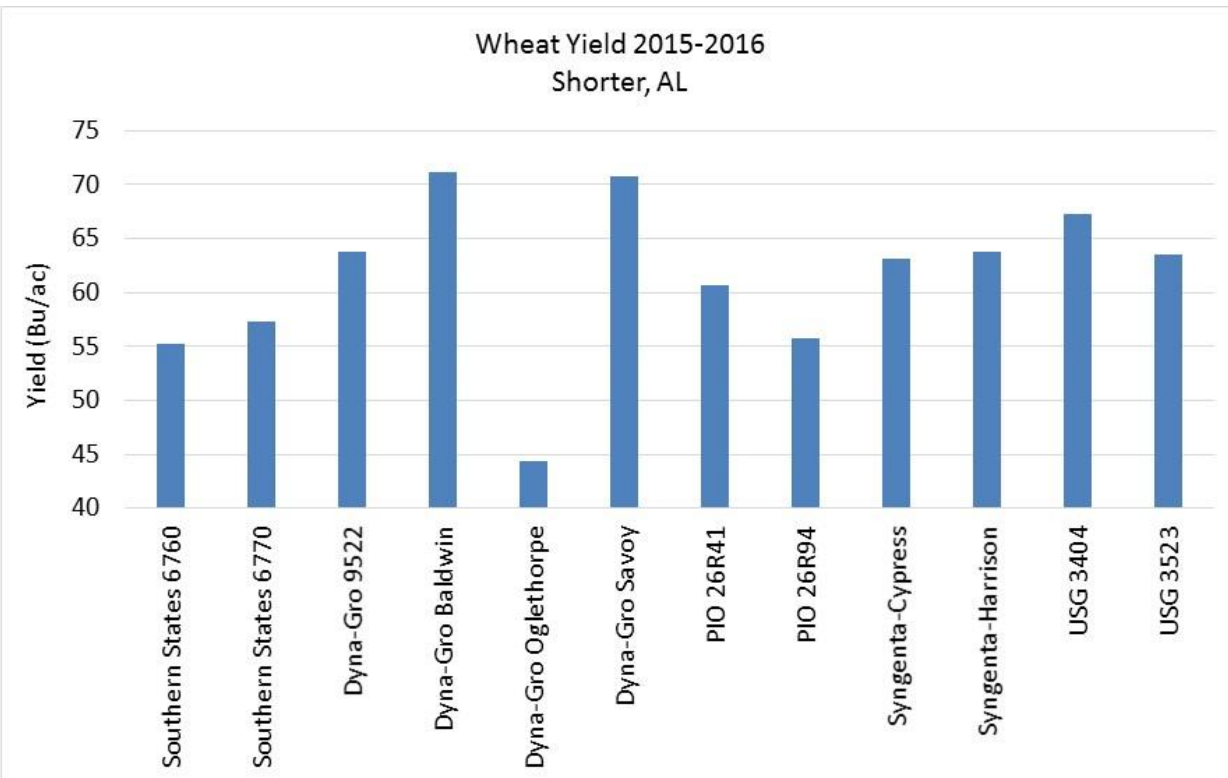


Figure 1. Wheat yield results from the trial conducted at Shorter, AL

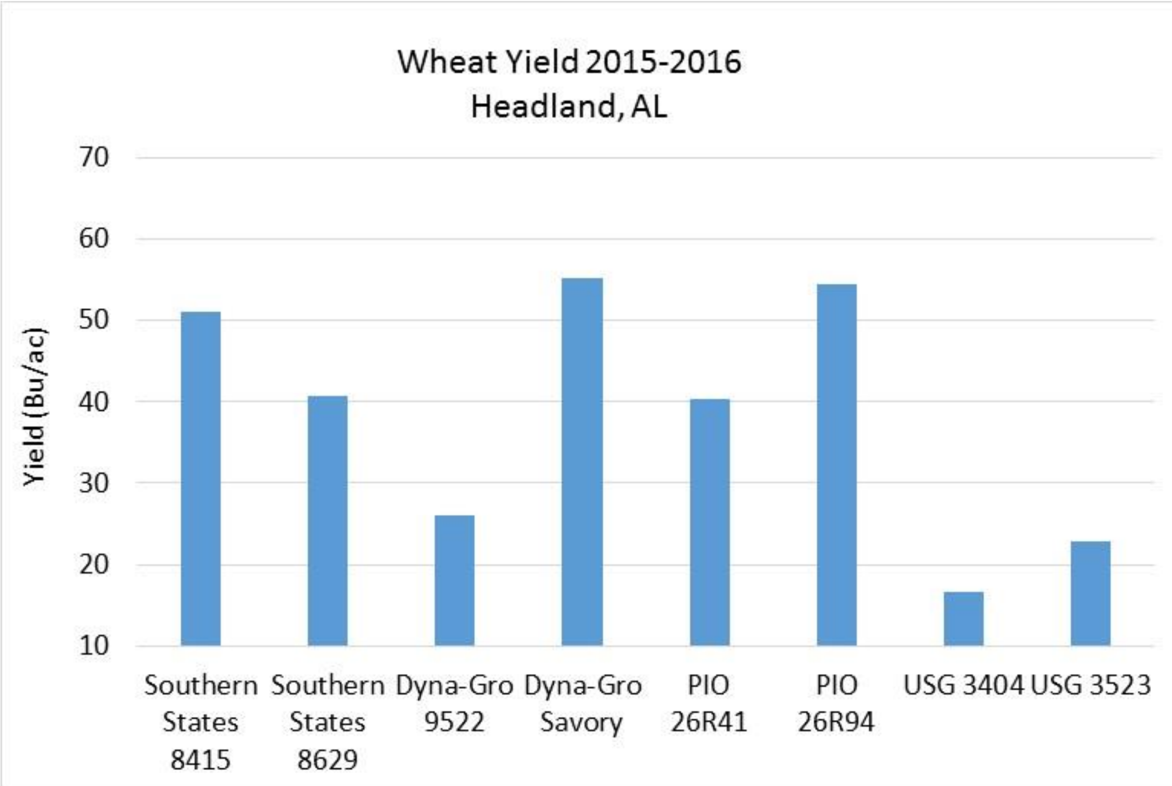


Figure 2. Wheat yield results from the trial conducted at Headland, AL

Evaluation of the Performance of Drought Tolerant Corn Hybrids in Alabama

B. Ortiz, K. Flanders, K. Bowen, and K. Wilkins

This is the third and final year of the performance evaluation of drought tolerant corn hybrids at Fairhope, Prattville, and Belle Mina, AL. This experiment was designed to compare a new drought tolerant corn hybrid from the AQUAMax group (Pioneer) with a conventional roundup ready hybrid. These hybrids were evaluated under four seeding rates (20K, 24K, 28K, and 32K plants/acre). Besides the yield data, data from yield components were collected: ear diameter, number of rows per ear, ear length, and number of grains per row.

The 2016 growing season precipitation changed among locations. In Fairhope, precipitation was above average in March and April but below average in May (-2.6"), June (-1.5"), and July (-2.9"). In Prattville, precipitation was below average in May (-2.5") and July (-4.0"). In Belle Mina, precipitation was below average during almost all corn growing season. In the flowering and grain filling months of May (-3.2), June (-2.8), and July (-1.6) was below average. Overall at the three research sites, corn yield was significantly lower than previous years.

<u>At Fairhope</u>, both AQUMAX hybrids showed comparative yield than the non-AQUAMax hybrid (P1319HR). Interestingly, for all three hybrids, yield increased as the plant population increased, however, yield reached a plateau at 28,000 seeds/ac. The P1443YHR AQUAMax hybrid outyielded the P1498YHR at 28,000 and 32,000 sees/ac. No significant differences were observed between the P1443YHR AQUAMax hybrid and the P1319HR hybrid. Independently of the hybrid, the lowest yield was observed at the density of 20,000 seed/acre compared with the 28,000 and 32,000 seed rates (the highest).

<u>At Prattville</u>, drought and heat during flowering and grain filling period impacted corn yield. There were significant differences between corn hybrids, especially at the lowest and highest seeding rate treatments. The two AQUAMax hybrids, P1443YHR and P1498YHR, out-yielded the non AQUAMax hybeids at the seeding rates of 20,000 and 32,000 seed/ac treatments. The greatest yield was observed from the P1443YHR AQUAMax hybrid planted at 24,000 seed/ac. At this location and under the drought conditions experienced during this growing season, the P1498YHR AQUAMax had the greatest yield at most seeding rates evaluated.

<u>At Belle Mina</u>, the P1498YHR AQUAMax had the greatest yield compared with the P1637YHR hybrid. The drought and heat conditions observed impacted severely corn yield and the greatest

effect was observed on the highest density treatment. The results of this 3-year project will be used in the preparation of Agronomy Journal articles and distributed among Alabama farmers.

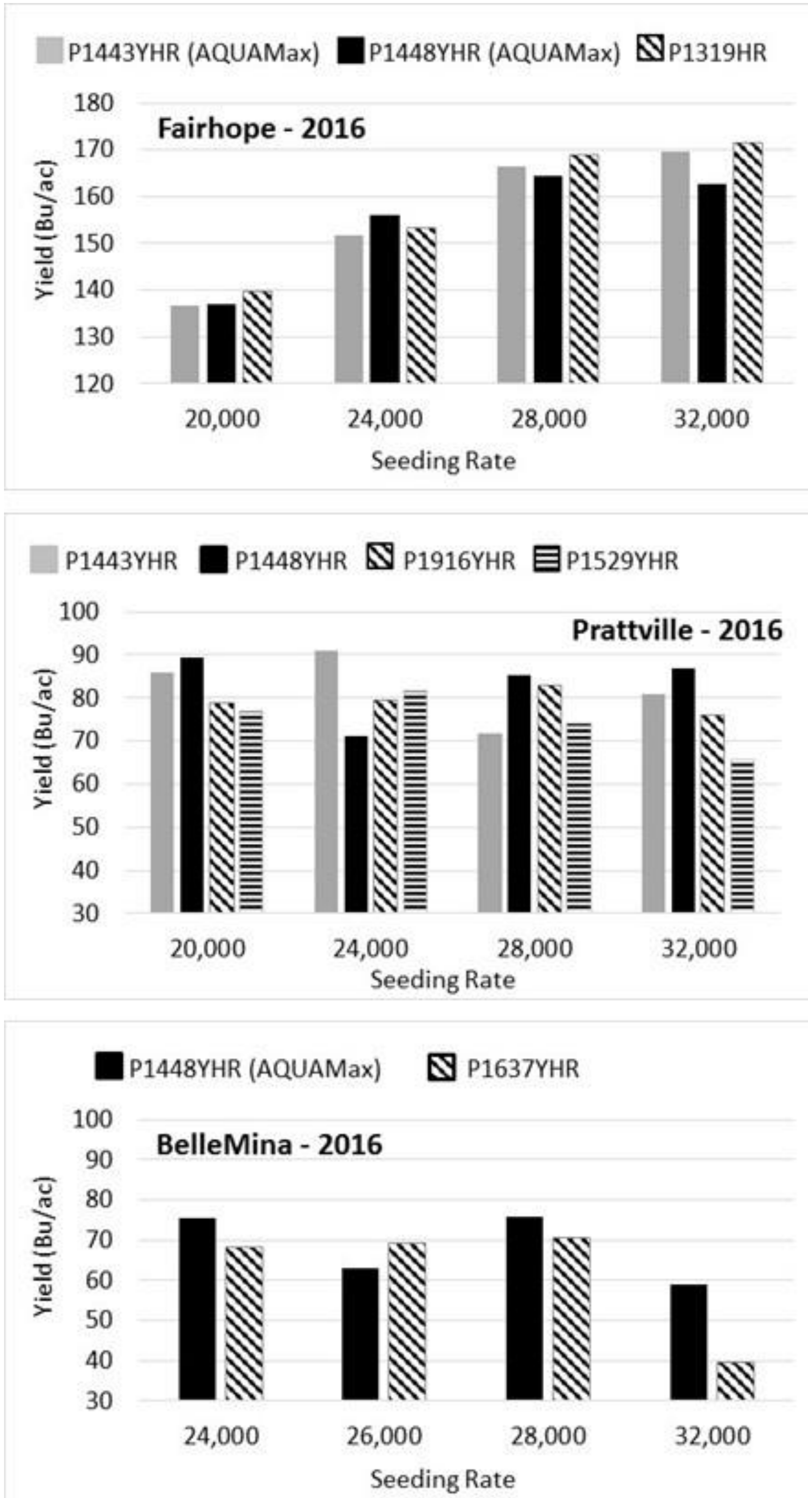


Figure 1. Yield differences between AQUAMax and conventional hybrids planted at four seeding rates.

Research and Economics of Safe Corn Storage in the Southeastern US

M. D. Toews, K. Flanders, N. Smith, and X. Ni

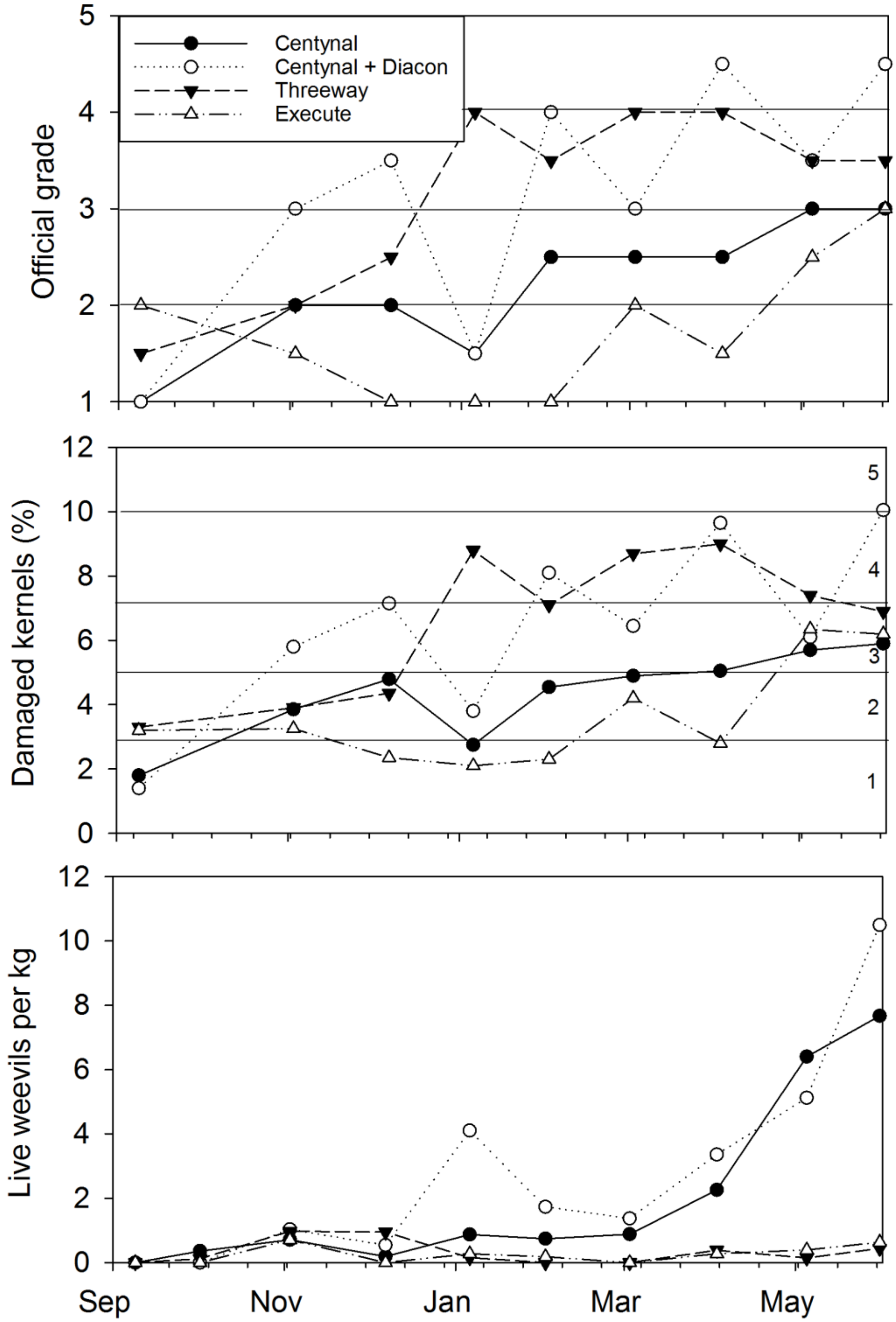
Methods: Commercial tests were conducted in 2000 bu grain bins filled with new crop corn purchased from a local elevator and stored for 9 months. Grain in each of seven bins was treated with a different grain protectant [including Actellic 5E, Centynal, Centynal + Diacon, Threeway (Centynal+PBO-8+Diacon), Execute and an untreated control] and then set up for grain management using thermostatically controlled aeration. Insect samples were taken monthly from each storage bin, while grain quality and aflatoxin contamination were assessed every three months. In a separate trial, grain protectants including Actellic 5E and Centynal were applied to wet grain which was then passed through a commercial grain drier. Grain samples were collected for protectant residue analyses between temperatures of 100 and 150° F.

