Impact of Application Timing of Fungicides On the Management of Target Spot

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Research Update
Importance of Foliar Diseases

• Historically foliar diseases (other than boll rot) were of minor importance in Georgia
  – Cercospora Leaf Spot
  – Ascochyta Blight
  – Areolate Mildew
  – Angular Leaf Spot
• Exception is Stemphylium Leaf Spot
  – Potassium deficiency is underlying cause
  – Less evidence of effective management with fungicides
Impact of Target Spot

• Since 2005, growers noticed a disease unrelated to potassium
• Symptoms associated with this disease
  – Premature defoliation
  – Severe spots on leaves, bolls, and bracts
  – Significant yield losses
• 2008, Corynespora leaf spot was distinguished from other foliar diseases
• 2012: FL, AL, NC, SC, and VA
Koch’s Postulates for Proof of Target Spot


- DP 555 and DP 1048
- Inoculated at 2-4 leaf stage
- Incubated in moist chamber at 21° C for 48 hours
- 100% of inoculated plants showed symptoms
- No symptoms found on non-inoculated plants
- Fungus was re-isolated, cultured, and confirmed by morphological characteristics and PCR
Objectives

• Best application timing for disease management
  – Disease onset
  – Growth stage (coverage)
  – Length of protection
• Quantify the effect that Target Spot has on yield
Description of Small Plot Trials

- Randomized and Replicated Studies (4-6 reps)

- Trials conducted on research stations in Tifton, Camilla (Stripling), and Attapulgus
  - Camilla: did not cut alley until defoliation (Irrigated and Dryland)

- PHY 499

- Fungicides
  - Headline (pyraclostrobin)
  - Twinline (pyraclostrobin + metconazole)
  - Priaxor (pyraclostrobin + fluxapyroxad)

- Lee Spider
  - 8002 FF
  - 20 GPA

- Ratings
  - Defoliation (2012)
  - Yield (2012)
  - Florida 1-10 (2013)
2012 Stripling Irrigation Park, Mitchell County

Target Spot

**Overhead Irrigation**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% Defoliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twinline (1)</td>
<td>40</td>
</tr>
<tr>
<td>Headline (1)</td>
<td>50</td>
</tr>
<tr>
<td>Twinline (1,3)</td>
<td>60</td>
</tr>
<tr>
<td>Twinline (3)</td>
<td>70</td>
</tr>
<tr>
<td>Untreated</td>
<td>80</td>
</tr>
</tbody>
</table>

**Dryland**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% Defoliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twinline (1)</td>
<td>10</td>
</tr>
<tr>
<td>Headline (1)</td>
<td>10</td>
</tr>
<tr>
<td>Twinline (1,3)</td>
<td>10</td>
</tr>
<tr>
<td>Twinline (3)</td>
<td>10</td>
</tr>
<tr>
<td>Untreated</td>
<td>10</td>
</tr>
</tbody>
</table>
2012 Stripling Irrigation Park, Mitchell County

Target Spot

### Overhead Irrigation

<table>
<thead>
<tr>
<th>Treatment</th>
<th>600</th>
<th>800</th>
<th>1000</th>
<th>1200</th>
<th>1400</th>
<th>1600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twinline (1)</td>
<td>979</td>
<td>985</td>
<td>933</td>
<td>1191</td>
<td>1065</td>
<td>985</td>
</tr>
<tr>
<td>Headline (1)</td>
<td>974</td>
<td>1167</td>
<td>1167</td>
<td>1405</td>
<td>1286</td>
<td>1072</td>
</tr>
</tbody>
</table>

### Dryland

<table>
<thead>
<tr>
<th>Treatment</th>
<th>600</th>
<th>800</th>
<th>1000</th>
<th>1200</th>
<th>1400</th>
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</tr>
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<td>Twinline (1)</td>
<td>1214</td>
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<td>953</td>
<td>1405</td>
<td>1286</td>
<td>1072</td>
</tr>
</tbody>
</table>
2012 Stripling Irrigation Park, Mitchell County

Target Spot

LSD=1.15 (P ≤ 0.05)

Planting date = May 3, First Bloom = July 10, Disease was first confirmed around June 20th
Last spray before rating: July 24 (3rd Week of Bloom)
2012 Stripling Irrigation Park, Mitchell County

Target Spot

LSD=16.95 (P ≤ 0.05)

% Defoliation

Aug. 1

Planting date = May 3, First Bloom = July 10, Disease was first confirmed around June 20th
Last spray before rating: July 24 (3rd Week of Bloom)

Headline: 6 oz.
Twinline: 8.5 oz.
2012 Stripling Irrigation Park, Mitchell County

Target Spot

LSD=23.95 ($P \leq 0.05$)

Planting date = May 3, First Bloom = July 10, Disease was first confirmed around June 20th
Last spray before rating: August 15 (5th Week of Bloom)

Headline: 6 oz.
Twinline: 8.5 oz.
2012 Stripling Irrigation Park, Mitchell County

Target Spot

LSD=30.67 (P ≤ 0.05)

% Defoliation

- Twinline (FS)
- Twinline (FS+14D)
- Twinline (14D Int)
- Headline (1)
- Twinline (1,3)
- Headline (1,3)
- Headline (3)
- Headline (3,5)
- Twinline (5)
- Headline (5)
- Twinline (5,7)
- Headline (5,7)
- Untreated

Planting date = May 3, First Bloom = July 10, Disease was first confirmed around June 20th
Last spray before rating: August 30 (7th Week of Bloom)

