

2013 Ray and Dorothy Young Endowed Assistantship for Row Crop IPM



2013 Louisiana State University College of Agriculture Spring Banquet

“Success is where preparation and opportunity meet.”

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**2014 Louisiana Agricultural
Technology and Management Conference
Marksville, LA
February 12-14, 2014**



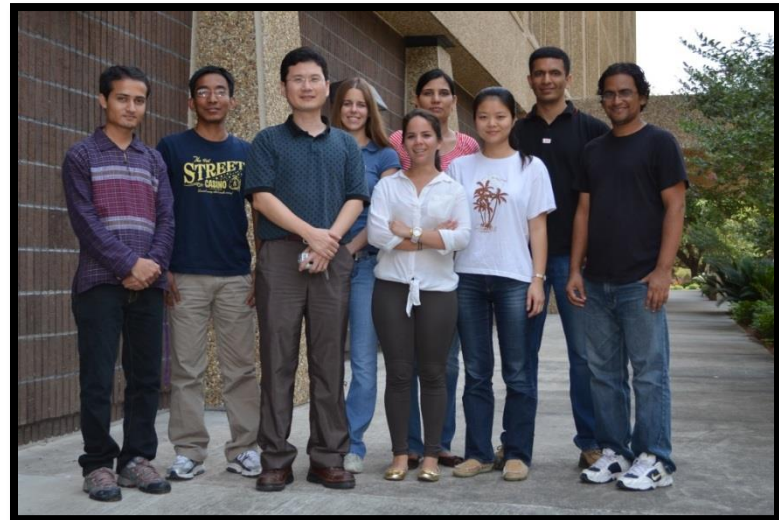
Education and Experience

- Centenary College of Louisiana
 - B. S. in Biology, 2003
- LSU AgCenter Red River Research Station, 2003
 - Student Worker, Entomology
- LSU AgCenter Pecan Research-Extension Station, 2004-2008
 - Research Associate, Plant Pathology



Education and Experience

- Louisiana State University/LSU AgCenter, Department of Plant Pathology and Crop Physiology
 - M. S. in Plant Health (Plant Pathology), 2011
 - Ph. D. in Plant Health (Plant Pathology), 2014
(expected)



Research Focused on Two Plant Diseases



Pecan Bacterial Leaf Scorch



Bacterial Panicle Blight

Pecan Bacterial Leaf Scorch (PBLS)

- Caused by *Xylella fastidiosa*
- Causes leaf-scorching and defoliation
- Reduces yield
- Untreatable
- No completely resistant cultivars



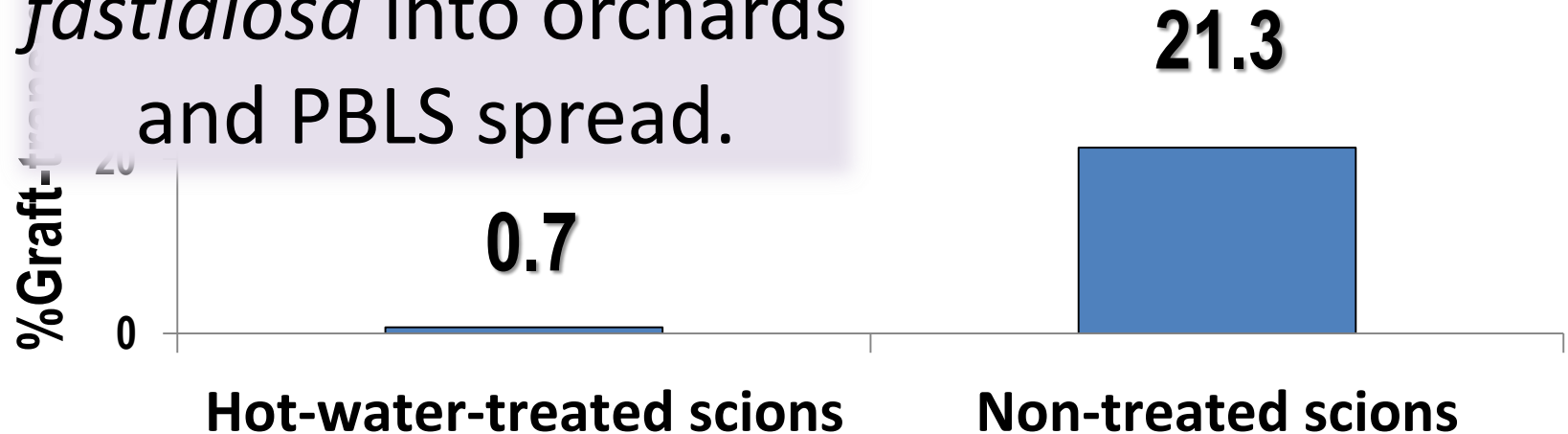
How is *X. fastidiosa* Transmitted?

