

# Sugarcane Brown Stripe, Yellow Leaf, Mosaic, and Yellow Canopy Syndrome

Andre Bueno Gama

Assistant Professor

Louisiana State University Agricultural Center

Department of Plant Pathology and Crop Physiology



*Making Life Sweeter Naturally*

# Brown stripe

- Sugarcane Brown stripe was first described by the International Society of Sugar Cane Technologists (ISSCT) as a disease caused by *Bipolaris stenospila* in the guide for sugarcane diseases.
- The disease is widely distributed through the main sugarcane growing regions in the world, including Australia, China, Brazil, India, and the US
- The causal agent is a fungus
- Dispersal of spores is mainly through wind and windblown rain



# Brown stripe

- Millions of spores are produced on dead leaves. Spores need free water to germinate and initiate infection
- The disease is considered a minor disease in many other regions of the world.
- In Louisiana, the disease became prevalent and increased in importance with the increased popularity of L01-299
- In China, brown stripe is described as one of the most important fungal disease, reportedly causing 30% sucrose yield losses



# Brown stripe

- Due to its importance in China, researchers started to investigate brown stripe more closely
- Researchers identified *Bipolaris setariae*, not *Bipolaris stenospila*.
- One of the most important varieties in China, ROC22 was initially rated as resistant to brown stripe
- Recently, this otherwise resistant cultivar was severely affected by brown stripe in certain regions.



# Brown stripe

- The hypothesis is a change in pathogen population.
- A survey was conducted in China and they found that *B. secalis* was also causing brown stripe, but even in the affected ROC22 plants, *B. setariae* was causing severe epidemics
- *Bipolaris* spp. are known to affect grasses, including maize and oats.
- The pathogen may survive in grasses that are weeds, but further research is needed to confirm this claim.
- The pathogen can survive in dead sugarcane leaves, where it reproduces



# Brown stripe

- Stakeholders and researchers observed higher incidence in L 01-299.
- Other varieties are known to be affected - L 03-371, HoCP 04-838, HoL 15-508, and HoCP 09-804
- Brown stripe in Louisiana and other locations has been linked to stresses – cold stress, herbicide-related stress, and water stress have been linked to increased severity
- Reports of higher severity in fields cut for seed the previous year
- Virtually no formal information coming out of literature from Louisiana

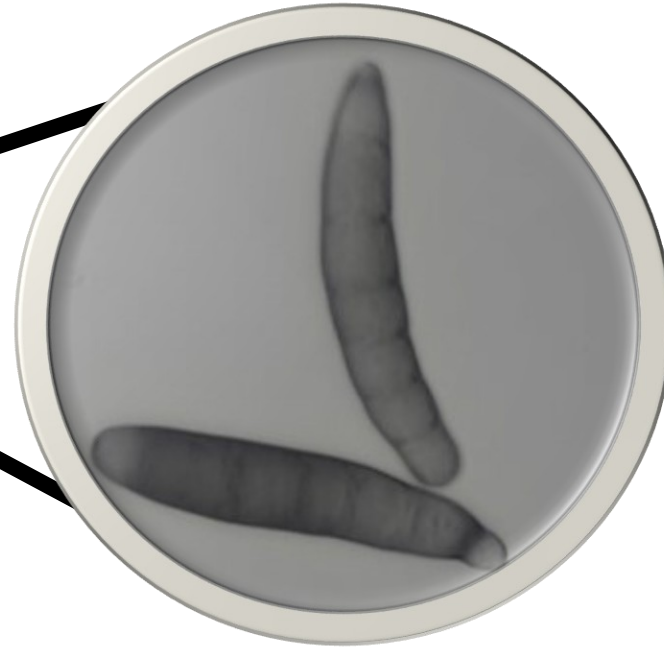


# Brown stripe

- Initially, in Louisiana the disease was thought to only appear in the spring, and would disappear after fertilization practices
- However, in 2024 and 2025 we have observed severely affected fields even in the summer
- Although no formal yield loss assessment due to brown stripe has been conducted, plants looked stunted and grower reported decreased sugar yields
- A research project has been initiated last year, currently under progress

