Bacterial Blight and Target Spot – Known Impacts

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Factors needed to result in yield loss due to disease PEST

1. **Pathogen** → influenced by field history, location, etc.

2. **Environment** → promotes disease development

3. **Susceptible host** → variety

4. **Time** → all 3 factors have to occur at a critical time/growth stage

- For **yield loss** to be an issue
Bacterial Blight/Angular Leaf Spot

Pathogen → Xanthomonas citri pv. malvacearum (race 18)
Environment → rain/irrigation, can survive in debris and soil
Susceptible host → clear resistant vs. susceptible varieties
Time → earlier disease develops > the chance of effecting yield
Don’t be fooled

Examine:

- Location
  - In canopy
  - In field
- All symptoms
- Variety
**Varietal Differences**

**Susceptible**
- Stoneville 4949 GLT
- DeltaPine 1522 B2XF
- DeltaPine 1725 B2XF
- NexGen 3406 B2XF
- NexGen 3522 B2XF
Varietal Differences

Mostly Susceptible

- DeltaPine 1614 B2XF
- Phytogen 312 WRF
- Phytogen 444 WRF
- DeltaPine 1646 B2XF (partially resistant)

Varieties inoculated and rated by Texas A&M AgriLife Research personnel
Varietal Differences

Resistant

- Phytogen 330 W3RF
- Phytogen 340 W3RF
- Phytogen 430 W3FE
- Phytogen 440 W3FE
- Phytogen 480 W3FE
- Stoneville 5517 GLTP*

- DeltaPine 1518 B2XF
- DeltaPine 1820 B3XF

Varieties inoculated and rated by Texas A&M AgriLife Research personnel

*Ratings were conducted by Bayer CropScience personnel
# Yield Loss Estimates

- Main yield loss mechanism – boll rot

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Lost</td>
<td>Total Bales Lost (x1000)</td>
<td>% Lost</td>
<td>Total Bales Lost (x1000)</td>
<td>% Lost</td>
</tr>
<tr>
<td>Bacterial Blight</td>
<td>0.04</td>
<td>4.9</td>
<td>0.1</td>
<td>24</td>
<td>0.16</td>
</tr>
<tr>
<td>Target Spot (other leaf spots)</td>
<td>1.31</td>
<td>171.4</td>
<td>0.9</td>
<td>136</td>
<td>0.69</td>
</tr>
<tr>
<td>Nematodes (All)</td>
<td>4.99</td>
<td>651.7</td>
<td>5.5</td>
<td>870</td>
<td>3.42</td>
</tr>
</tbody>
</table>
Yield Loss Estimates

- Main yield loss mechanism – boll rot

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**Bacterial Blight**

- 2013: 0.04%
- 2014: 4.9%
- 2015: 0.1%
- 2016: 24%
- 2017: 0.16%

**Target Spot (other leaf spots)**

- 2013: 1.31%
- 2014: 171.4%
- 2015: 0.9%
- 2016: 136%
- 2017: 0.69%

**Nematodes (All)**

- 2013: 4.99%
- 2014: 651.7%
- 2015: 5.5%
- 2016: 870%
- 2017: 3.42%
Target Spot/Corynespora Leaf Spot

**Pathogen** → Corynespora cassicola; can survive in debris

**Environment** → wet/humid, hot; lower canopy, after canopy closure

**Susceptible host** → all varieties susceptible, but different levels

**Time** → earlier disease develops > the chance of effecting yield
Factors that can increase Target Spot risk:

- No- or strip-till cotton fields that are cotton followed by cotton
- Frequent showers and/or irrigation
- High nitrogen fertility levels
- High-yielding varieties are most affected
- Rank growth
- Field history
- Variety
Target Spot in Tennessee

- First reported in Sept. 2013

Disease onset
- 2014 – middle of Aug
- 2015 – end of July
- 2016 – end of July
- 2017 – end of July

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Precipitation (in)</th>
<th>Mean Min Temp</th>
<th>Mean Max Temp</th>
<th>Mean Avg Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>37.4</td>
<td>47.8</td>
<td>83.4</td>
<td>72.1</td>
</tr>
<tr>
<td>2015</td>
<td>25.7</td>
<td>48.7</td>
<td>84.2</td>
<td>72.9</td>
</tr>
<tr>
<td>2016</td>
<td>22.6</td>
<td>49.8</td>
<td>86.6</td>
<td>75.3</td>
</tr>
<tr>
<td>2017</td>
<td>24.0</td>
<td>48.0</td>
<td>84.3</td>
<td>72.9</td>
</tr>
</tbody>
</table>
2017 Cotton Sentinel Plots