The use of scions collected from trees with PBLIS or rootstock trees with PBLIS should be avoided to reduce the introduction of the pathogen into orchards and the spread of the disease.



Can Pathogen Transmission through Infected Scions be Reduced?

Application of the hot-water treatment to pecan scions can help to reduce new introductions of *X. fastidiosa* into orchards and PBLS spread.

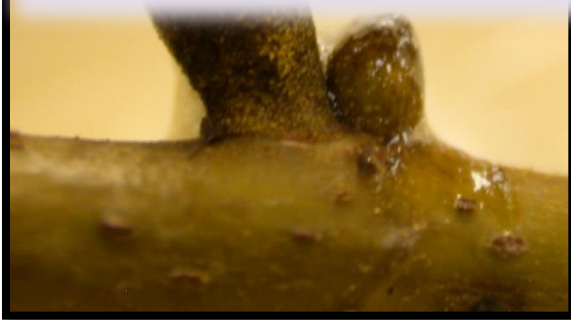


How is *X. fastidiosa* Transmitted?



How is *X. fastidiosa* Transmitted?

Studies to determine which of these insects are present in pecan orchards and how to control these insects may help to reduce *X. fastidiosa* transmission and PBLs spread in pecan.



(Pecan spittlebug)



(Diamond-backed spittlebug)



(Glassy-winged sharpshooter)

X. fastidiosa Has a Wide Host Range

- *X. fastidiosa* infects many economically important plants and landscape trees
 - Almond
 - Blueberry
 - Citrus
 - Coffee
 - Grapevine
 - Oak
 - Oleander
 - Peach
 - Sycamore



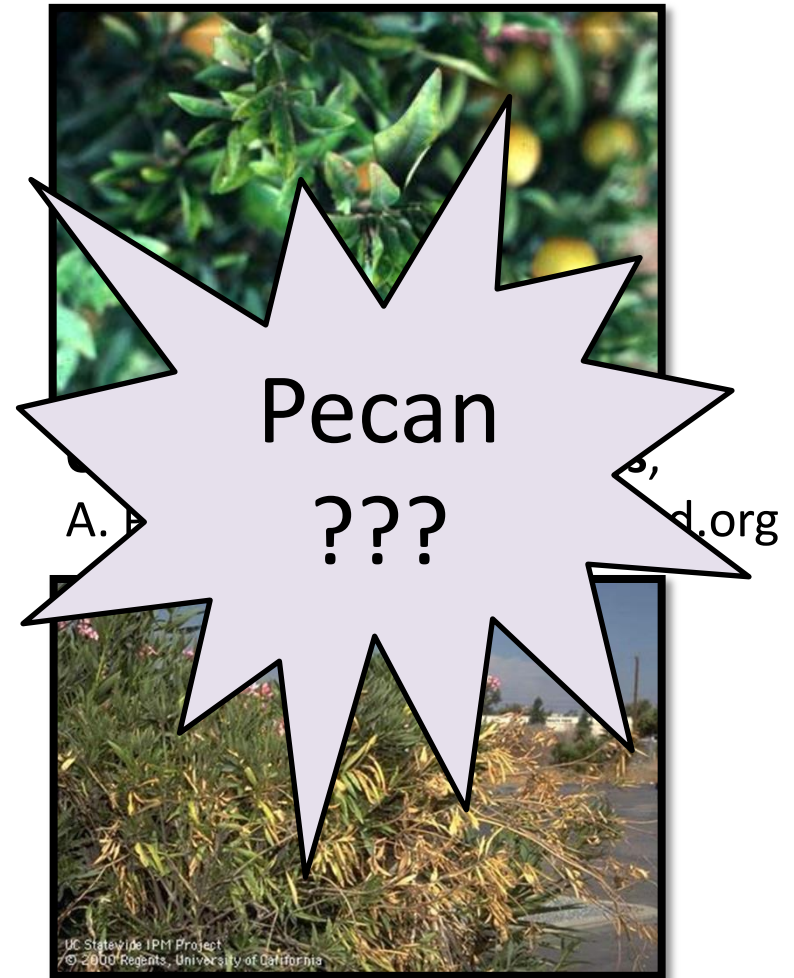
Pierce's disease of grapevine,
<http://www-plb.ucdavis.edu>