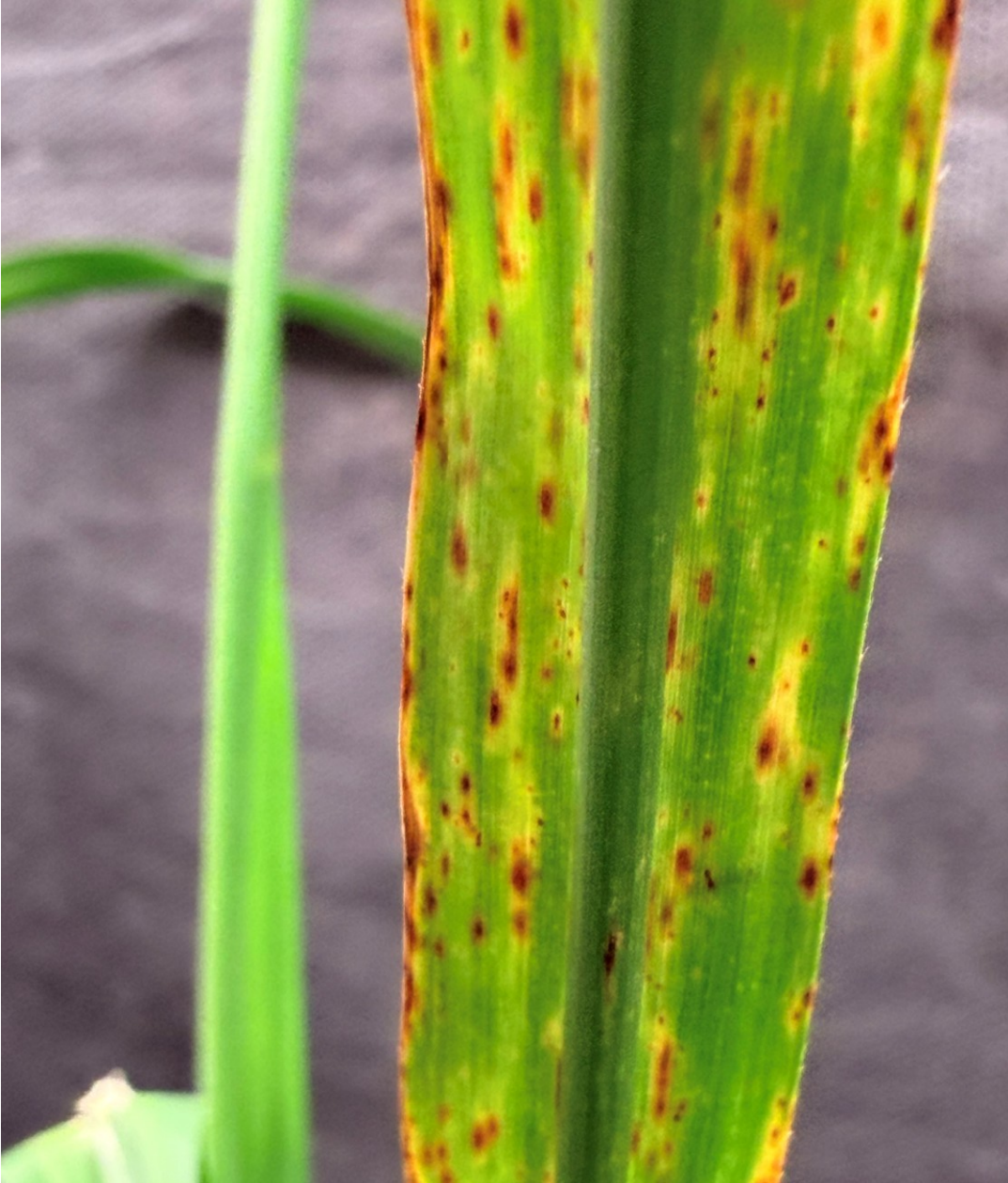


# Brown stripe research



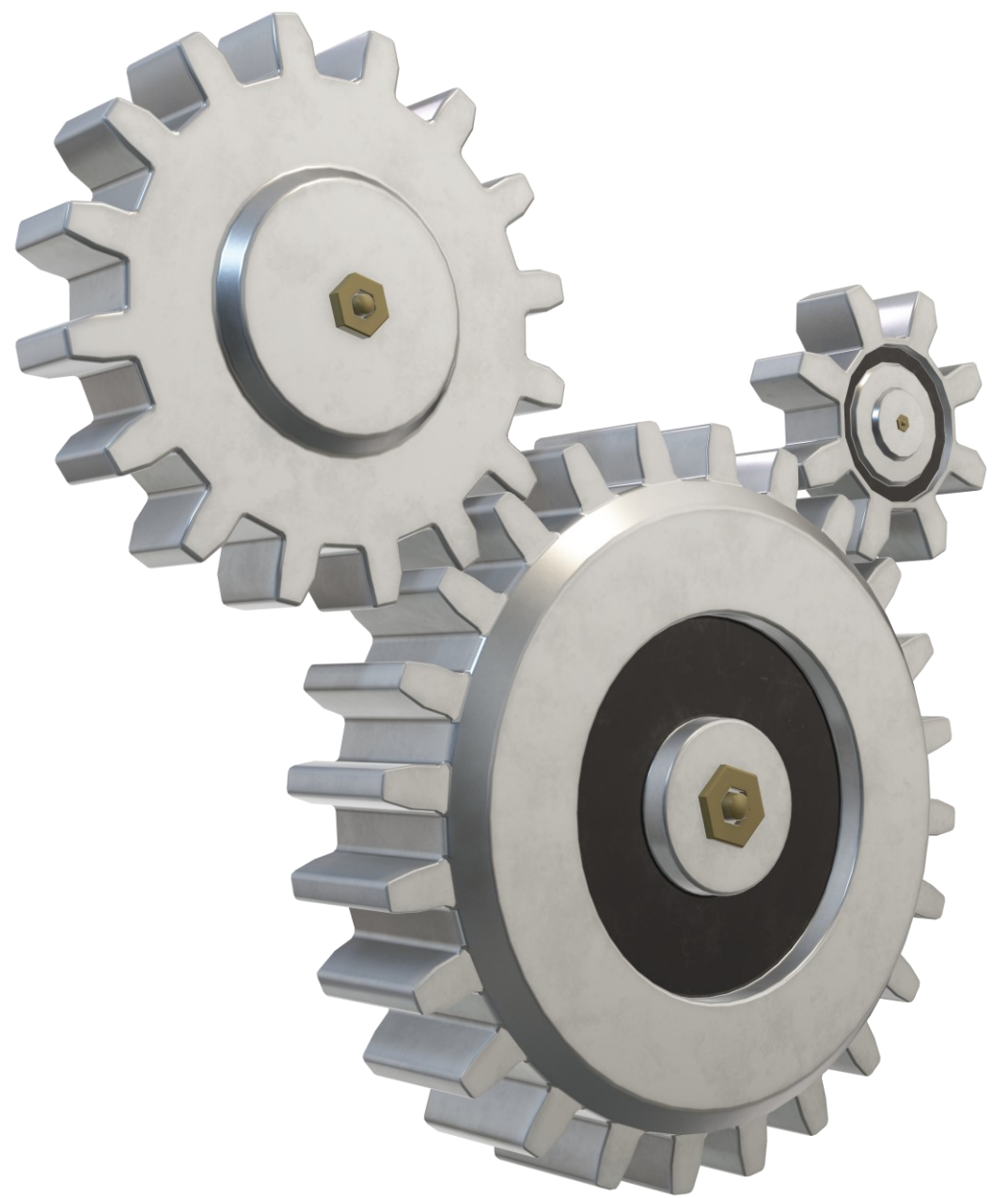
- First things first – identification of the causal agent
- Our team isolated the pathogen from multiple lesions and several locations from L01-299
- The pathogen was isolated, grown in culture medium, and inoculated to healthy sugarcane plants
- The symptoms were reproduced

# Brown stripe research



- Inoculations were successful – L01-299
- Collaboration with Dr. Vinson Doyle at LSU – species-level identification, most likely *Bipolaris setariae*
- **Future research** – test traditional and alternative management approaches to control brown stripe disease
  - Fungicide applications
  - Stress mitigation with nutrients and beneficial elements
  - Plant Defense Response activators

# SHIFTING GEARS



# Yellow Leaf and Mosaic Diseases

- **Sugarcane yellow leaf disease** is caused by sugarcane yellow leaf virus (SCYLV)
- **Sugarcane mosaic disease (shown on the picture on the right)** is caused by two viral species in Louisiana – sorghum mosaic virus (SrMV) and sugarcane mosaic virus (SCMV)
- We will talk about these diseases separately – but **SCYLV does not cause** the yellow canopy syndrome – I understand these names can be confusing!



