

An aerial photograph of a coastal wetland area. The landscape is a mix of green marshland and brown, muddy water. A large, irregularly shaped body of water occupies the lower-left and central portions of the frame. A small boat is visible in the lower-right part of this water body. The surrounding land is a mix of vibrant green and brownish-green, indicating different stages of vegetation or water saturation. The horizon is flat and extends to the top of the image.

# Understanding the recent *Phragmites* die-offs in Louisiana

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Rodrigo Diaz  
Ian Knight  
Andy Nyman  
Blake Wilson

# Brief Intro:

- Phragmites Die-offs
  - [Premature senescence](#)
  - Poor regrowth/ retreat from open water
  - Encroaching invasive vegetation
- *Nipponaclerda biwakoensis*
- Ongoing research efforts



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## Brief Intro:

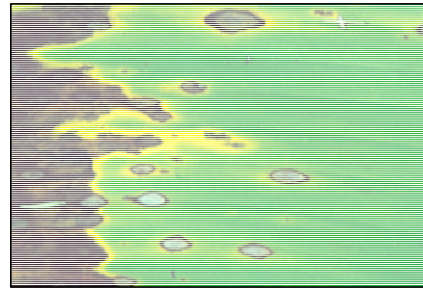
- Phragmites Die-offs
  - Premature senescence
  - Poor regrowth/ retreat from open water
  - Encroaching invasive vegetation
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# Caveat: Cause of Die-offs Still Unknown



Outbreak of exotic insect:  
Two mild winters, '15, '16



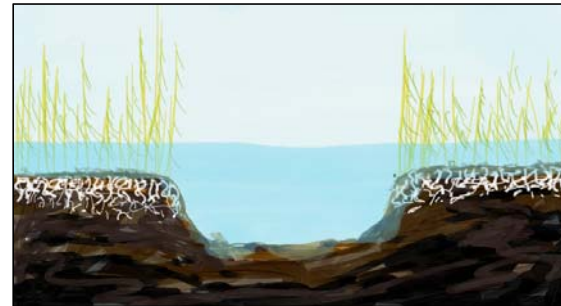
Plant pathogens



Toxins in sediments



Changes in salinity



Extended high water

# Overview

- Education and Outreach
- Monitor Distribution and Range Expansion
- Assess Host Range
- Investigate varietal resistance
- Evaluate insecticidal management options

# Education and Outreach: Website

The screenshot shows the top navigation bar of the LSU AgCenter website. It includes a search bar, links for PRODUCERS, CONSUMERS, RESEARCHERS, 4-H, and STORE. Below this is a secondary navigation bar with the LSU AgCenter logo and links for Topics, Services, Publications, News & Events, About, and Our Offices. The main content area features a large banner image of a marsh with the text "Roseau Cane Die-off" overlaid. To the right of the banner are logos for the LSU AgCenter, Louisiana Wildlife & Fisheries, Louisiana Department of Agriculture and Forestry, and CPRA. Below the banner is a paragraph of text: "The insect, roseau cane scale, is attacking Roseau cane, a plant that grows profusely along the coast. It is considered vital to the fragile marsh's longevity because the plant's root system binds the delicate soil. Finding a solution to controlling the insect that threatens the key vegetation in coastal Louisiana will require extensive research by the LSU AgCenter working with several other state agencies." At the bottom of the page is a row of five thumbnail images with labels: "DISTRIBUTION MAP", "ISSUE", "RESEARCH", "RESEARCHERS", and "RESOURCES AND NEWS".

Search

PRODUCERS CONSUMERS RESEARCHERS 4-H STORE

LSU AgCenter Research · Extension · Teaching

Topics · Services · Publications · News & Events · About · Our Offices ·

LSU College of Agriculture

Invasive Species Roseau Cane Die-Off

## Roseau Cane Die-off

LSU AgCenter Research · Extension · Teaching

LOUISIANA WILDLIFE & FISHERIES

LOUISIANA DEPARTMENT OF AGRICULTURE AND FORESTRY

CENTRAL PROTECTION AND RESTORATION AUTHORITY CPRA

The insect, roseau cane scale, is attacking Roseau cane, a plant that grows profusely along the coast. It is considered vital to the fragile marsh's longevity because the plant's root system binds the delicate soil. Finding a solution to controlling the insect that threatens the key vegetation in coastal Louisiana will require extensive research by the LSU AgCenter working with several other state agencies.

DISTRIBUTION MAP

ISSUE

RESEARCH

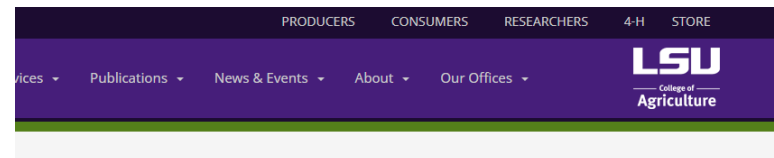
RESEARCHERS

RESOURCES AND NEWS

<http://www.lsuagcenter.com/roseaucane>



# Develop information and press releases for stakeholders



## News



**Louisiana sugarcane crop toughs excess rain and pests**  
(Video 07/26/17) Louisiana's sugarcane crop seems to be in good shape despite seeing excessive rainfall.



**Senate bill includes directives to manage invasive cane scale**  
(07/28/17) The U.S. Senate Appropriations Committee included in the 2018 Ag Appropriations Bill two directives to develop a program to manage Roseau cane.



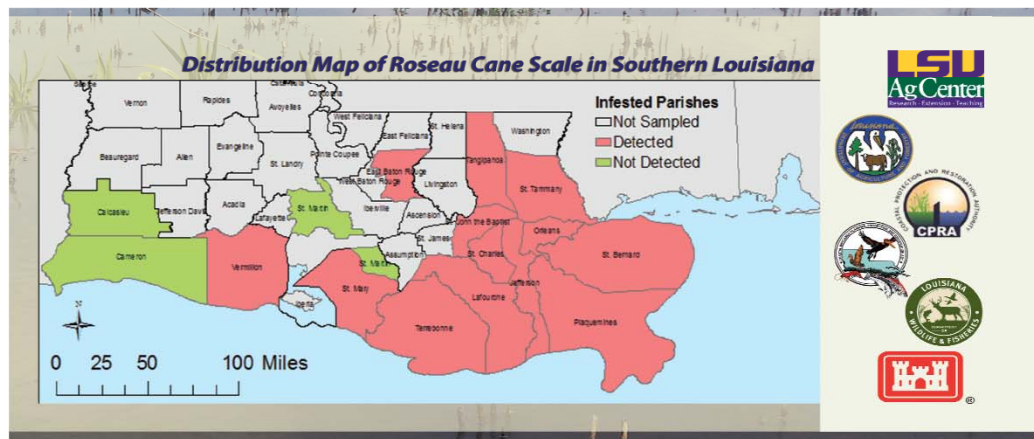
**Scale insect attacking coastal vegetation raises concerns**  
(06/16/17) Finding a solution to controlling an insect that threatens the key vegetation in coastal Louisiana will require extensive research by the AgCenter.



**Field survey collects samples to study Roseau cane pest**  
(06/07/17) A team of 16 scientists and students led by the LSU AgCenter conducted a survey to collect samples of a small insect that threatens fragile marsh.



# Develop push cards

- >3000 cards printed and distributed to stakeholders and interested parties at the start of duck season



## Invasive Roseau Cane Scale




Following die-offs of Roseau cane in lower Plaquemines Parish, an invasive scale insect was detected infesting stands. A multi-agency effort is underway to understand the cause of the die-offs and the potential impacts of the invasive scale. Preventing its spread and mapping its location are critical.

