Compiled by: C. Dale Monks, Alabama Coop. Extension System & Auburn University

Each year, Alabama wheat and feed grain producers provide funding for research-based educational projects through the use of check-off funds. This effort is lead by a committee of elected producer representatives from across the state. Requests for funding were submitted to the committee by research and extension professionals through the Head, Department of Crop, Soil and Environment Sciences at Auburn University.

The following requests were among those presented to the AWFGC in December 2013. This is not an exhaustive list.

**Proposals**

- Will Fungicide Applications Increase Profitability When Applied at V5 to V8 Growth Stage?
- Alabama Farmers ‘Talk about GMOs’ Video
- Evaluation of Population and Economic Damage of Southwestern Corn Borer through GPS
- Precision Agriculture Eight-hour Online Course
- Data Management Workshops
- Continued Support of Long-term Research: The Old Rotation
- Continued Support of Long-term Research: Cullars Rotation
- Improving Soil Quality
- Support of Long-term Field Research
- Improving Soil Quality
- Restoration of Antique Frick Thresher
- Impact of Sampling Depth on Phosphorus Soil Analysis and Fertilizer Recommendations for Wheat and Feed Grain Crops
- Irrigation Methods for High Management Corn Production
- Evaluation of Disease Response on Small Grain Cultivars in Alabama
- Evaluation of Effects of Foliar Fungicide Applications on Diseases of Wheat
- Proof of Concept of Aflatoxin Accumulation in Corn over a Growing Season
- Emerging Pests of Corn – Sap Beetles and Brown Marmorated Stinkbug
- Monitoring Hessian-fly Populations in Alabama
- Stored Grain Management

**Acknowledgement**

We would like to thank the Alabama Wheat and Feed Grain Committee for all that they do to support our projects and educational programs. Without the support of Alabama producers, these efforts would not be possible.

Project Proposal 2014
Alabama Wheat and Feed Grain Committee

Title: Corn Disease Control: Will fungicide applications increase profitability when applied at V5 to V8 growth stage?

Principal Investigators.
Mark Hall, Extension Renewable Energy Specialist
Anora Brooke, Biosystems Engineering Technician I

Justification and Procedures.
Corn yield potential continues to increase. Corn is a profitable crop to grow if yields are maintained. Foliar diseases are present in many fields.

We propose to fly fungicide treatments on 90 foot strips at V5 to V8 growth stage. Mark will spot check the corn weekly during the growing season. He will arrange to have the fungicide applied and do the cost benefit analysis and write the reports. Anora will do the precision agriculture segment of the project.

2014 will be the second year of this study.
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Alabama farmers talk about GMOs video

Principal Investigators.
Mark Hall, Extension Renewable Energy Specialist
John Fulton, Biosystems Engineering Specialist

Justification and Procedures.
I bet you are like me. Whenever I am in a non-farm setting like church, golf, reunions, etc., and people find out I’m involved in agriculture the first question is usually about GMOs. In their minds, we are poisoning them instead of keeping their children from starvation.

Larkin Martin spoke about this at last year’s soybean and corn meeting in Montgomery. She had been to Africa and drew some pointed observations. She has agreed to be interviewed for this video

This video would feature Alabama farmers talking about GMO issues like plenty vs. want, decreased pesticide usage, no-till, and wildlife.

If funded, I’ll hire a professional videographer to shoot the footage, put it together and get it up on YouTube.

We are also asking for funding from the Alabama Soybean Producers for this project.
Title: Evaluation of Population and Economic Damage of Southwestern Corn Borer through GPS

Principal Investigators.
Mark Hall, Extension Renewable Energy Specialist
Tim Reed, Extension Entomology Specialist
Anora Brooke, Research Technician I
John Fulton, Biosystems Engineering Specialist

Justification and Procedures.
The past three years Southwestern Corn Borer (SWCB) populations have been erratic in numerous non-Bt cornfields in North Alabama. Over 50% of stalks checked in many non-Bt fields were damaged by SWCB in 2012 but in 2013 damage was light. Yield losses due to stalk tunneling and ear feeding were common. Should high winds occur prior to harvest it is not known how much yields would be impacted due to SWCB damage causing stalks to lodge.