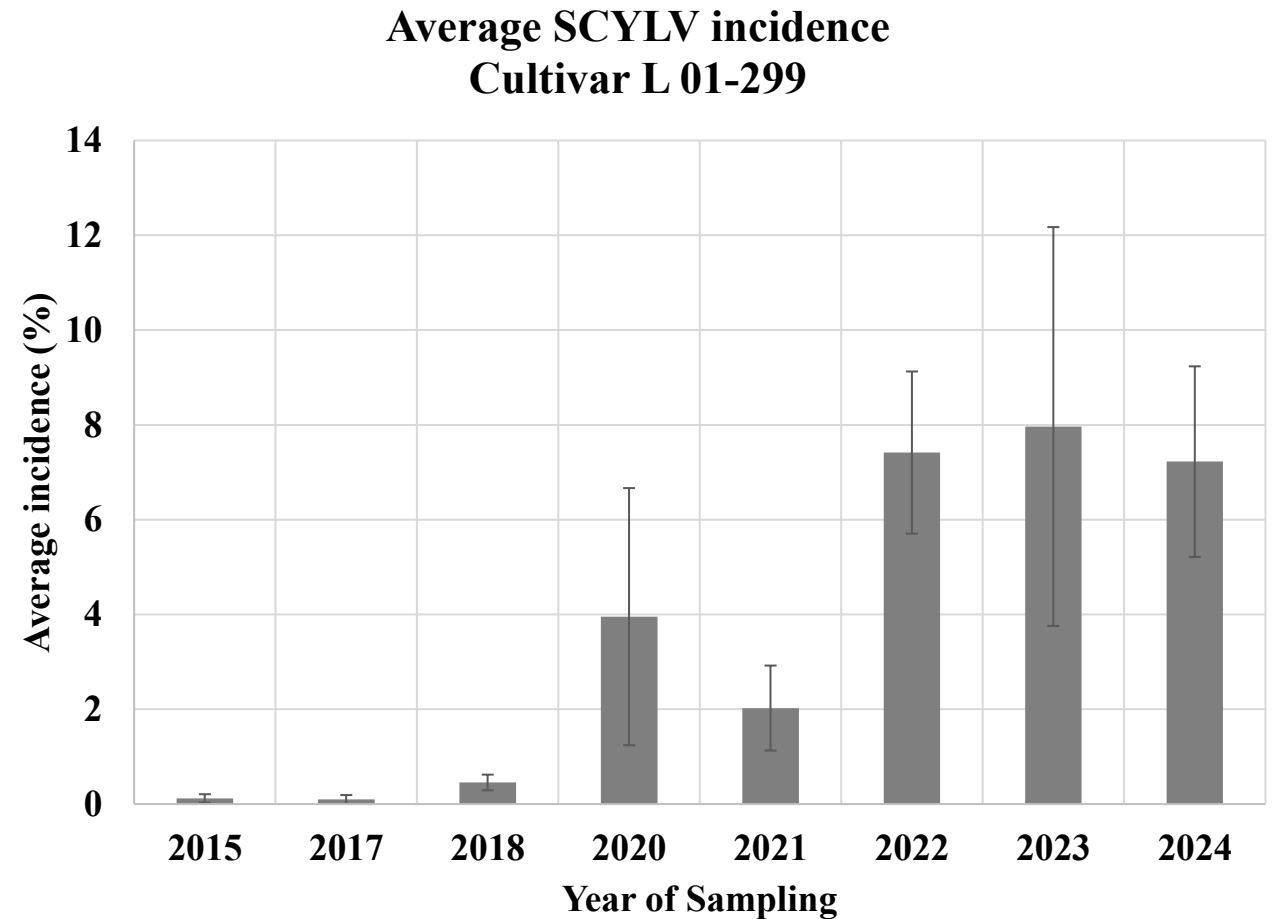
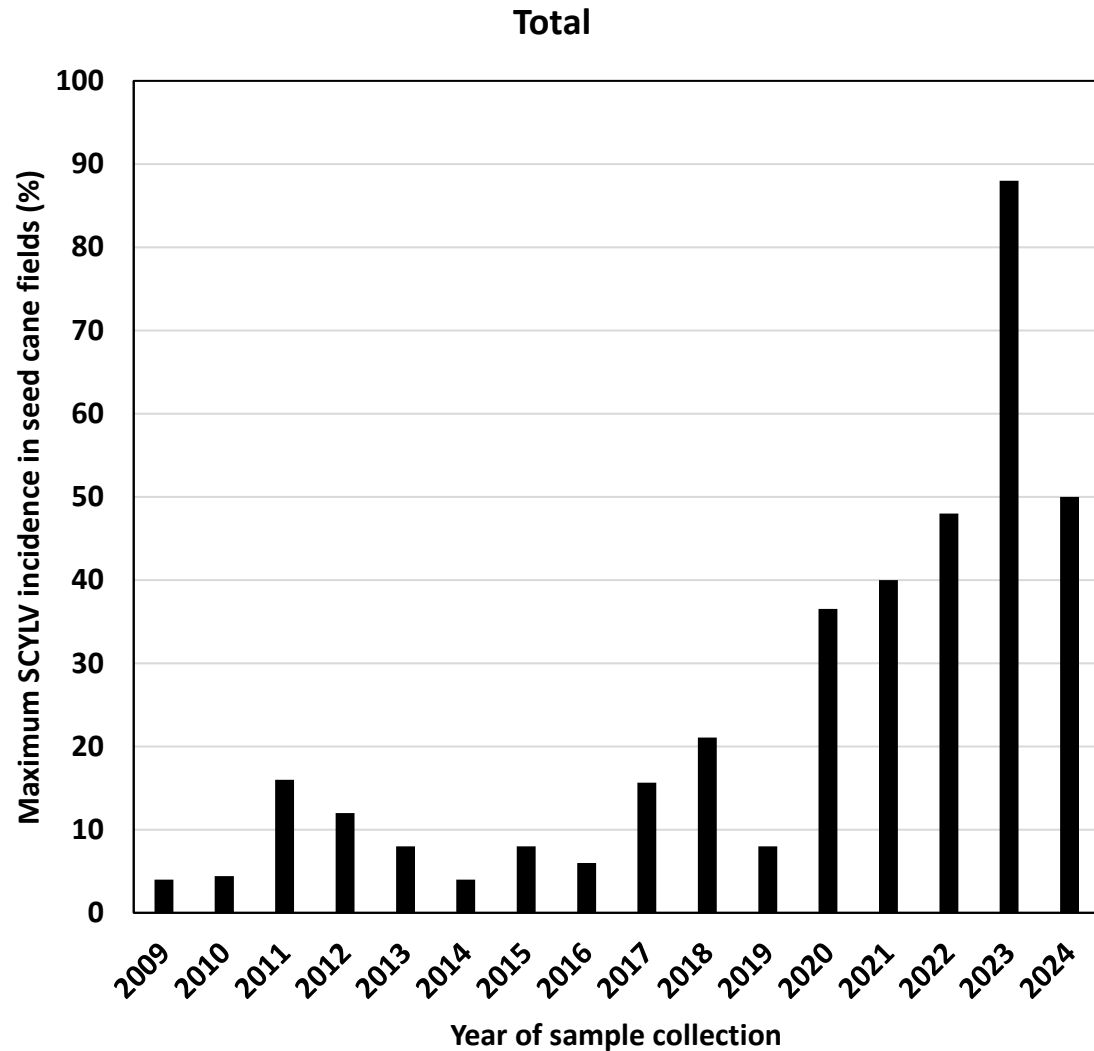
# Yellow Leaf Disease

