Raising awareness of the potential of crop sensing technologies to improve environmental stewardship in Alabama

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Advancing Science & Technology
Alabama row crops agriculture

- Corn 95,000 Ha
- Cotton 115,740 Ha

Farmers can use crop sensors to improve input use-efficiency

Agriculture a major industry ➔ Environmental Stewardship must be a priority

- Tennessee - Huntsville 1170 m³/s
- Tombigbee River - Coffeeville 741 m³/s
- Alabama River - Monroeville 636 m³/s
- Apalachicola - Blountstown 624 m³/s

Nitrogen: 22% Total Prod. cost/area
- Side-dress unit for N application
- N application at V6 stage

Agriculture ➔ Environmental Stewardship must be a priority

Precision Ag Adoption in Alabama

ALABAMA PRECISION AG DEMONSTRATION PROGRAM
There are many OPTIONS
but, there is only One NEXT STEP
Courtesy of Randy Lisk

PA Demonstration Program
- Initiated in 2010
- EV Smith Research Center, Shorter, AL
Goal
- Better educate constituents on Precision Ag technologies and practices
- Exposure of technology to multiple groups in Alabama and throughout US
We want to enable farmers to enhance their operation, bottom line and stewardship.

PA Demonstration Program
- Put the operator in the seat or take the technology to them (on-farm)
- KEYS:
  - Very hands-on and lets farmers to use technology or observe practices related to precision ag.
  - Links farmers to companies

Suite of Technologies
PA Demonstration Program
- Guidance - WAAS thru RTNs
- Automatic section control (sprayers and planters)
- VRT – liquid and dry inputs
- Precision soil sampling
- Crop Sensors
- Telemetry

CAUTION FOR FARMERS
Walk before You Run
- Grow with precision ag technology
  Guidance + Variable-rate Technology + Automatic Section Control (turn-key technologies)
- Expectations = Reality (curb misperceptions)

Crop Sensors Role in Ag Management
4R’s + 1 for Nutrient Stewardship
- Right Source
- Right Rate
- Right Time
- Right Place
- Right Records
- Accurate Timing
- Accurate Placement
- Preserve Conservation Structures
Introduction of Crop Sensing Technology to Alabama row crops agriculture

Back in 2005
GS system at the North AL research station.

2005
Latta Martin and Glenn farms - evaluation of Cotton, corn, and wheat

2006-2007
Demo's at field days and small farmers meetings

2009
Small scale evaluation of GreenSeeker and Crop Circle

2009-2010
On-farm demonstrations

2011
On-station demo to Government agencies and public

2011
Multiple crop sensors on Side-dress unit and Hagie sprayer

2011-2012
Trainings for crop consultants, vet agents, students

Trainings
Knowledge flow to ensure proper implementation at the farm level

Trainings - Crop Consultants
- Pre-workshop
  - 57% No NDVI knowledge
  - 37% None ≠ Uniform/VR
  - 42% Yield map=variability
- Post-workshop
  - 82% NDVI & applications
  - 94% Uniform vs. VR
  - 88% Crop sensor=variability

Trainings - Crop Consultants
- Pre-workshop
  - 43% No previous information about Crop Sensors
  - 21% Having positive experience using Crop Sensors
  - 71% Lack of training - limitation of usage
- Post-workshop
  - 71% Identified up to three Crop Sensor applications
  - 88% Use of Crop Sensors for spatial variability assessment
  - 65% Identified up to three benefits Crop Sensor can offer to consultants
  - 47% Consider to use Crop Sensors

Changes in attitudes
- Knowledge gained in basic concepts and applications
- Awareness of the benefits for crop consulting
- Less prone to use aversion
- Change of opinion on the role of crop sensors on enhancement of crop production and nutrient management
**Trainings**

**Multiple sensors - Multiple platforms**

- Use of existing farming equipment
- Monitor the status of the crop at multiple times
- Use sensor’s data and own knowledge to develop prescriptions
- Multiple applications not only nitrogen management
- Less product used and more uniform crop at harvest
- Slow learning curve (require agronomic and technical expertise)
- High initial investment
- **HAGIE** - Covering more area in less time

**Perceptions**
- How and why to use sensors in Agriculture and Environmental Stewardship.
- Aware of the potential applications and limitations.
- Identification of similarities and differences between sensors.
- Knowledge of how to perform sensor-based VR application of inputs (Nitrogen and PGRs).

**International Visitors**

**Trainings**

**Undergraduate and Graduate Students**

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**Field Days**

**Field scale comparison of sensors and algorithms for VRN on Corn**
- Two VRN algorithms at: V6 and V8 (6 row strips)
- Uniform Rate
### PA Demonstration Program

**EV Research Center**

- Government agencies
  - Federal (USDA-NRCS)
  - State (Nutrient management planners)
- Public
  - News outlets
  - Decision / policy makers including legislatures
  - Youth
- Companies and retailers

### On-Farm Demonstrations

- Mapping grain crops and cotton
  - Generating maps (within 24 hours)
  - Assist growers for refining management decisions (making them think)
- Real-time application (cotton)

### Applications in Cotton

- Real-time sensing of crop health and vigor
  - PGRs
  - Harvest Aids
  - Green - healthier, larger plants
  - Red - smaller plants, less vigor
  - Apply what is needed to optimize yield and minimize product loss (increase product use-efficiency)

### Maps to VR Application

**Harvest Aids in Cotton**

- Finish & Pro example

### Real-time VR Application

**PGRs in Cotton**

- Example of a variable-rate application of plant growth regulator in cotton as a function of biomass.
  - Higher biomass = more product
Available Nozzle Technology
Consider the range of application rate (GPA)

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TurboDrop VR - Greenleaf
VariTarget - Delevan

Information creates knowledge but challenges create experience!

Working with growers to enhance production efficiency and environmental stewardship.

Final Thoughts...

- Alabama PA program is demonstrating technologies but most importantly processes for site-specific management
- Crop sensors are essential to the future of nutrient management (1 solution)
- Demo program extremely successful
  - Growers asking more questions about PA
  - Growers expanding their adoption of PA