We propose to monitor SWCB populations by trapping and spraying with Intrepid insecticide (which provides more residual activity than pyrethroids) when numbers of moths trapped indicate economic losses could occur. Mark Hall and Tim Reed will erect and monitor traps and arrange to have the insecticide applied as needed. Tim Reed will determine when spraying is needed and along with Mark, measure SWCB and CEW damage to sprayed and unsprayed portions of the test field. Efforts will be made to cooperate with private consultants to trap and monitor at least 10 non-Bt fields to enhance chances of obtaining suitable SWCB populations. Counts will also be made prior to harvest to determine if there is a difference in the number of lodged stalks in treated and non-treated plots prior to harvest. If stalks are not plowed under after harvest, stalks in treated and non-treated areas will be examined at ground level to determine if there are differences in the number of SWCB larvae at the base of stalks near the soil surface. These larvae will be derived from the August moth flight which we have not been spraying and are also probably contributing to yield losses. Anora Brooke and John Fulton will do the precision agriculture work by November 15, 2014. Mark will do the cost benefit analysis and write the reports.
Title: Precision Agriculture Eight-hour online course

Principal Investigators.
Mark Hall, Extension Renewable Energy Specialist
John Fulton, Biosystems Engineering Specialist
Anora Brook, Biosystems Engineering Technician I

Justification and Procedures.
Precision agriculture is an integral part of today’s crop production. Its steady stream of technological improvements makes it hard for farmers and other ag professionals to stay current.

We propose to produce an online precision ag course consisting of eight-to-ten one-hour segments. Each lesson will feature video instruction, handouts and a test. Students who make 80% or higher on all the unit tests will be given a certificate of completion. Students will be required to register to take the course which will be on the eXtension online campus. We will post a short, easy-to-find video on YouTube telling students about the course and how to enroll. We will promote it at grower and ag-professional meetings.

We are also asking for funding from the Alabama Soybean Producers for this project.
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Data Management Workshops

Principal Investigators.
Christy Hicks Alabama Cooperative Extension System
Paul Mask, Alabama Cooperative Extension System
John Fulton, Biosystems Engineering Department
Simerjeet Virk, Biosystems Engineering Department
Brenda Ortiz, Agronomy and Soils Department

Objectives.
✓ Conduct hands on Data Management Workshop for producers.
✓ Assist growers in identifying available data that can be used to create management zones.
✓ Provide resources on how to generate management zones using GIS software.

Justification.
Data Management allows Producers to have the tools to make better management decisions. A few advantages of Data Management include correct hybrid selection on fields, ability to analyze data to determine areas of improvement, decrease input cost, reports and maps that can be used to satisfy regulatory compliance for application.

Support was also requested from the Alabama Cotton Commission.
Project Proposal 2014  
Alabama Wheat & Feed Grain Committee

**Title:** Continued Support of Long-term Research: The Old Rotation

**Principal Investigators.**
C. C. Mitchell, Extension Agronomist-Soils & Professor, Dept. Agronomy & Soils  
Dennis P. Delaney, Extension Program Associate, Dept. Agronomy & Soils  
K. Balkcom, USDA-ARS Soil Dynamics Lab

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. The complete history of this experiment was published in 2008 in the centennial issue of Agronomy Journal *(C.C. Mitchell, D.P. Delaney and K.S. Balkcom. 2008. A historical summary of Alabama’s Old Rotation (circa 1896): The world’s oldest, continuous cotton experiment. Agron. J 100:1493-1498).*

Non-irrigated corn yields in 2013 on plots receiving 180 lb. N/acre averaged 202 bu/acre with irrigation and 177 bu/acre without irrigation, a near-record yield for these plots. Timely and abundant rainfall during the corn growing season in 2013 was partly responsible for the high yields in spite of irrigation. Corn and cotton yields reflect N availability more than any other factor. There was a response to irrigation by all crops. Wheat yields were 83.9 bu/acre on the irrigated half and 71.9 bu/acre on the non-irrigated half although no direct irrigation was applied to the wheat crop.
## Crop yields on the OLD ROTATION in 2013.

<table>
<thead>
<tr>
<th>Plot</th>
<th>Description</th>
<th>Crimson clover dry matter (lb/a)</th>
<th>Wheat (bu/a)</th>
<th>Corn (bu/acre)</th>
<th>Cotton lint (lb/acre)</th>
<th>Soybean (bu/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Irrigated</td>
<td>Non-irrigated</td>
<td>Irrigated</td>
<td>Non-irrigated</td>
<td>Irrigated</td>
</tr>
<tr>
<td>1</td>
<td>no N/no legume</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>657</td>
</tr>
<tr>
<td>2</td>
<td>winter legume</td>
<td>7673</td>
<td>6480</td>
<td></td>
<td></td>
<td>1539</td>
</tr>
<tr>
<td>3</td>
<td>winter legume</td>
<td>6493</td>
<td>3660</td>
<td></td>
<td></td>
<td>1399</td>
</tr>
<tr>
<td>4</td>
<td>cotton-corn</td>
<td>2609</td>
<td>4151</td>
<td>179</td>
<td>165</td>
<td>corn</td>
</tr>
<tr>
<td>5</td>
<td>cotton-corn + N</td>
<td>8921</td>
<td>5565</td>
<td>182</td>
<td>160</td>
<td>corn</td>
</tr>
<tr>
<td>6</td>
<td>no N/no legume</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>469</td>
</tr>
<tr>
<td>7</td>
<td>cotton-corn</td>
<td>4483</td>
<td>9591</td>
<td></td>
<td></td>
<td>2065</td>
</tr>
<tr>
<td>8</td>
<td>winter legume</td>
<td>4934</td>
<td>5268</td>
<td></td>
<td></td>
<td>1831</td>
</tr>
<tr>
<td>9</td>
<td>cotton-corn + N</td>
<td>5925</td>
<td>3672</td>
<td></td>
<td></td>
<td>1755</td>
</tr>
<tr>
<td>10</td>
<td>3-year rotation</td>
<td>0</td>
<td>0</td>
<td>83.9</td>
<td></td>
<td>soy</td>
</tr>
<tr>
<td>11</td>
<td>3-year rotation</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>1380</td>
</tr>
<tr>
<td>12</td>
<td>3-year rotation</td>
<td>5144</td>
<td>4717</td>
<td>222</td>
<td>193</td>
<td>corn</td>
</tr>
<tr>
<td>13</td>
<td>cont. cotton/no legume + N</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>1389</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>5773</td>
<td>5388</td>
<td>194</td>
<td>173</td>
<td>1387</td>
</tr>
</tbody>
</table>