- **Sugarcane yellow leaf disease** is caused by sugarcane yellow leaf virus
- First reported in Hawaii in 1988 and in Brazil in 1992.
- The disease was first detected in Louisiana in 1996, with reported 11-14% yield losses in variety LCP 82-89.
- The disease is transmitted by vectors, especially *Melanaphis sacchari* and *Melanaphis sorghi*, but other aphid vectors may be involved in transmission.
- SCYLV is **NOT TRANSMITTED MECHANICALLY!**
- The disease can also be transmitted via infected seed cane



# Yellow Leaf Disease – incidence in seed cane fields

SCYLV incidence, meaning the percentage of samples testing positive for SCYLV, has increased in recent years



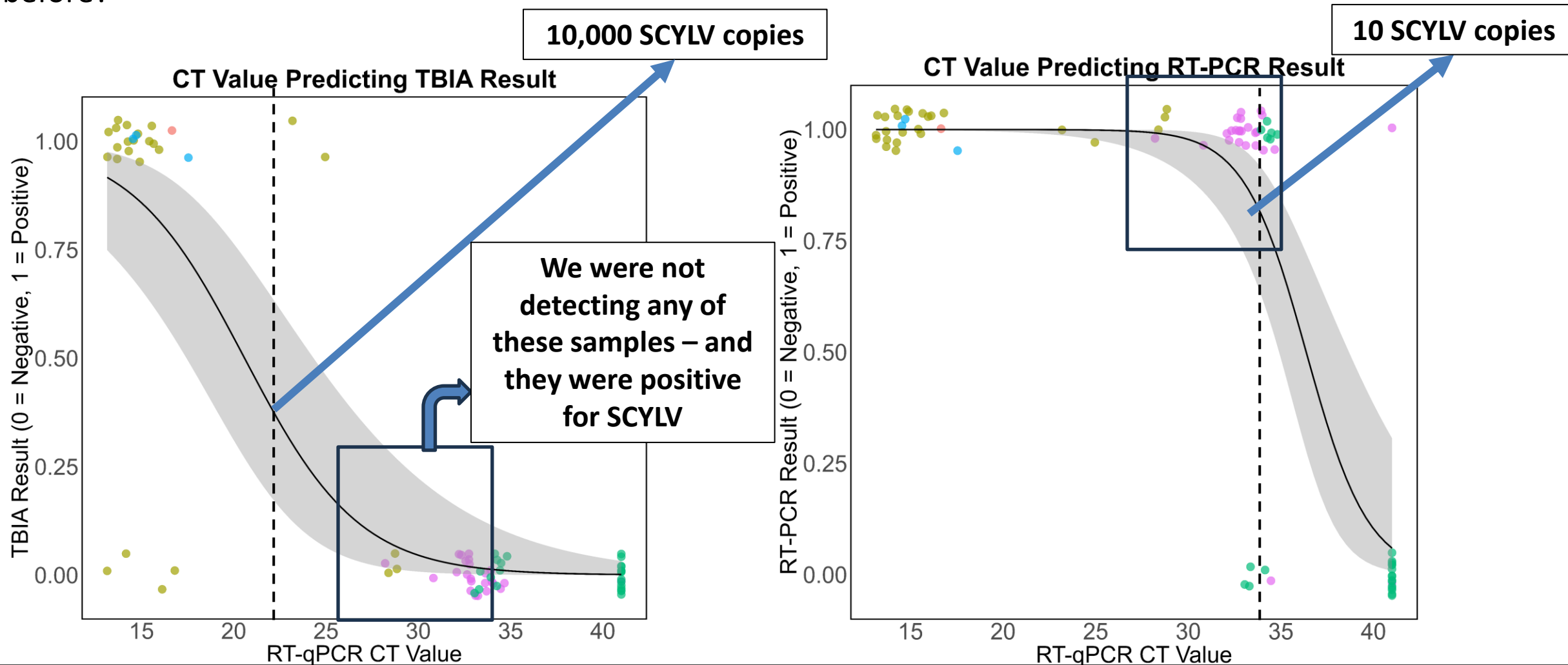
# Yellow Leaf Disease

- We will cover SCYLV incidence in commercial fields later, but spoiler alert – it is high.
- This disease is almost always asymptomatic in Louisiana – meaning you won't see the typical symptoms shown in the image on the right
- The disease reportedly caused yield losses in asymptomatic epidemics
- However, given its current incidence, we may have unintentionally selected for tolerance to yellow leaf disease
- Tolerance – ability to prevent yield losses even when infected



# Yellow Leaf Detection – Tricky business

- Viruses are tricky to detect. We used to detect SCYLV using tissue blot immunoassay. However, with this technique we can only detect 10,000 or more copies of the virus. Were we spreading SCYLV unintentionally before?



# Yellow Leaf and Mosaic Diseases

- **Mosaic disease** in sugarcane is caused by different species – sorghum mosaic virus (SrMV) and sugarcane mosaic virus (SCMV)
- A previous survey conducted in Louisiana in 2016 and 2017 identified only SrMV, but tested mostly HoCP 09-804.
- In other parts of the world, both species are identified.
- Mosaic disease almost wiped out the industry in the 1920s!!!



# Yellow Leaf and Mosaic Diseases

- **Mosaic disease** symptoms in Louisiana are usually visible until May
- **During the active growth stage, mosaic symptoms may disappear from otherwise symptomatic plants**
- Symptoms are easier to spot during cloudy days – or by using an umbrella to block direct, incidence sunlight from plants
- Mosaic is transmitted by **infected seed cane, aphids, and mechanically**, different from SCYLV.