Oak leaf scorch,
R. Cyr, Greentree, Bugwood.org

X. fastidiosa is Divided into Subspecies

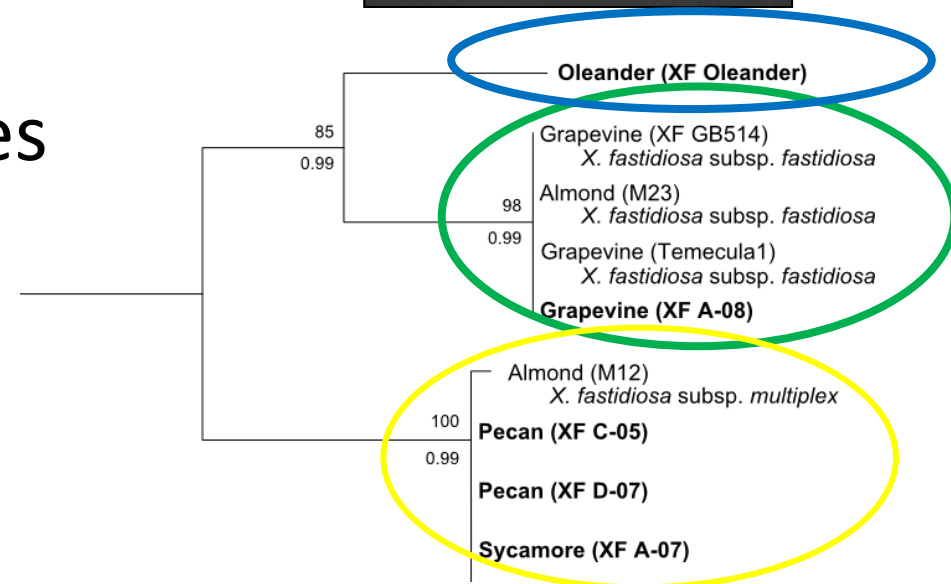
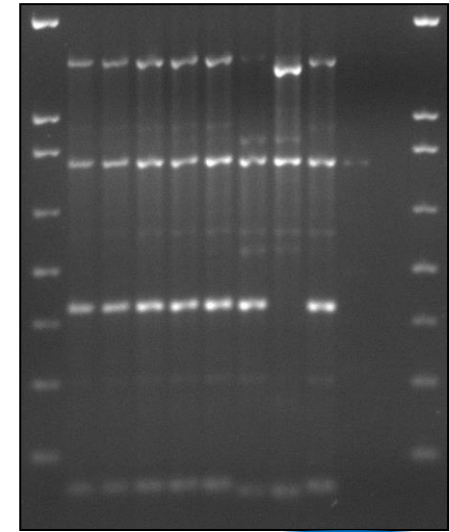
- Subspecies *fastidiosa*
 - Almond, grapevine
- Subspecies *multiplex*
 - Almond, peach, oak
- Subspecies *pauca*
 - Citrus, coffee
- Subspecies *sandyi*
 - Oleander
- Subspecies *tashke*
 - Chitalpa