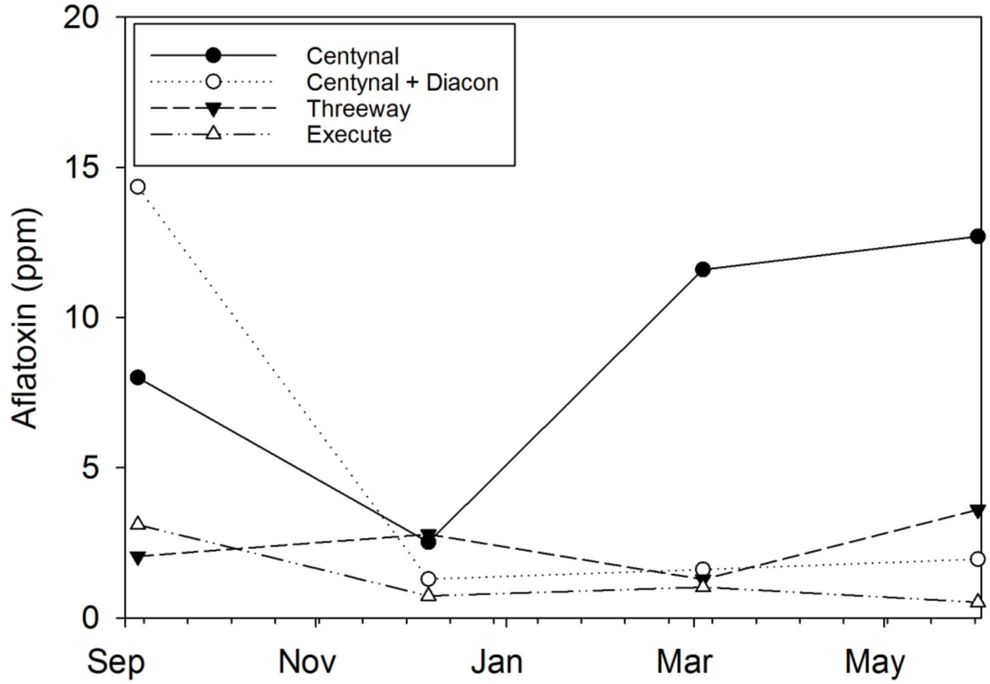
Results: This is the second year for this project. Due to malfunctioning thermostats, the untreated and Actellic 5E treated bins had to be turned and sold before the study ended. All of the thermostats were replaced during the year to eliminate this problem in the future; the remaining bins were managed as planned. Centynal and Centynal+Diacon were the most inexpensive treatments in the trial, but provided the poorest weevil suppression. By comparison, very few weevils developed in the Threeway or Execute treated bins. Grain quality and official grade estimates trended in the same direction as the live weevil counts. Centynal+Diacon provided 3 months of suppression and Centynal alone provided up to 6 months suppression, but neither treatment was adequate for protecting stored grain beyond 6 months. Both the Threeway and Execute provided adequate weevil suppression for storing grain up to 9 months. Aflatoxin was not detected at economically significant levels (>20 ppb) in any of the treatments, strongly suggesting that maintaining the grain at a good moisture content for storage (<14%) suppressed aflatoxin development. Residue analyses from the second experiment are still pending.

Outputs: Flanders, K. and M.D. Toews. 2016. Stored grains: 2016 Insect pest management recommendations for on-farm stored commodities in the southeast. Publication number IPM-0330. Alabama Cooperative Extension System, Auburn. Available on-line at http://www.aces.edu/pubs/docs/I/IPM-0330/IPM-0330.pdf.

Toews, M.D. 2016. Stored Product Insect Management. Pp. 377-382. *In* 2016 Georgia Pest Management Handbook, University of Georgia, Athens. Available online at http://www.ent.uga.edu/pest-management/Commercial/GA-Pest-Management-2016-Commercial-STORED-PRODUCT.pdf.

Additionally, PI Toews gave seven stored grain Extension talks during the calendar year 2016.


Centynal
Centynal + Diacon
Threeway
Execute
Official grade
Damaged kernels (%)
Live weevils per kg
Sep
Nov
Jan
Mar
May


Centynal
Centynal + Diacon
Threeway
Execute
Aflatoxin (ppm)
20
15
10
5
0
Sep
Nov
Jan
Mar
May

Alabama On-Farm Corn Hybrid Performance Tests

R. Yates, B. Ortiz, K. Wilkins, C. Hicks, T. Sandlin, B. Dillard, J. Kelton, and R. Colquitt

OBJECTIVES:

To help growers in the state with black belt, coastal plain, and other soil types evaluate corn hybrids that are best suited for their conditions on a large scale, on-farm production system.

RESULTS:

Eight on-farm corn hybrid performance tests were conducted in the following counties: Dale, Fayette, Morgan, Perry (2), Shelby, Talladega, and Washington. A test was planned for Baldwin County but rainfall prevented planting. Three additional tests were planted but not harvested for data. Plant stands in the Barbour and Houston County tests were affected by early, spring floods and a drought. The Macon County test had problems with irrigation. Corn hybrids were provided by four seed companies based upon their top two choices for the area and production type. Other seed companies were contacted but did not participate. All hybrids were glyphosate-tolerant. Companies provided seed with technology traits and their respective seed treatments. Dryland test results are listed in Table 1 and irrigated test results are listed in Table 2. Test results are also posted on the AlabamaCrops.com website.

<u>Dale Co. Irrigated Test</u>. Planted: 5/5/16. Harvested: 9/27/16. Tillage: strip-till. Previous Crop: peanuts. Seeding Rate: 32,000/acre. Soil type: Dothan sandy loam. Fertilizer Applied: 2 tons/acre of poultry litter (estimated grade: 3% N, 3% P_2O_5 and 2% K_2O per ton), additional K_20 applied variable rate according to grid sample, 160 lbs/acre N side-dressed, and 70 lbs/acre N through pivot. Plots: two 4-row strips at 36-inch row spacing. Harvest Length: averaged 800 feet. No significant lodging observed. Yields ranged from 188.27 to 210.16 Bu/A.

<u>Fayette Co. Dryland Test.</u> Planted: 4/21/16. Harvested: 9/9/16. Tillage: no-till. Previous Crop: cotton. Seeding Rate: 24,500/acre. Soil type: Savannah loam. Fertilizer Applied: lime, P_2O_5 and K_2O applied variable rate at planting and side-dressed 120 lbs/acre N. Plots: two 4-row strips at 36-inch row spacing. Harvest Length: 596 feet. No significant lodging observed. Yields ranged from 102.5 to 122.7 Bu/A.

<u>Morgan Co. Dryland Test</u>. Planted: 3/19/16. Harvested: 8/31/16. Tillage: no-till. Previous Crop: soybeans. Seeding Rate: 30,000/acre. Soil type: Etowah loam. Fertilizer Applied: 4 tons/acre of

poultry litter pre-plant in March (estimated grade: 1.5% N, 0.85% P_2O_5 and 3% K_2O per ton), 140 lbs/acre N side-dress. Plots: 4-row strips at 38-inch row spacing. Harvest Length: 452 feet. No significant lodging was observed. Yields ranged from 127.7 to 145.0 Bu/A.

Perry Co. Dryland Test. Planted: 4/10/16. Harvested: 8/26/16. Tillage: bedded. Previous Crop: soybeans and wheat cover crop. Seeding Rate: 25,000/acre. Soil type: Vaiden clay. Fertilizer Applied: 155 lbs N, 86 lbs P_2O_5, 90 lbs 1<20, and 27 lbs S per acre. Plots: two 6-row strips at 30-inch row spacing. Harvest Length: 625 feet. No significant lodging observed. Yields ranged from 142.3 to 187.7 Bu/A.

Perry Co. Irrigated Test. Planted: 4/8/16. Harvested: 9/1/16. Tillage: conventional and bedded. Previous Crop: corn. Seeding Rate: 32,000/acre. Soil type: Okolona silty clay loam. Fertilizer Applied: 2 tons/acre of poultry litter in fall (estimated grade: 3% N, 3% P_2O_5 and 2% K_2O per ton) and 255 lbs/acre N. Plots: two 6-row strips at 30-inch row spacing. Harvest Length: averaged 661feet. No significant lodging observed. Yields ranged from 224.0 to 250.2 Bu/A.

Shelby Co. Dryland Test. Planted: 3/22/16. Harvested: 9/7/16. Tillage: no-till. Previous Crop: corn. Seeding Rate: 28,000/acre. Soil type: Etowah silt loam. Fertilizer Applied: 30-80-105 lbs/acre of $N\text{-}P_2O_5\text{-}K_2O$, respectively at planting and side-dressed 180 lbs/acre N. Plots: 4-row strips at 38-inch row spacing. Harvest Length: 665 feet. No lodging reported. Yields ranged from 142.5 to 163.3 Bu/A.

Talladega Co. Irrigated Test. Planted: 4/6/16. Harvested: 9/8/16. Tillage: no-till. Previous Crop: soybeans. Seeding Rate: 34,000/acre. Soil type: Leadvale silt loam, Wickham fine sandy loam. Fertilizer Applied: minimum of 170 lbs/acre of N; applied P_2O_5, and K_2O variable rate. Plots: 8-row strip at 30-inch row spacing. Harvest Length: 365 feet. No significant lodging observed. Yields ranged from 235 to 269 Bu/Ac.

Washington Co. Dryland Test. Planted: 4/7/16. Harvested: 9/1/16. Tillage: no-till. Previous Crop: cotton. Seeding Rate: 26,000/acre. Soil types: Savannah and Malbis fine sandy loam. Fertilizer Applied: 150 lbs/acre N, 60 lbs/acre P_2O_5, and 120 lbs/acre 1<20. Plots: 4-row strips at 36-inch row spacing. Harvest Length: averaged 969 feet. No significant lodging observed. Yields ranged from 81.4 to 98.8 Bu/A.

Table 1. 2016 Alabama On-farm Corn Hybrid Program: Dryland Yield Results

Hybrid (Advertised Relative Maturity) [2]	Yields[1]				
	North Alabama			Central Alabama	South Alabama
	Fayette Co.	Morgan Co.	Shelby Co.	Perry Co.	Washington Co.
	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A
Pioneer P1197 YHR (111 days)	102.5	130.1	144.0	146.3	87.0
AgriGold A6499 VT2P (112 days)	108.9	127.8	-	142.3	-
AgriGold A6559 VT2P (113 days)	-	-	-	-	81.4
Croplan Genetics 6640 VT3P (113 days)	118.8	130.4	158.2	187.7	-
DeKalb DKC65-20 (GENDGVT2P) (115 days)	115.2	133.5	142.5	-	90.3
AgriGold A6659 VT3P (116 days)	-	-	163.1	158.0	-
DeKalb DKC66-59 (GENVT2P) (116 days)	-	127.7	-		-
DeKalb DKC66-97 (GENVT2P) (116 days)	-	-	-	160.3	-
Pioneer P1637 YHR (116 days)	108.7	145.0	146.2	-	-
Croplan Genetics 8410 VT3P (117 days)	-	-	-	-	95.9
Croplan Genetics 8512 DGVT2P (117 days)	122.7	137.1	160.6	166.7	-
DeKalb DKC67-72 (GENVT2P) (117 days)	112.4	-	150.5	181.0	98.8
AgriGold A6711 VT2P (118 days)	-	-	163.3	-	-
AgriGold A6719 VT2P (118 days)	111.4	129.3	-	-	-
Pioneer P1916 YHR (119 days)	-	-	-	145.8	-

[1]Yields adjusted to 15.5% moisture and an assumed test weight of 56 lbs bu^{-1}. Hybrids with (-) in the yield column were not reported at that location.
[2] Hybrids are listed in alphabetical order according to advertised relative maturity.

Appreciation is expressed to all the producers, the Alabama Wheat and Feed Grains Committee, and the participating seed companies for supporting these tests.

Table 2. 2016 Alabama On-farm Corn Hybrid Program: Irrigated Yield Results

Hybrid (Advertised Relative Maturity) [2]	Yields[1]		
	North Alabama	Central Alabama	South Alabama
	Talladega Co.	Perry Co.	Dale Co.
	Bu/A	Bu/A	Bu/A
Pioneer P1197 YHR (111 days)	235	238.8	194.89
AgriGold A6499 VT2P (112 days)	-	230.5	202.00
DeKalb DKC62-08 (GENSS) (112 days)	-	241.9	188.27
Croplan Genetics 6640 VT3P (113 days)	269	250.2	210.16
AgriGold A6659 VT3P (116 days)	-	239.0	190.60
DeKalb DKC66-59 (GENVT2P) (116 days)	-	-	191.56
Croplan Genetics 8410 VT3P (117 days)	-	-	206.30
Croplan Genetics 8512 DGVT2P (117 days)	-	224.0	-
AgriGold A6711 VT2P (118 days)	259	-	-
DeKalb DKC68-26 (GENVT2P) (118 days)	263	248.4	-
Pioneer P1916 YHR (119 days)	-	235.5	191.56

[1]Yields adjusted to 15.5% moisture and an assumed test weight of 56 lbs bu^{-1}. Hybrids with (-) in the yield column were not reported at that location.
[2] Hybrids are listed in alphabetical order according to advertised relative maturity.

Appreciation is expressed to all the producers, the Alabama Wheat and Feed Grains Committee, and the participating seed companies for supporting these tests.

II. Fertilizer Management

Benefits of Residual Nitrogen on Corn Production Following Soybean Production Using Poultry Litter

M. Hall, T. Reed, and T. Sandlin

Current weak crop prices increase the need for farmers to make optimum fertilizer inputs to achieve yield goals. Residual N present in the soil from previously applied poultry litter will provide a portion of the N fertilizer needed to achieve a grower's yield goal. If a farmer knows the amount of corn the residual N will produce he could reduce his N application rate for the current crop accordingly and save money. The objective of this study is to determine the yield response of corn planted into ground that has produced two wheat/ soybean crops fertilized with poultry litter and/or commercial fertilizer.

Materials and Methods: The study will be conducted at the Tennessee Valley Research and Extension Center at Belle Mina. The study will be conducted that documents corn yield response to residual N using a randomized complete block design with 4 replications per treatment. A currently recommended variety of corn will be planted. Fertilizer treatments will be as follows. (1) Poultry litter applied at a rate of 2 tons/acre the previous 2 years with no additional fertilizer applied to corn (2) Poultry litter applied at a rate of 3.5 tons/acre the previous 2 years with no additional fertilizer applied to corn. (3) Poultry litter applied at 2 tons per acre plus 50 lbs./acre of commercial N fertilizer the previous 2 years with no additional fertilizer applied to corn. (4) 100 lbs/acre of commercial N fertilizer applied during the 2 previous years with no additional fertilizer applied to corn. (5) 100 lbs/acre of commercial N fertilizer applied during the 2 previous years with 120 lbs/acre of additional commercial N fertilizer applied to corn post-plant as a split application (60 lbs at planting and 60 lbs side-dress). Treatment 5 will show the yield of corn achieved with a normal fertilizer treatment. The study will be conducted for 2 years since the residual N from previously applied litter should enhance corn yields for 2 years. Soil samples will be pulled prior to planting corn to ascertain P and K levels in the plots. Supplemental P and K will be applied to the plots if recommended by the soil tests. The fertilizer value of the poultry litter applied during the previous two years is recorded and will be presented in the results report.

