Distribution and Incidence of Mosaic and Evaluation of Resistance in Louisiana's Current Sugarcane Germplasm

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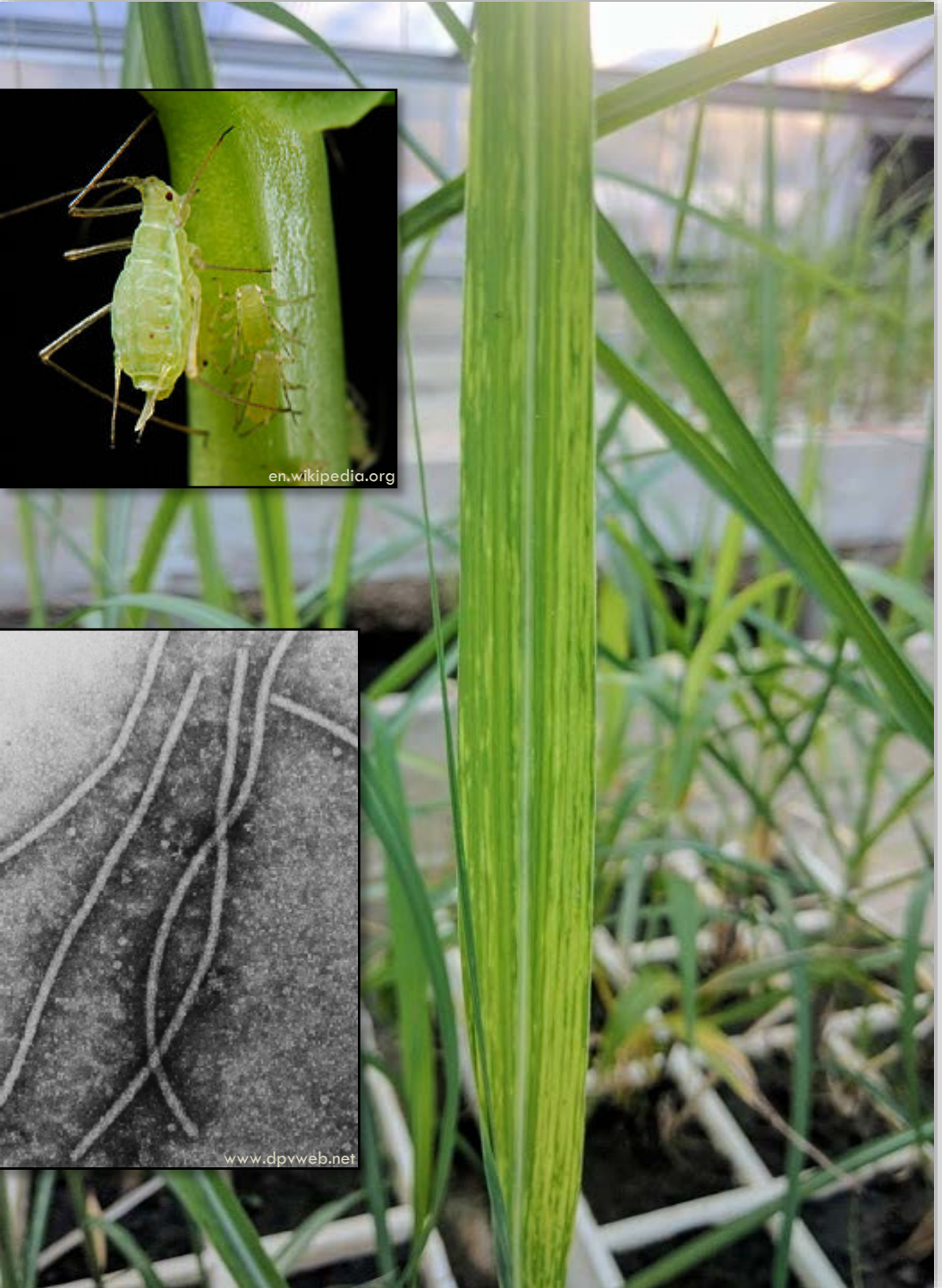
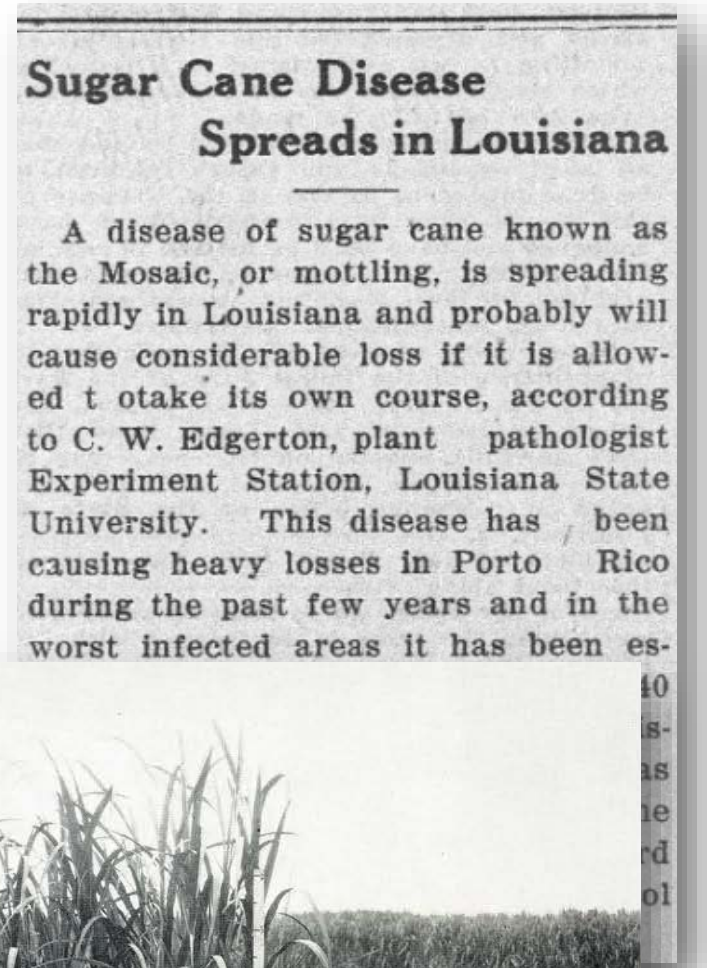