**What can you do?**  
With waterfowl season approaching, hunters can help reduce the spread by:

- avoiding cutting and moving Roseau cane for duck blinds.
- rinsing boats that come in contact Roseau cane—especially when in infested parishes.
- do not move cane between parishes.

Help us improve our distribution map by submitting observations of infested and scale-free Roseau cane at: <https://www.surveymonkey.com/r/PhragmitesSurvey>

**Identification**  
Two species of the scale insect have been reported on Roseau Cane in Louisiana:

- Invasive scale occurs in high numbers per stalk.
- Live scales are cream colored, while dead females are brownish.
- Native scales occur in low numbers and can be distinguished by their dark-pointed tip, which is not considered to be harmful.

**LSU AgCenter.com**



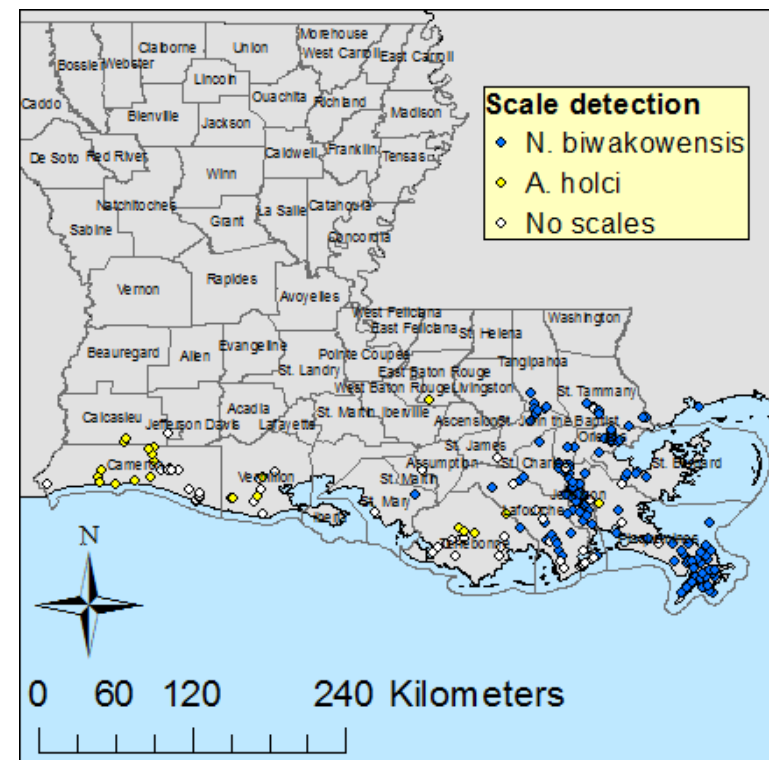
# Give on-site presentations to stakeholders

- Diaz – BTNEP, LSU Sugarcane Field Day, State delegates in DC, LA Private Landowners Association, Natural Resources House Committee
- Wilson – Rainey Conservation Alliance
- Nyman – Plaquemines Association of Business & Industry
- Knight – East Ascension Sportsman's League, CWPPRA Task Force
- Gill – Parish Zone Managers



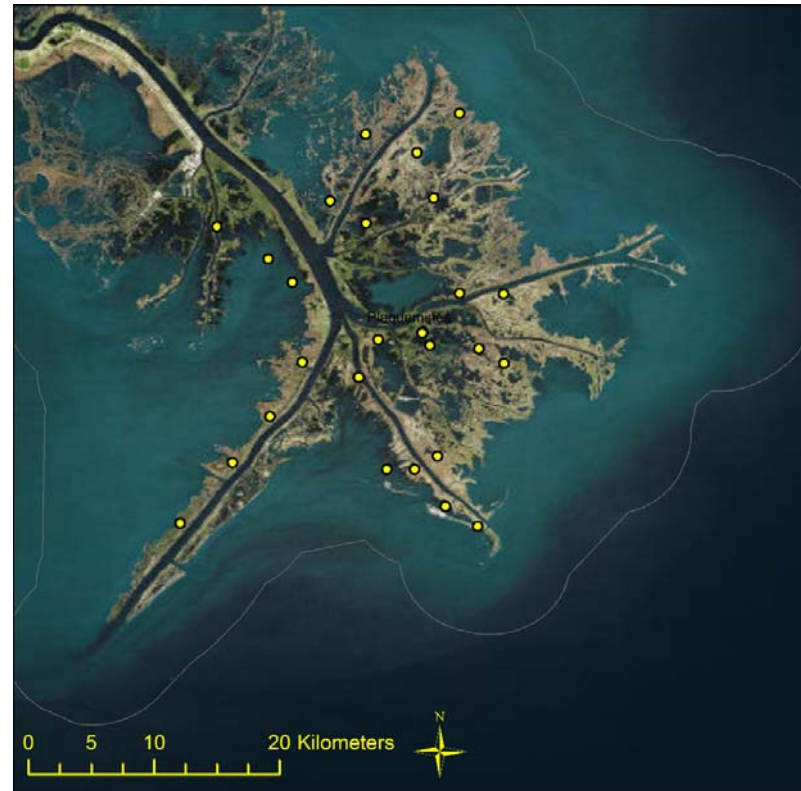
# Monitor Distribution and Range Expansion

- State-wide Roadside Sampling (Summer 2017)
- Public contributions through Survey Monkey
  - Confounding with native scale
- Periodical transect sampling in MRD
- Summer 2018: focus on monitoring un-infested roseau populations
- Updated map available on website