Impact of Sampling Depth on Phosphorus Soil Analysis and Fertilizer Recommendations for Wheat

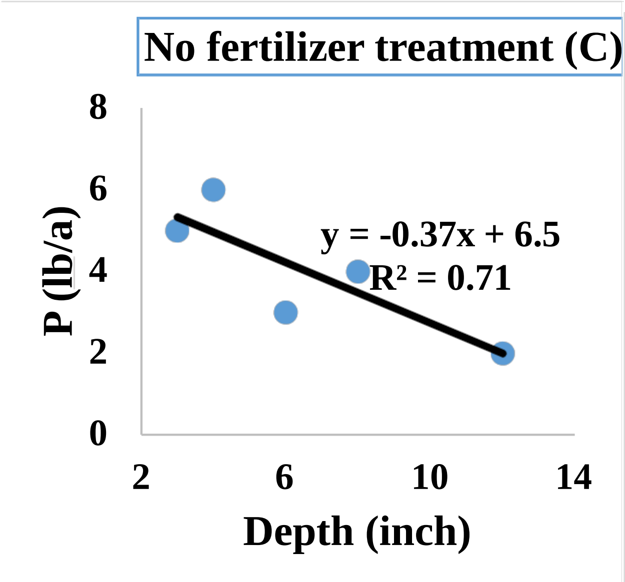
G. Huluka and C. C. Mitchell

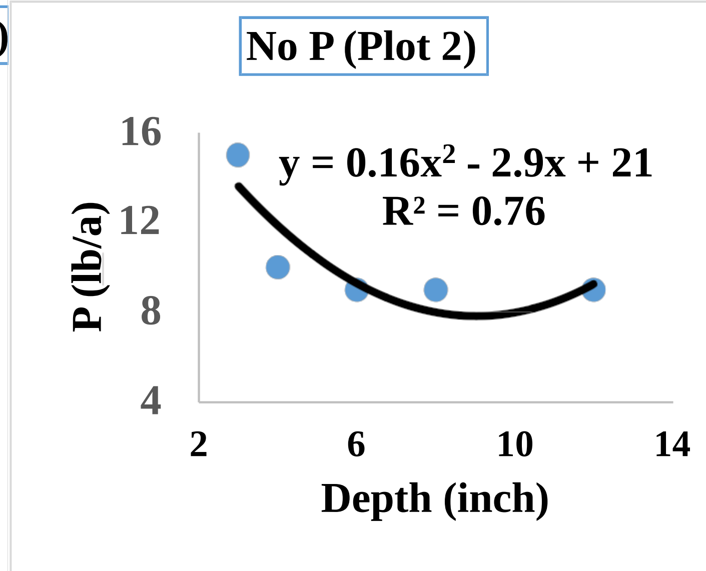
Introduction: Phosphorus is one of the essential primary macronutrients that is inherently deficient in soils. Data from Auburn University Soil Testing lab show that more than 50% of Alabama soil samples tested need phosphorus fertilizer applications for optimum plant growth. Soils are recommended to be sampled at 2-3 inches depth for established pastures, hayfields, and lawns and 6-8 inches for field/row crops.

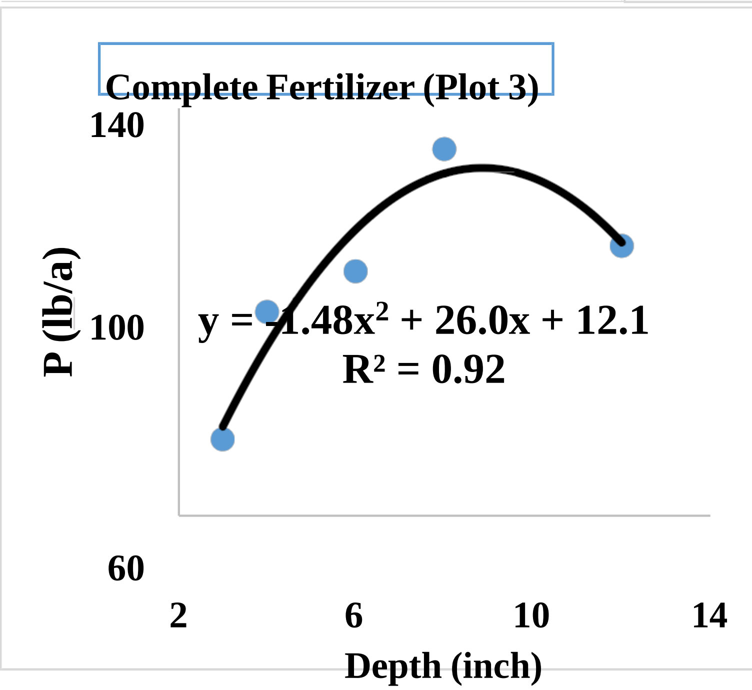
Our objective was to sample soils at 0-3, 0-4, 0-6, 0-8 and 0-12 inch depths and establish a critical range value for wheat and feed grain/or other row crops under different P treatments and cultural practices.

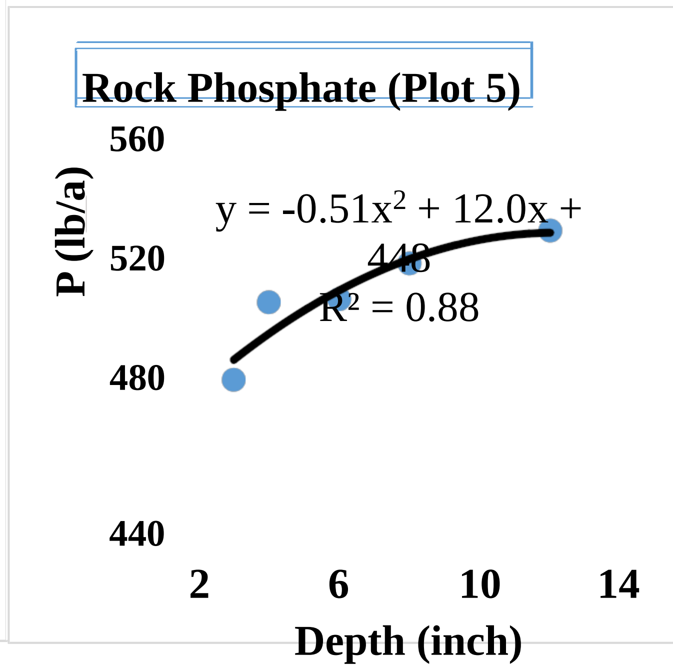
We collected soil samples from different fields including The Old Rotation and the Cullars Rotation long-term field experiment.
Our results of extractable P in different soil depths indicated:

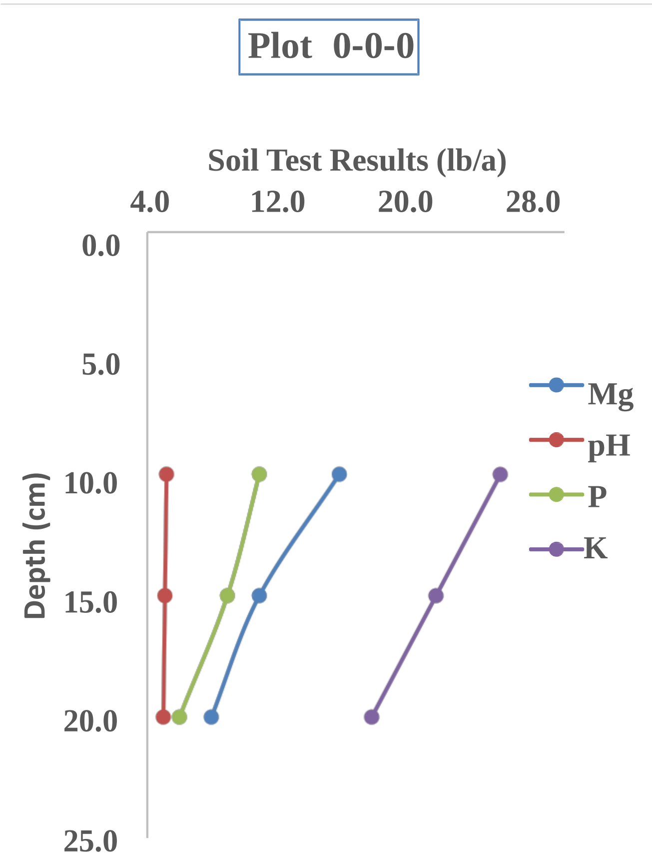
1. In general, taking soil samples to any depth between 4-8 inches **consistently** each time for plant extractable P is recommended for row crops. This is in agreement with many other public soil testing labs recommendation.
2. In general, extractable P in the 0-3 inches was higher than the other lower depths for “low P” rated soils (see Plots C and 2 for Cullars Rotation).
3. For “low P” rated soil, extractable P decreased with increasing sampling depth to 8 inches.
4. In general, extractable P in the 0-3 inches was lower than the other lower depths for “high P” rated soils (see Plots 3 and plot 5).
5. For “high P” rated soil, extractable P increased with increasing sampling depth to 8 inches.
6. For soils with no P treatment, we found that pH, P, K, Mg and Ca increased with depth (see Plot 0-0-0).
7. For “high P” rated soil, extractable P increased but pH, K, Mg and Ca decreased with depth (see Plot 120-100-270.)
8. It will be interesting to investigate if the above trends (#6 and #7) will hold for deep depth (up to 24”).
9. We propose to sample our Two-Year, Old and Cullars Rotations and others to determine if yield is enhanced with subsoil fertility status.

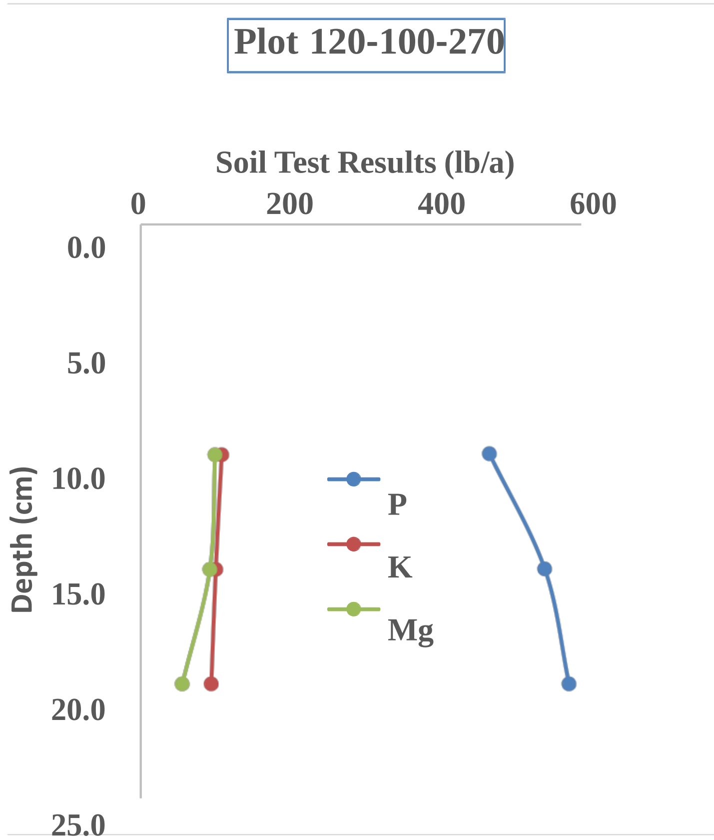

No fertilizer treatment (C)
8
6
4
2
0
P (lb/a)
y = -0.37x + 6.5
R² = 0.71
2
6
10
14
Depth (inch)


No P (Plot 2)
16
12
8
4
P (lb/a)
y = 0.16x² - 2.9x + 21
R² = 0.76
2
6
10
14
Depth (inch)


Complete Fertilizer (Plot 3)
140
100
60
P (lb/a)
y = -1.48x² + 26.0x + 12.1
R² = 0.92
2
6
10
14
Depth (inch)


Rock Phosphate (Plot 5)
560
520
480
440
P (lb/a)
y = -0.51x² + 12.0x + 448
R² = 0.88
2
6
10
14
Depth (inch)





We would like to take soil depth samples and yield data for established fields that will enhance our understanding of nutrient movement downward through the soil profile and their impact on yield. This will focus on pH, P, K, Mg and Ca. We plan to take soil samples from all our Two-Year- Rotations (Circa 1928) at Brewton, Prattville and Sand Mountain Stations; the Old and the Cullars' Rotations on AU main campus; a forest and a pasture with known history. Samples will be taken at 0-4, 4-8, 8-12 and 12-24 inches before fertilizer application and after harvest of the grain crops. We will correlate yield to individual depth and cumulative extractable nutrients to ascertain the impact of subsoil fertility on crop yield.

A poster presentation was at the Annual Meeting of CSSA, SSSA and ASA in Minneapolis, MN during Nov.15-18, 2015 fully acknowledging Alabama Wheat & Feed Grain Committee for its support.

The Auburn University Soil Testing lab was established in 1953, and it has been serving the people of Alabama for their agricultural analytical service needs. The lab analyzes about 30,000 soil samples for farmers, homeowners, researchers and others annually. The lab makes research based nutrient recommendations for lime, nitrogen, phosphorus, potassium, calcium and magnesium. It also makes other recommendations that are specific to plant and soil conditions as they become necessary.

Black Belt & Wire Grass On-Farm Corn Population Performance Tests

R. Yates, B. Dillard, J. Kelton, and B. Ortiz

OBJECTIVES:

To help growers in the Black Belt and Wire Grass regions evaluate plant population effects on corn hybrids that are best suited for their conditions on a large scale, on-farm production system.

RESULTS:

On-farm corn tests to evaluate plant populations were conducted in the Black Belt and Wiregrass Regions. The Black Belt tests included a dryland test in Dallas County and an irrigated test in Hale County. The Wiregrass test was conducted in Geneva County but the weight sensors on the weigh buggy failed during harvest, resulting in harvest data not being collected. Descriptions and results of harvested tests are listed in following tables. Test results will be presented in production meetings.

Table 1: Dallas County dryland on-farm corn population performance test.

Dryland test compared four plant populations/acre: 22,000, 26,000, 30,000 and 34,000. Tillage: minimum till. Previous crop: soybeans. Hybrid: DeKalb DKC67-57 GENVT3P (RM 117 day). Soil Type: Vaiden clay. Planted: 4/22/16 with a 24-row John Deere 1770NT planter. Each plot was a single strip, consisting of 24 rows. Row spacing was 30 inches. Fertility applied: 180 lbs. N, 60 lbs. P2O5, and 30 lbs. K2O per acre. Population count made on 8/29/16 at two random locations in each plot using the 1/1000th acre method. No significant lodging was observed. Twelve rows from each plot were harvested on 8/29/16. Harvest length averaged 960 feet.

DeKalb DKC 67-57 (GENVT3P)1			
Target Plant Population	Population Count 8/29/16	Harvest Moisture	Yield2
	Plants/Ac	%	Bu/Ac
22,000	20,750	16.6	143.7
26,000	24,750	16.5	153.5
30,000	28,750	16.5	159.8
34,000	33,000	16.6	175.6

1 Corn planted was DeKalb DKC67-57 (GENVT3P), a glyphosate-tolerant hybrid with a 117-day advertised maturity. Seed were treated with Poncho 500.

2 Yield was adjusted to 15.5% moisture and an assumed test weight of 56 lbs/bu.

Appreciation is expressed to Stanley and Clay Walters and the Alabama Wheat and Feed Grains Producers for supporting this test.

Trade names are used only to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

Table 2: Hale County irrigated on-farm corn population performance test.

Irrigated test compared four plant populations/acre: 30,000, 34,000, 38,000, and 42,000. Tillage: minimum-till. Previous crop: soybeans. Hybrid: DeKalb DKC67-72 GENVT2P (RM 117 day). Soil Type: Sumter silty clay loam. Planted: 5/10/16 with a 24-row John Deere 1770NT planter. Each plot was a single strip, consisting of 24 rows. Row spacing was 30 inches. Fertility applied: 220 lbs. N, 60 lbs. P2O5, and 120 lbs. K2O per acre. Population count made on 9/15/16 at two random locations in each plot using the 1/1000th acre method. No significant lodging was observed. Twelve rows from each plot were harvested on 9/15/16. Harvest length was 549 feet.

DeKalb DKC 67-72 (GENVT2P)1			
Target Plant Population	Population Count 9/15/16	Harvest Moisture	Yield2
	Plants/Ac	%	Bu/Ac
30,000	30,000	13.9	192.3
34,000	33,750	14.0	192.9
38,000	37,500	14.0	196.6
42,000	41,250	14.3	194.4

1 Corn planted was DeKalb DKC67-72 (GENVT2P), a glyphosate-tolerant hybrid with a 117-day advertised maturity. Seed were treated with Poncho 500.

2 Yield was adjusted to 15.5% moisture and an assumed test weight of 56 lbs/bu.

Appreciation is expressed to Stanley and Clay Walters and the Alabama Wheat and Feed Grains Producers for supporting this test. Trade names are used only to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

III. Weed Management

Evaluation of ‘Zidua’ and ‘Fierce’ Herbicides for Ryegrass Control in Wheat

J. Ducar, D. Delaney, and A. Price

OBJECTIVES:

Glyphosate-resistant ryegrass is becoming an increasing problem in wheat production in Alabama. In addition, ryegrass is also becoming resistant to the ALS-chemistry which has traditionally been used to control ryegrass and other weeds through herbicides such as Harmony Extra. A Section 18 label has been issued for Fierce in Georgia for controlling ryegrass in wheat and needs to be evaluated in Alabama for a Section 18. Zidua, is a new ryegrass material that is applied as a delayed preemergent and early postemergent material. It also needs to be evaluated for ryegrass control in Alabama. Both Fierce and Zidua also need to be evaluated for crop response.

