

Is CLRDV a Threat to Louisiana Cotton Production?



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Cotton leaf roll dwarf virus (CLRDV)

- Big problem in South America (80% yield losses reported)
- *Polerovirus* (family, *Luteoviridae*), positive-sense SSRNA
- Phloem-limited
- aphid-vectored (*Aphis gossypii*)
- Information out of South America indicates that aphids can transmit the virus in 40s, US entomologists skeptical
- Our strain is atypical in South America
- Our atypical strain is not completely identical to SA
- Amaranthaceae, Malvaceae, and legumes

Symptoms

1st Report in AL

- Foliar distortion
- Leaf curling
- Leaf rolling
- Bluish-green discoloration
- Vein-clearing
- Shortened internodes
- Dwarfing
- Reduced boll set

AU Extension Pub

- Leaf rugosity (puckering)
- Yellow veins
- Upward foliar cupping
- Red mid-veins
- Red, withered leaves
- Red petioles
- Accentuated verticality
- Downward foliar cupping
- Shortened internodes with zig-zag pattern
- Few blooms and bolls set

What can symptoms be confused with?

- Insect/mite damage
- Nematodes/seedling-root-stem diseases
- Herbicide damage
- Physical damage (implement, wildlife, hail, etc.)
- PGR overdose
- Nutrient deficiency
- Pima off-type
- Varietal characteristics
- “That’s just cotton being cotton” – Myra Purvis

Photos on social media implicating CLRDV



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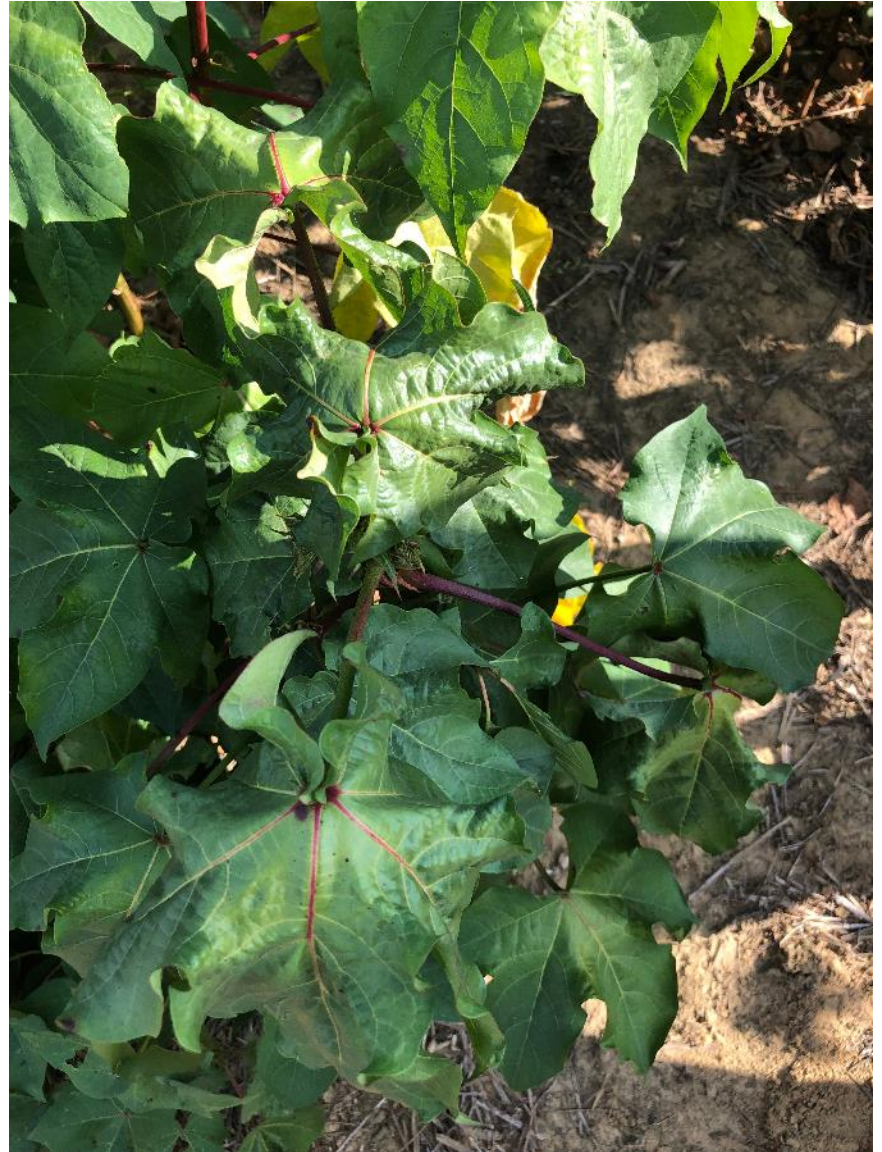
Confirmed Positive