# Sugarcane Disease Detection Team – Sugarcane Disease Survey

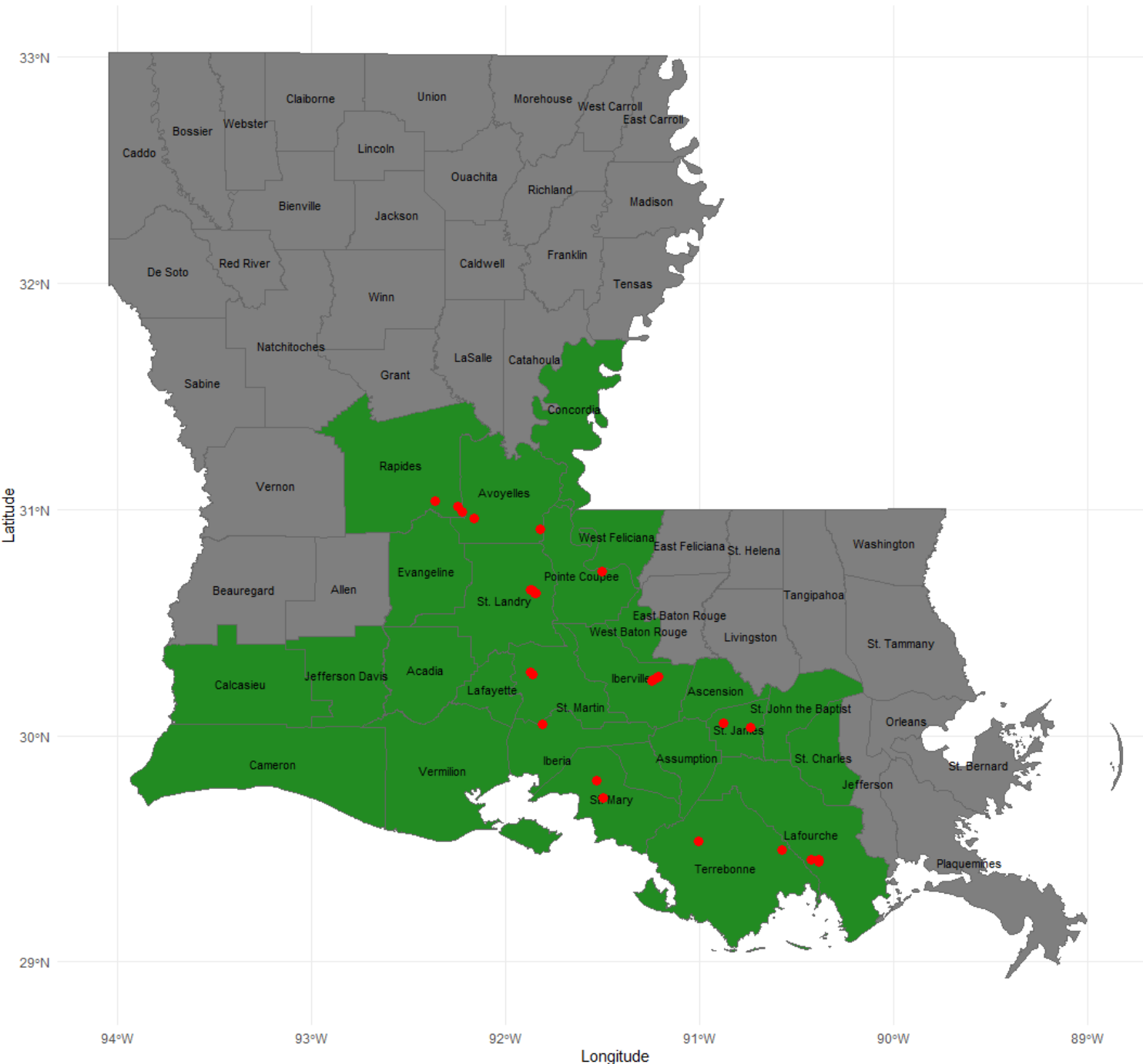
- Main objective – to understand the status of the main sugarcane diseases in Louisiana

- Targets:

- Ratoon Stunt Disease
  - Leaf Scald
  - Sugarcane Yellow Leaf Virus
  - Sugarcane Mosaic Virus
  - Sorghum Mosaic Virus
- } Bacteria
- } Virus



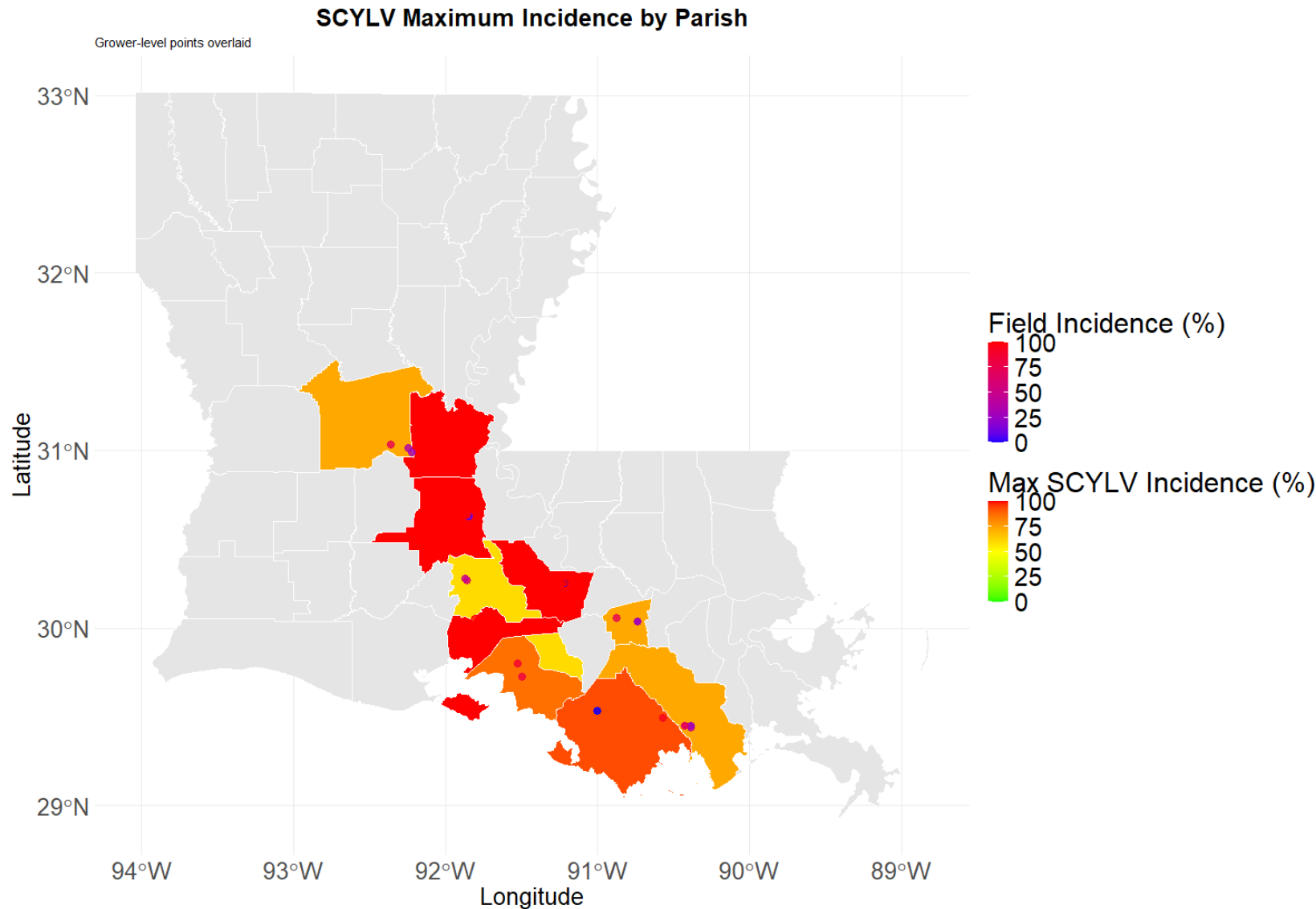
Surveyed Sugarcane Fields in Louisiana  
Sugarcane-producing parishes highlighted in green