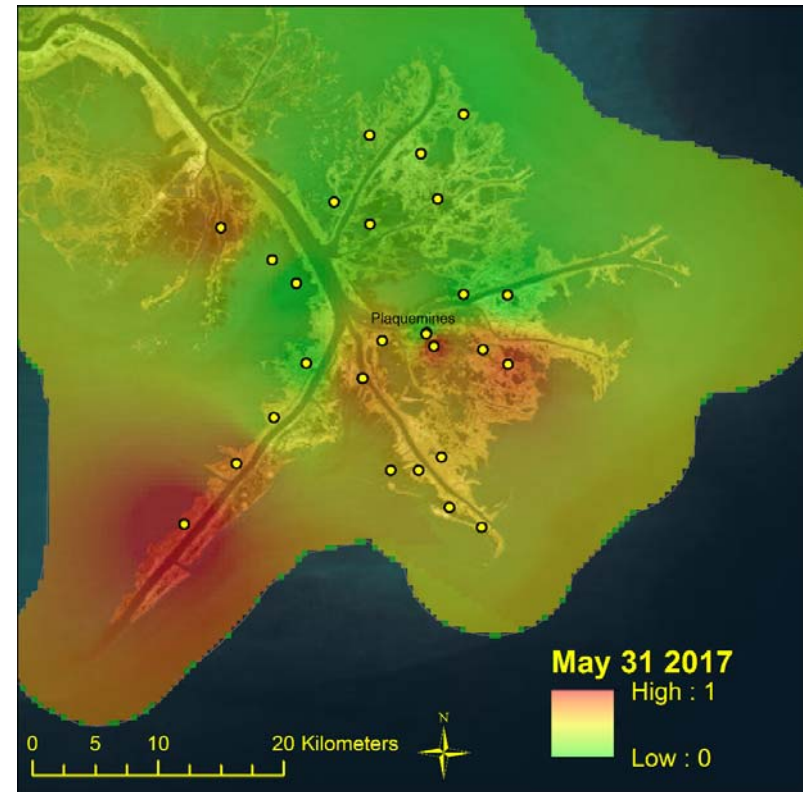
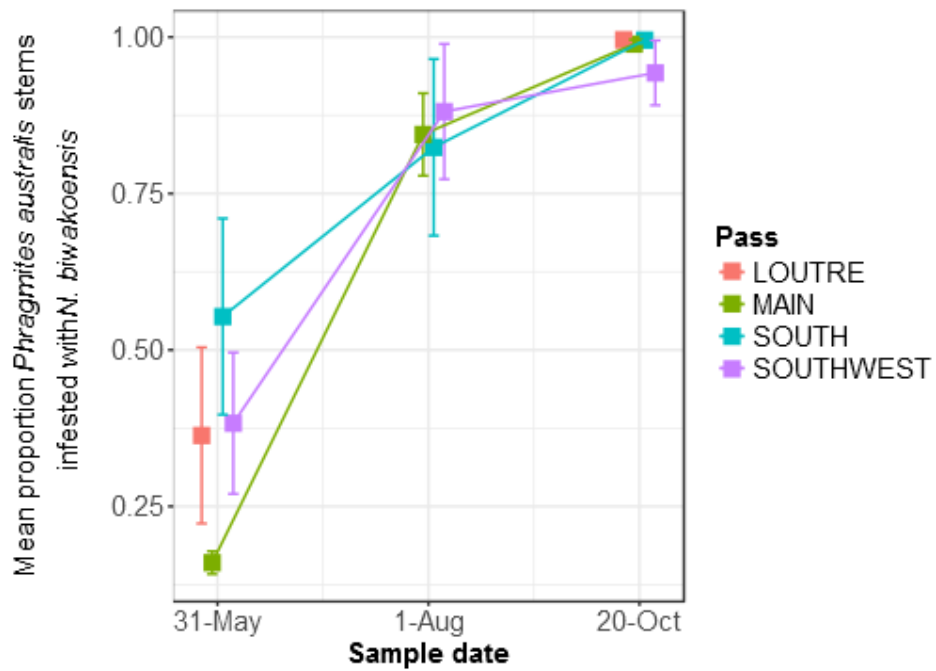


# Birds-foot Delta Transects

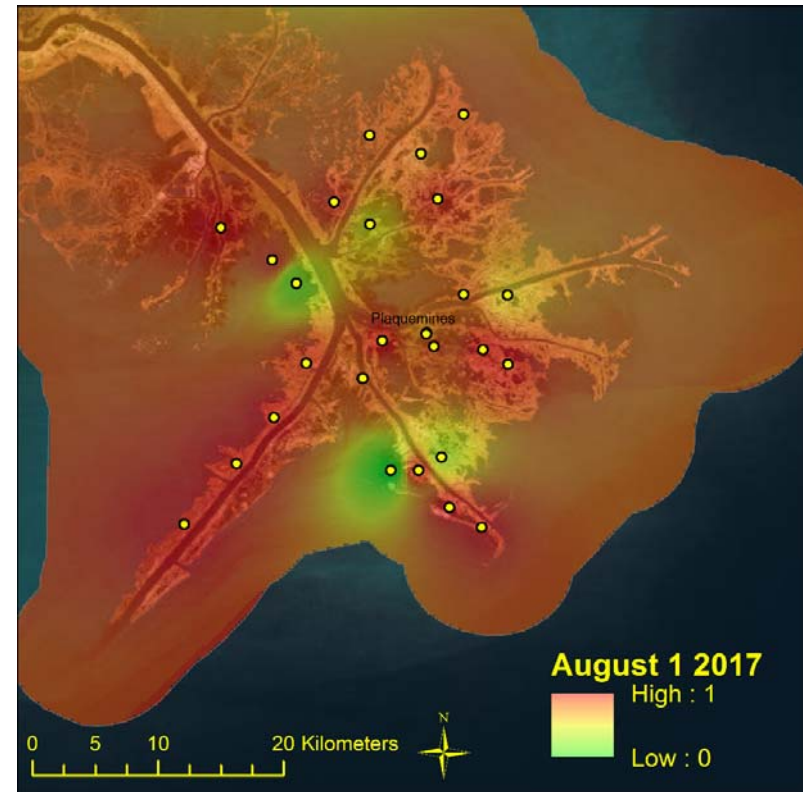
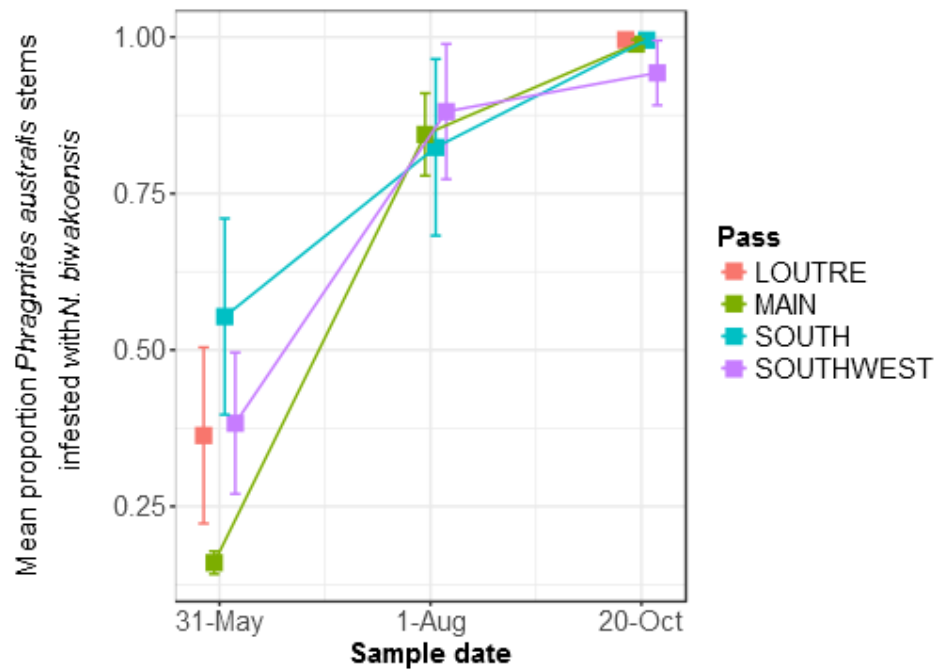
- Sampling every 2-3 months
- Stem heights/ densities
- Proportion stems infested
- Scales per stem
- Parasitism