PROCEDURES:

Field tests were conducted at two locations, E.V. Smith and Tennessee Valley Research and Extension Center evaluating Zidua and Fierce for ryegrass control in wheat. Fierce was evaluated at 2 rates early postemergence and compared to Zidua applied delayed PRE with Metribuzin and Zidua applied early postemergence, and Valor early-postemergence. Ryegrass was sown at TVREC on November 12, 2015 and wheat was planted on November 13, 2015. Ryegrass was sown on November 16, 2015 and wheat was planted on November 18, 2015. The delayed PRE treatments were applied on November 24, 2015 and the EPOST treatments were applied on December 4, 2015 at TVREC. The delayed PRE treatments were applied on November 23, 2015 and the EPOST treatments were applied on December 3, 2015 at E. V. Smith. The delayed PRE treatments were sprayed prior to emergence but after germination. EPOST treatments were sprayed between spiking and two leaf wheat. The treatments evaluated were Zidua at 1.5 oz/A delayed PRE, Sharpen at 2 fl. oz./A + Zidua at 1.5 oz/A delayed PRE, Zidua at 1.5 oz/A EPOST, Valor SX at 1.5 oz/A EPOST, Valor SX at 3 oz/A EPOST, Fierce at 1.5 oz/A EPOST, Fierce at 3 oz/A EPOST, and Zidua at 1.5 oz/A + Metribuzin at 2 oz/A. Crop Injury Ratings were taken at 7, 14, and 42 days after EPOST applications and weed control ratings were taken at 14, 42, 84, and 154 days after EPOST. Wheat yields were also taken at the end of the season.

RESULTS:

Wheat at the Tennessee Valley produced good yields especially in the plots where good weed control was provided. At 154 DAT (days after treatment), Fierce at 3 oz/A controlled ryegrass 95%, better than other treatments. Zidua + Metribuzin provided 91%, Fierce at 1.5 oz/A (91%), and Zidua (83%) at 1.5 oz/A delayed PRE were not different but were lower than Fierce at 3 oz/A. Zidua at 1.5 oz/A (73%) applied EPOST was lower than Fierce at 3 oz/A. Sharpen at 1 fl. oz/A + Zidua at 1.5 oz/A applied delayed PRE provided 65% ryegrass control, followed by 39% ryegrass control with 3 oz of Valor and 24% ryegrass control with Valor at 1.5 oz/A. Yields ranged from 20 bu/A (Untreated) to 110 bu/A (Fierce at 3 oz/A) which was equal to Fierce 1.5 (101 bu/A) and Zidua 1.5 + Metribuzin 2 oz (EPOST) (100). Zidua 1.5 oz DPRE yielded 93 bu/A while Zidua EPOST yielded 89 bu/A. The lowest yields were by Valor at 1.5 oz (40 bu/A) and 3 oz/A (71 bu/A).

Evaluation of HPPD Inhibitors for Postemergence Control of Morningglories and Palmer Pigweed Control in Corn

J. A. Tredaway, D. Delaney, and A. Price

OBJECTIVES.

Several HPPD herbicides are currently available in corn including Laudis, Callisto, Armezon Pro, Halex GT, Capreno, Impact, and Acuron. Each of these are combination products but have a common mechanism of action and control broadleaf and grass weeds. None of these products have been evaluated in a side-by-side comparison to evaluate the differences between these products. Morningglory has traditionally been a difficult weed to control in late season corn making it problematic at harvest time. The objectives of this study were to 1) evaluate the multiple combination corn products that are available and 2) evaluate the differences in morningglory control, particularly late season control 3) evaluate control of other broadleaf species and 4) evaluate control of grass weed species. Traditionally, atrazine would be added as a preemergence and an early-postemergence treatment to corn due to the efficacy of the product and the low price. The 5th objective was to determine whether the addition of atrazine would be of benefit when followed by the HPPD herbicides.

PROCEDURES

Field Studies.

Field studies were conducted at the E.V. Smith Plant Breeding Unit in Tallassee, Alabama and the GCREC in Fairhope, AL in areas where morningglories were already in high densities from previous years. The main species of morningglories present were pitted morningglory (*Ipomoea lacunosa)* and Ipomoea hederacea (entireleaf morningglory). Eleven herbicides were evaluated including: Laudis, Acuron, Revulin Q, Balance Flexx, Corvus, Callisto, Lexar EZ, Armezon, Halex GT, Capreno, and Armezon Pro. Herbicides that did not already contain atrazine were divided into two treatments, with and without. Herbicides were applied in mid-April at the V-3 corn stage. Herbicide evaluations of morningglory control and corn injury were taken at approximately 30, 60, and 90 days after treatment. There were no differences among treatments at all three rating timings. Treatments of Revulin Q and Callisto, both paired with atrazine, had the highest late season weed control ratings of 80%. There were no differences in yields for any treatments. We would like to repeat this study for a 2nd year to see if we get the same results and to determine if atrazine is or is not needed since the EPA is currently reviewing its label.

Study Locations.

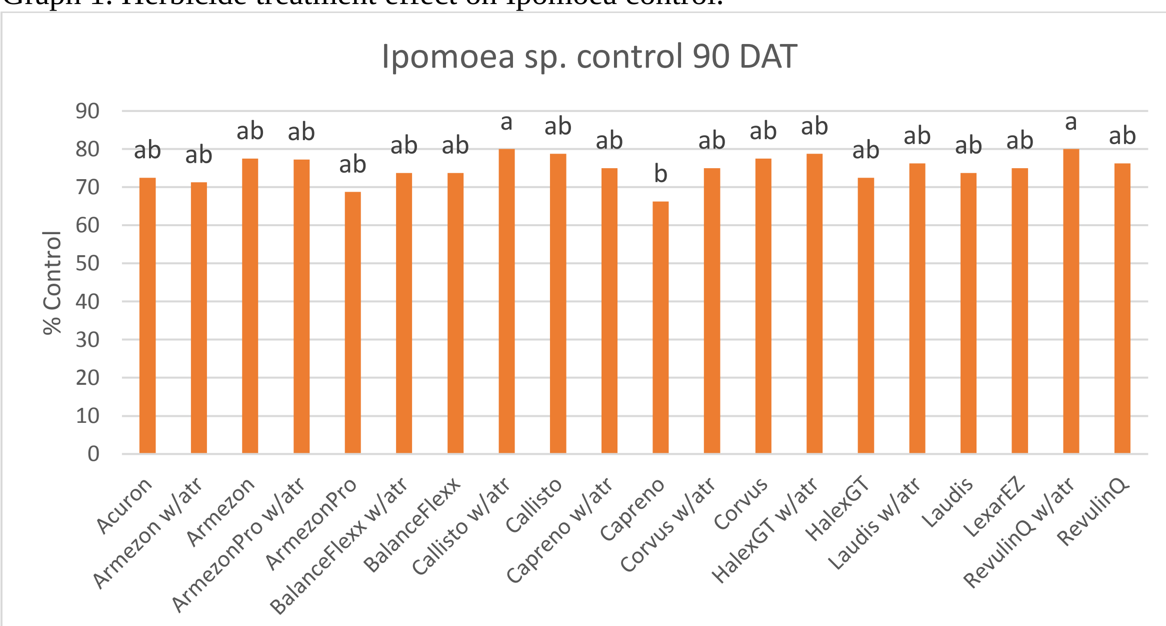
E.V. Smith Research Center, Plant Breeding Unit, Tallassee, Alabama

Gulf Coast Research and Extension Center, Fairhope, Alabama

Cultural Practices:

Corn (Pioneer 1197YHR) was planted on April 11, 2016 at PBU and Terral Rev 28HR20 was planted on April 7, 2016 at GCREC. Atrazine was applied at planting to half of the plots at 1.5 qt/acre. The herbicide treatments that contained atrazine did not get the additional PRE application of atrazine. Herbicide treatments were applied with a hand-held backpack CO2 sprayer on May 4, 2016 at GCREC and May 19, 2016 at PBU when corn was in the V-3 stage. Morningglory (*Ipomoea* sp.) control was evaluated at 30, 60, and 90 days after treatment (DAT) and corn was harvested on August 23, 2016 and September 2, 2016 at GCREC and PBU, respectively. Ammonium nitrate was used as the N fertilizer source (applied May 15, 2014) for corn. Fertilizer recommendations for this study were followed according to Alabama Agriculture Experiment Station recommendations.

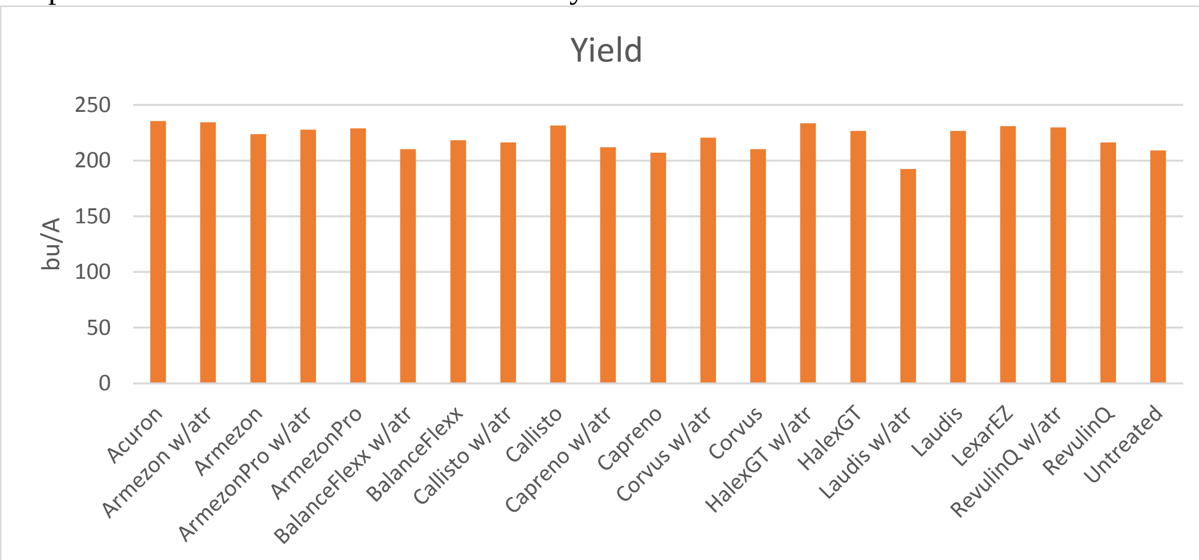
Graph 1. Herbicide treatment effect on Ipomoea control.



Crop yield:

Unfortunately, the data at GCREC had to be discarded because other herbicides were blanket applied to the test area which made the test invalid. However, the test at PBU maintained its integrity. Corn yields ranged from 192 to 235 bushel acre^{-1} with no differences detected between herbicide treatments and yields. The addition of atrazine PRE did not improve *Ipomoea* sp. control or yields.

Graph 2. Herbicide treatment effect on corn yield.



Fall Residual Control of Glyphosate Resistant Italian Ryegrass in Corn

T. Sandlin and J. Ducar

Results:

Two fall residual herbicide tests for control of Italian ryegrass/annual ryegrass were initiated in Limestone County on November 11, 2015 and November 13, 2015, respectively. One of these tests was a separate on-farm demo plot and the other was a replicated trial within a producer's existing field. Treatments lists for both locations included: (1) Untreated control/check (2) 40oz Gramoxone (paraquat) + 1.33pt Dual Magnum (s-metolachlor) (3) 40oz Gramoxone (paraquat) + 32oz Boundary (metolachlor + metribuzin) (4) 40oz Gramoxone (paraquat) + 2.5oz Zidua (pyroxasulfone). Both the demo and test proved to provide excellent fall control of Italian ryegrass. In the replicated trial, all herbicide treatments provided greater than 90% control compared to the untreated plots up to 56 days after treatment (Table 1). Herbicide treatments eventually began to break around 120 days after treatment (Table 1). However, ryegrass populations were significantly reduced along with other weeds, making spring control less difficult.

Table 1. Italian ryegrass control 10 to 120 days after application.

Treatment	10 DAT	14 DAT	21 DAT	28 DAT	56 DAT	120 DAT
Untreated	0	0	0	0	0	0
40oz paraquat + 1.33 pts Dual Magnum	96	96	96	98	96	85
40oz paraquat + 32oz Boundary	96	97	97	98	97	80
40oz paraquat +2.5oz Zidua	95	98	98	99	94	74

V. Disease Management

Evaluation of Effects of Foliar Fungicide Applications on Diseases of Wheat

K. L. Bowen

OBJECTIVE: To evaluate the efficacy of selected foliar fungicides on specific diseases of wheat at three locations in Alabama.

Results:
Plots of wheat were planted at four research units of the Alabama Agricultural Experiment Station.

At the Tennessee Valley REC (Belle Mina), various fungicides at different application timings were evaluated. Leaf rust was the only disease noted in Belle Mina. Twinline at Feekes' stage 10 (swollen boot) and Priaxor during flower were the best treatments for reducing leaf rust. Two fungicides (Absolute on flag followed by Prosaro during flower) and the Absolute application at swollen boot were the best treatments in terms of yield.

At the Prattville Agricultural Research Unit, different fungicide products, applied at full flag, were evaluated. Overall, very little disease was noted. Significant differences due to fungicides were noted for leaf blotch intensity (caused by *Phaeosphaeria avenaria*), but this disease was not found on non-treated plots. All fungicides, applied at flag leaf, numerically improved 1000-kernel weight. Many products tended to improve yield, although some products appeared to reduce yield compared to no treatment.

At the Plant Breeding Unit (PBU) of E.V. Smith RC and at the Gulf Coast REC, wheat cultivars were included in a factorial set of treatments and scab (=Fusarium Head Blight) was the disease of interest. Treatments included single and dual applications of designated scab fungicides at both locations. At PBU, plots were inoculated and a mist irrigation was applied at hourly intervals through evening and morning hours to promote scab development. Scab was severe in all plots. Jamestown had lower DON content then AGS 2035, which had lower DON contamination than SS8641 or Pioneer 26R41. Yield of AGS 2035 was higher than Jamestown, and these two cultivars had higher yield than the remaining cultivars.

At the Gulf Coast REC, two sites were planted for this test—one following corn and the other following soybean. At the former site, excessive water on site delayed wheat development. Surprisingly, scab was lower in wheat following corn than that following soybean. Only data from the soybean site is presented. Statistical differences in disease and yield were not noted between Jamestown (moderately resistant) and AGS 2035 (moderately susceptible), but the latter of these cultivars tended to have higher scab levels and lower yield. Scab incidence and severity were statistically lower with two application programs (Prosaro followed by Caramba 4 days later; Proline followed by Folicur 4 days later) when compared to the non-treated control. At PBU,

Tabular data follows for these three tests. Disease ratings and data analysis done by Dr. K.L. Bowen with assistance from graduate students, Brett Brown and Nancy Sharma.

Tennessee Valley, Belle Mina, AL**:**

- 'Pioneer 26R10' planted 13 Nov 15. Fungicide applications at FS 8-9 (flag leaf on 6 Apr 16), FS 10 (swollen boot, 22 Apr) and FS10.51 (beginning anthesis, 25 Apr). Harvest date, 20 June 2016.
- Powdery mildew, stripe rust, leaf and glume blotches, scab and BYD were observed at nil to trace levels.
- Product and timing of fungicide application affected leaf rust levels, yield and 1000-k weights.

