

Fungicide Programs for Pecan Scab Control and Resistance Management

Mini Pecan Short Course
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Disease and insect problems in Texas pecan orchards



cotton root rot
Pecan leaves will remain attached after death



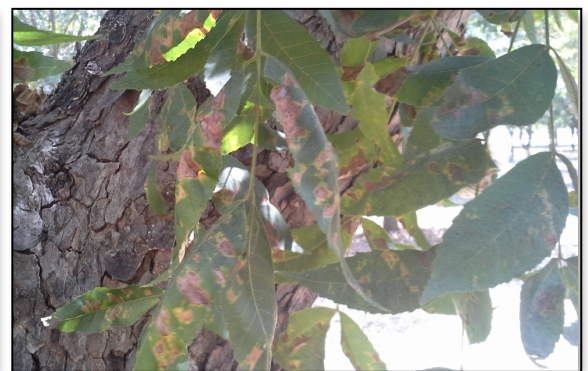
Marginal leaf necrosis from **salt toxicity**
New Mexico State University



Nitrogen/potassium imbalance
University of Georgia



Scorch mite damage
Bill Ree, Texas A&M University Extension



Black pecan aphid damage
Bill Ree, Texas A&M University Extension



Fungal **anthracnose** causes symptoms in pecan foliage and shucks
North Carolina State University





Pecan leaf



Pecan bacterial leaf



PRIONUS ROOT BORER

Lawn Resources

AgriLife Learn
Agrilifelearn.tamu.edu



Prionus Root Borers Identified as Silent Pecan Tree Killers in East Texas

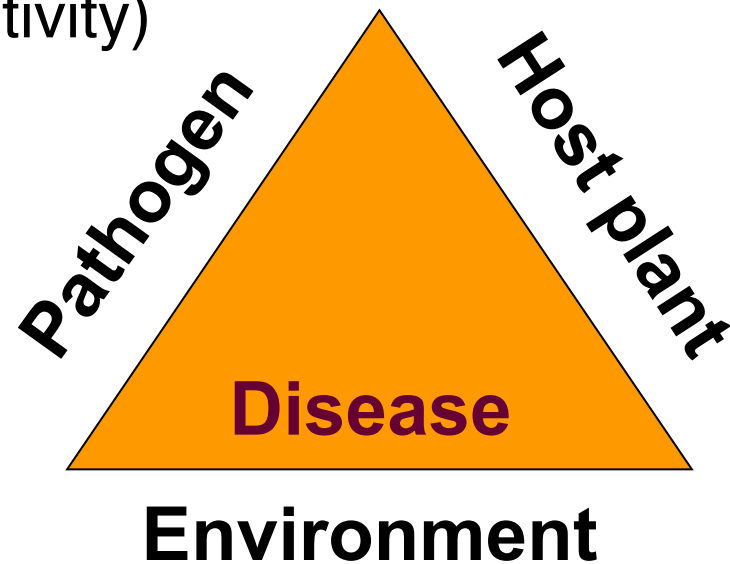
This free, 2-page article discusses the Prionus root borer and its potential to damage pecan trees in Texas.



Prionus root borers represent a silent but destructive pest with the potential to cause significant damage to pecan orchards. While control methods have not been well developed or validated, implementing good orchard management practices is crucial for long-term remediation as well as insect monitoring.