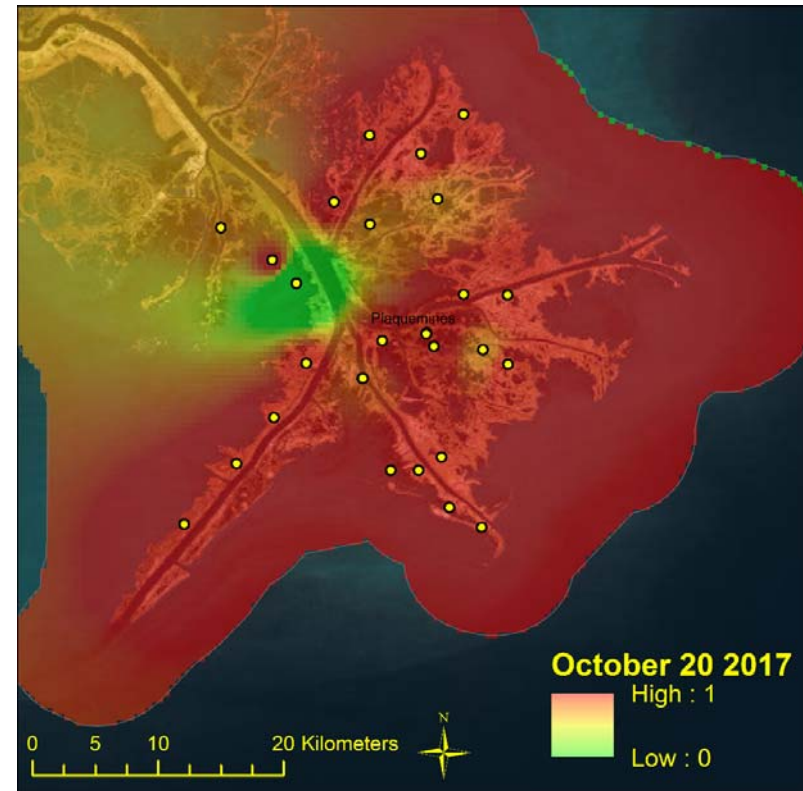
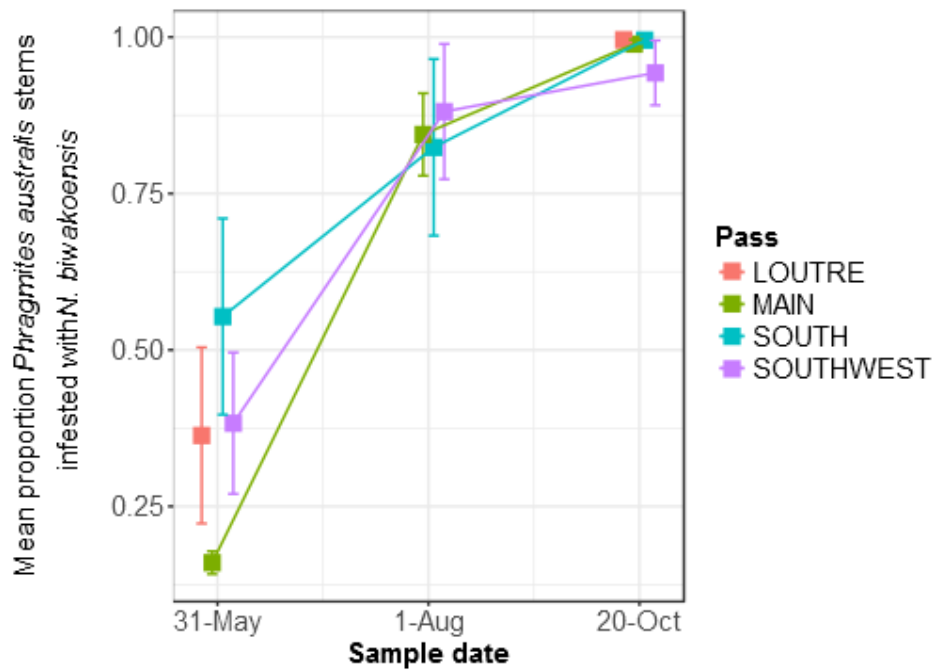
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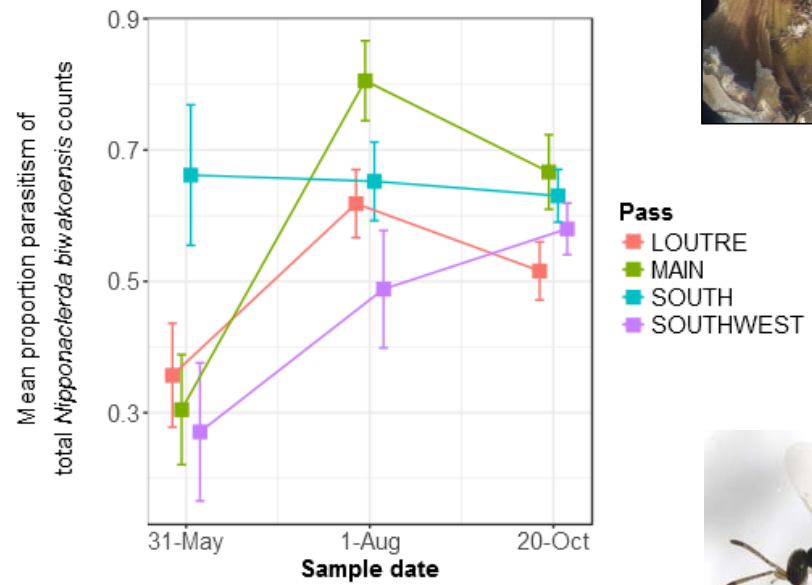
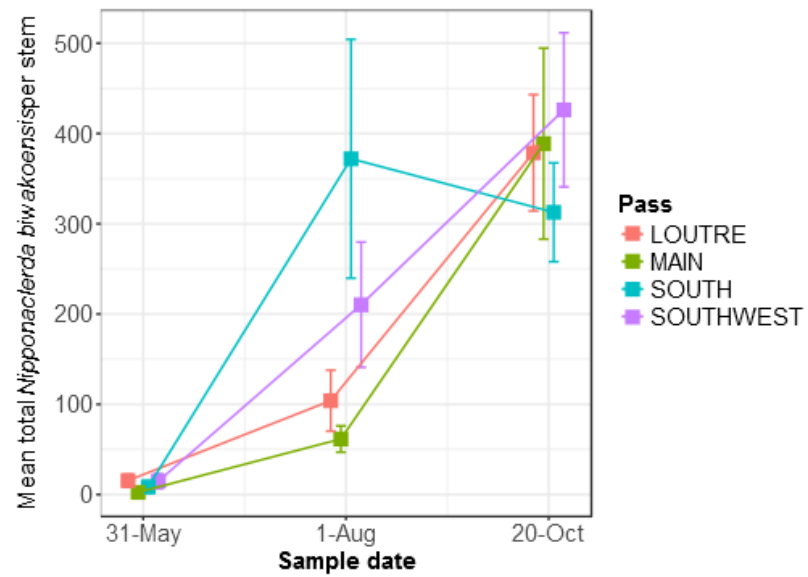


# Birds-foot Delta Transects





# Birds-foot Delta Transects



# Assessing Host Range

## Grass Crops

- Sugarcane ≈450,000 acres
- Rice ≈400,000 acres
- Corn ≈500,000 acres
- Sorghum ≈50,000 acres

## Resident Marshgrasses

- Sawgrass, cutgrass, maidencane, hog cane, paragrass, bullwhip, Spartina, giant reed