Headline: 6 oz.
Twinline: 8.5 oz.
2012 Stripling Irrigation Park, Mitchell County

Target Spot

LSD=312.62 ($P \leq 0.05$)

Planting date = May 3, First Bloom = July 10, Disease was first confirmed around June 20th
2012 Attapulgus REC, Decatur County
Target Spot / Stemphylium

Planting date = May 29, First Bloom = July 30, Disease was first confirmed around Aug 24th
Last spray before rating: August 16 (3rd Week of Bloom)
2012 Attapulgus REC, Decatur County
Target Spot / Stemphylium

LSD=18.72 (P \leq 0.05) NS

Planting date = May 29, First Bloom = July 30, Disease was first confirmed around Aug 24th
Last spray before rating: September 4 (5th Week of Bloom)
2012 Attapulgus REC, Decatur County
Target Spot / Stemphylium

LSD=16.63 ($P \leq 0.05$) NS

% Defoliation

Twinline (FS) Twinline (FS+14D) Twinline (14D Int) Headline (1) Twinline (1,3) Headline (1,3) Twinline (3) Headline (5) Twinline (5) Headline (5,7) Headline (5,7) Untreated

Aug. 29 Sept. 11 Sept. 24

Planting date = May 29, First Bloom = July 30, Disease was first confirmed around Aug 24th
Last spray before rating: September 13 (7th Week of Bloom)
2012 Attapulgus REC, Decatur County

Target Spot / Stemphylium

Headline: 6 oz.
Twinline: 8.5 oz.

Planting date = May 29, First Bloom = July 30, Disease was first confirmed around Aug 24th
2012 RDC Pivot, Tift County
Target Spot / Stemphylium

Severity (1-6)

LSD=0.77 (P ≤ 0.1)

Planting date = May 7, First Bloom = July 17, Disease was first confirmed around Sept. 5th
Last spray before rating: August 31 (7th Week of Bloom)
2012 RDC Pivot, Tift County

Target Spot / Stemphylium

LSD=22.88 ($P \leq 0.1$)

Planting date = May 7, First Bloom = July 17, Disease was first confirmed around Sept. 5th
Last spray before rating: August 31 (7th Week of Bloom)
2012 RDC Pivot, Tift County
Target Spot / Stemphylium

Yield (lb/ac)

LSD=187.6 (P ≤ 0.1) NS

Planting date = May 7, First Bloom = July 17, Disease was first confirmed around Sept. 5th
Georgia Small Plot Trial Recap

**Stripling**
- 3rd week of bloom timing best reduced defoliation
- Late application protected new growth, but did not help yields

**Attapulgus**
- Stemphylium and Target Spot
- Not much defoliation
- 11 of 13 treatments had numeric yield increase

**Tifton**
- Late timings had best disease control
- 8 of 11 treatment had numeric yield increases

- 200 LB.
Sprayed rows were treated with a single application of Headline during the 6th week of bloom.

Source: RJ Byrne
2012 Cotton Defoliation Study, Mitchell County

Target Spot

Disease was established in the field prior to application

Source: RJ Byrne
Planting date = May 17, First bloom = July 23, Disease was first confirmed on August 27
Last spray before rating: August 28 (6th Week of Bloom)
2012 Tidewater AREC, Suffolk VA

Target Spot

Planting date = May 17, First bloom = July 23, Disease was first confirmed on August 27
Last spray before rating: August 28 (6th Week of Bloom)

Source: Pat Phipps, Virginia Tech
2012 Tidewater AREC, Suffolk VA

Target Spot

\[ P \leq 0.05 \]

Source: Pat Phipps, Virginia Tech
Florida 1-10 Scale

1. No disease
2. Few spotted leaves in canopy
3. Few spotted leaves in upper canopy
4. Leaf spotting and ≤ 5% defoliation
5. Leaf spotting and ≤ 25% defoliation
6. Spotted leaves numerous and ≤ 50% defoliation
7. Spotted leaves numerous and ≤ 75% defoliation
8. Numerous leaf spots and ≤ 90% defoliation
9. Few remaining leaves and ≤ 95% defoliation
10. Plants defoliated or dead
2013 Stripling Irrigation Park, Mitchell County
Target Spot

LSD=0.138 ($P \leq 0.05$) NS

Planting Date = May 8, First Bloom = July 9, Disease was confirmed on July 9
Last spray before rating = July 9th (1st Week of Bloom)
2013 Stripling Irrigation Park, Mitchell County

Target Spot

LSD=0.988 ($P \leq 0.05$)

Planting Date = May 8, First Bloom = July 9, Disease was confirmed on July 9
Last spray before rating = July 25th (3rd Week of Bloom)
2013 Stripling Irrigation Park, Mitchell County

Target Spot

LSD=0.855 \( (P \leq 0.05) \)

Planting Date = May 8, First Bloom = July 9, Disease was confirmed on July 9
Last spray before rating = August 20\(^{th}\) (7\(^{th}\) Week of Bloom)
Summary

- Optimal fungicide timing appeared to be first week of bloom and third weed of bloom
- Strong trends for numeric yield increases across fungicide treatments versus untreated check
- Plots treated with Headline tended to out-yield plots treated with Twinline
- Evidence shows that Target Spot can be controlled with use of fungicides with potential of protected yield
- Combined results suggest that 200 lb. increase in lint is a realistic goal with use of fungicides
- Growers with high risk fields can expect similar results when using fungicides at proper timing
  - UGA Extension will recommend judicious use of fungicides in cotton in 2013
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