Confirmed Positive



Confirmed Positive



Confirmed Positive



CLRDV Positive - LA



CLRDV Positive – LA

- Preliminary positive in LA (via PCR)
- Sequence results in...98% homology with AU
- Look for symptoms within two weeks of aphid infestation
- Chlorosis
- Distortion
- Puckering (Rugosity)



PLANS FOR 2020

- Coordinate with Dr. Brown/agents to identify heavy aphid infestations
- Monitor for CLRDV symptoms thereafter
- Sample cotton-producing parishes where symptoms are found
- Send samples to Dr. Valverde for PCR testing
- *Mark sampled plants in the field
- *Return to sampled areas for further symptom evaluation/**attempt yield loss estimates**
- Continue to collaborate with AU on “sentinel plots”

From my notes at the Beltwide...

- Virologists...4 total clades
 - Typical (Brazil and Argentina)
 - Atypical (Brazil and Argentina)
 - AL, US (*resistant varieties from SA, not resistant)
 - Different genotype in TX* complicates single introduction hypothesis
 - Ongoing efforts to develop ELISA kits
 - Improving detection methods
 - Discussed the possibility of developing transgenic plants

From my notes at the Beltwide...

- Entomologists
 - Circulative, persistent virus, phloem-limited
 - Hours to transmit usually
 - Speculated 30m-1.5h to reach phloem
 - Winged aphids transmit faster? 40s??
 - Caging with artificial infestation is the only way to determine yield losses
 - Preliminary data indicated increased yield losses and shortest plants from earliest infestations

From my notes at the Beltwide...

- Yield loss guesstimates...
 - AL 22%, 1 field; 5.1%-5.8%, 2 fields
 - MS 6 fields with “yield loss” and “compounding issues”
 - GA 32.31% loss over one field; 2 or 3 fields with “losses”

Incidence and Impact of Cotton Leaf Roll Dwarf Virus in 2019											
State	AL	AR	FL	GA	LA	NC	MS	SC	TN	TX	VA
CLRDV Formally Reported	yes	submitted	accepted	yes	in prep.	submitted	yes	yes	in prep.	yes	positive
% Fields Symptomatic	90%	< 0.01%	>20%	100%	50-60%	unknown	100%	80%	15%	unknown	n/a
% Symp. Plants in Symp. Fields	0-30%	< 0.01%	~ 5%	1-50%	0.0001%	unknown	5-100%	0-25%	25%	unknown	n/a
% Plants Reduced Boll Load	0-30%	< 0.01%	unknown	0-30%	unknown	unknown	1-5%	0-5%	5%	unknown	n/a
% Plants Zero Boll Load	< 0.10%	< 0.01%	unknown	<0.01%	unknown	unknown	0.001%	0-5%	0	unknown	n/a
# of Complaints Received	1	0	4	1	2	2	5	1 or 2	twelve	0	n/a
Fields with probable Yield Loss	10-20%	unknown	unknown	2	very few	0 known	6	<1%	0-10	0 known	0
Range of Yield Loss	0-20%	unknown	0 - high	0-25%	unknown	unknown	0-10%	0-5%	unknown	unknown	n/a
Mean Yield Loss	0.20%	unknown	unknown	0.00%	< 1%	unknown	0.0001%	<1%	unknown	trace	n/a

Cotton leaf roll dwarf virus (CLRDV)

my take at this point...

- Yes, we have the virus
- No, we shouldn't panic
- Yield loss estimates currently unreliable
- 2019 in LA...Incidence very low, no yield losses
- Don't overuse insecticides, don't change IPM
- Be cautious of folks selling "cures"
- Don't believe everything on social media
- Just because cotton plants are doing strange things doesn't mean the virus is at fault...
- Late season diagnosis is sketchy

Thanks to Cooperators!

Myra Purvis

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Boyd Padgett

Scott Washam + Crew

Warren Ratcliff + Crew

Darrell Franks + Crew

Daniel Stephenson

Donnie Miller



COTTON INCORPORATED

Agents

Producers

Consultants

Industry

Dan Fromme

Sebe Brown

Josh Copes

Regional Pathology
Group

Student Workers

Thank you for the opportunity!

