Agronomic Management of Irrigated Cotton

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Arkansas Irrigated Cotton

![Graph showing Lint lb/A from 1980 to 2007 for Stage Avg and CRVP Avg]

Y-axis: Lint lb/A
X-axis: Year from 1980 to 2007

Legend:
- Blue line: Stage Avg
- Red line: CRVP Avg
Irrigation Benefits

- Yield
- Stand Establishment
- Herbicide Activation
- Nitrogen Activation and nutrient movement
- Canopy Development
- Maintain Earliness
Factors and Variability

- Pumping Capacity
- Soil Type
- Soil Productivity
- Rooting Zone
- Infiltration
- Drainage
- Leveling/ditching
Questions

- Do varieties respond differently?
- Will increased PGR applications be needed?
- Can I activate residual herbicides?
- What about fertility especially nitrogen?
Arkansas Cotton Yield Response to Irrigation

LSD (0.05) = 249
Questions

- Will increased PGR applications be needed?

It depends.... When was irrigation initiated?
Rate of Water Use in Relation to Cotton Development

- Days after planting:
  - 0 to 10: Emergence
  - 10 to 20: Squaring
  - 20 to 160: First white bloom, Peak bloom, First open boll, Harvest

- Rate categories:
  - < 0.10 per day
  - 0.10 to 0.25 per day
  - 0.25 to 0.40 per day
Irrigation Initiation (Tacker) Small Boll Shed

Days after planting

Small Boll Shed (%)

Dryland

1st Flower

1st Square
Plant Height: Node

- Arkansas: LSD (0.05) = 0.1
- Mississippi: LSD (0.05) = 0.1
- Tennessee: LSD (0.05) = NS
CI: Variety Management 2012
Plant Heights: Cutout (7-30-12)

LSD (0.05) = 4.1

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<th>STANDARD</th>
<th>AGGRESSIVE</th>
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CI: Variety Management 2012
Seed Cotton Yields

LSD (0.05) = 363

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Irrigation and PGR Application

- Conducted at Rohwer Research Center
- Irrigation Treatments
  - Early – 12 node cotton ~ week prior to bloom
  - Late – 15 node cotton ~ first week of bloom
- PGR (Mepex) Applications
  - Just Prior to first irrigation
    - 6 oz, 12oz and 12 oz at bloom
  - 5 days after initial irrigation
    - 6 oz, 12oz and 12 oz at bloom
Irrigation Initiation
Main Effect on Plant Heights

Plant Heights (in)

- Sum of ht 6/28
- Sum of ht 7/6
- Sum of ht 7/12
- Sum of Final ht

Early Initiation

Late Initiation
Irrigation X PGR
Main Effects PGR Application

Pre and Post Irrigation

Plant Heights (in)

POST 12oz
POST 6oz
POST Bloom 12oz
POST UTC
PRE 12oz
PRE 6oz
PRE Bloom 12oz
PRE UTC
Irrigation X PGR
Plant Heights at Maturity Early Timing

Plant Heights (in)

PRE UTC  PRE 6 oz/A  PRE 12 oz/A  Bloom  Post 6 oz/A  Post 12oz/A  Post UTC
Irrigation X PGR

Cotton Lint Yields: NS

Lint Yields (lbs/A)

POST 12oz
POST 6oz
POST Bloom 12oz
POST UTC
PRE 12oz
PRE 6oz
PRE Bloom 12oz
PRE UTC
Summary: Irrigation and PGR

• Week prior to bloom = Critical!
• Manage growth more efficiently by applying 6 - 10 oz Mepex prior to turning on water
  – Depends on variety and irrigation system
• Protect fiber quality - Mic
• 200 lb/A yield difference by waiting 1 week
• No differences in yield based on PGR App.
Questions

- Can I activate residual herbicides?
- Jason Norsworthy and Jason Bond 2011
Residual Herbicides

- **Activation**: placement of the herbicide in the soil region that maximizes opportunity for herbicide uptake by the germinating and emerging weed seedling.

- **Soil active** herbicides are only available when dissolved in the soil water.

- **Activation dependent on**
  - Timing and amount of rainfall or incorporation
  - Herbicide selection
    - volatilization, photodegradation, solubility, partitioning to soil particles, mobility, etc.

- **Does not work on dry soil surfaces**
  - Volatilization, photodegradation, lack of uptake during germination/growth
No rainfall
Non-incorporated

Rainfall
Incorporated

Too Much Rainfall

Surface

1 inch

2 inch

3 inch

4 inch
Palmer amaranth residual control (Marianna)

- **Valor**
- **Reflex**
- **Direx**
- **Caparol**
- **Prowl H20**
- **Envoke**

Control (%) vs. Weeks after planting

- 0.1"
- 0.25"
- 0.2"
Palmer amaranth control

Stand reduction (% of control)

- Cotoran
- Direx
- Dual Magnum
- Prowl H20

Subirrigate 0.25" 0.5" 1"
Palmer amaranth control

Stand reduction (% of control)

- Staple
- Envoke
- Reflex
- Valor

Legend:
- Subirrigate
- 0.25"
- 0.5"
- 1"
Palmer amaranth control (Furrow Irrigated - clay)
Palmer amaranth control (Furrow Irrigated – silt loam)

Control (%)

Weeks after application
Palmer amaranth control (Furrow Irrigated – sandy loam)

Control (%)

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</tr>
<tr>
<td>Reflex</td>
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<tr>
<td>Valor</td>
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Control (%)

Weeks after application

Graph showing the control of Palmer amaranth over time with Reflex and Valor treatments.
Palmer amaranth control (Furrow Irrigated – sandy loam)

Control (%)

Weeks after application

* Bed

* Furrow
Sprinkler irrigation is more consistent in activating residual herbicides (across soil types)

Furrow irrigation is effective in activating residual herbicides on fine textured soils

Furrow irrigation will **not** fully activate herbicides on coarse soils.

Residual herbicides will generally break first near the polypipe or in areas of standing water.
Questions

- What about fertility especially nitrogen
Nitrogen Activation
Conclusions

- Pivots provide more flexibility
  - Stand establishment
  - Herbicide and nutrient activation
- Furrow most common in Arkansas
  - Infiltration issues
  - More plant size variability
- ALL BETTER THAN NOTHING!
Acknowledgements:
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