Foliar treatment (formulation/A)	Appl. Stage (FS)[z]	Leaf rust[x]		Grain Moisture (%)		Yield (bu/A)		1000-k weight (gms)	
Non-treated control		63.8	a	10.6	d	75.0	f	30.7	f
Absolute[w] (5 fl oz)	8-9	32.8	abcd	11.2	c	89.1	cde	32.8	ef
Stratego YLD[w] (4 fl oz)	8-9	52.5	abc	11.3	bc	89.0	cde	33.2	cde
Muscle[w] (4 fl oz)	8-9	54.0	a	11.1	c	86.6	e	32.5	de
Twinline[w] (9 fl oz)	8-9	57.5	ab	11.3	bc	87.6	de	32.8	de
Absolute[w] (4 fl ozq)	10	25.0	cdef	11.7	ab	97.4	b	35.0	ab
Stratego YLD[w] (4 fl oz)	10	31.2	abcde	11.4	bc	91.3	bcd	33.8	bcd
Muscle[w] (4 fl oz)	10	36.8	bcdef	11.6	ab	90.9	bcde	34.6	abc
Twinline[w] (9 fl oz)	10	16.8	ef	11.6	ab	93.3	bc	35.1	ab
Muscle[w] (4 fl oz)	10.51	25.0	def	11.4	bc	90.1	bcde	34.1	bcd
Prosaro[w] 421SC (8.2 fl oz)	10.51	20.0	def	11.5	abc	92.9	bc	35.2	ab
Absolute[w] (5 fl oz) fb Prosaro[w] 421SC (8.2 fl oz)	8-9 10.51	32.5	def	11.8	a	98.8	a	36.0	a
Prosaro[w] (8.2 fl oz) fl oz)	delay	15.0	f	11.6	ab	92.2	bc	34.2	bcd
P =		0.007		<0.0001		<0.0001		<0.0001	

[z] Growth stage of application is reported according to Feekes' stage, FS 9 = flag leaf completely emerged, FS 10 = swollen boot, and FS10.51 = beginning anthesis.
[x] 0 to 100% severity scale; rated 5/11/16.
[w] Plus 0.125% Induce (v/v).

Prattville

- 'SS 8641' planted on 13 Nov 2015.
- Fungicides were applied at Feekes' stage (FS) 8 (flag leaf just visible) on 25 Mar. Diseases rated 9 May; harvest date was 26 May 2016.
- Powdery mildew, rusts and barley yellow dwarf were noted at nil to trace levels.
- Leaf blotch, but not glume blotch, was noted at low intensity. Scab was found in few plots.
- Yield (bu/A) and 1000-kernel weights did not significantly differ among treatments.

Fungicide, rate/A	Application Rate (oz/A)	Leaf Blotch (8 Apr)[y]		Scab (9 May)[y]	1000 Kernel wt (g)	Yield (bu/A)
Control (non-treated)	-	0	fg	0	33.76	53.0
TopGuard EQ 4.29SC[x]	5	1.2	bc	0	35.66	55.9
TopGuard EQ 4.29SC[x]	14	0.8	bc	0	34.52	54.3
Preemptor 385SC[x]	5	0.5	cd	0	34.63	53.2
Caramba 0.75EC[x]	12	0.0	ef	0	35.02	53.5
Twinline 210EC[x]	8	0.1	efg	0	34.92	53.2
Quilt Excel 2.2SE[x]	10.5	1.4	ab	0	35.04	54.1
Stratego YLD 500SC[x]	4	0.2	de	0	34.44	47.0
Absolute 500SC[x]	5	0.0	ef	0.1	34.80	52.8
Prosaro 421SC[x]	7	2.9	a	0	34.79	49.2
Aproach Prima 2.34SC[x]	6.8	1.2	b	0	34.89	51.9
Priaxor 4.17SC[x]	6	0	g	0.1	35.03	55.0
P-value		< 0.0001		0.992	0.2075	0.522

[y] 0 to 9 scale; 0 = no disease, 9 = severe disease.
[x] plus 0.125% Induce non-ionic surfactant.
[w] fb = followed by.
[v] Column numbers followed by the same letter are not significant different at *P*=0.05 as determined by Fisher's (protected) least significant difference.

Plant Breeding Unit, E.V. Smith, Tallassee

- Wheat planted 1 Dec 2015.
- Fungicides were applied at Feekes' stage (FS) 10.51, early flower for each cultivar, starting 10 Apr.
- Disease was rated approx. 3 weeks after FS 10.51; harvest date was 1 June 2016.
- Most plots were inoculated with *Fusarium graminearum* infested corn.
- Only scab was rated; no other diseases were noted to any degree.
- Scab was reduced with dual applications of fungicides; these treatments also reduced DON contamination.
- Yields were very low but improved compared to non-treated, as were test weights.

Source of variance (*P* value)	Scab Incidence (%)[y]	Scab Severity Index[y]	Yield (bu/A)	Test weight (lbs/bu)	DON (ppm)
Wheat variety	0.2731	0.1394	<0.0001	<0.0001	<0.0001
Fungicide	0.0167	0.0012	0.0137	0.0002	<0.0001
Variety × Fungicide Interaction	0.4875	0.1854	0.5724	0.009	0.0720
Wheat variety					
AGS 2035	97.2	35.5	50.3 a	51.6 a	8.9 b
Jamestown	88.2	20.8	42.9 b	50.6 a	4.9 c
SS 8641	95.0	51.1	22.0 c	29.9 b	22.3 a
Pioneeer 26R41	96.0	47.9	29.9 c	35.8 b	18.4 a
Fungicide[x,w] and rate/A					
Non-treated, non-inoculated	97.8 a	40.1 ab	34.2 ab	37.6 c	17.0 b
Prosaro 8.2 fl oz	95.0 ab	34.7 b	39.6 a	45.2 a	13.5 b
Prosaro fb[v] Caramba 14 fl oz	89.4 b	33.4 b	42.4 a	49.4 a	8.4 d
Caramba fb Folicur 4 fl oz	95.3 ab	38.9 ab	38.4 a	45.0 a	9.9 cd
Proline 5.7 fl oz fb Folicur	89.2 b	34.1 b	37.6 a	43.1 ab	11.4 bc
Non-treated, inoculated	97.9 a	51.7 a	29.0 b	31.5 c	21.8 a

[z] [y] Incidence and severity index from 10 heads per plot; samples collected 17 to 22 days after FS 10.51 for each cultivar.
[x] Fungicides applied separately to each variety at FS10.51.
[w] Each fungicide applied with 0.125% Induce.
[v] 'fb' indicates 'followed by'; the second fungicide application was 3 to 4 days after FS10.51.
[u] Means in each column followed by the same letter are not significantly different according to Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

Gulf Coast

- Wheat was planted 4Dec 2015.
- Fungicides were applied at Feekes' stage (FS) 6 (joint stage, 23 Mar), FS 10.51 (early flower, second node of stem visible, 5 Apr) and 4 days after the FS 10.51 application.
- Scab was rated on 5 May 2016; plots were harvested 26 May.
- Two fungicide applications during flowering reduced scab severity and DON contamination.
- Highest yields were obtained with two fungicide applications during flower.

Source of Variation (*P* values)		Scab Incidence[y]		Scab Severity[x]		Test Weight (lbs/bu)	Yield (bu/A)		DON (ppm)
Cultivar		0.5541		0.4056		0.8956	0.3791		0.5293
Fungicide program		0.5386		<0.0001		0.7296	<0.0001		<0.0001
Cultivar X Fungicide		0.8174		0.1479		0.3163	0.6828		0.2888
Cultivar									
Jamestown		5.39		5.6		51.9	74.9		6.01
AGS 2035		6.64		12.9		51.9	69.9		9.34
Fungicide[w] (fl. oz./A)	**Appl. Timing**								
Non-treated		6.5		13.1	ab	52.0	68.7	d	10.04 a
Prosaro 421SC (8.2)	FS10.51	6.8		9.0	a-d	51.7	70.3	cd	12.15 a
Prosaro 421SC (8.2)	FS10.51+4d	7.0		16.4	a	52.0	68.4	cd	10.43 a
Prosaro 421SC (8.2) fb[v] Caramba (14)	FS10.51 fb 4 days	4.5		1.3	d	52.1	78.8	a	3.42 b
Caramba (14) fb Folicur 3.6F (4)	FS10.51 fb 4 days	6.2		7.4	bcd	51.8	76.3	ab	4.83 b
Proline 480SC (5) fb Folicur 3.6F (4)	FS10.51 fb 4 days	3.3		3.6	cd	52.0	78.9	a	3.82 b
Folicur 3.6F (4)	FS6	7.5		15.9	a	51.8	69.8	cd	8.93 a
Folicur 3.6F (4) fb Folicur 3.6F (4)	FS6 fb FS10.51+4	5.7		6.7	bcd	51.9	73.9	bc	7.80 a

[y] Scab incidence was the number of affected heads with FHB from a sample of 10 heads per plot.
[x] Scab severity is the average proportion of affected heads from a sample of 10 heads per plot.
[w] All fungicides were applied with Induce at 0.125% v/v.
[v] fb = followed by.

Disease Monitoring on Wheat Varieties

K. L. Bowen

Objective 1: To evaluate a number of small grain varieties for their reaction to specific diseases at several locations throughout the state.

Results: Up to forty-five (37) soft red winter wheat cultivars were evaluated as part of small grain variety trials at four research centers and experiment fields across Alabama. In addition, up to seven oat cultivars were evaluated at each of two locations. Disease evaluations were done during April and May 2015, about Feekes' stage 11.2 (soft dough), except for at Brewton, which was evaluated late. Locations were: Tennessee Valley Research Center (REC) in Belle Mina, Brewton Agricultural Research Unit in Brewton, Prattville Ag Research Unit, and Gulf Coast REC in Fairhope. Evaluations were not done at additional sites due to time limitations. In addition, fungicides were applied to wheat varieties at most locations, which would limit disease information obtained from rating.

The fungicide applications made at most sites did a good job of minimizing foliar diseases. No powdery mildew nor stripe rust was found at any location. Leaf rust was noted only at southern and central locations, where it was found at low to trace levels on most cultivars. However, a few cultivars, including Progeny 243, Progeny 357, Progeny PGX 15-14, and USG 3404 were recorded as having 30% or higher leaf rust severity. Leaf and glume blotches were noted at low to moderate levels at southern and central sites; Jamestown and AGS 2024 were among the cultivars with highest leaf blotch at Gulf Coast. Fusarium head blight (= scab) was severe on some cultivars at Gulf Coast, but stayed at moderate and low levels at Prattville and Belle Mina, respectively. Low levels of scab were consistently noted on several Progeny lines. It needs to be noted that fungicide application can help with scab management, if the open flower is protected. However, because of flowering-time differences among varieties in wheat trials, all varieties could not be appropriately treated.

On oats cultivars, low levels of Helminthosporium leaf spot were noted at Prattville and Gulf Coast. Trace to low levels of crown rust were also seen at these two sites.

Disease ratings for small grain cultivars will be presented in the on-line publication "*Supplement to: 2015 Small Grains Official Variety Trial Report.*"

Objective 2. To collect rust samples to be sent to the Cereal Disease Laboratory (St. Paul, MN), in order to monitor races of rust present especially for the virulent wheat stem rust type Ug99, for which resistance is not widely known.

Results: Leaf and stripe rust samples were sent to St. Paul. No word on results has been received. A potentially devastating disease and emerging of wheat (= blast caused by *Magneporthe oryzae*) was also watched for in all plots.

Management of Southern Rust and Other Diseases in Early and Double Crop Corn

A. K. Hagan

Objectives:

1. Evaluate the efficacy of registered fungicides for the control of southern rust and northern corn leaf blight (NCLB).
2. Evaluate alternative fungicide application timing on disease severity and corn yield.
3. Develop fungicide treatment programs for the control of southern rust on double crop corn.
4. Compare the efficacy of novel or experimental fungicides with registered fungicides for rust and NCLB control in corn.
5. Assess the reaction of corn varieties to southern rust and other diseases.

While southern rust activity was minimal in March and April planted corn across all of Alabama, some rust development did occur in May-planted corn cv 'DeKalb 62-08 Smart Stax' at the Brewton Agricultural Research Unit (BARU). In addition, low levels of southern corn leaf blight (SCLB) and northern corn leaf blight (NCLB) in the lower leaf canopy was observed in corn fungicide and variety trials at BARU and the Gulf Coast Research and Extension Center (GCREC). Disease activity was minimal in corn variety trials located at the Field Crops (FC) Unit at the E. V. Smith Research Center and Sand Mountain Research and Extension Center (SMREC). Also, sizable yield reductions attributed to dry and hot weather patterns occurred in fungicide screening studies at the latter two locations due to pivot breakdowns during silking and kernel fill. Four fungicide trials were conducted at GCREC in 2016. Due in part to low disease pressure as noted above coupled with timely rain and irrigation, average yields across all fungicide treatments and varieties in all GCREC studies were in the 225 to 240 bu/A range. Yields for the non-fungicide treated controls and all of the fungicide programs at GCREC did not significantly differ. At BARU, southern rust intensity, despite the late planting date, was considerably below the levels noted in late planted corn in the previous two years at this location. When compared with the non-fungicide treated control, significant reductions in southern rust intensity were obtained with all fungicide programs except for Tilt, Muscle, and Topguard, all of which had similarly high rust ratings. The low rust rating recorded for the 12.9 fl oz rate of Custodia was matched by the 9 fl oz rate of the same fungicide, as well as Quilt XCEL, Fortix, Affiance, Headline AMP, and Evito T. Topguard, Evito T, and Affiance reduced NCLB intensity ratings below those recorded for the non-fungicide treated control. Affiance provided better NCLB control than all the fungicide programs except for Topguard and Evito T. When compared with the non-fungicide treated control, significant reductions in kernel test weight were noted for the Quilt XCEL, Headline AMP, Fortix, Affiance and Priaxor, with all of the latter fungicide programs showing good efficacy against southern rust. Equally higher yields than those recorded for the non-fungicide treated control were obtained with the 12.9 fl oz rate of Custodia, Headline AMP, Quilt XCEL, Affiance, Aproach fb Aproach Prima, Fortix, and Priaxor. When compared with the non-fungicide treated control, significant yield gains were also provided by Evito T and low rate of Custodia. Low yields recorded for the non-fungicide treated control were matched by Muscle, Tilt, Topguard, and Stratego YLD. In the GCREC corn variety trial, southern rust ratings for the earl leaf averaged less than 1.5 on a 10 point scale, which confirms that pressure from this disease was very low. Despite the low southern rust pressure, significant differences in disease ratings were noted between corn varieties. The similarly high ear leaf rust ratings noted for DeKalb DKC 65-17 and Pioneer 1197YHR were matched by fourteen varieties. Southern rust was not observed on the ear leaves of Northrup King NK78S-3111. Higher test weights were recorded for Pioneer 1197R than all other varieties except for its Bt isoline Pioneer 1197YHR, along with DeKalb DKC 62-08, Pioneer 1319HR, and DeKalb DKC 66-97, while Pioneer 2089YHR, Pioneer 2088R, DeKalb DKC 68-04, and Northrup King NK78S-GT had similarly low test weights. Pioneer DKC 68-05 GENVT3P and DeKalb DKC 66-97 GENVT3P had higher test weights than their respective GENVT2P and non-Bt isolines. Yield for DeKalb DKC 62-08, Pioneer 2089YHR, Pioneer 1637YHR, Pioneer 1637VYHR, Pioneer 1197R and Pioneer 1197YHR equaled those recorded for Pioneer 1637R, which was the numerically highest yield. No yield gains were observed for any varieties with Bt traits when compared with their non-Bt isolines. At BARU, southern rust damage to the ear leaves of most varieties was limited to a few, scattered rust pustules. The high rust rating noted on Pioneer 1197YHR was matched by its non-Bt isoline, DeKalb DKC 65-19, DeKalb DKC 62-08, Pioneer 1739R, Pioneer 2089YHR, and DeKalb 67-86. Rust was not observed on the ear leave of DeKalb DKC 67-88, DeKalb DKC 68-05, and Pioneer 3035HR tropical corn. Rust ratings of an additional 17 varieties were similar to those recorded for the latter three varieties. Significant differences in test weights were observed among the varieties screened. Pioneer 1197R, Pioneer 1319YHR, Pioneer 1637VYHR, DeKalb DKC 66-94 along with its Bt isolines DeKalb DKC 66-96, and DeKalb DKC 66-97 have test weights that equaled those of Pioneer 1197YHR, while Pioneer 3035H tropical corn had lower test weights than all varieties except for Northrup King NK78S-3111, Pioneer 1739R, Pioneer 1739YHR, Pioneer 2088R, and Pioneer 2089YHR. Differences in test weight were not observed between Bt and their non-Bt isolines. Equally high yields to those noted for DeKalb DKC 66-96 were recorded for DeKalb DKC 68-05, Northrup King NK78S-3111, DeKalb DKC 62-08, DeKalb DKC 66-94, Pioneer 1319YHR, and Pioneer 1319YHR.

DeKalb DKC 68-05 and Pioneer 1637VYHR had higher yields that their non-Bt isolines DeKalb DKC 68-04 and Pioneer 1637R, respectively. However, no differences in yields were observed between the remaining paired Bt and non-Bt isolines. The low yield recorded for Pioneer 1637R was similar to Pioneer 1739R, Pioneer 2088R, Pioneer 1319R, DeKalb DKC 65-17, Pioneer 1690R, and DeKalb DKC 68-04.