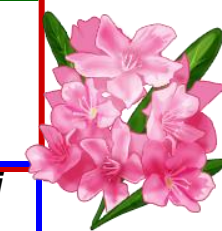
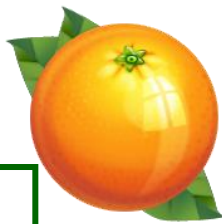
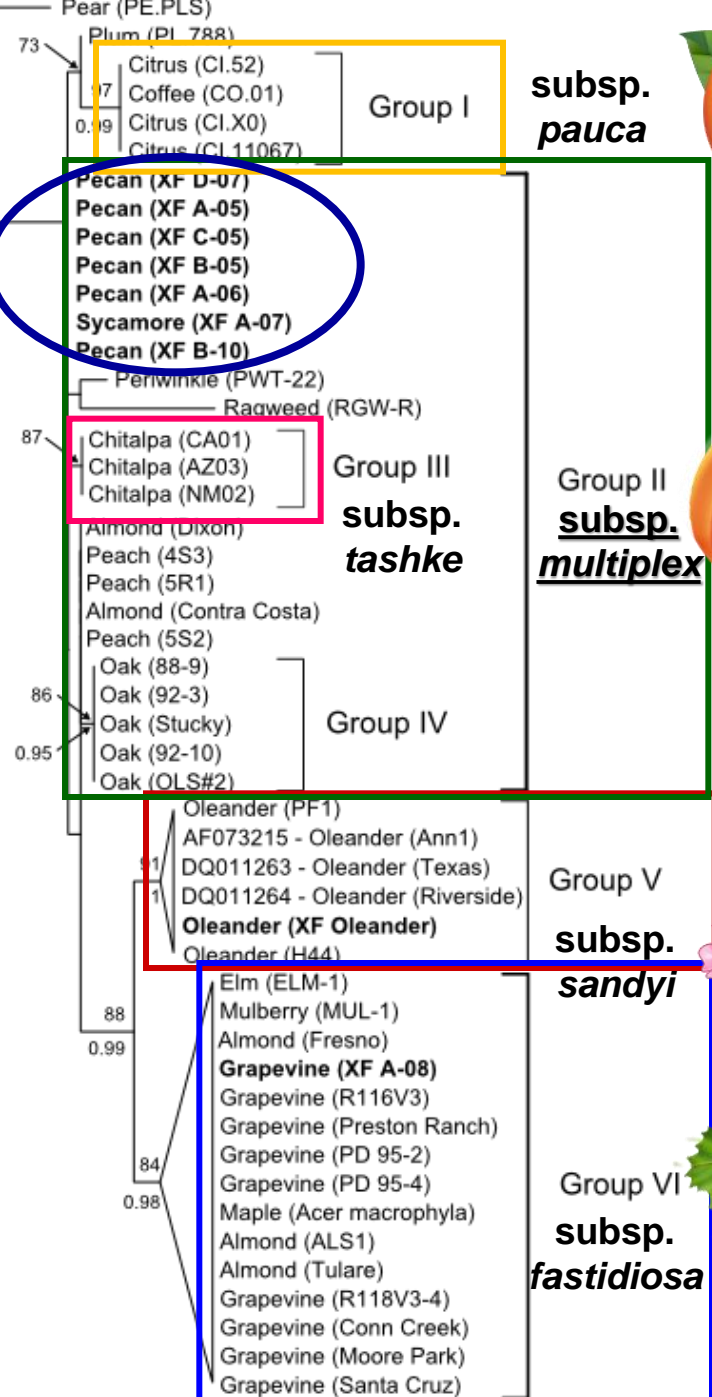


Oleander leaf scorch,
<http://biocontrol.ucr.edu>

What Subspecies of *X. fastidiosa* are the Strains that Infect Pecan?

- Polymerase chain reaction (PCR)
 - Multiprimer PCR
 - ERIC-PCR
 - REP-PCR
- DNA sequence analyses
 - ITS
 - *pglA*





Strains of *X. fastidiosa* that infect pecan should be classified as *X. fastidiosa* subsp. *multplex*.