What is Sugarcane Mosaic?

- Named after the symptom it causes
- Disease caused by: *Sorghum mosaic virus* and *Sugarcane mosaic virus* in LA
- Vectored by aphids non-persistently

Why is This Research Needed?

- Resistance with interspecific hybrids after near crash of industry in 1920s
- Strain changes have caused periodic outbreaks
- Low inoculum pressure has created uncertainty about resistance levels
- Mosaic susceptibility in breeding program's advanced selections & a recently released variety



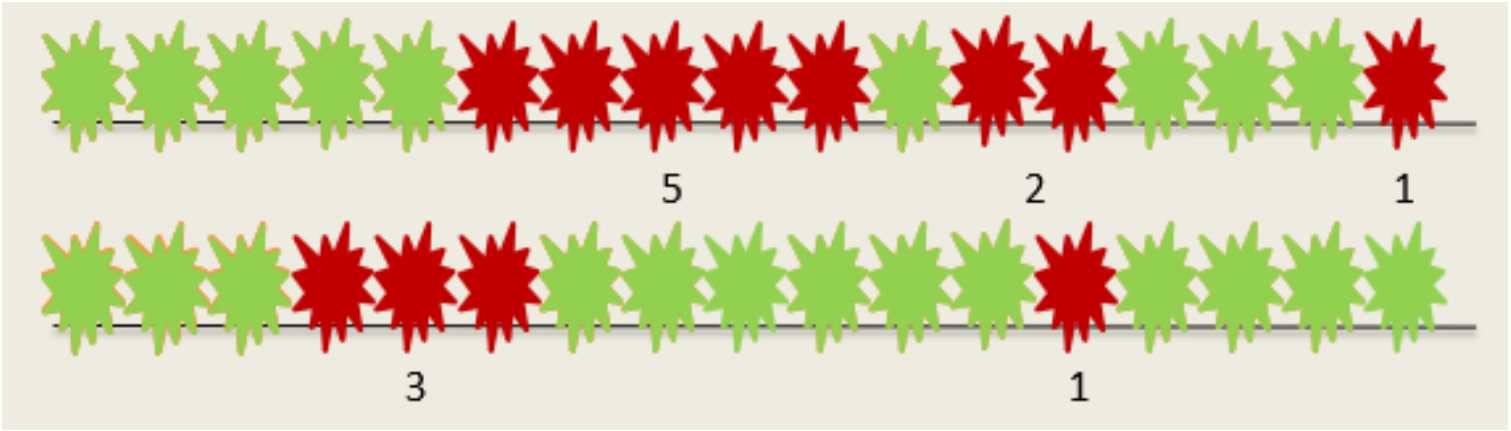
Sugar Cane Disease Spreads in Louisiana

A disease of sugar cane known as the Mosaic, or mottling, is spreading rapidly in Louisiana and probably will cause considerable loss if it is allowed t otake its own course, according to C. W. Edgerton, plant pathologist Experiment Station, Louisiana State University. This disease has been causing heavy losses in Porto Rico during the past few years and in the worst infected areas it has been es-