Publications from these trials:

1. Hagan, A. K. and K. L. Bowen. 2016. Efficacy of fungicides for the control of southern rust in corn. Rust Symposium. DOI: 10.13140/RG.2.1.2829.4804 http://www.apsnet.org/meetings/topicalmeetings/Pages/2016RustProceedings.aspx

2. Hagan, A. K., H. L. Campbell, and H. B. Miller. 2016. Yield response and reaction of corn varieties to foliar diseases in Southwest Alabama, 2015. Plant Disease Management Reports 10:FC063. https://www.plantmanagementnetwork.org/pub/trial/PDMR/reports/2016/FC063.pdf

3. Hagan, A. K., H. L. Campbell, and H. B. Miller. 2016. Yield response and southern stem rot control with selected fungicide on corn in Southwest Alabama, 2015. Plant Disease Management Reports 10:FC064. https://www.plantmanagementnetwork.org/pub/trial/PDMR/reports/2016/FC064.pdf

4. Hagan, A. K., H. L. Campbell, K. L. Burch, M. Pegues, and J. Jones. 2016. Yield and disease response of rainfed corn varieties in southwest Alabama, 2015. Plant Disease Management Reports 10:FC065. https://www.plantmanagementnetwork.org/pub/trial/PDMR/reports/2016/FC065.pdf

5. Hagan, A. K. and W. Clements. 2016. Fungicides screened for eyespot control and yield response of corn, 2015. Plant Disease Management Reports 10:FC217. https://www.plantmanagementnetwork.org/pub/trial/PDMR/reports/2016/FC217.pdf

Management of Diseases in Grain Sorghum

A. Hagan

Objectives:

1. Assess the reaction of grain sorghum varieties to the diseases anthracnose and Fusarium head mold.
2. Evaluate the efficacy of registered and experimental fungicides to control anthracnose and Fusarium head mold in grain sorghum.

Grain sorghum variety trials were conducted at the Brewton Agricultural Research Center (BARU), Field Crops (FC) Unit at E. V. Smith Research Center, and Wiregrass Research and Extension Center (WGREC), while fungicide screening trials were done at the BARU, FC, and WGREC. As was noted in the previous year, disease intensity in the variety trials declined as one moved from SE to NE AL. At BARU, due to frequent showers throughout July and August, anthracnose pressure was exceptionally high in Pioneer 84P40 grain sorghum that was cropped behind a 2015 forage and sweet sorghum variety trial. At black layer on August 16, reductions in anthracnose severity when compared with the non-fungicide treated control were obtained with two application programs of Headline 2.09SC, Priaxor at 4 and 6 fl oz/A, and Headline AMP. Among the latter treatments, Headline 2.09SC gave superior anthracnose control with Priaxor at 6 fl oz/A giving better disease control than the 4 fl oz/A rate of the same fungicide and Headline AMP. At black layer, the Quadris, Quilt Xcel, Aproach fb Aproach Prima and Topguard-treated grain sorghum along with the non-treated control had succumbed to anthracnose. While test weights differed among the fungicide programs, those recorded for the non-fungicide treated control and all fungicide programs were similar. Test weights for the Quadris-treated grain sorghum were higher compared with the Priaxor- and Headline 2.09SC-treated plots, all of which had significantly higher yields compared with the former fungicide program. Yield reductions of up to 42% were attributed to anthracnose damage to Pioneer 84P80 grain sorghum. When compared with the non-fungicide treated control, significant yield gains were obtained with Headline 2.09SC, Headline AMP, the 4 and 6 fl oz/A rates of Priaxor, and Quadris but not with Quilt Xcel, either rate of Aproach fb Aproach Prima or Topguard. Yields were higher for the Headline 2.09SC-treated grain sorghum than the all fungicide programs except for Headline AMP and the 6 fl oz/A rate of Priaxor. Overall, the registered Quadris, Quilt Xcel, and Topguard programs failed to reduce anthracnose severity or consistently increase yield when compared with the non-fungicide treated control. The yield loss study on three grain sorghum varieties at BARU was lost when the seed in the heads began to germinate. Pressure from the foliar diseases anthracnose, ladder leaf spot, and zonate leaf spot in the fungicide screening study at FC was low. When compared with the non-fungicide treated control, reductions in total foliar disease damage was obtained with all fungicide programs except for Quadris, Quilt Xcel, and the low rates of Aproach fb Aproach Prima. The Priaxor- and Headline SC-treated Pioneer 84P80 grain sorghum were free of symptoms of all of the above diseases. The level of peduncle blighting attributed to anthracnose was also low with only Quadris, Quilt Xcel, Headline AMP and the 6 fl oz/A rate of Priaxor providing some control of this phase of anthracnose. Yields for the high rate Aproach fb Aproach Prima program were higher than the non-fungicide treated control and 6 fl oz/A rate of Priaxor. Overall, yields for the above study at FC ranged from 122 to 140 bu/A. In a variety trial at FC, total foliar disease ratings were lower for the fungicide- than the non-fungicide treated Pioneer 83P17 and a white sorghum as compared with Pioneer 84P80 which had similarly low ratings for the fungicide treated and non-fungicide treated plots. Significant yield gains were observed for the fungicide- than non-fungicide treated Pioneer 84P80 but not for Pioneer 83P17 or the white grain sorghum. Mean yields for this study at FC varied from a low of 114 to a high of 133 bu/A. As was previously noted at BARU, anthracnose severity was high due to frequent July and August showers. At black layer in mid-September, significant reductions in anthracnose severity when compared with the non-fungicide treated control were obtained with all fungicide programs except for Quilt Xcel as well as the 7 and 14 fl oz/A rates of Topguard. Equally effective disease control was provided by non-registered two application programs with a 4 and 6 fl oz/A rates of Priaxor, Headline 2.09SC, Headline AMP and 12 fl oz/A rates of Aproach fb Aproach Prima. Despite sizable differences in control noted among the fungicide programs, yields for the non-fungicide treated control and all fungicide programs were similar. Mean yields ranged from 61 to 75 bu/A. For the limited variety screening trial at WGREC, anthracnose severity was lower on Pioneer 83P17 than Pioneer 84P40. While a significant reduction in anthracnose severity was obtained with the 2 application 6 fl oz/A Priaxor program on the former but not the latter grain sorghum variety, yields for both varieties and fungicide treatments were similar.

Publications from these trials:

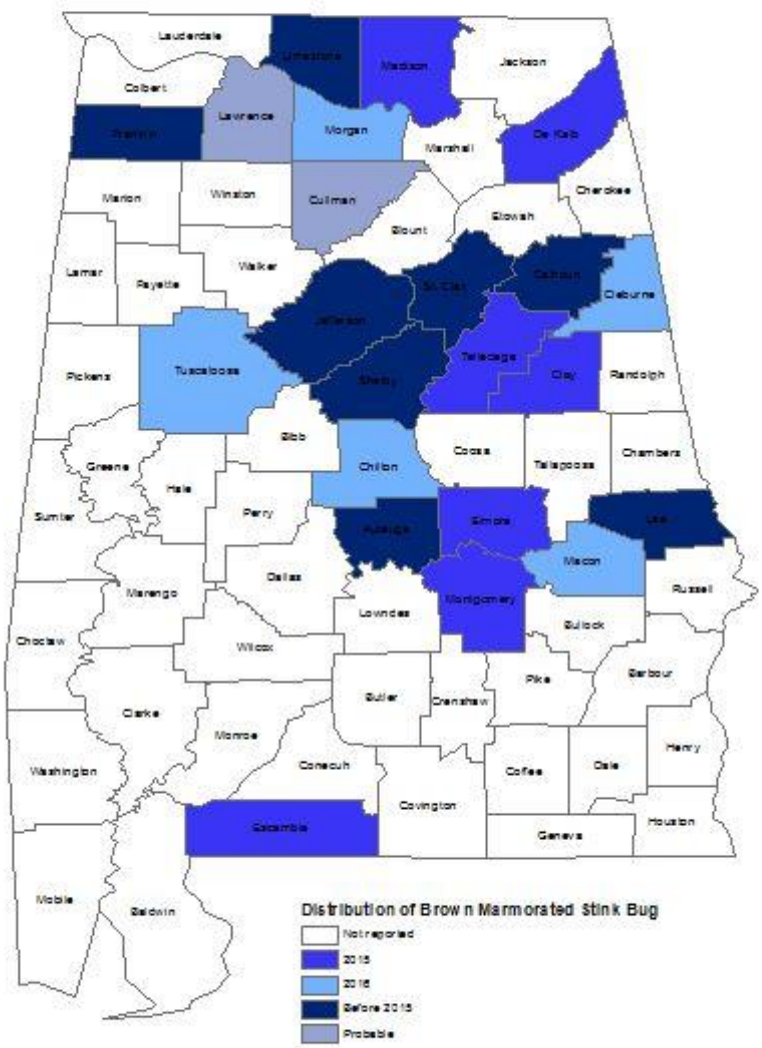
1. Hagan, A. K., K. Burch, and W. Clements. 2016. Yield response and disease reaction of grain sorghum varieties in North Alabama, 2015. Plant Disease Management Reports 10:FC219. https://www.plantmanagementnetwork.org/pub/trial/PDMR/reports/2016/FC219.pdf
2. Hagan, A. K., K. L. Burch, and S. Scott. 2016. Fungicide efficacy and control of foliar and seed head diseases of grain sorghum in Central Alabama, 2015. Plant Disease Management Reports 10:CF032. https://www.plantmanagementnetwork.org/pub/trial/PDMR/reports/2016/CF032.pdf
3. Hagan, A. K., K. L. Burch, and S. Scott. 2016. Yields and reaction of grain sorghum varieties to anthracnose and ladder leaf spot in Central Alabama, 2015. Plant Disease Management Reports 10:CF031. https://www.plantmanagementnetwork.org/pub/trial/PDMR/reports/2016/CF031.pdf
4. Hagan, A. K. and H. B. Miller. 2016. Impact of fungicides on zonate leaf spot control and yield of grain sorghum in southwest Alabama. Plant Disease Management Reports 10:FC218. https://www.plantmanagementnetwork.org/pub/trial/PDMR/reports/2016/FC218.pdf

VI. Insect Management

Emerging Pests of Corn-sap Beetles and Brown Marmorated Stink Bug

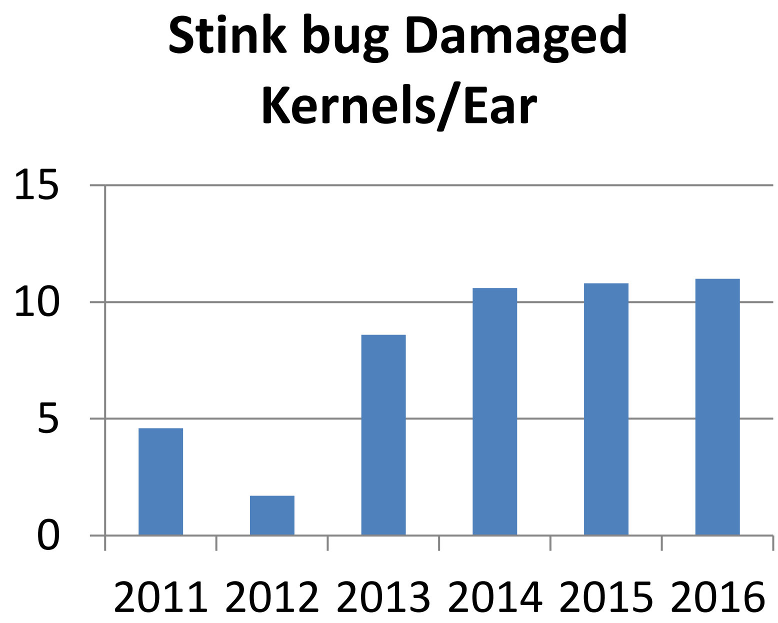
K. Flanders, K. Bowen, and C. Ray

Spatial distribution of sap beetles, stink bugs, and other ear feeding pests: A 7 acre block of field corn (80% Optimum Leptra, 20% RR2 isoline) was planted at the Plant Breeding Unit in Tallassee with the intent of grid sampling to determine spatial distribution of various ear feeding pests. Ears were evaluated twice for damage from insects. 360 samples were arranged in a grid. Insect damage was assessed at corn growth stages R4 and R6 (2 ears from each sample point on each sample date). Samples were also collected for aflatoxin testing. Results are still being analyzed but there was a tendency for stink bug damage to be higher on the edges of the field.



Survey for brown marmorated stink bug in North and Central Alabama: Brown marmorated stink bug has now been found in 22 counties in Alabama, based on surveys of corn and soybean fields, pheromone trapping, and specimens sent in to Dr. Charles Ray.

Continuing damage to corn ears by stink bugs in the Tennessee Valley. A survey of 25 corn fields in north and in 2016 indicated that stinkbug damage on corn ears was about the same as in 2014 and 2015. There was an increase in damage over what was observed in 2011-2012.



Data source:
2011-12, TVREC, UCPREC, SMREC replicated test
2013: Limestone Co. survey, 2 fields, field edge
2014-2016: average of 20-25 corn fields in north Alabama each year, field edge

Monitoring Hessian Fly Populations in Alabama

K. Flanders, K. Bowen and A. Jacobson, and B. Ortiz

Seven commercially available wheat varieties were planted in replicated plots at Prattville Agricultural Research Unit in Prattville, AL on 12 November 2015, Gulf Coast Research and Extension Center in Fairhope, AL on 23 November 2015, and Sand Mountain REC in Crossville in mid-December. Plots were 5 ft X 20 ft, and replicated 4 times (RCBD). To determine Hessian fly infestation, plants from five 6-inch sections of row were excavated from each plot on 11 January (Prattville) or 11 February (Fairhope). The plants were examined in order to determine percent infested plants in each plot. Plants had 4-5 leaves and were starting to tiller (Prattville, Feeks 2-3) or were tillering (Fairhope, Feeks 3-4). In Fairhope, a second Hessian fly evaluation was made on 19 April when the wheat had just finished flowering (Feekes 10.6). Plants were excavated from five 6-inch sections of row in each plot. 15 of the excavated plants in each plot were chosen randomly for sorting. If the plants had fewer than 30 total tillers, additional plants were examined until 30 tillers had been examined. Plots were harvested on 25 May in Fairhope as well as in Prattville.

In Fairhope, Hessian fly infestation was highest, around 0.5 flies per tiller on 19 April, on Southern Harvest 555, Pioneer 26R94, and USG 3404. Fewest Hessian flies were found (0.04 to 0.08 flies per tiller on 19 April) in DynaGro Savoy, Southern States 8629, and Pioneer 26R41. Scab intensity reached moderate levels on SS 8629, but was low on DynaGro Savoy. Highest yields were from Dynagro Savoy, followed by Pioneer 26R94, Southern Harvest 555, Pioneer 26R41, and SS 8629.

The Hessian fly infestation in **Prattville** was highest on Southern Harvest 555 (25% infested plants) and USG 3404 (13% infested plants) on 11 January. Fewest flies were on Pioneer 26R41 (0.5% infested), SS8629 (1.2%), and DynaGro Savoy (2%). Highest yields were recorded from DynaGro Savoy and Southern Harvest 555. Scab intensity, though generally low across all of plots, was not found in DynaGro Savoy or Pioneer 26R94. Yields should be interpreted with caution, since plants in some plots were infected with Rhizoctonia root rot.

No Hessian flies were found at **Sand Mountain REC in Crossville, AL**. Leaf rust was high on Croplan 9415, USG 3404 and SS 8629; other diseases were noted at low intensity. High yield was noted for DynaGro Savoy, while Croplan 9415 and USG 3404 did not yield well.

Seventy-five single row nursery plots were planted at Gulf Coast Research and Extension Center in Fairhope, AL on December 10. These represented advanced breeding lines from the University of Georgia. Results were sent to the UGA plant breeders to use for selecting better breeding lines.

Table 1. Hessian fly infestation, scab intensity and yield of seven wheat varieties, Fairhope, AL 2016.