Why is This Information Significant?

If we are able to identify and remove potential sources of inoculum near pecan orchards, we may be able to reduce pathogen introduction into orchards that result from insect transmission by vectors that feed on multiple hosts.

Bacterial Panicle Blight of Rice

- Caused by *Burkholderia glumae*
- Severe in unusually hot weather and high night time temperatures
- Yield losses from 15-80%
- Epidemics and severe losses occurred in 1995, 1998, 2000, and 2010 in the southern United States
- No resistant varieties



Photo: J. H. Ham

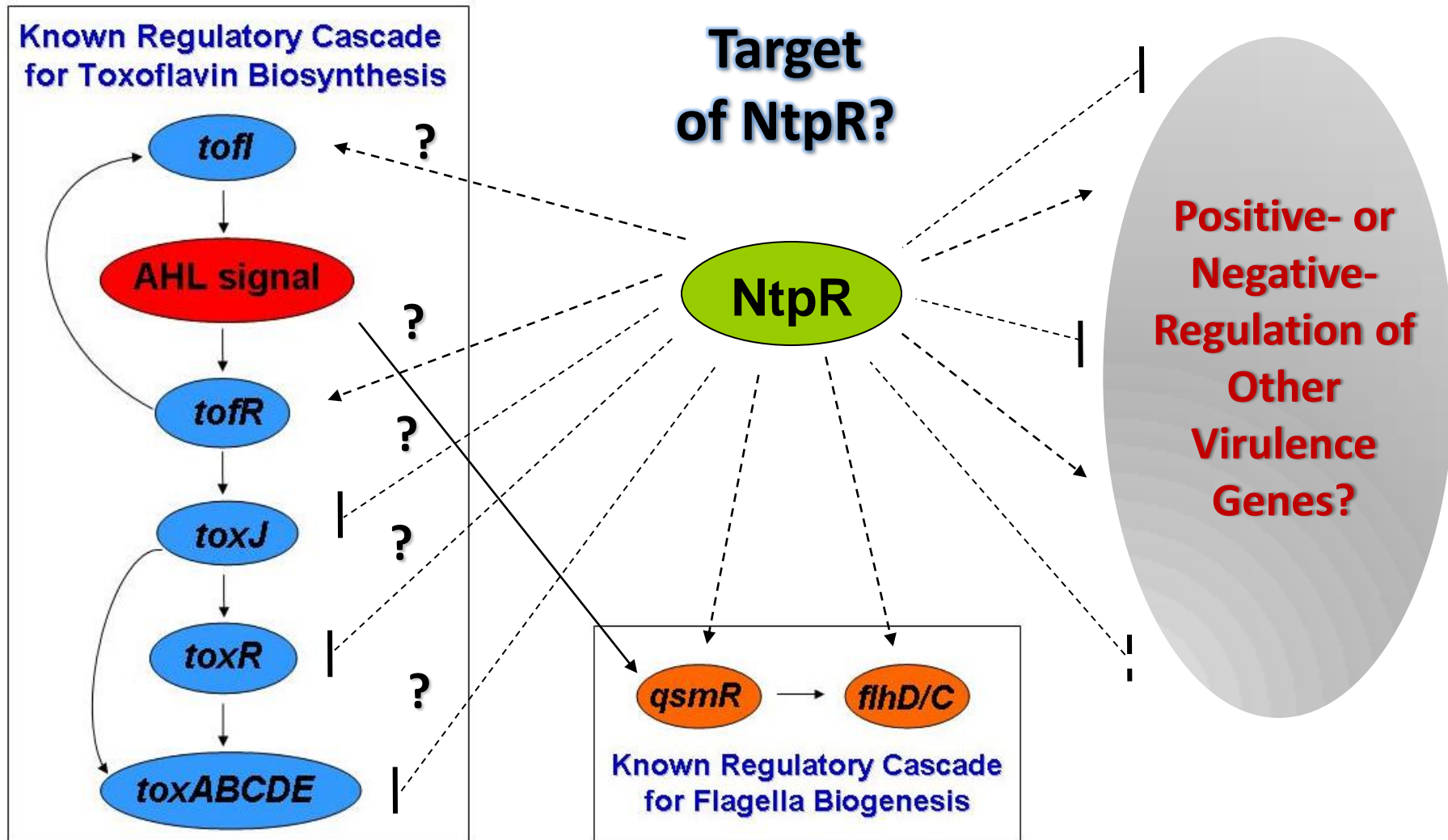
Burkholderia glumae

- Produces a number of virulence factors
 - Toxoflavin
 - Lipase
 - Flagella



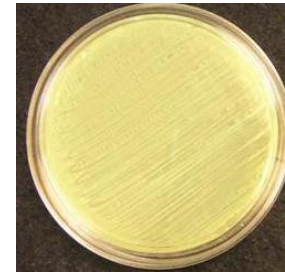
Photo by: J. H. Ham

Dissertation Research



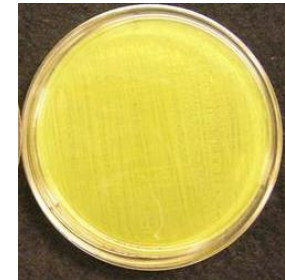
Dissertation Research

- Intact *ntpR* gene (wildtype)