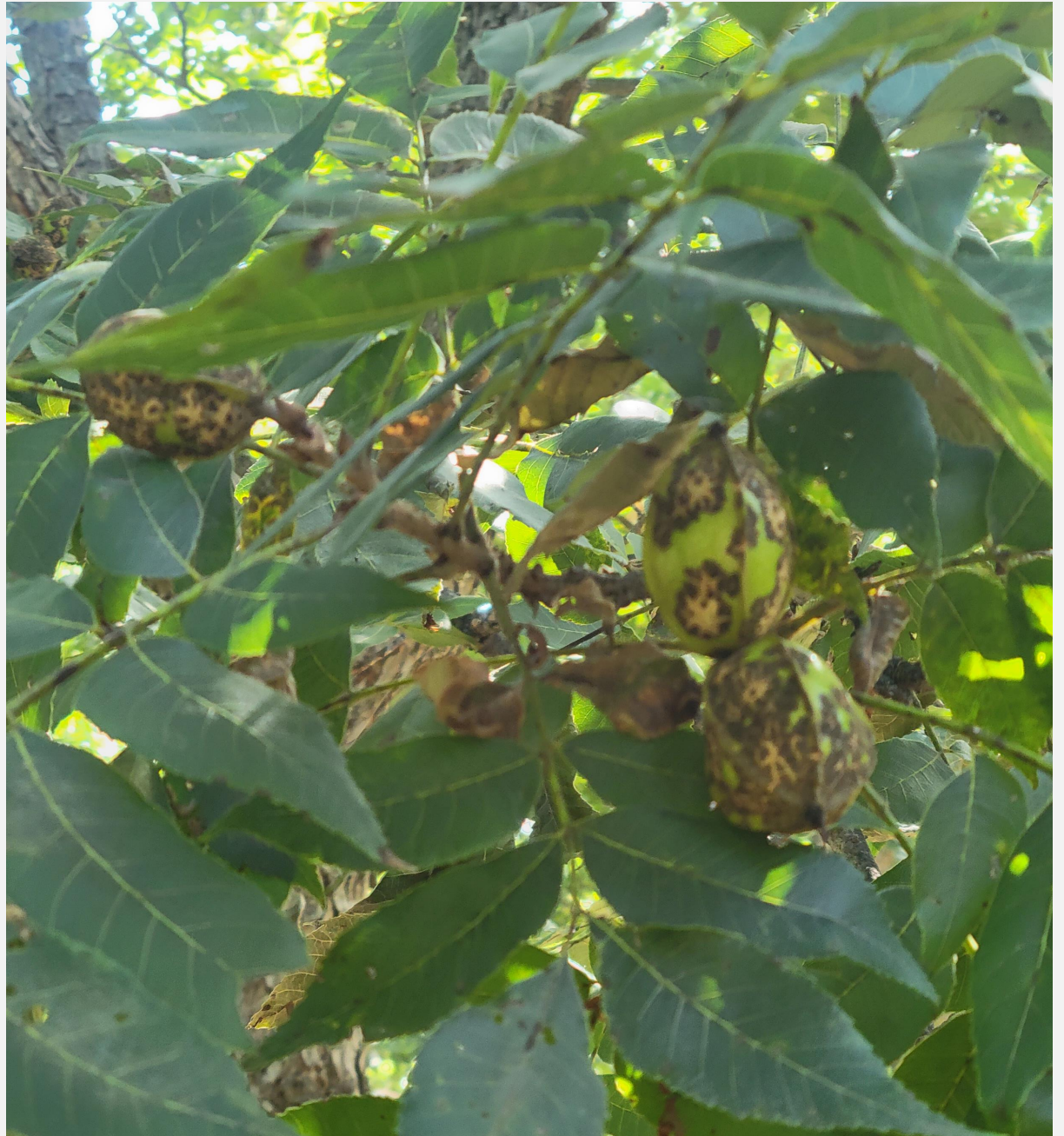
Significance of pecan scab

- Significant economic impact
- Causes crop yield reduction and low quality of nuts
- Incurs expenses from intensive fungicide applications throughout the growing season
- Concerns about the development of fungicide resistance (=insensitivity)



Scab on 'Desirable' pecan

2019



Host resistance of pecan cultivars to scab

Resistance Level	Recommended	Recommended for Trial	Not Recommended for Most Situations
Excellent	Elliot	Gafford	Gloria Grande
	Kanza	Syrup Mill	Curtis
		Jenkins	Barton
		Carter	
		Excel	
Good	Sumner	McMillan	Candy
Mediocre	Oconee		Stuart
Poor	Caddo		Moreland
	Kiowa		Cape Fear
	Forkert		
	Sioux	Pawnee	
	Desirable		
Wichita			

