COTMAN Research

Directed Sampling to Improve Management Efficiency

Tina Gray Teague

Arkansas State University
University of Arkansas Division of Agriculture
Quick-View Guide for When to Quit Cotton Insect Control from University of Arkansas Cooperative Extension MP 144.

1) Determine date of cutout using the earlier of date of NAWF=5 or Weather-restricted date (North AR: 8 Aug, Central AR: 14 Aug, South AR: 21 Aug)

2) Record daily heat units (DD60s) from Date of Cutout. (DD60s are calculated by subtracting 60 from the average daily temperature.)

<table>
<thead>
<tr>
<th>Insect Pest</th>
<th>When to Quit Control of NEW Infestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarnished Plant Bug</td>
<td>Cutout+250 DD60s</td>
</tr>
<tr>
<td>Bollworms &amp; Tobacco Budworms</td>
<td>Cutout+350 DD60s</td>
</tr>
<tr>
<td>Stink Bugs</td>
<td>Cutout+450 DD60s</td>
</tr>
<tr>
<td>Fall Armyworms</td>
<td>Cutout+500 DD60s</td>
</tr>
</tbody>
</table>

Crop termination recommendations are based on long-standing and ongoing COTMAN research conducted by University of Arkansas Division of Agriculture scientists. Date of Cutout is the flowering date of the last economically significant boll population. If a field reaches physiological cutout [average number of nodes above white flower=5 (NAWF=5)] in late July or early August in Arkansas, then heat units are accumulated from the NAWF=5 date. Otherwise, heat units are accumulated from a seasonal cutout date based on historical weather for that production region. Typically, a boll needs 850 DD60s to mature with acceptable size and quality. The weather-restricted, seasonal cutout date is the calendar date on which there is a 50% probability that the crop will have the benefit of late season temperatures sufficient to develop a mature boll. Seasonal cutout dates range across the state from August 8 in northernmost parts of Arkansas (Clay County) out to August 21 in the most southern portions of the state (Ashley County).
End of Season Management

Insect Control

Identify flowering date of last effective boll population and track heat units . . .

+ 250 DD60s
Lygus lineolaris

+ 350 DD60s
Heliothines

QUIT Spraying for new infestations
Crop Monitoring -- Maturity

Late season decision making in a variable system

- Time
- Space

Cutout date
Soils, landscape, elevation, drainage
Spatial Variability

Whys of Where?
NAWF values recorded 19 July 1998 in a Lee Co., AR field farmed by Larry McClendon – over 1900 plants were examined.
Crop Monitoring in spatially variable fields: field level management decisions → site specific management

COTMAN – Tool to help us describe geographic distribution of cutout
Newly available application and spatial technologies may provide producers with the ability to make “just right” applications of pesticides, plant growth regulators and harvest aid materials in variable fields.
84 DAP - 25 July

NDVI – In Time
Biomass
Classifications

1
2
3
4
5
6
7
Geo-Referenced Sample Points
In the meantime …

Irrigated and Rainfed

150 acres – 122 irrigated and 28 acres rainfed – 18%

Worthy of Zone Designation?
COTMAN monitoring in georeferenced sites – irrigated and rainfed zones

Wildy Farms 2010, 2011 and 2012
COTMAN Growth curves – rainfed and irrigated zones

- Wheat, 4/26/2012 - DPL 912, 15NT, 5/4/2012 - AM 1511, 61NT, 4/30/2012 - ST5458, 83
- Wheat, 5/2/2012 - AM 1511, D2NT, 5/2/2012 - ST5458, 93N
Difference in days to cutout?

- Wheat, 4/26/2012 - DPL 912, 15 NT, 5/4/2012 - AM 1511, 83 NT, 4/30/2012 - ST5458, 83
- Wheat, 4/26/2012 - AM 1511, 83
- Wheat, 5/2/2012 - ST5458, 86N
- Wheat, 5/2/2012 - ST5458, 93N

Mean no. squaring nodes
Days after planting

Difference in days to cutout?
Difference in days to cutout?