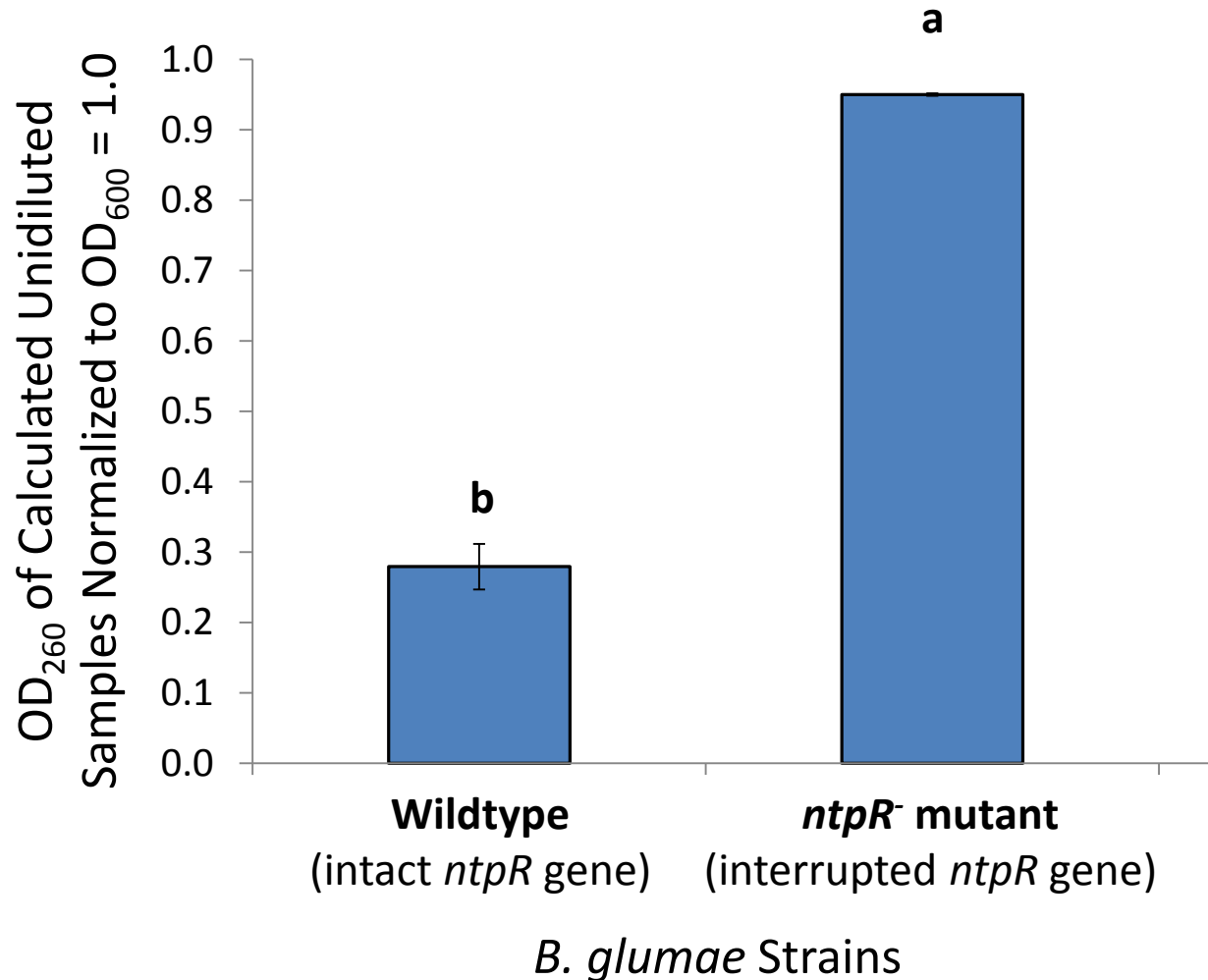
'normal' toxoflavin production

- Interrupted *ntpR* gene (*ntpR*⁻ mutant)