# Sugarcane Disease Detection Team – Sugarcane Disease Survey

- 31 Commercial Sugarcane Fields sampled and increased testing in the breeding program plots
- More sensitive molecular techniques for disease detection – qPCR for bacterial pathogens and RT-PCR for viruses
- Great news – we did not find any fields with RSD
- One field with leaf scald in St. James Parish – Ho 13-739 and HoCP 04-838

# Sugarcane Disease Detection Team – Sugarcane Disease Survey



## Sugarcane Yellow Leaf Virus – SCYLV

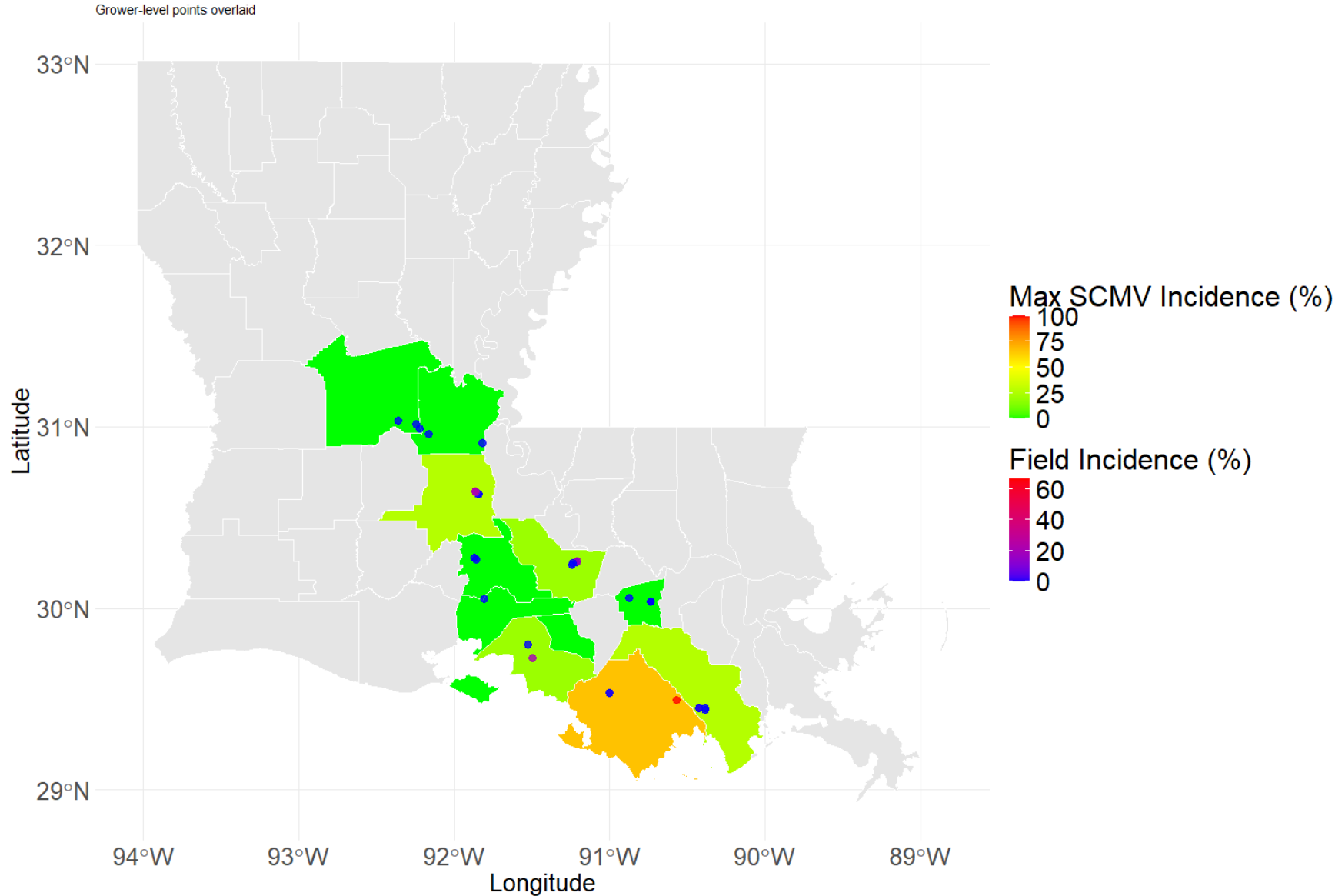
Ho 12-615, L01-299, HoCP 14-885, HoCP 04-838, Ho 13-739, HoCP96-540, L09-112, L 15-306 – all tested varieties tested positive

Only two fields tested negative – L01-299.