FUNGICIDE APPLICATION

Early to mid growing stages
to protect fast-growing
leaves and shucks

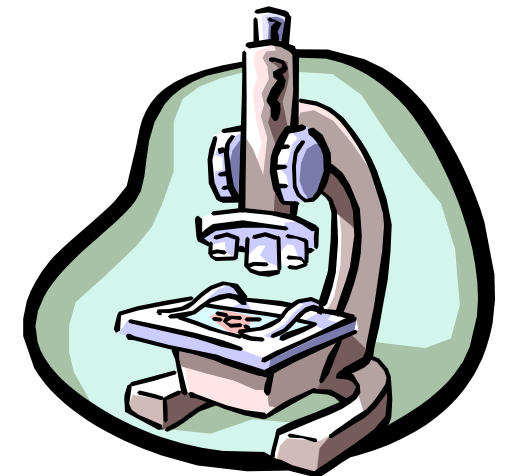
- Phosphonate (FRAC P07)
- DMI (FRAC 3)
- QoI (FRAC 11)
- FRAC 3 + 11
- FRAC 3 + 7

Later season to protect
maturing shucks

- Organotin (FRAC 30):
Fentin hydroxide (TPTH)
- Guanidine (FRAC U12):
Dodine (Elast)
- FRAC 30 + U12

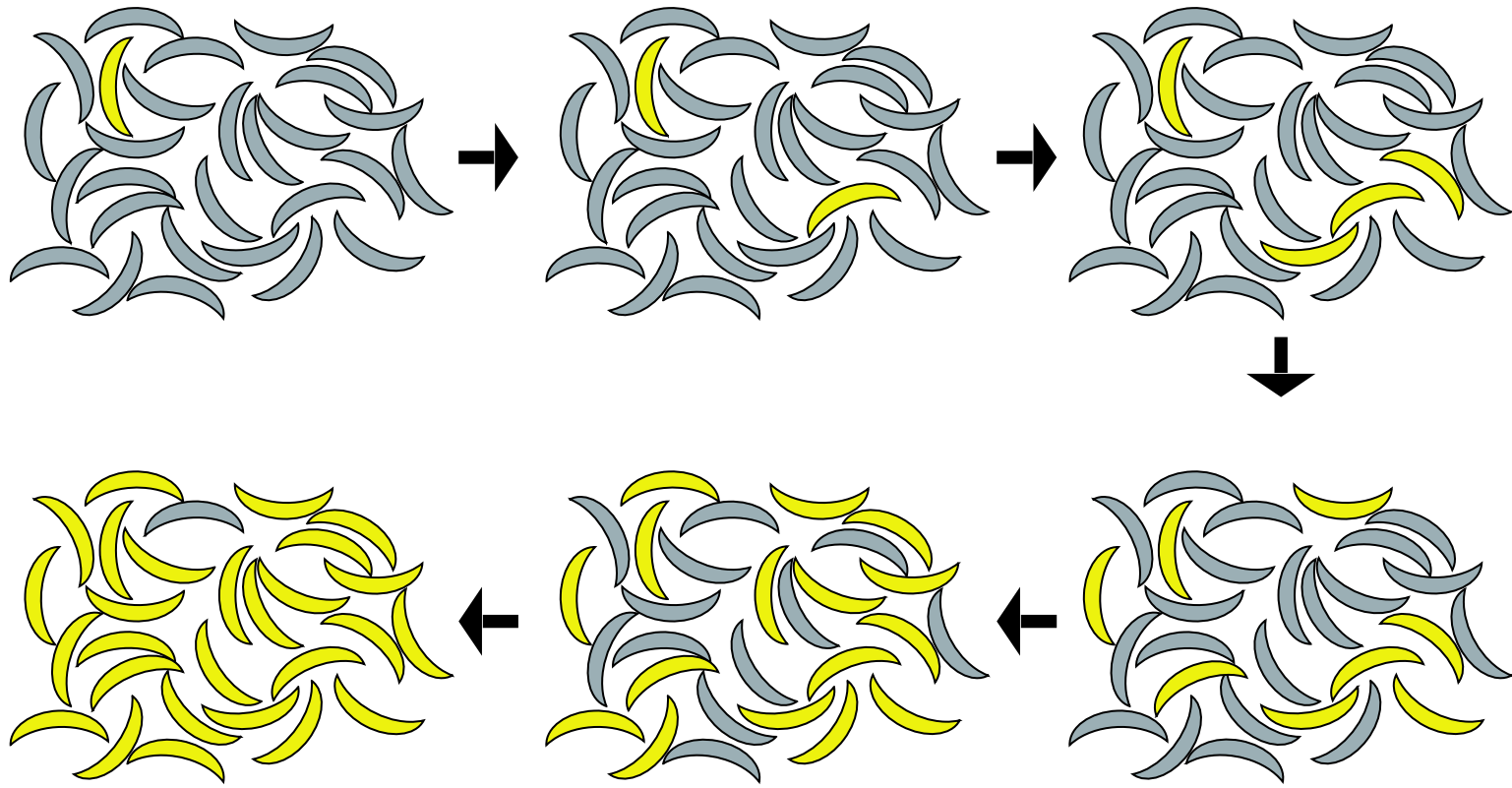
WHAT IS RESISTANCE?