### 11-yr mean corn grain yields on the Old Rotation, 2003-2013.

<table>
<thead>
<tr>
<th>Rotation treatment</th>
<th>Plots</th>
<th>Irrigated</th>
<th>Non-irrigated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton-corn, no N</td>
<td>4, 7</td>
<td>79.9</td>
<td>b</td>
</tr>
<tr>
<td>Cotton-corn, +180 lb N/a</td>
<td>5.9</td>
<td>175.5</td>
<td>a</td>
</tr>
<tr>
<td>3-Yr Rotation, no N</td>
<td>10,11,12</td>
<td>156.7</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>137.4</td>
<td>87.9</td>
</tr>
</tbody>
</table>
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Continued Support of Long-term Research: Cullars Rotation

Principal Investigators.
C. C. Mitchell, Extension Agronomist-Soils & Professor, Dept. Agronomy & Soils
Dennis P. Delaney, Extension Program Associate, Dept. Agronomy & Soils
K. Balkcom, USDA-ARS Soil Dynamics Lab

The Cullars Rotation (circa 1911) is the oldest, continuous soil fertility study in the Southern U.S. In commemoration of the 2011 Centennial Year for this experiment, a comprehensive Ala. Agric. Exp. Station bulletin was published covering the first 100 years of this experiment.


A poster was also presented at the 2012 Beltwide Cotton Conference.

This study is non-irrigated and yields reflect growing conditions during that season. Note the dramatic yield response to added K by cotton. Highest cotton yields (1493 lb. lint/acre) were produced on the treatment receiving a complete fertilizer plus micronutrients (boron). No added P (Plot 2) dramatically reduces relative wheat and corn yields more than cotton yields. At the time of this report, soybeans had not been harvested. 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.
Crop yields on the CULLARS ROTATION in 2013.

<table>
<thead>
<tr>
<th>Plot</th>
<th>Treatment description</th>
<th>Clover dry wt.</th>
<th>Wheat</th>
<th>Corn</th>
<th>Cotton lint</th>
<th>Soybean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>-lb/acre-</td>
<td>-bu/acre-</td>
<td>-bu/acre-</td>
<td>-lb/acre-</td>
<td>-bu/acre-</td>
</tr>
<tr>
<td>A</td>
<td>no N/+legume</td>
<td>3978</td>
<td>29.4</td>
<td>168.1</td>
<td>742</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>no N/no legume</td>
<td>0</td>
<td>22.2</td>
<td>36.4</td>
<td>929</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>nothing</td>
<td>0</td>
<td>4.2</td>
<td>0.0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>no legume</td>
<td>0</td>
<td>66.0</td>
<td>128.2</td>
<td>1014</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>no P</td>
<td>1896</td>
<td>35.6</td>
<td>31.1</td>
<td>544</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>complete</td>
<td>7256</td>
<td>63.8</td>
<td>184.0</td>
<td>901</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4/3 K</td>
<td>4582</td>
<td>69.7</td>
<td>151.8</td>
<td>1173</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>rock P</td>
<td>7406</td>
<td>55.9</td>
<td>172.3</td>
<td>1098</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>no K</td>
<td>3407</td>
<td>61.4</td>
<td>41.7</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2/3 K</td>
<td>3233</td>
<td>69.7</td>
<td>190.7</td>
<td>1042</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>no lime (pH~4.9)</td>
<td>0</td>
<td>0.0</td>
<td>36.0</td>
<td>141</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>no S</td>
<td>8373</td>
<td>64.4</td>
<td>181.1</td>
<td>854</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>complete+ micros</td>
<td>5901</td>
<td>61.6</td>
<td>194.2</td>
<td>1493</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1/3 K</td>
<td>6303</td>
<td>68.0</td>
<td>162.1</td>
<td>516</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean of all treatments</td>
<td>5234</td>
<td>56.0</td>
<td>129.0</td>
<td>957</td>
<td></td>
</tr>
</tbody>
</table>
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Improving Soil Quality

Principal Investigators.
C. C. Mitchell, Extension Agronomist-Soils & Professor, Dept. Agronomy & Soils
Gobi Huluka, Laboratory Director and Assoc. Professor, AU
Extension Agronomy Team
Extension Commercial Horticulture Team

Objectives.
- Develop a reasonable soil quality/soil productivity index that can be used on routine soil samples
- Make producers aware of soil quality and how it influences productivity and sustainability
- Adopt practices that will increase the soil quality index over time.