High incidence – only 4 out of 30 fields testing below 10% positive, 26 fields testing over 20% positive, and 20 fields testing over 50% positive

# Sugarcane Disease Detection Team – Sugarcane Disease Survey

## SCMV Maximum Incidence by Parish



Sugarcane Mosaic Virus – SCMV

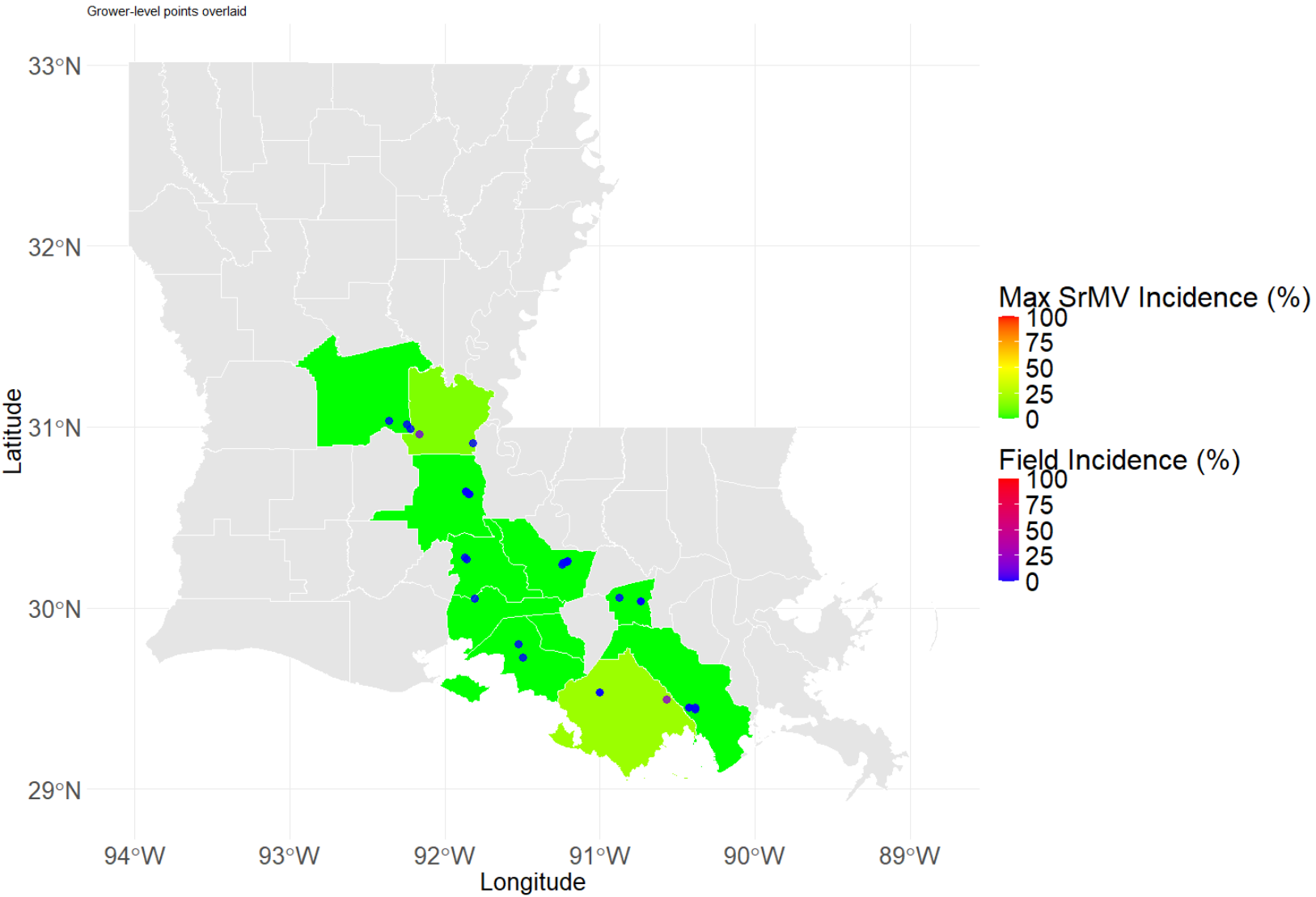
L01 – 299 (Plant Cane at lower incidences, 4<sup>th</sup> and 6<sup>th</sup> stubble higher incidences) and L 15-306 (Plant Cane, one field) only

Incidences ranging from 6.7% to 67%

Worth paying attention to this disease!