- Resistance is the increasing ability of a specific pathogen population to not respond to desired fungicide treatments
- Once the insensitive population becomes increasing, the efficacy of fungicides start reducing



PROGRESSION OF RESISTANCE

- In nature, spontaneous mutation occurs continually
- Survival of mutation depends on benefits of
 - Fitness
 - Competitiveness
 - Selection by management practices



Resistance is inheritable
Resistance is accumulated

Loss of economic control levels

PROGRESSION OF RESISTANCE

Selection of resistant mutants and accumulation of resistance will be affected by

- Fungicide treatment
 - ✓ Modes of Action (MOA) fungicides
 - ✓ Curative vs. Preventative
 - ✓ Repeated treatment
- Rapidly growing populations

QUESTIONS ABOUT RESISTANCE

- What are different types of resistance?
 - Single genetic change
 - ON/OFF Switch
 - Multiple genetic change
 - DIMMER switch
 - Cross Resistance
 - Fungicides within same MOA group
 - Multiple Resistance
 - Fungicides in different MOA groups
- What is the population stability once the resistance developed?

Is it really resistance in my orchard?

- There is a temptation to blame resistance for poor performance of fungicide applications, but what about...
 - Pathogen misidentification
 - High disease pressure
 - Unusual plant growth
 - Poor applications to “miss” the target
 - Calibration = Speed and Nozzle selection
 - Treatment Location = Water volume, Nozzles, and Speed
 - Prolonged treatment intervals

CHEMICAL CONTROL STRATEGIES FOR RESISTANCE PREVENTION

- **Right** diagnosis
- **Right** material
 - Know the MOA/FRAC of your programs
 - Avoid repetitive sole use
- **Right** time
 - Maintain proper timing of treatments
- **Right** method of application
 - Maintain recommended dose rates
 - Use proper spray volume for chemistry
 - Mix with appropriate partners

Current status of pecan scab

- **Pro:** There are still fungicides with good efficacy against pecan scab.
- **Con:** Fungicide resistance is threatening the chemical management of scab in the long term
- **Pro:** There are good pecan cultivars available with a range of other favorable agronomic traits with good host resistance to scab
- **Con:** The fungus had demonstrated historically that it can adapt to host resistance
- **Challenges**
 - Necessity to manage disease in upper canopies of old and tall trees
 - The disease severity depends on the weather during the growing season
 - Unnecessary spray wastes money and exposes the pathogen to selection of resistant populations



Pecan scab fungicide resistant management in Texas

Research Goal: Identify and manage fungicide resistance in scab populations in Texas pecan orchards

- Build up the working group consisting of pecan experts
- Include commercial pecan producers who intend collaboration in the pecan scab projects
- Conduct surveys for Texas pecan orchards
- Establish the screening protocol for fungicide resistance of pecan scab
- Develop proper fungicide programs based on fungicide sensitivity results
- Funding from the TDA Specialty Crop Block Grant

Sending your pecan scab samples to

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