2013 Activities & Accomplishments.
• In August, 2013, Ms. Tabby Bosarge, graduate research assistant, began work on this project as the focus of her M.S. degree program. Prior to this time, only a few samples had been collected for analysis. Since then, over 200 soil samples have been collected from on-going research projects and farmers’ fields to be used to evaluate components of a potential Soil Quality Index (see example).
• Each sample is associated with an actual crop yield or relative yield to be used as the independent variable. A goal is over 300 samples.
• PowerPoint presentations have been presented at 6 meetings around the state with two more scheduled this year (2013).
• Additional funding for this project was sought from the Southern SARE program and the USDA-NRCS Conservation Initiative Grants program. Support was successful from the Alabama NRCS office to help fund Ms. Bosarge’s assistantship.
• Goal is to present a draft index (similar to below) to the Southern Soil Test Work Group in June, 2014.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Values</th>
<th>Max. value</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil CEC/soil group</td>
<td>&lt;4.6 (Grp 1) 4.7-9.0 (Grp 2) 9.0-15.0 (Grp 3) &gt;15.0 (Grp 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 4 5 5 5 5 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil pH&lt;sub&gt;w&lt;/sub&gt;</td>
<td>&lt;5.0 5.1-5.8 5.9-7.0 7.0-8.0 &gt;8.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 10 15 10 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P RATING</td>
<td>VL/LOW MEDIUM HIGH VERY HIGH EXT. HIGH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 5 10 5 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K RATING</td>
<td>VL/LOW MEDIUM HIGH VERY HIGH EXT. HIGH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 3 5 3 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base saturation</td>
<td>&lt;10% 11-25% 26-50% 50-75% &gt;75%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 3 6 10 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil O.M.(%)</td>
<td>&lt;0.5 0.6-1.0 1.1-2.0 2.1-3.0 &gt;3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 5 15 20 25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N mineralized (lb/a)</td>
<td>&lt;10 11-20 21-30 31-50 &gt;50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 1 2 3 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil respiration</td>
<td>V. LOW LOW MEDIUM HIGH V. HIGH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 1 2 3 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggregate stability</td>
<td>No aggregate Weak Moderate Good Very strong aggregates</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 2 4 6 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC (1:2) Mmho/cm</td>
<td>&lt;0.40 0.40-0.80 0.81-1.60 1.61-3.20 &gt;3.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 3 5 3 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metals</td>
<td>2 or more metals “very high” One metal is “very high” Metals low</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-10 -5 -7 -7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL SOIL QUALITY INDEX** 100
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Support of Long-term Field Research

Principle investigators.
C. C. Mitchell, Extension Agronomist-Soils & Professor, Dept. Agronomy & Soils
Dennis P. Delaney, Extension Program Associate, Dept. Agronomy & Soils
K. Balkcom, USDA-ARS Soil Dynamics Lab

Objective.
✔ Help to maintain Alabama’s oldest, long-term cropping systems and soil fertility experiments that involve grain crops and periodically summarize soil and yield information to update recommendations.

Justification.
The Alabama Agricultural Experiment Station and the Department of Agronomy and Soils at Auburn University maintain two of America’s oldest field crop experiments on the campus of Auburn University. Both are on the National Register of Historical Places, "The Old Rotation" (circa 1896) and "The Cullars Rotation" (circa 1911).

“The Old Rotation” (c. 1896)
A cropping system experiment with 13 plots on 1 acre, it is the third oldest continuous field crop experiment in the U.S and the oldest experiment with cotton in the world. Seven of the 13 plots include corn in the rotation and 3 of the plots include small grain. The Old Rotation was placed on the National Register of Historical Places in 1988. In 2003, plots were split and irrigation was installed on half of the plots.

Corn has consistently responded to irrigation with much higher grain yields. Cotton has responded to irrigation in only 3 of the 6 years.

“The Cullars Rotation” (c. 1911) at Auburn
A 3-year rotation of cotton (legumes)-corn (wheat)-soybeans with soil fertility variables on approximately 3 acres of land, this is the oldest soil fertility experiment in the South and has 14 soil fertility treatments replicated 3 times. It was placed on the National Register in April 2003, and a permanent marker was dedicated in 2006.