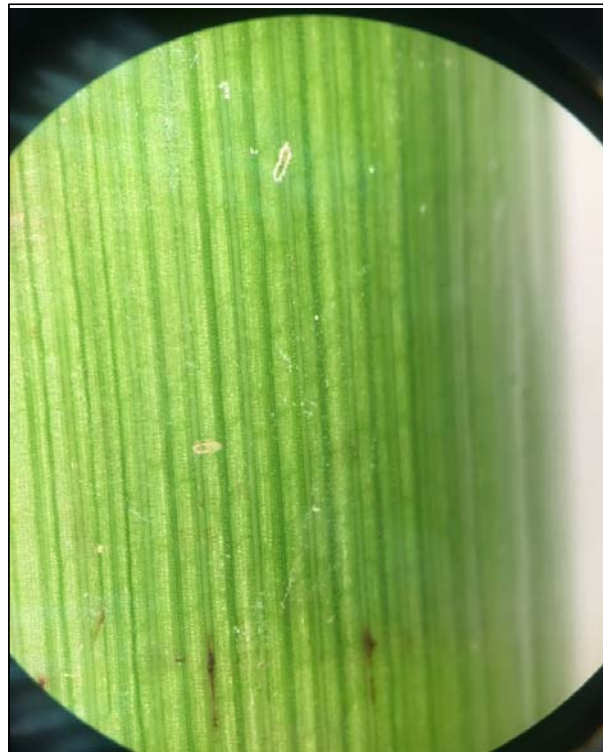
# Preliminary Inoculations



# Preliminary Inoculations

## Results:

- Little to no survivorship
- Some development on sorghum
- Will nymphs complete development?
- New trials underway with augmented infestation treatment





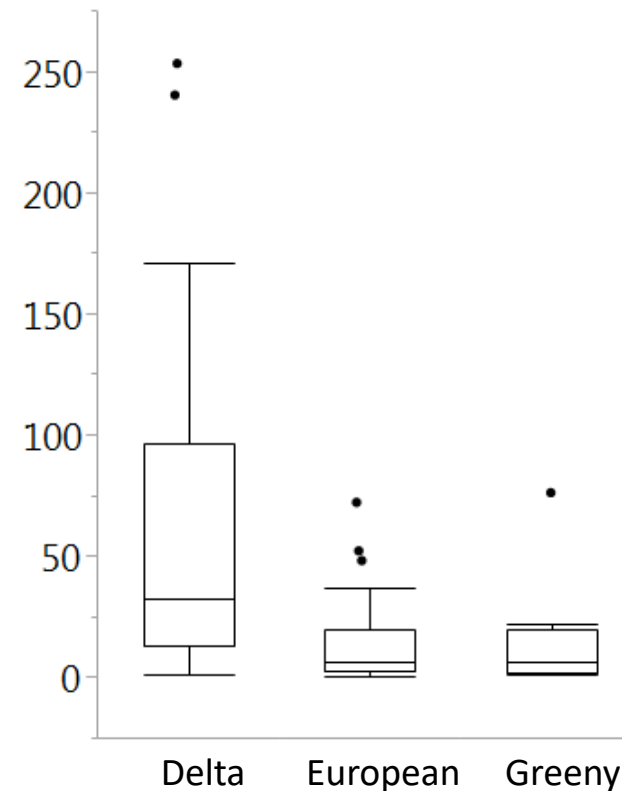
# Varietal Resistance

- Apparent differences in die-off symptoms between roseau cane varieties in the marsh
- Initial investigation also observed difference in scale pressure
- Season long differences between varieties being monitored in paired plot study



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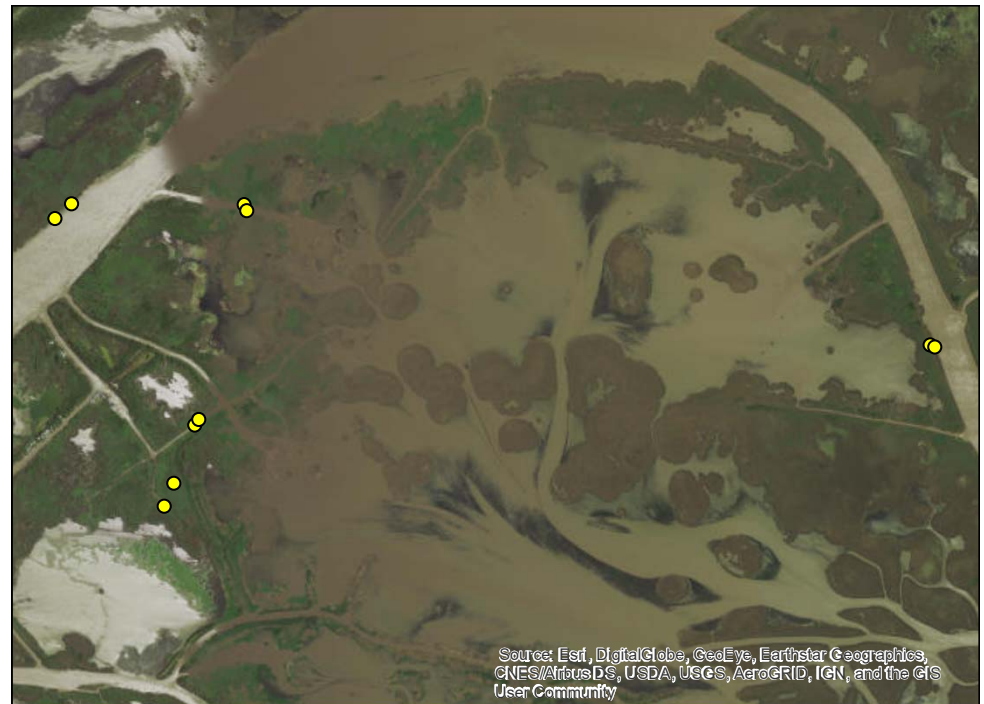
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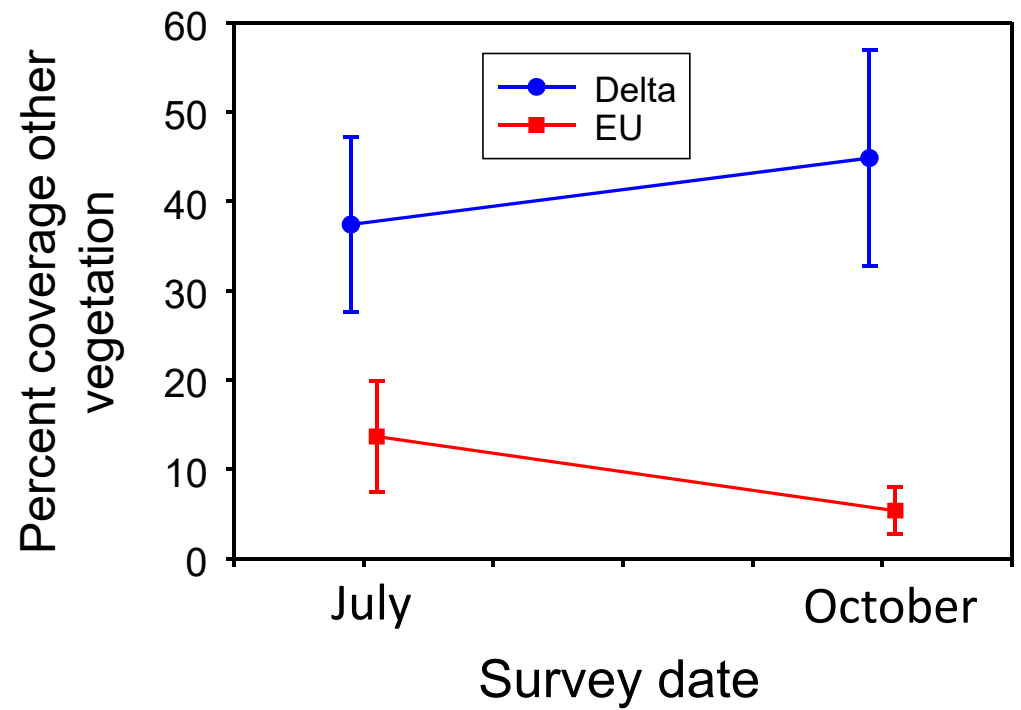
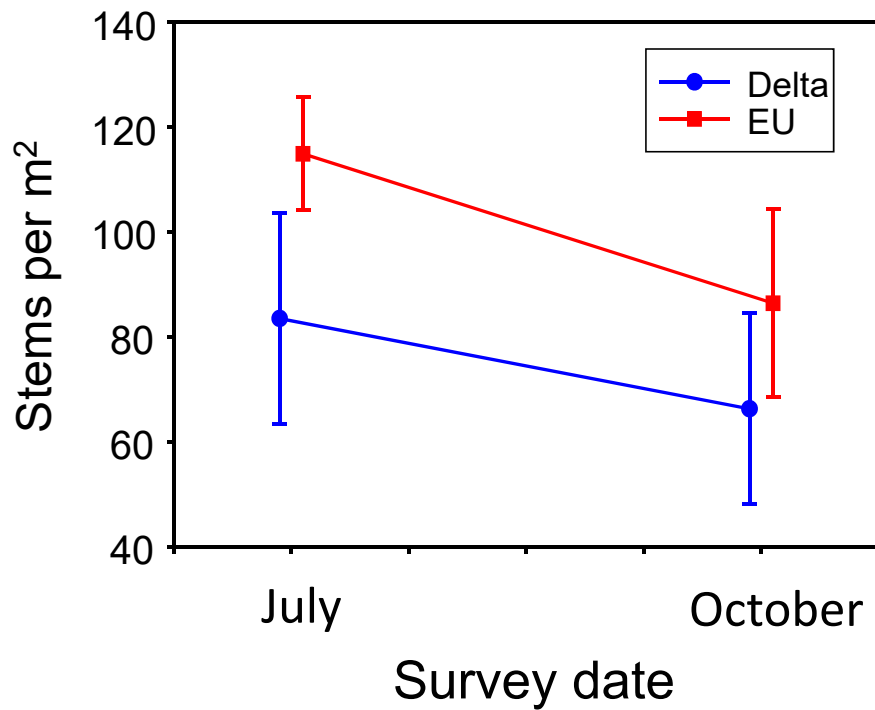


