The Role of Precision Agriculture on Peanut Production in the Southeast

B. V. Ortiz, G. Vellidis, C. Perry, K. B. Balkcom, J. P. Fulton, E. van Santen, R. Hill

July 10-11, 2013
45th ANNUAL MEETING

In the early 80’s some of these PA systems were conceptualized as the future of Ag....Now, this is real

- Telematics
- On-the-go data collection and mapping
- GPS autoguided tractors
- Variable rate seeding
On the farm Hitchcock utilizes variable rate lime on all crops. All of the irrigation pivots use low pressure nozzles and most use electrical irrigation pumps. In 2012, Hitchcock purchased two new pivots with wireless technology to monitor from his smart phone. Hitchcock also uses GPS systems to plant, spray and harvest more efficiently.

**GPS technology adopted in farm machinery results in efficiency gains**

**Yield Maps – Peanut Yield Monitoring System (PYMS)**

Yield data is a valuable tool for evaluating management strategies.

Simplified operation of a peanut combine.
PYMS Commercialization

- Today, there is not a commercially available Peanut yield monitor
- PYMS licensed by UGA to WAG Corporation of Tupelo, Mississippi, September 1999
- WAG intended to have PYM commercially available for the 2000 season
- Market availability?

Small electronics company tried to market. Difficulties due to small size of the peanut market

PYMS Users

- 5 Grower combines on 4 farms in Georgia
- 2 NESPAL combines
- 1 grower in Alabama, Texas A&M, USDA-ARS

Recently, OSU is trying to expand the work by UGA PA team (G. Vellidis & others) of adapting the Ag. Leader Cotton Yield monitor for measuring Peanut yield (2012)
Variable Rate Irrigation on Peanuts

Different water rates based on soil water holding characteristics

Avoid water application on protected areas, avoid over watering areas were pivots overlap

Irrigation/Rainfed and Irrigation scheduling (Right rate at Right time)

Irrigated and non-irrigated peanut yields using Irrigator Pro and soil water potential to schedule irrigation

Automated Steering Uses on Peanut Production

- Peanut production in the Southeast USA has increased during the last decade / 29% in 2007-2008 harvested area.

- Alabama→production expansion: **Southeast** (1999 - 67% of the total production) to the **Central and Southwestern** areas (2008 - 18% of the total production).

Farming scenario for peanut producers

- Farming **straight rows** vs **contoured rows**.

“Automated steering is particularly important in peanuts because the vines get so big and bushy that it’s hard to tell where the rows are when it comes time to dig them.”
2005-2007 studies on straight rows indicated the yield impact by row deviation

Peanut yield as influenced by Tillage, Row configuration and Row deviation; average data from 2005 - 2007

SR >> TWR losses as row deviation increased
TWR>> SR losses if of 7” deviation vs. RTK guidance
Production benefits of using RTK GPS based auto-guidance on rolling terrain peanut fields

Yield differences between Auto-steering and Manual guidance

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<th>Manual</th>
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</table>
Revenue differences between Auto-steering and Manual guidance

| Field ID | Replications per treatment | Gross Revenue ($ ha⁻¹) | Difference Estimate ($ ha⁻¹) | Pr > |t| |
|----------|---------------------------|------------------------|-------------------------------|-------|---|
|          |                           | Guidance treatment     |                               |       |   |
|          |                           | RTK GPS | Manual |                       |       |   |
| AL_JSF   | 4                         | 2868    | 2768   | 101                  | 0.5572 |   |
| GA_B10   | 7                         | 4276    | 3845   | 431                  | 0.0212 |   |
| AL_CPH   | 4                         | 2890    | 2869   | 20                   | 0.6255 |   |
| GA_B11   | 10                        | 4660    | 4365   | 295                  | 0.0036 |   |

Yield results from the 2011 auto-steer study in Georgia

<table>
<thead>
<tr>
<th>Curvature</th>
<th>Yield (lb/ac)</th>
<th>Difference (AS – M)</th>
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<tbody>
<tr>
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<td>Manual</td>
<td>Auto-Steer</td>
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</tbody>
</table>

Auto-Steer – Manual;

180 ac x 270 lb/ac x $950/ton $23,110
2000 lb/ton
Thank-You

Brenda Ortiz
bortiz@auburn.edu
334-844-5534

Twitter: @AL_Prec_Ag
Facebook: Alabama Precision Ag Online
Improving producer profitability and environmental stewardship

www.alabamaprecisionagonline.com