Wheat in early spring on the Old Rotation (c. 1896). In 2013, wheat yields were 84 bushels per acre behind a soybean crop that has averaged over 54 bushels per acre the past 10 years.
This is one of the few sites where one can see deficiencies of N, P, K, S, and low pH on 5 crops during the course of a year. This year, 2011, is the centennial year of this historic experiment. Special publications are planned to commemorate this event.

Procedures.
These long-term experiments have been justified because of support from Alabama farmers. Funds allow data to be summarized and published on an annual basis. For example, the first ever comprehensive, refereed journal article on the Old Rotation was published in Agronomy Journal in 2008 and was selected as a feature article for the Centennial Issue of Agronomy Journal (Mitchell, C.C., D.P. Delaney, and K.S. Balkcom. 2008. A historical summary of Alabama’s Old Rotation (circa 1896): The world’s oldest, continuous cotton experiment. Agron. J. 100:1493-1498). Funds support part-time help to compile data, present data at meetings, publish data, and pay for added costs such as soil testing, plant analysis, lime, fertilizer, seed, etc. which must be included in the costs of managing these research plots by individual project leaders. Both sites are planted using conservation tillage. Data are presented at growers’ meetings and field days, at regional and national meetings and workshops, and have been presented at international meetings. These experiments get an increasing amount of exposure from national and international visitors because of their unique history.
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Restoration of Antique ‘Frick’ Thresher

Project leaders.
Charles C. Mitchell, Crop, Soil and Environmental Sciences
Dennis Delaney, Crop, Soil and Environmental Sciences
Kip Balkcom, USDA-Soil Dynamics Laboratory
Timothy McDonald, Biosystems Engineering
John Fulton, Biosystems Engineering

Situation.
Around 2000, the McLemore family of Montgomery, AL, donated an antique, stationary Frick Threshing machine (circa 1920) and a circa 1946 cotton picker to the College of Agriculture and Ala. Agric. Exp. Station. Both were in very good condition and both had been stored out of the weather. Since then, both have been under a shed at E.V. Smith Research Center. Neither the College of Agriculture nor the AAES has resources to restore such equipment. With the establishment of Ag Heritage Park, there is a venue for displaying these items from Alabama’s agricultural history. Events like AgDiscovery Day may offer opportunities to demonstrate uses of these types of old equipment in the field.

The Frick Threshing machine needs replacement belts, a good lube job and some cosmetic repair and it could be used. Certainly it would make an interesting contribution to Ag. Heritage Park’s collection and a preservation of a bit of Alabama’s agricultural history related to wheat and feed grain production.

Proposal: We propose to repair and repaint our antique thresher. First choice would be to do it on campus but finding a reliable contractor to do the work is also a possibility. A local restorer of antique farm equipment has expressed interest in such a project. A
permanent sign will acknowledge the donation of the McLemore Family and The Alabama Wheat and Feed Grain Committee.

University of Georgia’s fully restored, one-row, circa 1950 International cotton picker mounted on a Farmall M tractor that is used to harvest cotton research plots at Moultrie and Tifton (photo taken 10/09).
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Impact of Sampling Depth on Phosphorus Soil Analysis and Fertilizer Recommendations for Wheat and Feed Grain Crops

Investigators.
Gobi Huluka, AU Soil Testing lab Director
Charles C. Mitchell, Extension Agronomist-Soils, Dep. Crop, Soil and Environmental Sciences

Location & Impact. State-wide

Objective. Determine the impact of soil depth on soil phosphorus recommendations.

Justification. Phosphorus is one of the essential primary macronutrients that are inherently deficient in soils. More than 50% of Alabama soils sent to the lab need phosphorus fertilizer applications for optimum plant growth (see Table I). Phosphorus becomes plant unavailable due soil fixation and/or sediment removal. Too much phosphorus in soil causes pollution of water called eutrophication. Added to these extreme ends of phosphorus is its global reserve scarcity and instability of countries that control the ores. Uncertainty of this essential nutrient has led to market speculation that spiked phosphorus fertilizer costs a few years ago. There is no replacement for phosphorus as an essential plant nutrient and the need will increase as world population continues to increase. Even though the basic chemistry of phosphorus in soil is well studied and established, there are many management improvements that can be made to improve phosphorus plant use efficiency without sacrificing profitable yield and environmental pollution.