- **5 July**
  - 62 DAP

- **28 July**
  - 85 DAP
After Physiological Cutout

**Irrigated**

+110 DD60s

<table>
<thead>
<tr>
<th>Heat Unit Threshold</th>
<th>Actual date</th>
<th>Projected date</th>
</tr>
</thead>
<tbody>
<tr>
<td>350</td>
<td>--</td>
<td>08/14</td>
</tr>
<tr>
<td>850</td>
<td>--</td>
<td>09/12</td>
</tr>
</tbody>
</table>

**Rainfed**

+653 DD60s

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<th>Projected date</th>
</tr>
</thead>
<tbody>
<tr>
<td>350</td>
<td>07/20</td>
<td>--</td>
</tr>
<tr>
<td>850</td>
<td>--</td>
<td>08/12</td>
</tr>
</tbody>
</table>
Zone Termination?

Protect susceptible plants but don't waste costly insecticides where plants are past the end point for crop susceptibility.
Insect Control Termination
Comparisons – 3 treatments

Broadcast
Zone – rainfed not sprayed
Check
Mean no. plant bugs per drop at 4, 11 and 18 days after application of Bidrin & Bifenithrin on 2 August 2012, Wildy Farms, Leachville, AR.

<table>
<thead>
<tr>
<th>Sample date</th>
<th>Days after spray</th>
<th>Broadcast Insecticide</th>
<th>Zone Management</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>rainfed</td>
<td>irrigated</td>
<td>rainfed</td>
</tr>
<tr>
<td>1 Aug</td>
<td>-1</td>
<td>0</td>
<td>3.2</td>
<td>0.2</td>
</tr>
<tr>
<td>6 Aug</td>
<td>4</td>
<td>0</td>
<td>1.2</td>
<td>0.3</td>
</tr>
<tr>
<td>11 Aug</td>
<td>9</td>
<td>0</td>
<td>3.2</td>
<td>1.0</td>
</tr>
<tr>
<td>18 Aug</td>
<td>16</td>
<td>0</td>
<td>6.9</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Yields – zone termination

No yield differences among spray treatments

Zone - 18% reduction in spray costs compared to Broadcast
4 Soil EC based Management Zones

Low EC Sand

High EC Clay
COTMAN Growth Curves
4 Soil EC Based Management Zones

Wildy Farms

Days after planting

Mean no. squaring nodes

Days after planting

Mean no. squaring nodes

0 5 10 20 40 60 80 100

0 5 10 30 50 70 90 110

1 2 3 4

1 2 3 4

Standard

Standard
COTMAN Growth Curves
4 Soil EC Based Management Zones

Mean no. squaring nodes vs. Days after planting for Miller Farms in various management zones (1 to 4) and a standard line.
Early start 33 DAP and Late start 41 DAP
FARM LEVEL SUMMARY REPORT

LONG TERM WEATHER: Keiser, AR, 1960-2010
ACCEPTABLE WEATHER RISK: 50

DAYS BETWEEN DEFOLIATION AND HARVEST INITIATION: 14
TARGET HARVEST COMPLETION DATE: 11/01

DAILY PICKER CAPACITY: 40
HARVEST DAYS PER WEEK: 5
TOTAL ACREAGE: 40

GROWER: Wildy
LOCATION: ARKANSAS, AR

FARM: IrrVig
YEAR: 2012
ANALYSIS DATE: 10/21

Low Soil EC – Sand Blow

Sandy Loam

Early

Late

Rainfed
Irrigation Timing * Soil EC

Early start 33 and Late start 41 DAP

Mean no. squaring nodes per plant
Days after planting

EarlyIrr-HighEC
DelayIrr-HighEC
Rainfed-HighEC
EarlyIrr-LowEC
DelayIrr-LowEC
Rainfed-LowEC
Std
early start
delayed start

Early start 33 and Late start 41 DAP
Where did you take the samples?
Acknowledgments

Wildy Family Farms – David Wildy, Justin Wildy, Paul Harris
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