# Paired Plots: Study Area

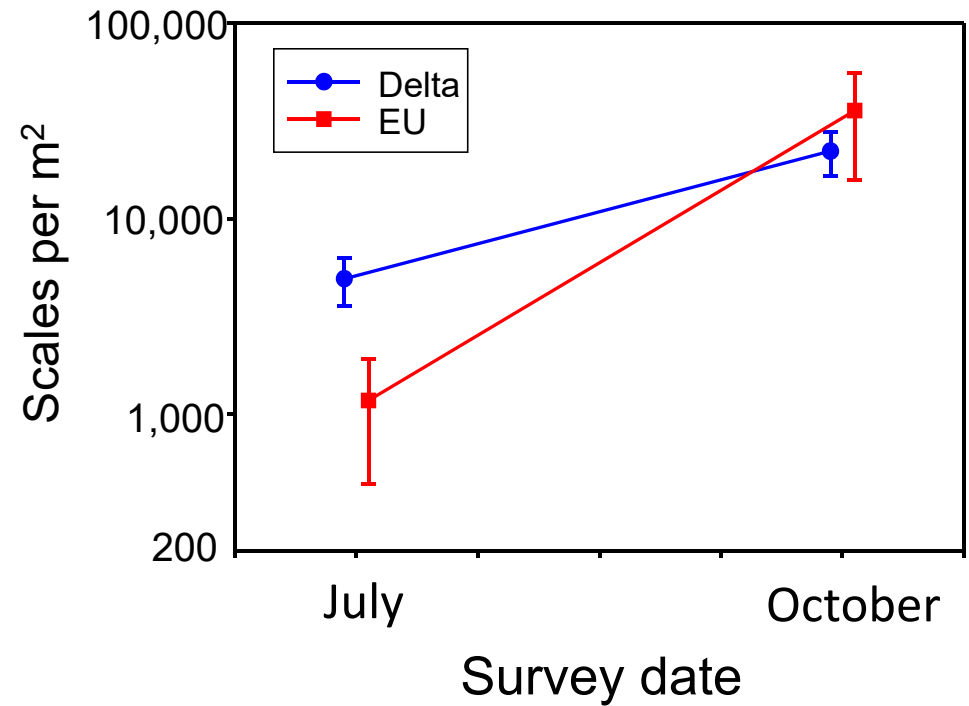
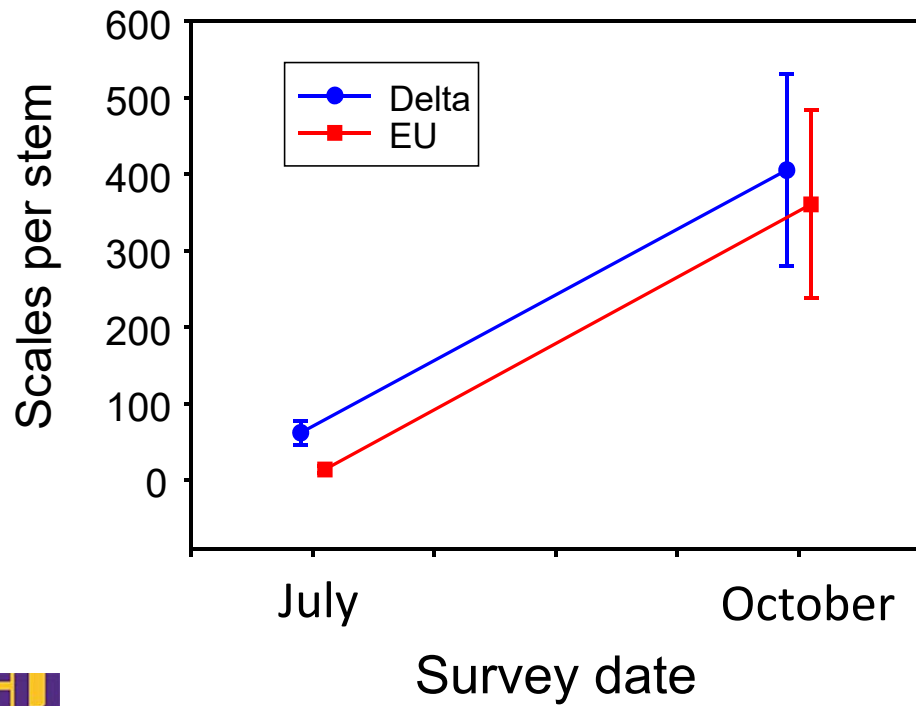
- Pass-a-loutre WMA
- 5 adjacent stands of 'Delta' and 'European' varieties
  - Greeny too rare
  - Gulf not present in lower delta
- Sampling methods same as transects