Table I: Alabama Soil Test Ratings for Phosphorus for all samples tested

<table>
<thead>
<tr>
<th>Year</th>
<th>VL</th>
<th>L</th>
<th>M</th>
<th>H</th>
<th>VH</th>
<th>EH</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Percentage of all phosphorus recommendations</td>
</tr>
<tr>
<td>2004</td>
<td>15.0</td>
<td>14.9</td>
<td>21.8</td>
<td>24.0</td>
<td>20.0</td>
<td>4.2</td>
<td>100.0</td>
</tr>
<tr>
<td>2005</td>
<td>14.6</td>
<td>15.1</td>
<td>22.1</td>
<td>25.2</td>
<td>19.7</td>
<td>3.2</td>
<td>100.0</td>
</tr>
<tr>
<td>2006</td>
<td>15.2</td>
<td>14.5</td>
<td>21.2</td>
<td>26.2</td>
<td>19.7</td>
<td>3.1</td>
<td>100.0</td>
</tr>
<tr>
<td>2007</td>
<td>14.3</td>
<td>13.9</td>
<td>20.7</td>
<td>25.3</td>
<td>22.5</td>
<td>3.3</td>
<td>100.0</td>
</tr>
<tr>
<td>2008</td>
<td>13.4</td>
<td>13.7</td>
<td>20.6</td>
<td>25.9</td>
<td>22.9</td>
<td>3.6</td>
<td>100.1</td>
</tr>
<tr>
<td>2009</td>
<td>13.6</td>
<td>15.4</td>
<td>21.1</td>
<td>23.7</td>
<td>20.4</td>
<td>5.7</td>
<td>99.9</td>
</tr>
<tr>
<td>2010</td>
<td>13.7</td>
<td>16.9</td>
<td>22.8</td>
<td>22.8</td>
<td>18.1</td>
<td>5.8</td>
<td>100.1</td>
</tr>
<tr>
<td>2011</td>
<td>13.2</td>
<td>16.7</td>
<td>22.7</td>
<td>23.1</td>
<td>18.4</td>
<td>5.8</td>
<td>99.9</td>
</tr>
<tr>
<td>2012</td>
<td>14.6</td>
<td>16.1</td>
<td>20.9</td>
<td>21.7</td>
<td>19.8</td>
<td>6.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Average</td>
<td>14.2</td>
<td>15.2</td>
<td>21.6</td>
<td>24.2</td>
<td>20.2</td>
<td>4.6</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Our objectives are to soil sample at 0-3, 0-4, 0-6 and 3-6 inch depths and establish a critical range value for wheat and corn under optimum conditions. We will collect soil samples from Alabama Experiment Station and farmer’s fields planted to wheat and corn that represent major Alabama soil areas, before phosphorus fertilization, at critical age of plant growth and after plants are harvested. We will collect crop yields and correlate to phosphorus soil analysis value at different soil depths that is best correlated to the efficient use of phosphorus and maximum profit and environmental quality.

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 a given plant and soil conditions as they become necessary.
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Irrigation Methods for High Management Corn Production

Investigators.
Kip Balkcom, Research Agronomist, USDA-ARS NSDL
Brenda Ortiz, Small Grain/Precision Ag Specialist, Auburn University
Wes Porter, Irrigation Specialist, University of Georgia & Auburn University

Justification.
Plant available water across the Southeast is typically the dominant factor that explains yield variability from year to year. As a result, developing irrigated agriculture across Alabama is one way to stabilize yields and enhance agricultural productivity into the future. However, irrigation strategies must be developed to enable growers to use existing and newly developed irrigation the most effectively, particularly for crops with high water requirements, like corn. In addition to a high water requirement, corn also has a high N requirement. Current N recommendations for irrigated corn production are for 180 lb N ac⁻¹, but many irrigated growers are applying rates above the current recommended rate.

Objectives.
✓ Determine whether a sensor based irrigation strategy can maintain yields by using irrigation water more efficiently compared to a traditional approach that applies water based on a set weekly amount minus rainfall.
✓ Determine how increasing N rates by 50% and 100% affects yield under each irrigation strategy.

Procedures.
A split plot design with three replications that consists of two irrigation strategies (checkbook and sensor) as the main plots and three N rates (180, 240, and 300 lb. N ac⁻¹) as the subplots will be conducted at the Tennessee Valley Research and Extension Center in Belle Mina. Sensors will be purchased and installed in all the plots to allow for continuous monitoring of the soil moisture content. Corn will be planted in single rows at 40,000 plants ac⁻¹ across all plots and managed with conservation tillage and a rye cover crop. Each eight-row plot can be independently irrigated with four sprinkler nozzles located in each corner of the plot. The eight-row plots also allow us to apply corresponding N rates to one half of the plot and use the remaining half as a 0 N rate for plant uptake and nitrogen use efficiency (NUE) calculations for each N rate under both irrigation strategies. Typical crop growth measurements will also be collected across treatments at appropriate times such as plant population, plant heights, and yield.
Title: Evaluation of Disease Response on Small Grain Cultivars in Alabama

Principle Investigators.
Dr. K.L. Bowen, 334-844-1953
E-mail: bowenkl@auburn.edu
Dept. Entomology and Plant Pathology
209 Life Sciences Bldg.
Auburn University, AL 36849-5409

Objectives.
✓ To evaluate a number of small grain varieties for their reaction to specific diseases at seven locations throughout the state.