# Sugarcane Disease Detection Team – Sugarcane Disease Survey

SrMV Maximum Incidence by Parish

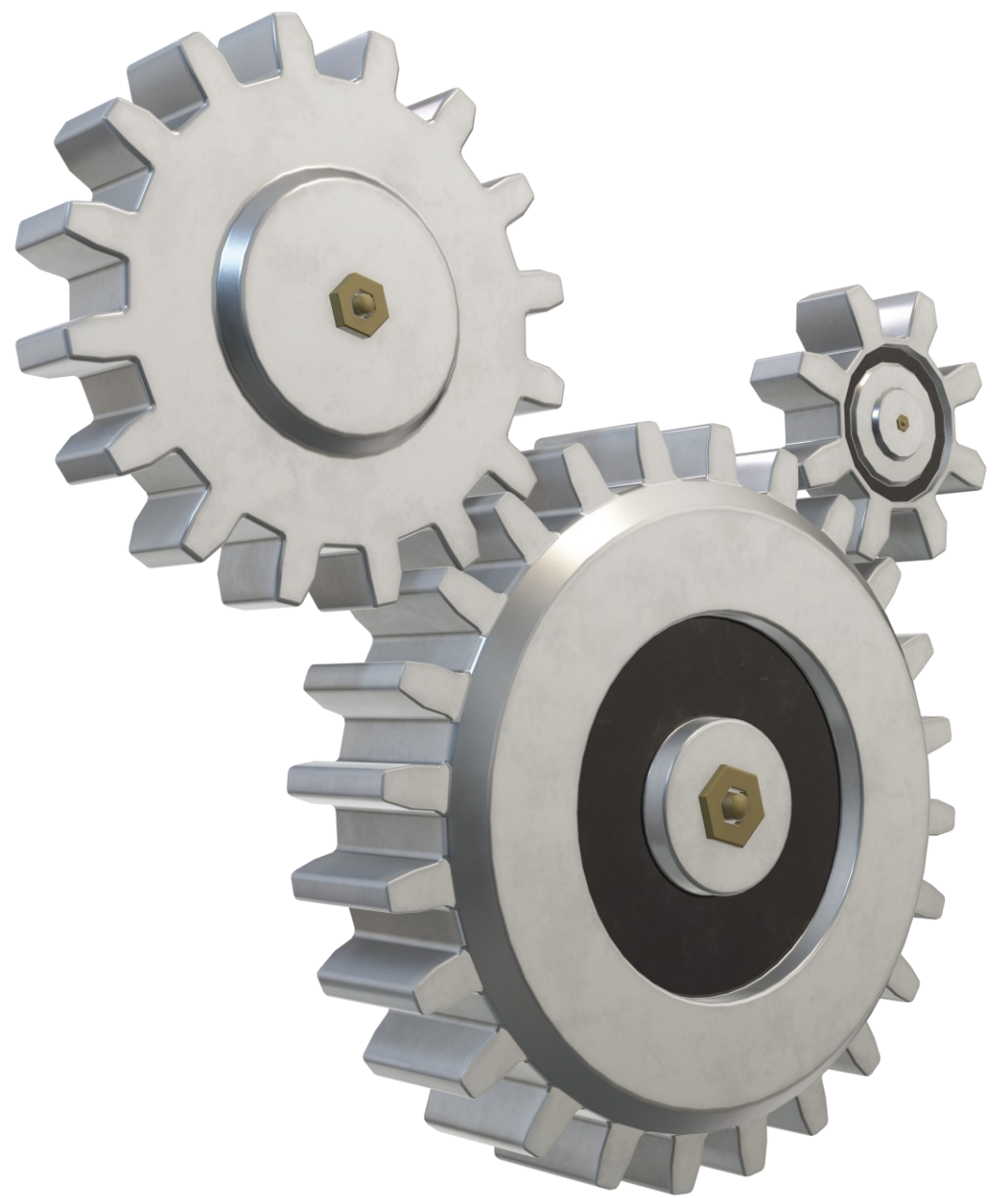


Sorghum Mosaic Virus – SrMV

Two positive fields - L01 – 299 6<sup>th</sup> and PC, 20 and 13% positive, respectively

Surprisingly, lower incidence than SCMV.

# SHIFTING GEARS



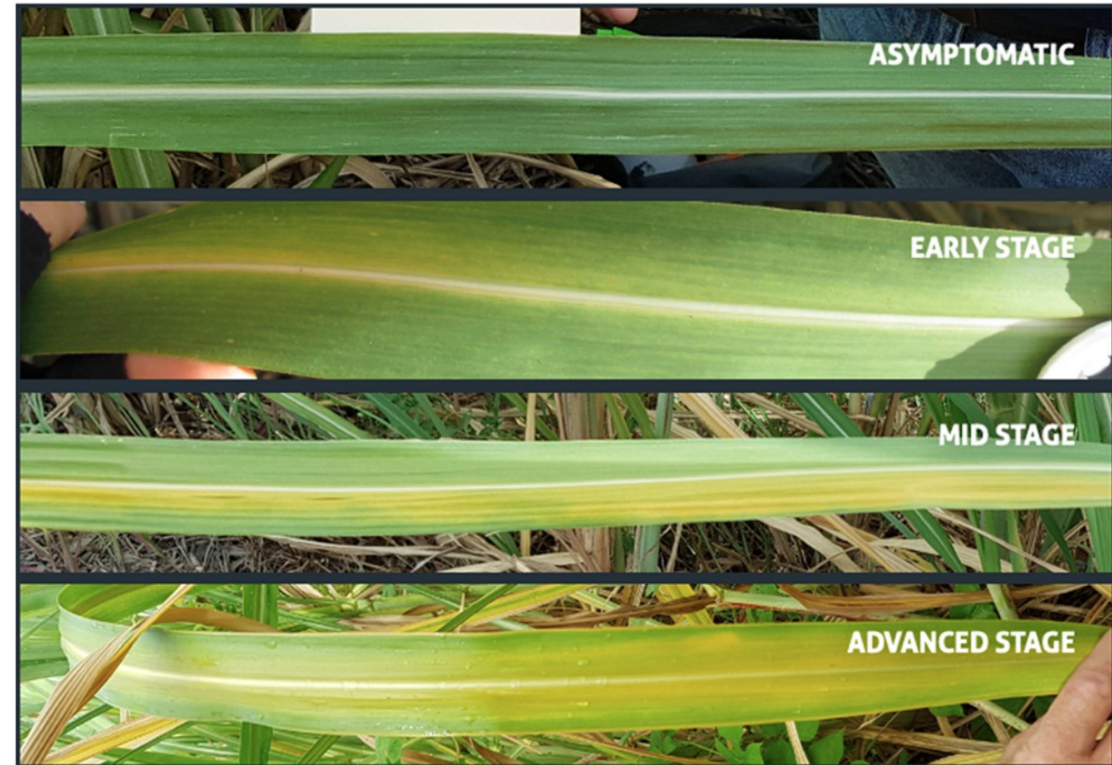
# Yellow Canopy Syndrome

- An apparent case of yellow canopy syndrome was observed last year by Dr. Kenneth Gravois and other researchers in Louisiana.
- Yellow Canopy Syndrome is NOT yellow leaf disease, therefore it is **NOT caused by** sugarcane yellow leaf virus
- **Syndromes**, by definition, are hypothesized to have multiple causes, often the combination of **biotic** (e.g., pathogens and insect pests) and **abiotic** (e.g., water stress, nutrient deficiency or excess)
- YCS caused prominent yellowing of plants and reduced sugar yields.



# Yellow Canopy Syndrome (YCS)

- Yellow canopy syndrome was first reported in Papua New Guinea since 2008.
- It was first reported in Australia in 2012.
- Despite more than a decade of research, the disease, the causal factors are unknown, although the main hypotheses are insect infestations and long dry periods followed by rainfall.
- Insecticide applications reportedly reduce symptom expression and increased sugar yields compared to nontreated controls in Australia



Source: Xu et al. 2026

# Yellow Canopy Syndrome

- Dr. Blake Wilson identified the invasive Pasture Mealybug (*Helicococcus summervillei*) infestations were observed in affected fields in Louisiana, however, it is unknown whether that is the main cause.
- Nematode populations were higher in YCS fields as well – but not in all cases.
- My hypothesis – a complex of issues (meaning, combination of different problems, meaning – a syndrome)
- USDA and LSU AgCenter researchers are investigating the issue.



# Acknowledgements

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THANK YOU!  
Any Questions?