Carroll County - Target Spot
- Incidence
- Severity

Haywood County - Target Spot
- Incidence
- Severity

2018 Data from Cotton Sentinel Plots posted at news.utcrops.com
2014 – 2016 Fungicide application timing
- Investigated single and double apps of Headline at 6 fl oz/a
  - Single – 1st, 3rd, or 5th week of bloom
  - Double – 1st + 3rd, 3rd + 5th week of bloom
- IPM – single and double, applied at first lesion
Timing x Year Interaction
Defoliation $p = 0.0248$, Lint $p = 0.8494$
Take home – **later fungicide application timings** had best probability of decreasing defoliation and protecting yield.
Fungicide application timing

2014 – 2016 data
- Across all timings
  - Single protected 50 lbs/a lint
  - Double protected 43 lbs/a lint

![Diagram showing defoliation levels and lint production for different application timings.](chart.png)
Fungicide application timing

2014 – 2016 data
- Across all timings
  - Single protected 50 lbs/a lint
  - Double protected 43 lbs/a lint
- Pulling out just 5\textsuperscript{th} and 3\textsuperscript{rd}+5\textsuperscript{th}
  - 5\textsuperscript{th} week of bloom – 72 lbs/a
  - 3\textsuperscript{rd}+5\textsuperscript{th} week of bloom – 145 lbs/a
### Break-even Scenarios for Cotton

<table>
<thead>
<tr>
<th>Cotton price ($/lb.)</th>
<th>Application cost ($/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$8</td>
</tr>
<tr>
<td>$0.65</td>
<td>12.3</td>
</tr>
<tr>
<td>$0.66</td>
<td>12.1</td>
</tr>
<tr>
<td>$0.67</td>
<td>11.9</td>
</tr>
<tr>
<td>$0.68</td>
<td>11.8</td>
</tr>
<tr>
<td>$0.69</td>
<td>11.6</td>
</tr>
<tr>
<td>$0.70</td>
<td>11.4</td>
</tr>
<tr>
<td>$0.71</td>
<td>11.3</td>
</tr>
<tr>
<td>$0.72</td>
<td>11.1</td>
</tr>
<tr>
<td>$0.73</td>
<td>11.0</td>
</tr>
<tr>
<td>$0.74</td>
<td>10.8</td>
</tr>
<tr>
<td>$0.75</td>
<td>10.7</td>
</tr>
</tbody>
</table>
Consistency of yield impact

- Based on regional data from 2014 – 2016 only 20% of the time fungicide significantly protected yield
  - That probability will decrease with incorporation of 2017 data

- Based on TN trial data from 2014 – 2017 only 15% of the time fungicide significantly protected yield
  - On average ~174 lb/a of lint protected
Fungicide Efficacy Data

2015 – 2016 Data

<table>
<thead>
<tr>
<th>Product</th>
<th>Lint (lb/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTC</td>
<td>1622</td>
</tr>
<tr>
<td>Topguard</td>
<td>1648</td>
</tr>
<tr>
<td>Quadris</td>
<td>1594</td>
</tr>
<tr>
<td>Priaxor</td>
<td>1634</td>
</tr>
<tr>
<td>Headline</td>
<td>1697</td>
</tr>
</tbody>
</table>
Fungicide Efficacy Data

2017 data - 5th week of bloom timing

- Miravis Top 13.7
- Topguard EQ 6
- Headline 6
- Quadris 6 + Topsin 20
- Priaxor 4
- Quadris 6
- NTC
# Fungicide Efficacy Data

**2017 Data – 3rd or 3rd + 5th week of bloom timing**

<table>
<thead>
<tr>
<th>Product</th>
<th>Yield (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadris 6</td>
<td>1747</td>
</tr>
<tr>
<td>Double Priaxor 4</td>
<td>1737</td>
</tr>
<tr>
<td>NTC</td>
<td>1701</td>
</tr>
<tr>
<td>Priaxor 4</td>
<td>1683</td>
</tr>
<tr>
<td>Aproach 9</td>
<td>1680</td>
</tr>
<tr>
<td>Delaro 8</td>
<td>1678</td>
</tr>
<tr>
<td>Double Aproach 9</td>
<td>1633</td>
</tr>
<tr>
<td>Double Miravis Top 13.7</td>
<td>1582</td>
</tr>
<tr>
<td>Miravis Top 13.7</td>
<td>1579</td>
</tr>
</tbody>
</table>
Additional Management Strategies that are being investigated

- 2017 regional trials investigating

Trial 1
- Varieties (Phytogen 490, DeltaPine 1646, and DeltaPine 1725)
- Fungicides (single and double applications of Priaxor)
- Canopy Management (low vs. aggressive PGR)

Trial 2
- Fungicide
- Nitrogen Rate (0, 80, 160 lbs/a)
- Canopy Management (passive, moderate, and aggressive PGR)
Summary – Management Options

- **Bacterial Blight**
  - Variety selection
  - Crop rotation and tillage
  - Minimal impact on yield, boll rot main concern

- **Target Spot**
  - Scout starting around first flower
  - Examine risk factors
  - Consider fungicide on a field by field basis
Thank you for your attention!

Questions or Comments?

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