increased toxoflavin production

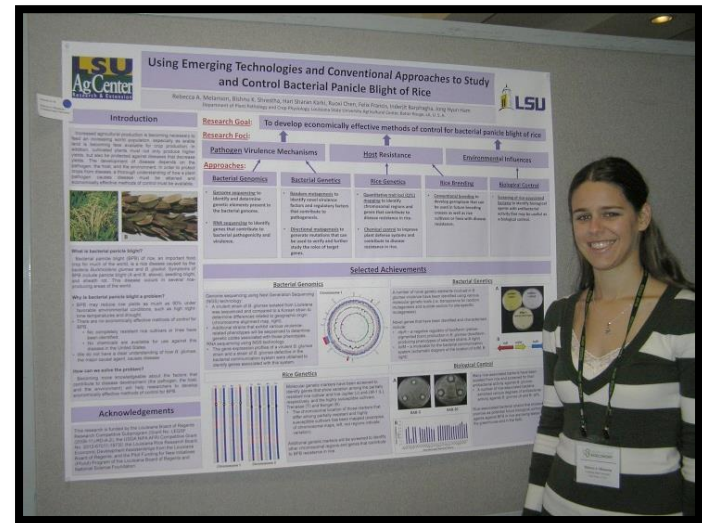
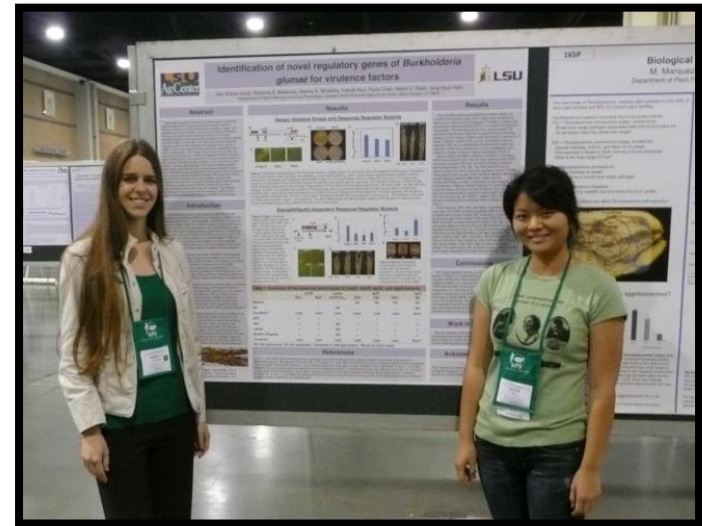
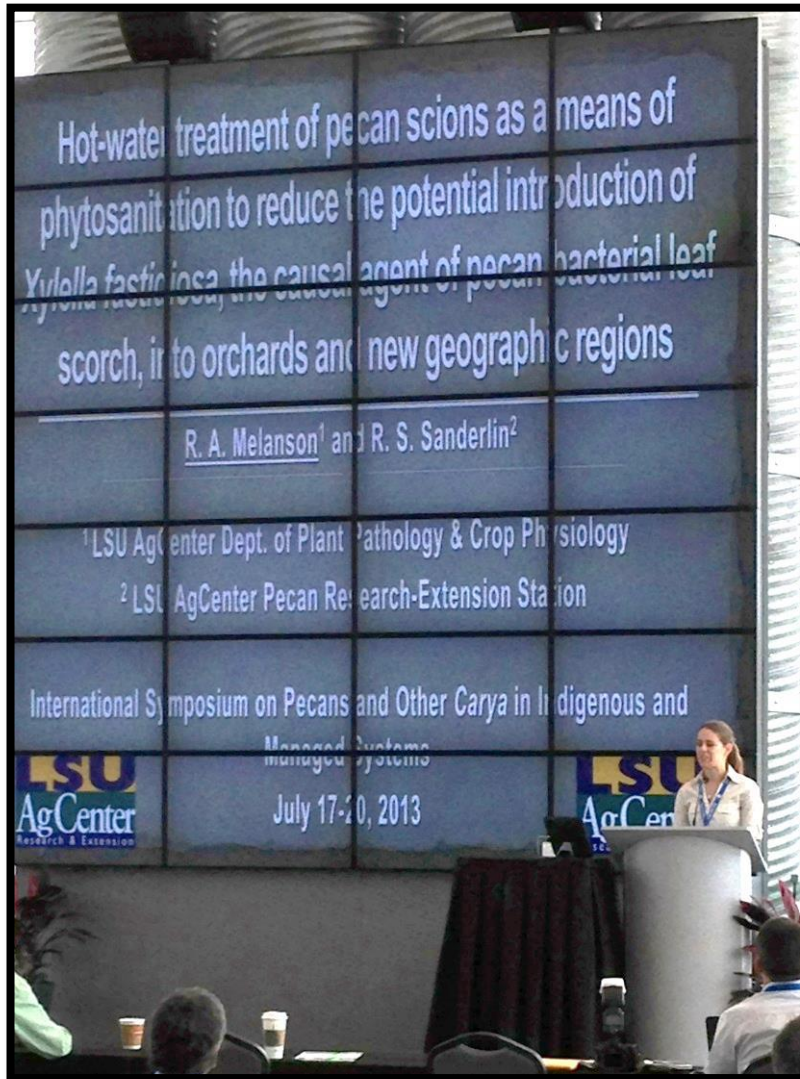
Relative Toxoflavin Production of *ntpR* Strains



How Will This Research Help?

A better understanding of how *B. glumae* causes disease in rice will lead to the development of management methods that can be used to prevent or reduce yield losses attributed to bacterial panicle blight.

Information Transfer is Essential



Education Beyond Louisiana



Davis, California



Corvallis, Oregon



College Station, Texas



Salinas, California



Austin, Texas



Corvallis, Oregon

What Now?



- ✓ Research
- ✓ Extension

“Success is where preparation and opportunity meet.” -Bobby Unser

Acknowledgements

Graduate Committee:

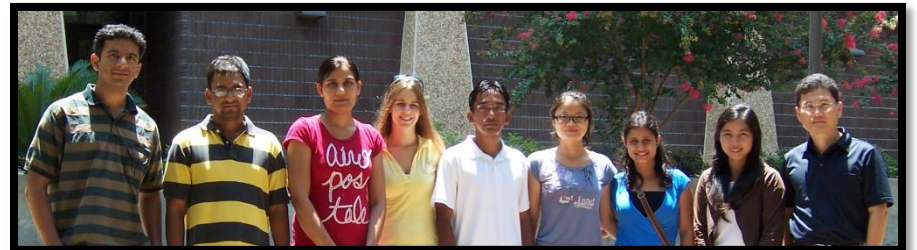
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