Variety	Infested plants (%) on 11 Feb 2016*		Flies per tiller on 19 April 2016*		Yield (Bu/A)**		Scab intensity[&]	
DynaGro Savoy	1.0	a	0.08	a	60.9	a	0.4	c
Pioneer 26 R41	1.3	a	0.04	a	***51.6	bc	2.4	ab
Pioneer 26R94	7.3	b	0.52	b	56.2	ab	1.8	abc
Southern Harvest 555	20.4	c	0.51	b	53.2	b	1.1	ab
SS 8415	2.3	ab	0.05	a	***44.3	cd	2.0	abc
USG 3404	6.0	b	0.53	b	39.1	d	1.1	abc
SS 8629	0.6	a	0.04	a	51.7	bc	2.8	a

*Means within a column followed by the same letter are not significantly different, alpha=0.05, Tukey's LSD. Percent infested plants was transformed with arcsin square root before analysis.
****Yield adjusted to the equivalent of 13.5% 60 lb. bushel. Means within a column followed by the same letter are not significantly different, alpha=0.05, Tukey's LSD.
***Only three replications of this variety were included in the yield analysis. In the fourth replication, these varieties were located in a low spot in the field resulting in severe root rot.
[&] Scab intensity rated on a scale of 0 to 9, with 9 = all heads completely infected. Means were differentiated with P = 0.05, Fisher's protected LSD.

Table 2. Hessian fly infestation, scab and rust intensity, and yield of seven wheat varieties, Prattville, AL, 2016.

Variety	Infested plants (%) on 11 Jan 2016*		Yield (Bu/A)*		Scab Intensity***		Rust severity[&]	
DynaGro Savoy	2.06	cd	56.0	a	0	b	0	b
Pioneer 26 R41	0.47	d	40.9	bc	1.0	ab	17	a
Pioneer 26R94	3.49	c	45.8	ab	0	b	0	b
Southern Harvest 555	25.54	a	52.5	a	1.4	a	0	b
SS 8629	1.18	cd	40.4	bc	0.7	ab	18	a
USG 3404	13.24	b	32.6	c	1.7	a	23	a
USG GA 031086-10E26	3.55	c	50.4	ab	1.7	a	0	b

*Means within a column followed by the same letter are not significantly different, alpha=0.05, Tukey's LSD. Infested plant percent data were transformed with arcsin square root before analysis.
**Yield adjusted to the equivalent of 13.5% 60 lb. bushel. Means within a column followed by the same letter are not significantly different, alpha=0.05, Tukey's LSD.
***Scab intensity on a scale of 0 to 9, with 9 = all heads completely infected. Means differentiated with P = 0.05, Fisher's protected LSD.
[&] Rust severity was rated on flag leaves on a scale of 0 to 100% leaf damage. Means differentiated with P = 0.05, Fisher's protected LSD.

Table 3. Leaf rust, leaf and glume blotch, and scab intensities and yield of seven wheat varieties, Crossville, AL 2016.

Variety	Leaf Rust[&]		Leaf Blotch[&]		Glume Blotch[&]	Scab[&]	Yield (Bu/A)**	
Croplan 9101	21.75	d	0.5	abc	0	0.1	82.3	c
Croplan 9415	92.5	a	0	c	0.2	0	41.5	d
DynaGro Savoy	5.5	e	0.88	a	0.4	0.4	115.5	a
Pioneer 26R41	3.2	e	0.01	bc	0.4	0	85.0	c
Southern Harvest 555	0	f	1.34	a	1.8	0.2	86.0	b
SS 8629	51.5	c	0.8	ab	0.1	0	86.6	b
USG 3404	75.0	b	0.5	abc	0.2	0	62.0	c

[&] Diseases were as on a scale of 0 to 9, with 9 = all leaves/heads completely infected. Means within a column followed by the same letter are not significantly different based on Fisher's protected LSD, P = 0.05.

** Means within a column followed by the same letter are not significantly different based on Fisher's protected LSD, P = 0.05.

Hedgehog Grain Aphid

K. Flanders, K. Bowen, A. Hagan, R. Yates, and J. Smitherman

OBJECTIVES:

1) How far has the hedgehog grain aphid spread?
2) Use social media as well as traditional media and face-to-face meetings to get the word out
3) Determine what, if any, strains of barley yellow dwarf are carried by the aphid

SITUATION:

In early May 2015 Rudy Yates, Jimmy Smitherman, and I (K. Flanders) found a new invasive aphid on Johnsongrass. *Sipha maydis*, known as the hedgehog grain aphid, is a known pest of small grains because of its feeding activity and its ability to spread barley yellow dwarf/cereal yellow dwarf.

In late December Jimmy submitted a sample of early planted oats to the diagnostic lab. The plants were infested by aphids. The leaves showed spots similar to those made by greenbug, another aphid pest of small grains. Dr. Charles Ray was able to make the identification of the hedgehog grain aphid. This is the first report of damage to small grains by this pest in Alabama.

Because of its ability to spread barley yellow dwarf, it is important that we spread the word about this insect so commercial small grain fields can be scouted and treated if necessary. At the same time, we need to figure out how far the aphid has spread in Alabama.

RESULTS:

In winter and spring 2016, small grain production fields were scouted for the presence of the new aphid pest. No hedgehog grain aphids were found in production wheat fields. No aphids were found in the oat field that had been infested in fall 2015.

The hedgehog grain aphid was found on Johnsongrass in multiple sites in central Alabama in May 2016. Aphids collected on Johnsongrass were tested to see if they were carrying barley yellow dwarf. Continued scouting showed that hedgehog grain aphid spent the summer on Johnsongrass. In late August the aphid disappeared from the Johnsongrass sites that were being monitored. This may have been due to the fact that the Johnsongrass patches were mowed, then did not regrow due to the prolonged drought. Commercial small grain planting was delayed in fall 2016 due to the drought, but small plots of wheat in Prattville were planted in order to collect hedgehog grain aphids and other aphids as they colonized the field. No hedgehog grain aphids were found. In fact, very few aphids colonized the wheat plots, presumably due to the drought.

Information about hedgehog grain aphid was provided at crop production meetings in 2016, as well as in webinars and blog posts.

VII. Nematode Management

Reproduction of the Cotton Root-knot and Stubby Root Nematodes on Commercial Field Corn Hybrids and Their Impact on Plant Growth and Corn Yield

A. K. Hagan

Objectives:

1. Assess the impact of Counter 20G insecticide/nematicide application rate on corn yield and control of root knot nematode.
2. Compare the performance of VOTiVO and Avicta Duo corn nematicide seed dressings with Counter 20G for the control of cotton root knot nematode and assess their impact on corn yield.
3. Assess the efficacy of Velum Total nematicide for the control of root knot nematode and yield response of corn.

Trials were established at the Brewton Agricultural Research Unit (BARU), Field Crops Unit (FC) at the E. V. Smith Research Center, and Plant Breeding Unit (PBU) to assess the efficacy of Counter 20G and Velum Total at-plant nematicides along with VOTiVO seed dressing for the control of the cotton root knot nematode and stubby root nematodes as well as their impact on the growth and yield of corn. Since Avicta treated corn seed could not be sourced, that seed treatment (nematicide) was not included in the 2016 screening trials. In addition to the above trials, an application timing study with Counter 20G was established at PBU to assess the impact of at- and post-applications of this nematicide on population dynamics of the above nematodes and impact on yield of late planted corn. At BARU, the 14 and 18 fl oz/A rates of Velum Total were compared with granular insecticide/nematicide Counter 20G and seed treatment nematicide Poncho VOTiVO for the control of cotton root-knot nematode and yield response of corn. Stand density was not impacted by the nematicide seed or any at-plant in-furrow nematicide treatments. When compared with the non-treated control, increases in top, root, and total plant weight recorded with Counter 20G were matched by both rates of Velum Total. Overall, plant top weight was 30 to nearly 50% lower for the non-treated control compared with the Velum Total and Counter 20G-treated corn, respectively. Similar test weights were recorded for all at-plant, in-furrow Counter 20G and Velum Total treatments. Yield gains of 25 to 31 bu/A were obtained with Velum Total and Counter 20G than those noted for the non-treated controls. In sharp contrast to the at-plant in-furrow nematicides, stand counts, along with top, root, and total plants weights, and yields were similar for the Poncho 600 insecticide seed treatment control and Poncho VOTiVO seed treatment nematicide. Finally, minimal differences in the reproduction rate for the cotton root knot and stubby root nematodes were noted in the BARU study. In an identical study at PBU, top, root, and total plant weights for the Counter 20G were significantly above those reported for either rate of Velum Total or for the non-treated controls, which had similarly low values for each of these variables. Root knot reproduction was higher for the Counter 20G- than the Velum Total treated and non-treated corn. Due largely to damage attributed to standing water shortly after planting, similar yields were observed for all at-plant in-furrow nematicide treatments as well as the non-treated controls. In addition no differences in any of the above variables were observed for the insecticide seed treatment Poncho 600 standard and the Poncho VOTiVO nematicide seed dressing. A second very late-planted study at PBU designed to assess the impact of Counter 20G application timing on corn growth and yields suffered dry weather related damage when the pivot system failed at silking. No differences in plant growth or yield were noted among the nematicide treatments and the non-treated control. The stubby root nematicide trial at PBU was also lost due to a pivot irrigation failure and severe infestation of Palmer amaranth.

Publications from these studies:

1. Hagan, A. K., H. L. Campbell, K. Burch, and H. B. Miller. 2016. Seed treatment and at-plant nematicide compared for root-knot nematode control on corn, 2015. Plant Disease Management Reports 10:FC020.
https://www.plantmanagementnetwork.org/pub/trial/PDMR/reports/2016/N020.pdf

2. Hagan, A. K., K. Burch, and J. Burkett. 2016. Yield response and nematode control with registered and experimental nematicides on corn, 2015. Plant Disease Management Reports 10:N019. https://www.plantmanagementnetwork.org/pub/trial/PDMR/reports/2016/N019.pdf

3. Hagan, A. K., H. B. Miller, J. Burkett, and K. Burch. 2015. Root-knot control and yield response of corn with seed treatment and granular nematicides. Plant Health Progress 16(4):151-157.

Yield Loss of Five Corn Hybrids due to the Root Knot Nematode and Nematicide Evaluation in Alabama, 2016

S. Till and K.S. Lawrence

Five corn hybrids were evaluated for performance in root-knot infested soil in different regions of the state, as well as the efficacy of Poncho VOTiVO and ILeVO seed treatments. Both trials were arranged in a randomized complete block design with five replications. All plots were irrigated and under conventional tillage. Plots consisted of 4 rows, 20 – 25 ft. long, and 36-inch row spacing. Blocks were separated by a 20 ft. wide alley. The entire plot was machine-harvested for yield and grain moisture content. Grain yields were adjusted to 15.0 % moisture and converted to bushels/acre. Data were subjected to analysis of variance in SAS 9.4 (SAS Institute Inc.) using the PROC GLIMMIX procedure and means compared using Tukey-Kramer with $P \leq 0.10$.

Table 1. Locations and Cultural Practices of Root-knot Corn Hybrid Trial

Location	**Planting date**	**Nitrogen rate*** (lbs/A)	**Plant pop.** (Seed/A)	**Harvest date**
Central Alabama Plant Breeding Unit (Tallassee)	21-Apr	150	36,000	8-Sep
South Alabama Brewton Agricultural Res. Unit (Brewton)**	7-Apr	250	36,000	26-Aug

*Other nutrients were applied as recommended by soil tests
** Research Unit included a non-infested root-knot control field

Methods

The 4-row plots consisted of two rows having the nematicide seed treatment and two rows having no seed treatment. Poncho VOTiVO and ILeVO seed treatments were applied at the rates of 2.7 oz/80,000 seed and 0.15 mg ai/seed, respectively. The Brewton Agricultural Research Unit was able to have a control field since the root-knot infested field site has been artificially inoculated and the root-knot nematode does not naturally exist (or below threshold numbers). Root-knot populations for each hybrid were determined at PBU and BARU, 40 and 45 days after planting, respectively. This was accomplished by digging up two random plants per plot for both treated and untreated rows.

Results

Table 2. PBU Corn hybrid with and without a nematicide application in a Root-knot nematode field.						
No.	Hybrid	*Meloidogyne incognita* eggs/g of root[y]		Yield (bu/A)		
		Untreated	Treated[z]	Untreated	Treated[z]	
1	AgriGold A6517VT3PR1B	5828 abc[x]	1474 bcd	84 c	141 ab	
2	Syngenta NK N83D-3000GT	6217 abc	1825 cd	83 c	115 b	
3	TA 774-22DPRIB	11476 a	1781 de	115 b	145 a	
4	Terral Rev 28HR20	2837 bcd	505 e	141 ab	136 ab	
5	Augusta 8868VT3PRO	9020 ab	1693 cd	81 c	126 ab	

[z]Poncho VOTiVO applied at the recommended rate of 2.7 oz/80,000 seed. ILeVO applied at 0.15mg ai/seed.
[y]Data was log transformed in order to satisfy model assumptions.
[x]Means followed by the same letter do not significantly differ according to Tukey-Kramer method ($P \leq 0.10$).

Root-knot disease pressure was high for irrigated corn at PBU in 2016 (Table 2). Terral Rev 28HR20 supported the fewest root-knot eggs/g of root in both treated and untreated plots. All hybrids except AgriGold A6517VT3PR1B and Syngenta NK N83D-3000GT supported significantly fewer root-knot eggs/g of root ($P \leq 0.10$) with the seed treatments as compared to the same hybrids with no seed treatment. The seed treatments decreased eggs/g of root by an average of 79% across all hybrids. All hybrids except Terral Rev 28HR20 saw a significant increase ($P \leq 0.10$) in yield with the seed treatment as it performed significantly better than all hybrids except TA-774-22DPRIB when left untreated. Overall, yield increased over the untreated hybrids by an average of 37% across all hybrids, ranging from a 4% decrease to a 68% increase.

Table 3. BARU Corn hybrid with and without a nematicide application in a Root-knot nematode field.						
No.	Hybrid	*Meloidogyne incognita* eggs/g of root[y]		Yield (bu/A)		
		Untreated	Treated[z]	Untreated	Treated[z]	No RK
1	AgriGold A6517VT3PR1B	597 a[x]	660 ab	119 bcd	116 cd	198 a
2	Syngenta NK N83D-3000GT	134 ab	2080 ab	113 d	123 bcd	196 a
3	TA 774-22DPRIB	703 a	32 b	136 b	129 bcd	187 a
4	Terral Rev 28HR20	316 ab	130 ab	118 bcd	123 bcd	186 a
5	Augusta 8868VT3PRO	607 ab	1342 a	133 bc	126 bcd	196 a

[z]Poncho VOTiVO applied at the recommended rate of 2.7 oz/80,000 seed. ILeVO applied at 0.15 mg ai/seed.
[y]Data was log transformed in order to satisfy model assumptions.
[x]Means followed by the same letter do not significantly differ according to Tukey-Kramer method ($P \leq 0.10$).

Root-knot disease pressure was moderate for irrigated corn at BARU in 2016 (Table 3). There was no difference in root-knot eggs per gram of root in treated plots except for with the hybrid, TA 774-22DPRIB which supported the highest population. There were no differences in yield between the treated and untreated hybrids in the root-knot field; however, all hybrids in the non-infested field yielded significantly better than the same hybrids in the root-knot field. The presence of root-knot contributed to a 42% average decrease in yield across all hybrids without the nematicide application.

An Integrated Approach to Improving Corn Plant Health in *Meloidogyne incognita* Infested Field with Nematicides, Plant Growth Regulators, and Starter Fertilizers

S. Till, K.S. Lawrence

Currently, there are no resistant corn hybrids for the southern root-knot nematode, *Meloidogyne incognita*. All hybrids will either maintain or increase populations. Besides reducing yield in corn, root-knot is very important for cotton growers rotating behind corn. Growers with a known infestation must take actions to limit significant yield loss, but often do not due to limited management resources and the high costs of those that are available. If producers can combine fertilizers and other direct yield increasing inputs with nematicidal treatments, they may be able to maximize their profit in yield-limiting situations. For this trial, we examined the benefits of starter fertilizers, plant growth regulators, nematicides, and their combinations for their ability to increase yield while either maintaining or decreasing root-knot populations. Previous greenhouse screenings of selected products have already been undergone, and treatments in these field trials are those selected from the screenings.

Table 1. Locations and Cultural Practices of Root-knot Management in Corn Trial

Location	Planting date	Nitrogen rate (lbs/A)	Plant pop. (Seed/A)	Harvest date
Central Alabama Plant Breeding Unit (Tallassee)*	21-Apr	150	36,000	8-Sep
South Alabama Brewton Agricultural Res. Unit (Brewton)**	7-Apr	250	36,000	26-Aug

*Field site is naturally infested with the root-knot nematode
**Field site has been artificially inoculated with root-knot since 2013.

