Impact of CLRDV on Plant Development and Yield

Row Crop Short Course
December 2, 2019
What are we seeing in the field?
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In 2019.... We observed

• Symptoms observed in 2019 include
  • small, puckered, thick, brittle leaves
  • stacked internode
  • sterile flowers
  • irregular shaped bolls

• Response is different by variety
  • symptoms are difficult to pinpoint
  • similar to responses to other stressors
    • herbicide application/ misapplication (dicamba.. 2,4-D)
    • breeding abnormalities
    • delayed harvest

• No varieties observed to be resistant at this point
  • narrow range of germplasm
  • winter nurseries in parts of the world which historically have reported viral diseases
    • Cotton blue disease
    • Cotton “leaf curl” diseases
Cotton Development

- Excessive vegetative growth can delay maturity and increase problems with insects and boll rots
  - More attractive to aphids

- Excessive fruiting may cause early cessation of flowering “cutout” which promotes fruit shed and reduced yield.
Infection timing?

- Dependent on when infection occurred
  - Infection early
    - shorter plants.. lacking the “whip-like” appearance in upper canopy
    - symptoms visible throughout the plant
  - Infection post-reproductive
    - tall plants... “whip” visible
    - crazy growth in upper portion of the plant
      - excessive fruiting
      - tiny leaves
      - leaf regrowth

- Timing dictates where bolls are lost on the plant= yield loss =$loss
  - early infection-more bolls misshapen, aborted
  - late infection-more positions towards the top of the plant
Infection timing?
Why are we concerned?

- Flowers with misshapen parts
  - No pollen production
- Plants with no bolls
- Plants with random “dead” squares and bolls
- Parrot beaked bolls (misshapen)
- Bolls that will never open
Importance of boll retention

- Seed cotton yield and lint quality tend to decrease away from the main stem.
  - First position
    - 60-75%
  - Second position
    - 18-21%
  - Third + positions
    - 10%

- Weights of bolls at position 1 increase from node 6-12 and then decrease for the remaining nodes.
Plant mapping

• Stoneville OVT
  • Varieties chosen which have been confirmed positive in other locations and had symptoms associated with the virus in this particular field.
    • DP1646B2XF
    • NG 5711B3XF
    • PHY 580W3FE
  • 25 plants in a row per replication for a total of 100 plants
  • Unopened bolls were collected and allowed to dry and open in greenhouse
## Stoneville Variety Trial

<table>
<thead>
<tr>
<th>Variety</th>
<th>% First position</th>
<th>% Second position</th>
<th>% Third position</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY580 W3FE</td>
<td>55.4</td>
<td>34.4</td>
<td>10.2</td>
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<tr>
<td>NG5711B3XF</td>
<td>58.3</td>
<td>30.6</td>
<td>11.1</td>
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<tr>
<td>DP1646B2XF</td>
<td>62.3</td>
<td>28.1</td>
<td>10.0</td>
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## Stoneville Variety Trial

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<th>Variety</th>
<th>Seedcotton Yield (lb/acre)</th>
<th>Lint Yield (lb/acre)</th>
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<tbody>
<tr>
<td>PHY580 W3FE</td>
<td>3273.25</td>
<td>1276.57</td>
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<tr>
<td>NG5711 B3XF</td>
<td>4591.90</td>
<td>1790.84</td>
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<tr>
<td>DP1646 B2XF</td>
<td>4066.60</td>
<td>1585.98</td>
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# Commercial Field

- Itta Bena, MS
- Plants with symptoms associated with the virus
- 25 plants per replication for a total of 100 plants
- Unopened bolls were collected and allowed to dry and open in greenhouse

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<td>3356.65</td>
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Management?

• DON’T PANIC.....
  • This may have been around longer than we think
  • 2019 yields are good

• Manage weeds
  • alternate hosts

• Varietal resistance.... Possibly

• Insecticide applications
  • manage aphids as usual
Research Constraints

• Just starting to scratch the surface
• Overloading the virologists
  • timely process
  • no quick test yet
• No resistant varieties to compare

A TON MORE WORK TO DO!
As far as yield loss?

• Cotton blue disease in Brazil is associated with up to 80% losses
  • NOT the same disease

• State cotton averages are going to be high this year
  • hard to define losses
  • losses will be on a field by field basis

• Viral diseases don’t always cause major impacts... but they can.
  • keeping a close eye on this one until we have more information

• AT THIS POINT WE DON’T KNOW
  • 2019 Disease Loss Estimates
    • 0.01%
Questions?

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