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.

Procedures.
A number of varieties of wheat, oats, and possibly triticale and barley, will be evaluated prior to the soft dough stage for their reaction to foliar diseases including rusts and powdery mildew; barley yellow dwarf and wheat scab will also be rated. Visual assessment of individual plots will be done using an intensity rating based on disease severity on flag leaves with consideration of incidence throughout the plot. Trials will be located at seven Experiment Stations in Alabama. Northern locations are Tennessee Valley Research and Extension Center (REC) at Belle Mina and Sand Mountain REC at Crossville. In the central region of the state, tests will be conducted at Prattville Experiment Field at Prattville, Black Belt REC, and the Plant Breeding Unit at Tallassee. Southern sites include the Brewton Experiment Field at Brewton, Gulf Coast REC at Fairhope, and the Wiregrass REC at Headland. Varieties may differ among locations.

Results will be shared with extension personnel, reported at state meetings, and published in appropriate printed materials.
Title: Evaluation of Effects of Foliar Fungicide Applications on Diseases of Wheat

Principal Investigators.
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Objectives.
- To evaluate the efficacy of selected foliar fungicides on specific diseases of wheat at three locations in Alabama.

Procedures.
A variety of wheat (e.g., ‘AGS 2060’) was (or will soon be) planted at four locations in the state, Gulf Coast Research and Extension Center at Fairhope (GCREC), Prattville Experiment Field at Prattville, Sand Mountain REC at Crossville, and Tennessee Valley REC in Belle Mina. Foliar fungicides including Stratego YLD (Bayer CropSciences), Twinline (BASF), Caramba (BASF) and Tilt (Syngenta) will be applied at all locations to test disease control efficacy. Each treatment will be replicated at least four times at each location. Disease ratings will be made prior to the soft dough stage for leaf rust, stem rust, Septoria leaf blotch, powdery mildew and scab. Yield will be measured at harvest and grain quality will be estimated by obtaining 1000 kernel weights.

Results will be shared with extension personnel, reported at state meetings, and published in appropriate printed materials.
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Proof of concept of aflatoxin accumulation in corn over a growing season.

Principal Investigators.
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Auburn University, AL 36849-5409

Objectives.
Hypothesis: Hot, dry weather occurring during a relatively short period of time around the time of corn silk date is most conducive to aflatoxin contamination. As kernels develop, aflatoxin concentrations may increase, but periods of high temperatures and drought do not accelerate this increase.

✓ Our objective is to evaluate corn for aflatoxin content at intervals following silking.
Three planting dates will be planned so that variability in weather conditions will occur around silk date.

Procedures.
A select corn variety with glyphosate resistance will be planted at three planting dates in four replicate plots. The first planting date will be at a ‘normal’ or standard date, the others will be planned on 3 week intervals. Approximately 2 weeks after silk date for each planting date, and subsequently on three week intervals, 5 ear samples will be arbitrarily harvested from each plot. These ears will be dried and kernels shelled from cob, then grain will be assayed for aflatoxin content.

Note.
This study is planned as a proof of concept based on observations that hot, dry weather occurring immediately prior to or during silking is critical relative to aflatoxin contamination. As a proof of concept study, no AMCOE funding had been sought.

Results will be shared with extension personnel, reported at state meetings, and published in appropriate printed materials.
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Emerging pests of corn – sap beetles and brown marmorated stinkbug

Investigators.
Kathy Flanders, Entomology and Plant Pathology
Kira Bowen, Entomology and Plant Pathology
Charles Ray, Entomology and Plant Pathology
Brenda Ortiz, Agronomy and Soils, Auburn University

Objectives.
✓ Determine spatial distribution and severity of sap beetle damage within a field
✓ Survey cornfields in north Alabama for brown marmorated stinkbug.

Justification.
New Bt corn technology is available in southern adapted hybrids (see 2012 Bt Corn Products for the Southeastern United States (www.caes.uga.edu/.../2012BtcornSEBtcorntraitstableNov21.pdf). As the newer Bt corn hybrids are more widely planted we seem to be seeing more sap beetle damage on the ears. Perhaps they were always there or perhaps they are occupying the “territory” once occupied by corn earworms. More information is needed to determine how much damage these insects are causing to corn.

Brown marmorated stinkbug is a large invasive stinkbug that has been found in six counties of the state (St. Clair, Jefferson, Shelby, Limestone, Autaugaville and Lee). Corn growers in south Alabama have always had to contend with brown, green, and southern green stinkbugs. This new stinkbug may be a threat to growers in central and north Alabama.

