CLRDV: What we know, and what we don’t

2019 Row Crop Short Course
Starkville, MS
December 2, 2019
Tom Allen
DREC; Stoneville, MS
(662) 402-9995
tallen@drec.msstate.edu
www.mississippi-crops.com

Twitter: @baldpathologist
So, what’s in a name?

• Virus vs. the plant disease
  – The plant virus infects the plant and leads to disease, the specific virus in question has a particular name
    • Cotton leafroll dwarf virus – is the name of the virus itself within the plant
  – The virus within the plant causes the disease:
    • Cotton leafroll dwarf disease

• Abbreviations are obviously the easiest way to present this particular situation:
  • Cotton leafroll dwarf virus = CLRDV
  • Cotton leafroll dwarf disease = CLRDD
What we currently know about the virus

• Initially observed in Alabama during the 2017 season
• Closely related to a virus of cotton in South America, which has been referred to as “blue disease”
  – Called blue disease due to the leaf coloration
  – However, we do **NOT** have blue disease in the U.S.
• Transmitted by the cotton aphid
• To date, officially reported from:
  – AL, FL, GA, MS, SC, TN, TX
• Symptom expression appears to vary by cotton cultivar
Distribution following the 2018 season

So by mid-November 2018, we had identified virus-infected cotton in 13 MS counties
Cotton leafroll dwarf virus (CLRDV): 2018

• Symptoms:
  – Stunting due to shortening of the internodes
  – Leaf rolling
  – Petiole and vein reddening
  – Distorted new growth (youngest leaves)
  – Reduced flower set
  – Reduced boll size
  – Sterility

• Transmitted by the cotton aphid

• Up to 80% yield losses reported in Brazil
And so, 2019 came around........
CLRDV symptoms I – early symptoms

• Easiest to break symptom expression into observations at different times of the season
  
  – **BUT**, take note that CLRDD symptom expression can mimic herbicide injury

  – **Early-season symptoms (that we observed in MS):**
    
    • Yellowing of leaf margins
    • Puckering of leaves along the veins
    • Reddish leaf coloration (that some are referring to as a “bronze wilt-type” symptom)
    • Symptoms may tend to be masked over time with new growth from the plant making diagnosis of symptoms in the field difficult
CLRDV symptoms II – late-season in MS

- Leaf symptoms
  - Yellowing leaves
  - Rubbery, thicker leaves
  - Puckering of leaves along veins
  - Brittle leaves
  - Folded leaves in the upper canopy
  - Mis-shaped leaves
  - Smaller leaf size

- Stem/petiole symptoms
  - Thicker stems
  - Reddening of stems/petioles
  - Don-turned petioles

- Flower/boll symptoms
  - Increased square proliferation
  - Square abortion/cavitation
  - Flower sterility
  - Mis-shaped flower parts
  - Parrot-beaked bolls

- Whole plant symptoms
  - Stunted plants
  - Increased terminal growth
    - Referred to as a “whip”
  - Increased vegetative branching
  - Shortening of internodes
    - Or node stacking
  - Greener plants late in the season
Additional hosts

• Serve as a reservoir for the virus and can result in early and late-season infection post-aphid feeding

• Over-wintering hosts
  – Reported on:
    • Henbit
    • White clover
    • Perennial peanut

• In-season hosts
  – Reported on:
    • okra
    • Pigweed (MS)
So what’s left to determine?

• Overwintering hosts (both for aphids and virus reservoir)
  – Where do the aphids go?

• In-season additional hosts

• Variety susceptibility
  – Presence of resistance within commercial or experimental germplasm?

• Impact of the virus on yield
  – Even though we had the virus in a lot of places during 2019 we can’t assume that we lost a lot of yield as a result
Acknowledgements

- Dr. Bob Nichols
- Dr. Don Parker
- Dr. Jodi Scheffler
- Nick Tadlock
- Sanfrid Shaifer
- Walter Solomon
- Tessie Wilkerson