Courtesy: U.S Dept of Agriculture

Research Approach

- Field surveys to determine mosaic incidence and distribution



Plants were recorded as “runs” of infected plants

Anna Hale

Mosaic Incidence Low for HoCP 09-804 in 2016 Field Survey

Area	Number locations surveyed	Percent infection
Teche/North	**11**	**All zero**
River	**4**	**0, 0.04, 0.5, 0.9**
Upper River	**7**	**0, 0, 0, 0.01, 0.2, 0.2, 2.5**
Lafourche	**12**	**0, 0,0.01, 0.05, 0.2, 0.5, 0.6, 1.2, 1.3, 1.4, 3.5, 10.4**

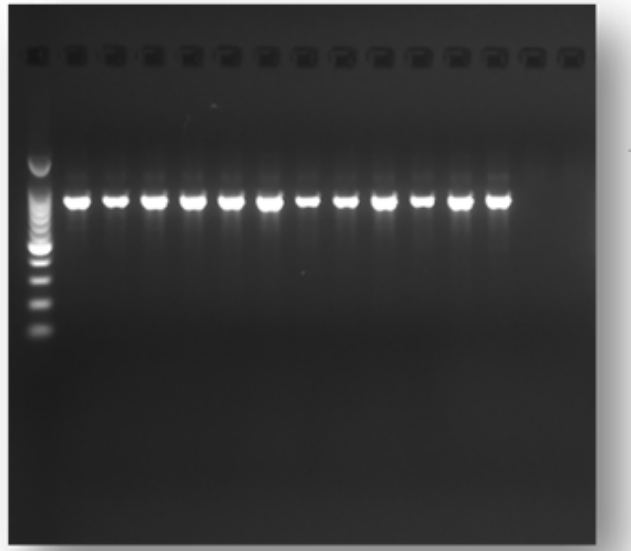
Number of Infected Plants in Revisited Locations for HoCP 09-804

Location	2016 Percent Infection	2017 Percent Change of Infected Plants
Raceland	1.2%	+97%
Cedar Grove	1.3%	+70%
Alma	2.5%	+24%
Glendale/Lanaux	0.9%	-27%
Glenwood	1.4%	-32%
Little Texas	10.4%	-41%
Blackberry	0.5%	-62%

Research Approach

- Field surveys to determine mosaic incidence and distribution
- Collect samples to characterize virus species and strain – Currently being processed and tested

Jeff Hoy



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Research Approach

- Field surveys to determine mosaic incidence and distribution
- Collect samples to characterize virus species and strain
- Greenhouse inoculations to evaluate the breeding program parent varieties for susceptibility

Varieties Show Different Levels of Resistance in Preliminary Greenhouse Inoculation Results

Variety	Percent Symptomatic
L 08-88	**100%**
Sorghum ‘Rio’	**80%**
L 10-147	**42%**
HoCP 09-804	**22%**
Ho 05-961	**9%**
HoCP 96-540	**9%**

Percentages are calculated from 10 – 12 plants per variety

USDA Sugar Research Station Breeding Germplasm Inoculation Results

Percent Symptomatic	Number of Varieties	Percent
75-100%	20	9%
50-74%	18	9%
25-49%	12	6%
1-24%	14	7%
0%	147	70%
Total Number of Varieties	211	

Research Approach

- Field surveys to determine mosaic incidence and distribution
- Collect samples to characterize virus species and strain
- Greenhouse inoculations to evaluate the parent breeding varieties for susceptibility
- Determine if asymptomatic infection or “recovery” occurs

L 10-147 Expresses Higher Frequency of Virus Recovery Than HoCP 09-804

Variety	Total Number of Plots*	Plots* with Asymptomatic Plants (%)	Total Number of Plants	Asymptomatic Plants (%)
HoCP 09-804	**58**	**3% a**	**152**	**2% a**
L 10-147	**81**	**32% b**	**291**	**19% b**

(GLM, p<.0001)

*Each individual plot contains plants from buds on a single stalk

Recovered Plants Test Negative for SrMV by RT-PCR, Most of the Time

Variety	Total Asymptomatic Plants Tested	Plants Testing Positive	
		Number	Percent
HoCP 09-804	3	1	33%
L 10-147	55	3	5%

Conclusions

- Mosaic incidence was low or absent for HoCP 09-804
- Most survey locations did not have disease increases of concern
- Greenhouse inoculation of parent germplasm detected susceptibility
- L 10-147 expressed a higher frequency of recovery than HoCP 09-804
- Virus recovered plants test negative with RT-PCR for SrMV most of the time

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