Procedures.
Spatial distribution of sap beetles and stinkbugs:
A six acre block of corn (80% Genuity VT Triple Pro hybrid and 20% isolate non-Bt hybrid) will be planted at E.V. Smith Research Center in 2014. Ears will be collected around the edges of the field and on a 36 ft grid so we can determine if sap beetles and stinkbugs occur throughout the field or whether they are a problem on field borders. Damage from sap beetles, stinkbugs and other ear feeding insects will be quantified at R4 and at harvest. At harvest, some ears will be held to determine weevil contamination, and other kernels will be hand-shelled to assess grain quality and aflatoxin contamination.

Survey for brown marmorated stinkbug in North and Central Alabama:
Pheromone traps for brown marmorated stinkbugs will be placed in 15 fields in north and central Alabama. Traps will be checked weekly from pre-tassel stage through the milk stage. 30 ears will be collected from the each field to determine the amount of damage caused by the stinkbugs.
<table>
<thead>
<tr>
<th>Sap Beetle Damage (above) and sap beetle adults</th>
<th>Brown marmorated stinkbugs on an ear of corn (above), closeup of brown marmorated stinkbug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photos from various land grant sources</td>
<td></td>
</tr>
</tbody>
</table>
Title: Monitoring Hessian-fly Populations in Alabama

Investigators.
Kathy L. Flanders, Entomology and Plant Pathology, Auburn Univ
Brenda Ortiz, Agronomy and Soils, Auburn University
Rudy Yates, Regional Extension Agents, Alabama Cooperative Extension System
Christy Hicks, Regional Extension Agents, Alabama Cooperative Extension System

Objectives.
✓ Evaluate Extension Agent on-farm variety tests for Hessian fly
✓ Evaluate resistance of wheat varieties and breeding lines in small plot tests

Justification.
The Hessian fly is a major pest in Alabama and has changed over the past 20 years. Lab tests show that flies from Alabama can overcome the “old style” resistance in our wheat varieties. Most of the “old style” varieties contain the combination of resistance genes H7 and H8. Only a few varieties contain newer resistance genes, such as H13 and H21. New varieties need to be assessed for their performance against our local biotypes of Hessian fly.

Procedures.
On-farm wheat trials.
Evaluate on farm wheat tests conducted by Alabama Cooperative Extension System Regional Extension Agents. Detailed sampling will be made from the two variety tests with the most Hessian flies. Plant samples will be collected from each plot and brought back to the lab for processing. At least 50 stems from each plot will be checked for infestation by Hessian fly.

Small plot tests.
New varieties and breeding lines will be evaluated for resistance to Hessian fly at Fairhope. 187 single row 3–ft. long plots were planted in early November. They represent advanced breeding lines from the University of Georgia as well as commercial varieties of known resistance or susceptibility. Each will be sampled at least once (as described above) to determine how the varieties and breeding lines perform against Hessian fly.
Project Proposal 2014
Alabama Wheat & Feed Grain Committee

Title: Stored Grain Management

Investigators.
Kathy L. Flanders, Entomology and Plant Pathology, Auburn Univ.
Rudy Yates, Regional Extension Agent, Alabama Cooperative Extension System
Cooperators: Brandon Dillard, David Derrick, and Christy Hicks, Regional Extension Agents, Alabama Cooperative Extension System, and Brenda Ortiz, Agronomy and Soils, Auburn Univ.

Objectives.
✓ Conduct a workshop in central Alabama on managing insects in stored grain, with emphasis on applying grain protectants and monitoring for stored grain pests.
✓ Continue to develop YouTube videos using farmer best-management-practices sound bites
✓ Maintain phosphine gas detectors and make them available to farmers during on-farm fumigations.

Justification.
On-farm grain storage allows farmers flexibility in determining price and end-use of grain, and allows for greater efficiency in farming operations. It is important to provide quality information that will help farmers maintain the quality of their grain while it is in storage.
This project is a logical continuation of our IPM programs for stored grain in Alabama. Educational materials and workshops have been developed to provide IPM education to stored grain practitioners. More information on stored grain can be found at: http://www.aces.edu/dept/grain/StoredGrainInformation.php.

Procedures.
Workshops. A workshop will be conducted in Central Alabama. Emphasis will be placed on how to calibrate sprayers to apply grain protectants, how to use “Storgard” traps to look for insects in stored grain, and how to clean and prepare bins for on-farm storage. WF&G Committee: When is the best month to conduct the workshop? Farmers who attend the workshops will be given 5 Storgard traps to use to look for insects in their grain bins.

YouTube videos. Over the years, we have collected sound bites and made YouTube videos featuring Alabama farmers describing their management practices for stored grain. In 2014 we want to collect more sound bites, as well as new video footage, to make at least 6 more videos. Emphasis will be on getting new footage on cleaning grain bins and applying empty bin treatments and grain protectants.

Calibrating Gas Detectors. The low-range phosphine gas detectors need their annual calibration. Phosphine gas detectors are at each of the following locations: Belle Mina, Headland, Autaugaville, Alexandria, and Brewton.