# Paired Plots: Preliminary Data

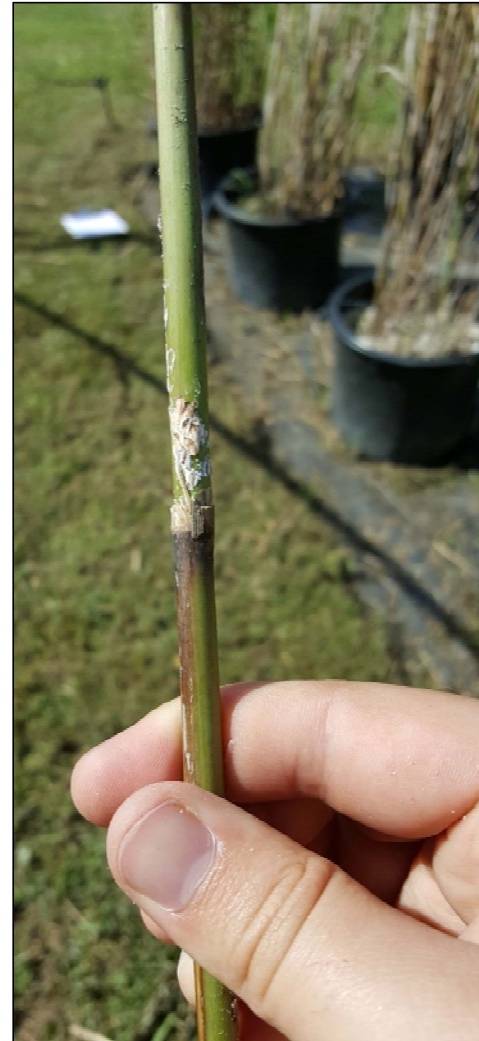


# Paired Plots: Preliminary Data



# Discussion

- Scales per stem
  - No anticipated differences in spite of apparent differences in plant health
  - Resistance vs. tolerance
  - Other factors?
  - Stem height and width
- Greater stem density = greater scale density?
- Revegetation



# Multifactorial Experiment

- Objective: Subject roseau cane varieties to multiple stress factors under controlled conditions
  - Scale infestation (Control, High)
  - Salinity (Fresh, Saltwater)
  - Varieties (Delta, European, Gulf)
  - Inundation (Control, Flooded)\*
- Currently propagating plant material in greenhouse

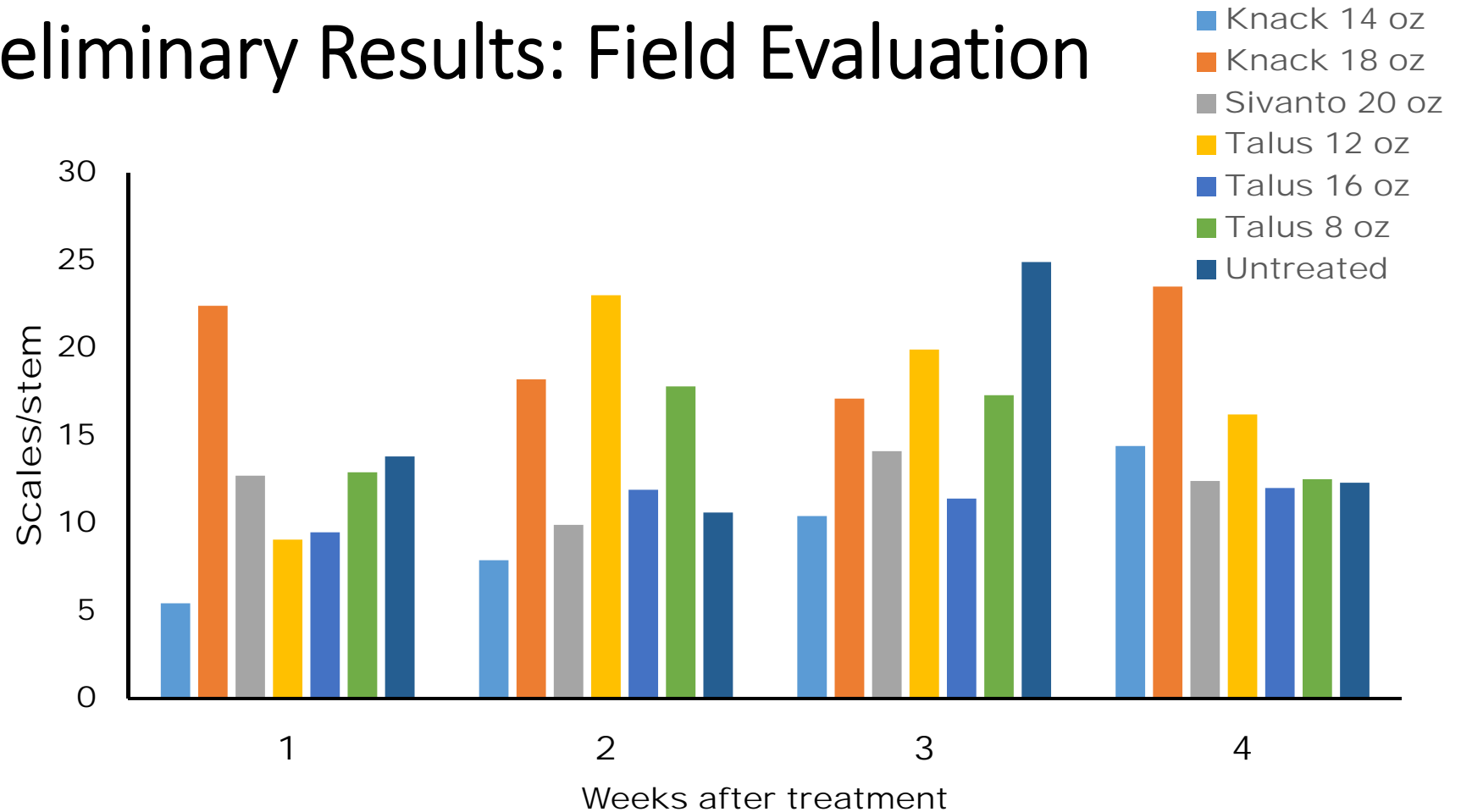


# Insecticidal Management Options

- Field study conducted in terrestrial Roseau cane at Cut Off, LA.
- Summer 2017
- Foliar application (spray)
- 3 active ingredients,
- 7 total treatments tested