Methods

Trials consisted of 10 treatments with one treatment being an untreated control. Plots were 2-row, 20-25 ft. long, with 36-in. row spacing. The trials were arranged in a randomized complete block design with five replications. All plots were irrigated and under conventional tillage. The hybrid used in these trials was Mycogen 2C797. Root-knot populations and plant heights were determined for each plot 40 and 45 days after planting for PBU and BARU, respectively. Root-knot populations were estimated by digging up two random plants per plot, and analyzing root-knot eggs on a per gram of root basis. The entire plot was machine-harvested for yield and grain moisture content. Grain yields were adjusted to 15.0 % moisture and converted to bushels/acre. Data were subjected to analysis of variance in SAS 9.4 (SAS Institute Inc.) using the PROC GLIMMIX procedure and means separated using Dunnett's method with $P \leq 0.10$.

Treatments

No.	Treatment
1	Untreated Control
2	Counter 20G
3	ILeVO
4	Counter 20G + Ascend IFS
5	ILeVO + Ascend IFS
6	Counter 20G + (Pro-Germ, Sure-K, Micro 500)
7	ILeVO + (Pro-Germ, Sure-K, Micro 500)
8	Counter 20G + Ascend IFS + (Pro-Germ, Sure-K, Micro 500)
9	ILeVO + Ascend IFS + (Pro-Germ, Sure-K, Micro 500)
10	Counter 20G + ILeVO + Ascend IFS + (Pro-Germ, Sure-K, Micro 500)

Nematicides

Counter 20G was applied at planting at a rate of 6 oz./1000 ft. of row. ILeVO was applied as a seed treatment at a rate of 0.15 mg ai/seed.

Plant Growth Regulators

WinField's Ascend PGR (a synthetic blend of cytokinin (0.09%), gibberellic acid (0.03%), and indolebutyric acid (0.045%) was applied at planting as an in-furrow spray at the rate of 5 oz./A.

Starter Fertilizers

A combination of Pro-Germinator (9-24-3), Sure-K (2-6-1), and Micro-500 (0.02 B, 0.25 Cu, 0.37 Fe, 1.20 Mn, and 1.80 Zn) was applied in-furrow at planting at the rates of 3 gal/A, 1 gal/A, and 1 Qt/A, respectively.

Results

		PBU**			Brewton**		
No.	Treatment	Plant Height (cm)	Eggs/g of root	Yield (bu/A)	Plant Height (cm)	Eggs/g of root	Yield (bu/A)
1	Untreated Control	86	1188	171	90	58	114
2	Counter 20G	84	1062	173	99*	2*	128
3	ILeVO	84	2436	157	86	12	109
4	Counter 20G + Ascend	88	481	180	93	3	129
5	ILeVO + Ascend	81	226	159	90	3	116
6	Counter 20G + SF	91	895	172	102*	1*	142*
7	ILeVO + SF	84	2769	160	85	9	110
8	Counter 20G + Ascend + SF	98*	191	182	104*	693	148*
9	ILeVO + Ascend + SF	89	2061	168	89	5	111
10	Counter 20G + ILeVO + Ascend + SF	90	402	170	87	2*	111

*Indicates significant difference compared to the control at $P \leq 0.10$
**PBU and Brewton Plant Heights and Eggs/g of root were taken at 40 and 45 DAP, respectively

At PBU, plant heights were increased ($P \leq 0.1$) over the untreated control in the Counter + Ascend + SF treatment (8). While this translated to the highest numeric yield, the control yielded similar to all other treatments. There were no differences in root-knot eggs/g of root compared to the untreated control, however; all treatments that included Counter averaged 657 eggs/g of root, whereas treatments that included ILeVO averaged 1873 eggs/g of root.

At Brewton, similar trends were observed among the treatments. Counter (2), Counter + SF (6), and Counter + Ascend + SF (8), all increased plant heights at 45 DAP ($P \leq 0.1$) compared to the untreated control. Root-knot populations were low at the time of sampling, however; Counter (2), Counter + SF (6), and Counter + ILeVO + Ascend + SF (10) supported significantly fewer eggs/g of root ($P \leq 0.1$) compared to the control. Counter + SF (6) and Counter + Ascend + SF (8) were the only treatments that increased yield ($P \leq 0.1$) over the control. These two treatments also saw an increase in plant heights. Overall, the addition of starter fertilizers and the plant growth regulator, Ascend, to Counter 20G was able increase early plant growth, which in turn, caused an increase in yield. At Brewton, a 34 bu/A increase over the control occurred, while at PBU an 11 bu/A increase occurred for the same treatment (Counter + Ascend + SF).

VIII. Extras

Continuing ACES & Exp. Station Information Transfer for Alabama Row Crop Producers

T. Cutts, D. Monks, D. Delaney, and C. Dillard

Objective: Maintain, develop, and update the ACES web sites and social media for Alabama row crop producers.

Note: Funding for this project was approved by the Alabama Soybean Producers, Alabama Wheat and Feed Grains Commission, and Alabama Cotton Commission in 2016 and is being requested again for 2017. Additional funding is provided by the AU Crop, Soil, and Environmental Sciences Department and Alabama Agricultural Experiment Station.

Justification:

The Alabama Crops web site (www.alabamacrops.com) serves as the hub for crops-related sites for areas such as grain crops, soil testing, precision agriculture, and plant diagnostics. Correct decisions usually depend on accurate, up-to-date information concerning new developments in agriculture. Producers across the state rely on the objective, research-based information provided by the Extension system to assist in their decision-making. The web site allows the information and publications utilized by producers to be kept current and delivered in a timely manner.

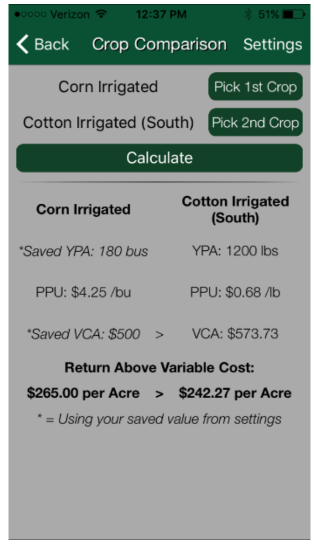
On the web site, producers can find information on on-farm research and development, IPM guides, enterprise budgets, and variety trials. The web site hosts the commodity group project reports and summaries, which may be viewed, downloaded, or printed. The main page of the web site includes the latest headlines and announcements and a calendar of events for the Agronomic Crops Team. The web site received a major design change in 2013 based on the current ACES web design template, and now includes Twitter, Facebook, and a "blog" section to notify followers of agronomic news.

Mr. Jon Brasher currently holds the web-development position for the crops team. Jon assists the team with the development and maintenance of the Alabama Crops web site, on-farm tests, equipment maintenance and management, and a variety of other team activities. Jon assists in the planting and harvesting of on-farm tests and analyzes, tabulates, and prepares results for posting to the web site.

Without your support, this effort would not be possible.

Alabama Crop Production Mobile App Upgrade

B. Dillard and M. Runge



Original Features:

Original features on the Alabama Crops app include sections for: Crop Production News, Profit Profiles, Contact a Crop Specialist, Calendar, Submit a Photo/Question, and AlabamaCrops.com link.

To date, the app has been downloaded over 600 times and has been advertised at many grower events throughout the state.

Recently Added:

A crop comparison tool was recently added to allow growers to compare 2 potential crops for planting on farm. Producers can use the data from ACES budgets or each user can customize their own numbers such as yield and inputs to compare variable input costs and potential profit from two crops.

Push notifications at planned intervals for upcoming events to make farmers aware of meetings and remind them as meeting time approaches without actively having to check the Alabama Crops App calendar is now implemented on the Crops App.

Things to Come in 2017:

IPM section that will allow farmers to access IPM guides with drop down menus. With drop down menus, growers could select the crop, then either disease, weed control, or insect control. This would bring up the "IPM" guide and section for that particular crop/issue. For example, a grower wanting herbicide options for wheat production could easily access the IPM section for chemical weed control in wheat.

Stored Grain Management

K. Flanders, C. Hicks, and B. Dillard

OBJECTIVES:

1) Conduct stored grain pest management workshops in central and south Alabama, with emphasis on cleaning grain bins and using aeration to manage bin temperature.
2) Continue to develop YouTube videos using farmer best-management-practices sound bites
3) Maintain phosphine gas detectors and make them available to farmers during on-farm fumigations.

REPORT:

Workshops and other Extension Activities:

- A workshop was conducted in spring 2016 in Talladega County. The workshop was poorly attended because farmers had to be in the field after a period of unfavorable weather.
- Two webinars on stored grain pest management were presented and are archived on the 2016 Agronomic Crops Webinar page (http://www.aces.edu/anr/crops/2016%20Webinar%20Series/2016alcropswebinarseries.php) Emphasis was placed on how to clean and prepare bins for on-farm storage, use of aeration fans to manage bin temperatures, and the importance of monitoring.
- A talk on "Should You Use an Insecticide on Stored Corn" was presented as part of the Milan No-Till Field Day in Milan, TN.
- A demonstration was made at the Corn and Wheat Short Course in Auburn, AL on using the RESQ cofferdam system. This system is used to rescue someone who has been engulfed by grain in a grain bin. The demonstration was filmed and will be converted to a YouTube video in 2017.

Purchase New Gas Detectors: Three new phosphine gas detectors were purchased. Farmers or Extension Agents can contact Kathy Flanders if they want to borrow one for use during a fumigation. This will save time and money for farmers who need to go pick up a gas detector. It will also make it easier to get the units calibrated in a timely manner.

Precision Agriculture Online Lessons

M. Hall

Dr. Fulton, former AU Biosystems Engineer and current professor at The Ohio State University, and I will produce the online lessons February 9-10, 2017 at the Auburn University Studio.

The new lessons are;

1) Precision Planting
2) Precision Spraying
3) Variable-rate N
4) Telemetry
5) Data Quality and Management

We may also consider a “calibration” and setup module.

2016 Agriculture Discovery Day

D. Monks, L. Kriese-Anderson, G. Pate, C. Smith, C. Hicks, and P. Mask

Objective: Conduct education awareness of traditional Alabama agriculture and advanced production technologies for the community and producers.

Activity

The Alabama Cooperative Extension System, AU College of Agriculture, and Alabama Experiment Station conducted the 4th annual Agricultural Adventure Discovery Day to promote our industry and educate Alabamians on its importance to our economy and livelihood. This event will be held again at the EV Smith Research Center in late September or early October 2017. Planning will begin early next year to include various education events and tours for youth and adults. Advertisement of this event will start in March to help promote to surrounding counties and school systems.

Events included:

1- Cotton picking & ginning;
2- Peanut digging and boiling;
3- Farm and wild life animal interactive activities;
4- Fish production in pond raceways;
5- Field corn maze, picking, shucking, & grinding;
6- Small grain grinding;
7- Forestry, pine straw harvest, and tree identification;
8- Hay bale maze;
9- Precision ag activities & pedal car races;
10- Food safety & prep by a local chef;
11- Wildflowers and honey bee education;
12- Trailer tour of the farm, displays by sponsors, and other activities.

2016 Results.

The 2016 Ag Adventure Discovery Day drew over 2300 participants, up from 1900+ in 2015. We have had an increase of 300 to 400 participants each year and hope to reach 2500 at the 2017 event. This does not include over 200 volunteers that work together to make it possible. The overall budget is just over $40,000 which does not include donations of food, supplies, etc. We appreciate the support that you have provided and feel that this continues to be a major educational event for the state. We have begun to see more visitors from western Georgia and southern Tennessee as a destination event as well.

Alabama Corn and Wheat Short Course

B. Ortiz, B. A. Dillard, C. Hick, T. Sandlin, K. Wilkins, and K. Flanders

The 2016 Alabama Corn and Wheat Short course took place at the Auburn University Hotel on December 12 and 13, 2016. This year the event had 95 participants, down from previous years. From the group of 16 speakers, 10 of them were coming from universities out of state. The program covered a broad variety of topics ranging from basic agronomics, corn response to plant population, fertilization, new planting technologies, plant pathology, entomology, emerging crops, irrigation and more. The list of presentations and speakers is listed below.

Participants

Monday, December 12

7:45 – 8:30	**Registration**
8:30 – 8:45	**Welcome and Introductions** *Dr. Brenda Ortiz & Dr. Kathy Flanders* *Auburn University*
8:45 – 9:25	**Irrigation Strategies for Corn Production** *Dr. Wesley Porter* *University of Georgia*
9:25 –10:05	**Key Strategies to Increase Corn Productivity in the Southeast** *Dr. Chad Lee* *University of Kentucky*
10:05 – 10:20	Break
10:20 –11:00	**Silicon Fertilization on Corn and Wheat** *Dr. Brenda Tubana* *Louisiana State University*
11:00 – 11:40	**Managing Auxin Herbicide Drift and Off-Target Injury on Sensitive Crops** *Dr. Steve Li* *Auburn University*
11:40–12:20	**Use of Plant Growth Promoting Rhizobacteria on Row Crop Production** *Dr. Joseph Kloepper* *Auburn University*
12:20 – 1:20	Lunch
1:20 – 1:25	**New from the Crop, Soil, and Environmental Sciences Department** *Dr. John Beasley* *Auburn University*
1:25 – 2:10	**Farmers Panel: Recommendations for High Yielding Corn Production** *Various Farmers from Alabama*
2:10 – 2:50	**Yield Responses to Planting Density for U.S. Corn Modern Hybrids** *Dr. Ignacio Ciampitti* *Kansas State University*
2:50 – 3:30	**Current Planting Technology** *Dr. Ajay Sharda* *Kansas State University*
3:30 – 3:45	**Break**
3:45 – 4:15	**Efforts to Increase Nitrogen Use Efficacy in Cereals** *Dr. Leo Espinoza* *University of Arkansas*
4:15 – 4:55	**Update on Bt Corn Technology and Insect Resistance to Bt Technology** *Dr. David Buntin* *University of Georgia*

Tuesday, December 13

8:00 – 9:00	**What Is in the Pipeline of the Commercial Companies to Increase Production?** *Gold Sponsor Company Representatives*
9:00 – 9:40	**Slow and Control Release Fertilizer Technology** *Dr. Debbie T. Helllums* *International Fertilizer Development Center*
9:40 – 10:00	**Climate iBook: A New Resource to Adapt Crops to a Variable Climate** *Dr. Brenda Ortiz* *Auburn University*
10:00 –10:20	Break
10:20 – 11:20	**Update on Nematode Management in Corn Production** *Dr. Robert (Bob) Kemerait* *University of Georgia*
11:20 – 12:20	**Update on Carinata and Sesame Production in the Southeast** *Dr. David Wright* *University of Florida*
12:20 – 1:15	**Sorghum and Control for Anthracnose** *Dr. Austin Hagan* *Auburn University*
1:15	Adjourn

Demonstration of Sensor-based Irrigation Scheduling Technology

B. Ortiz and G. Pate

Unfortunately, this test was lost in 2016. When the sensors in the field were installed, the soil was extremely dry, and after installation the sensors lost good contact with the soil. During all growing season, there were many problems with sensor's data (recording and transmission to the base station). These issues did not allow the irrigation scheduling to be done properly. This test will be repeated in 2017 and no additional funding will be requested.

Precision Agriculture workshop

B. Ortiz, B. A. Dillard, C. Hick, T. Sandlin, and G. Pate

The Advanced Precision Agriculture workshop took place at the Auburn University Hotel on January 28, 2016. Some of the objectives of the workshop were: 1) Review the basics of the most adopted precision agriculture management strategies in the US., 2) Learn how adoption of precision agriculture technologies can make production more efficient and more profitable while increasing environmental sustainability, 3) Learn what it takes "Turning your Precision Agriculture technological investment into Profits", 4) Connect with University faculty and industry representatives that can help you to either implement or advance Precision Agriculture management strategies. The workshop highlighted five different Precision Agriculture management strategies: Precision Planting, Precision Spraying, Data management, Variable rate nutrient management, Variable rate irrigation. These topics were addressed in two different ways. In the morning, university faculty and federal employees from USDA-ARS provided basic concepts behind each practice, discussed the benefits (agronomic, economic and environmental) of their adoption, and covered the limitations of each practice/technology. In the afternoon, precision agriculture company representatives addressed the same topics with the perspective of "what it takes" to adopt a particular practice, the equipment and components necessary for implementation, the training necessary, the cost and availability of each technology, and demonstrations.,..

There were 125 participants distributed among farmers, crop consultants, industry representatives, extension agents, extension faculty, USDA-ARS scientists, and NRCS employees.

The graph below shows results of a survey conducted with the participants on their perception of the most beneficial technologies/practices to agricultural production. From the graph you can see how the perceptions change between the groups of participants. This information will be use to direct research and training activities.