# Preliminary Results: Field Evaluation



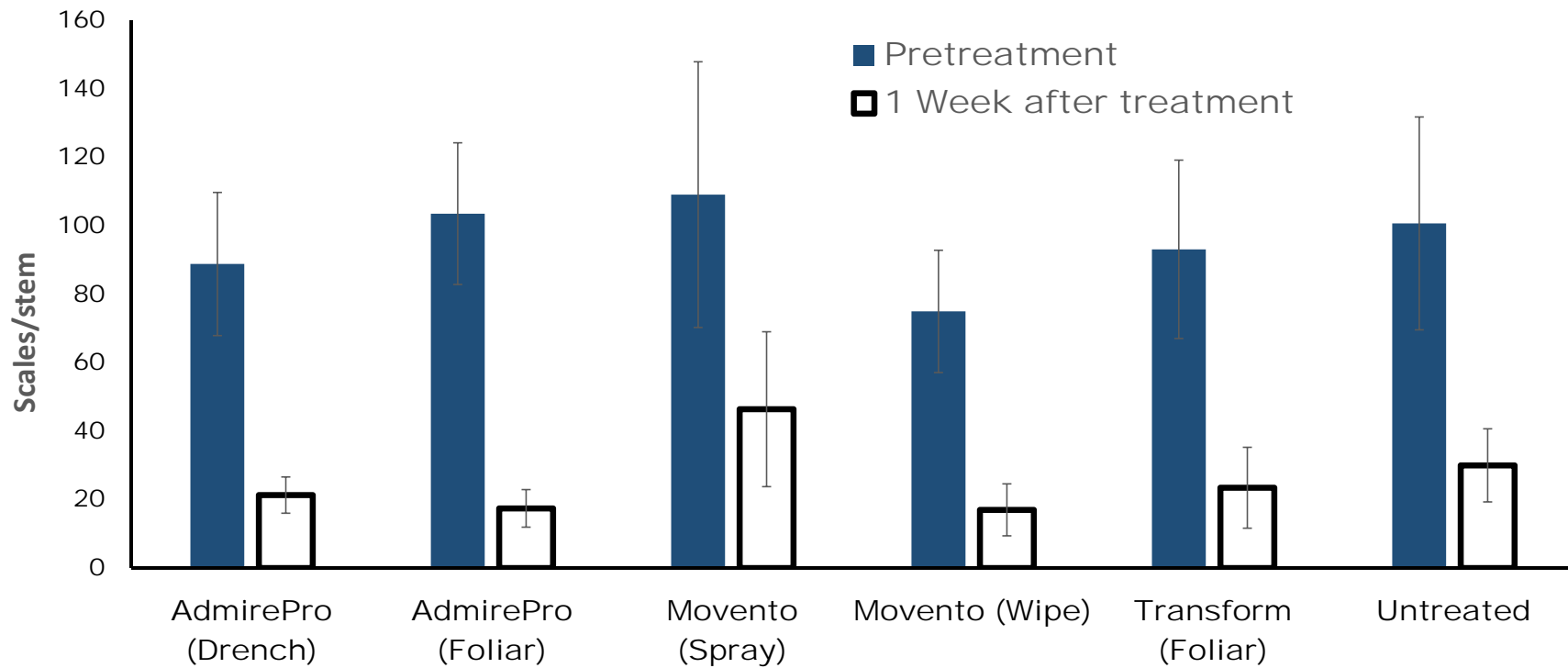
# Insecticidal Management Options

- Conducted in LSU common garden
- 3 active ingredients with systemic activity
- Foliar, soil drench, and “wipe” application methods





# Preliminary Results: Systemic & Application Methods



# Insecticides: Discussion

- Contact insecticides ineffective, more research needed
  - Leaf sheath provides protection
- Further evaluation of systemic products
- Increased potted plants for continued work this spring
- Field studies continued at the Cut Off site when sufficient infestations appear
- Limited applicability for use in natural systems
  - Potential solutions in case of host-switching to crops

# Closing Remarks: Harsh Winter 2017-2018

- Damage from Hurricane Nate and harsh winter causing some alarm
- Scale populations lower but not gone
- Continuing to monitoring of transects and paired plots



# Closing Remarks: Loss of Roseau Cane

- Extent of die-offs and changes in plant communities
- Implications for marsh stability / shipping lanes?

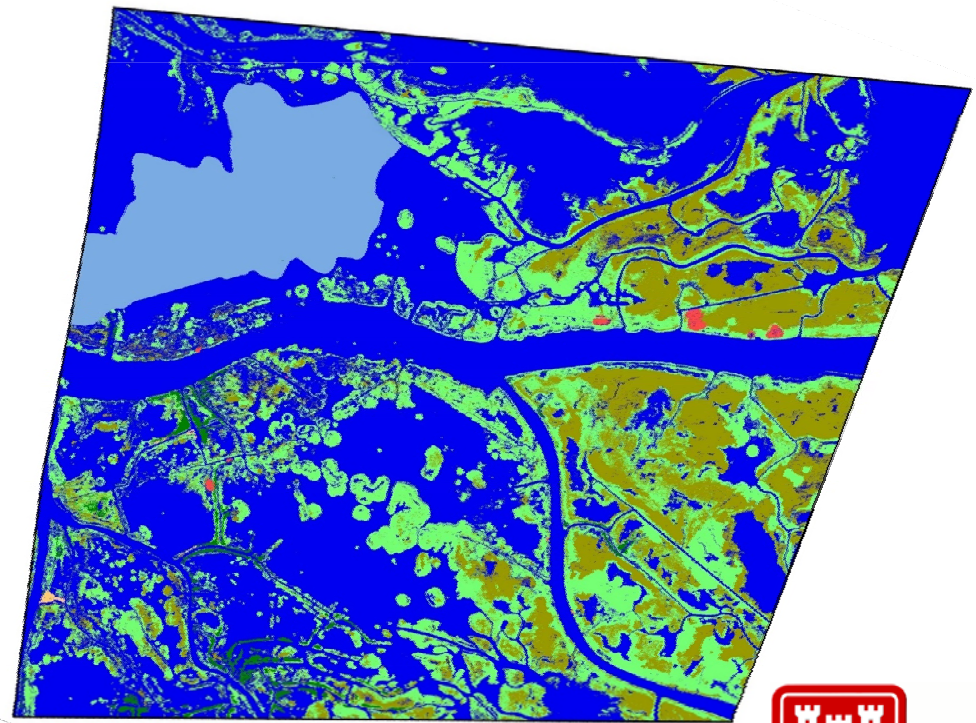
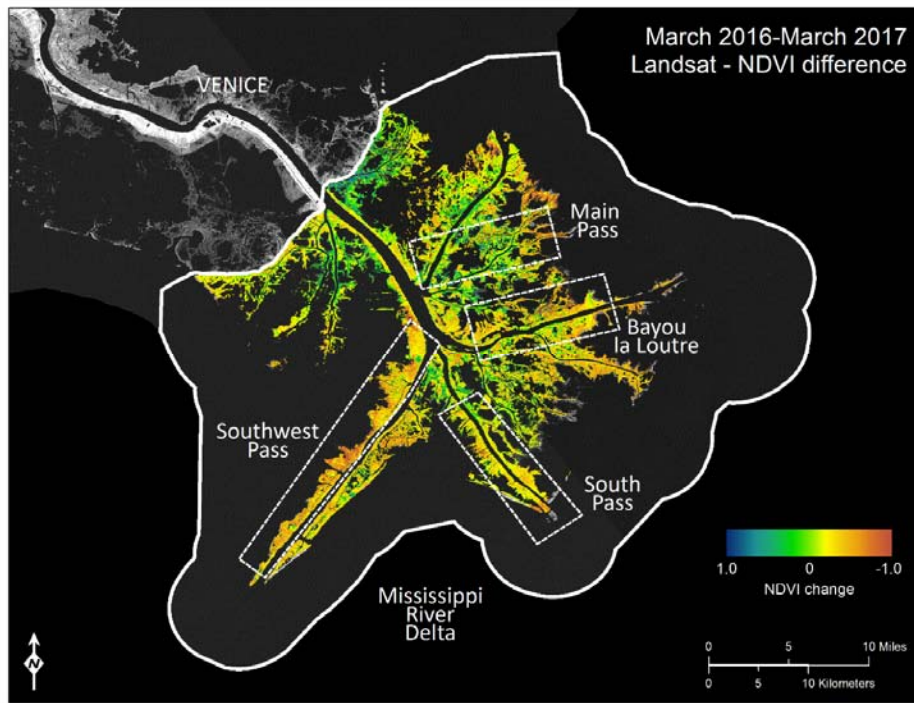


Site JC-3, Plaquemines Parish. 31  
May 2017.



Site JC-3, Plaquemines Parish. 14  
February 2018.

# Past Collaboration with USACE



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# Closing Remarks

- Role of the scale still being investigated
  - Die-offs progressing independent of our research
- Many additional potential factors to be investigated
  - Foliar or soil borne pathogens
  - Soil toxicity (heavy metals, sulfides?)
- Applications for remote sensing
  - Historical changes in roseau stands (growth and stand loss)
  - Extent/ severity of die-offs via NDVI?
  - Changes in plant communities

# We thank agencies and people who are contributing to this effort

Funding provided in part by



Partners



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