

# Brown Spot Needle Blight In Loblolly Pine

Observational Infection Patterns and Potential Resistance

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# Brown Spot Needle Blight in Loblolly Pine

- Brown Spot Needle Blight (BSNB)
  - ❑ Scientific Name: *Lecanosticta acicola*
    - Other Scientific Name: *Scirrhia acicola*
- BSNB Has Been well Known in the Southeast U.S. Since 1900
- Primarily associated with longleaf pine but infects other pine:
  - ❑ Loblolly pine
  - ❑ Shortleaf pine
  - ❑ Virginia pine
  - ❑ Sondereggeri pine
  - ❑ Pitch pine
  - ❑ Eastern white pine
  - ❑ Ponderosa pine

Source: Van Der Nest, Ariska et.al., *Lecanosticta acicola: A growing threat to expanding global pine forest and plantations* (2019).

# Brown Spot Needle Blight

## ➤ Symptoms

- ❑ Small yellow irregular spots on needles that become brown
  - May be surrounded by a yellow halo
- ❑ Brown spots form bands with needle death from infection to needle tip
- ❑ Infection usually more severe on lower part of tree and progresses upwards
- ❑ Identification based only on symptoms must be treated with caution and verified using molecular ID techniques

## ➤ Dissemination

- ❑ Conidia and ascospores are released throughout the Year however, warm and wet weather is particularly conducive for development of BSNB
- ❑ Conidia are dispersed predominantly by rain splash to adjacent trees
- ❑ The main component that facilitates spread on conidia and ascospores is moisture

## ➤ Genetic Resistance – Literature Review

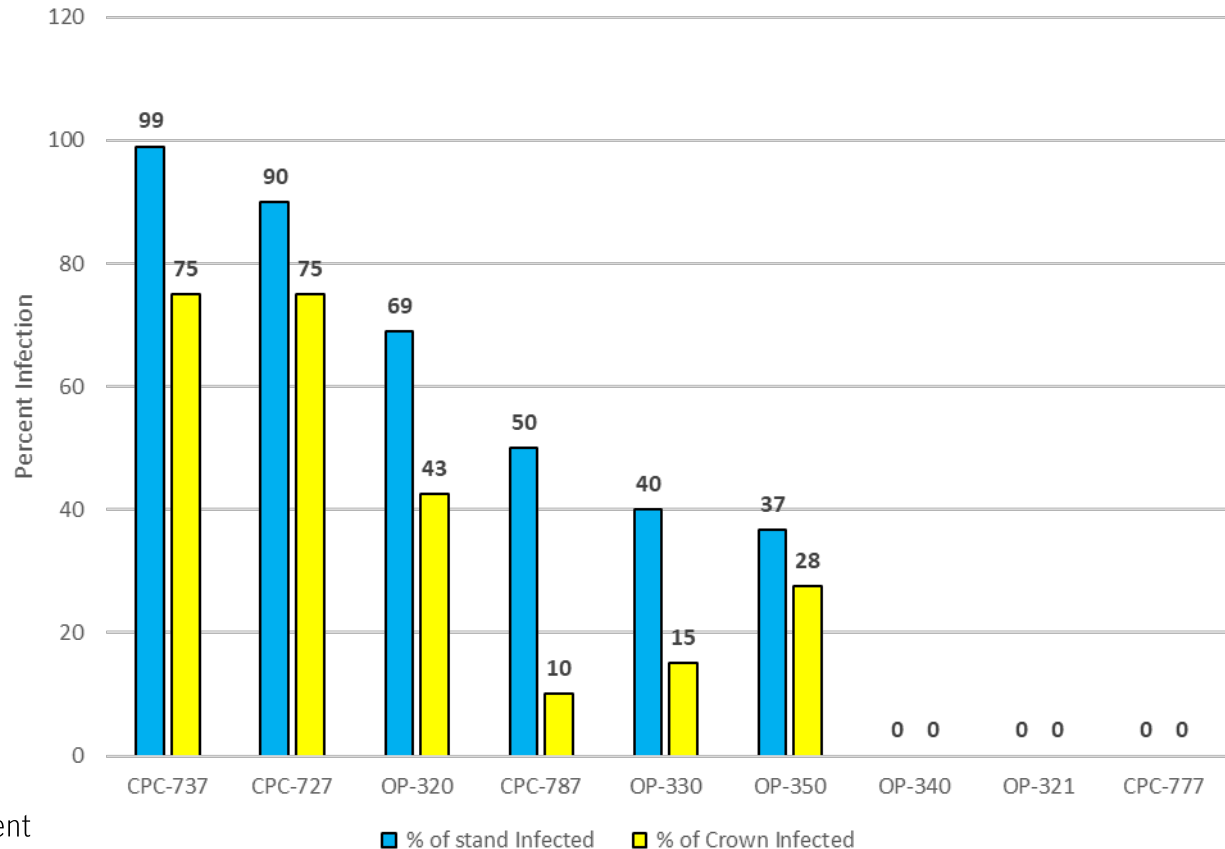
- ❑ Breeding for resistance to *L. acicula* has been successfully used to reduce the impact of the disease on *P. palustris* in Alabama (*Van Der Nest et. Al*)
- ❑ Not all loblolly pine families are equally susceptible to brown spot (*Alabama Extension*)

# Observational Infection Patterns of BSNB

## ➤ Loblolly Pine BCNB Infection Investigation Provided Antidotal Patterns of Resistance (Limited Data)

- ❑ Genetic Resistance by Family?
- ❑ Nutritional Resistance Influence?
- ❑ Age and/or Size Infection Pattern Difference?

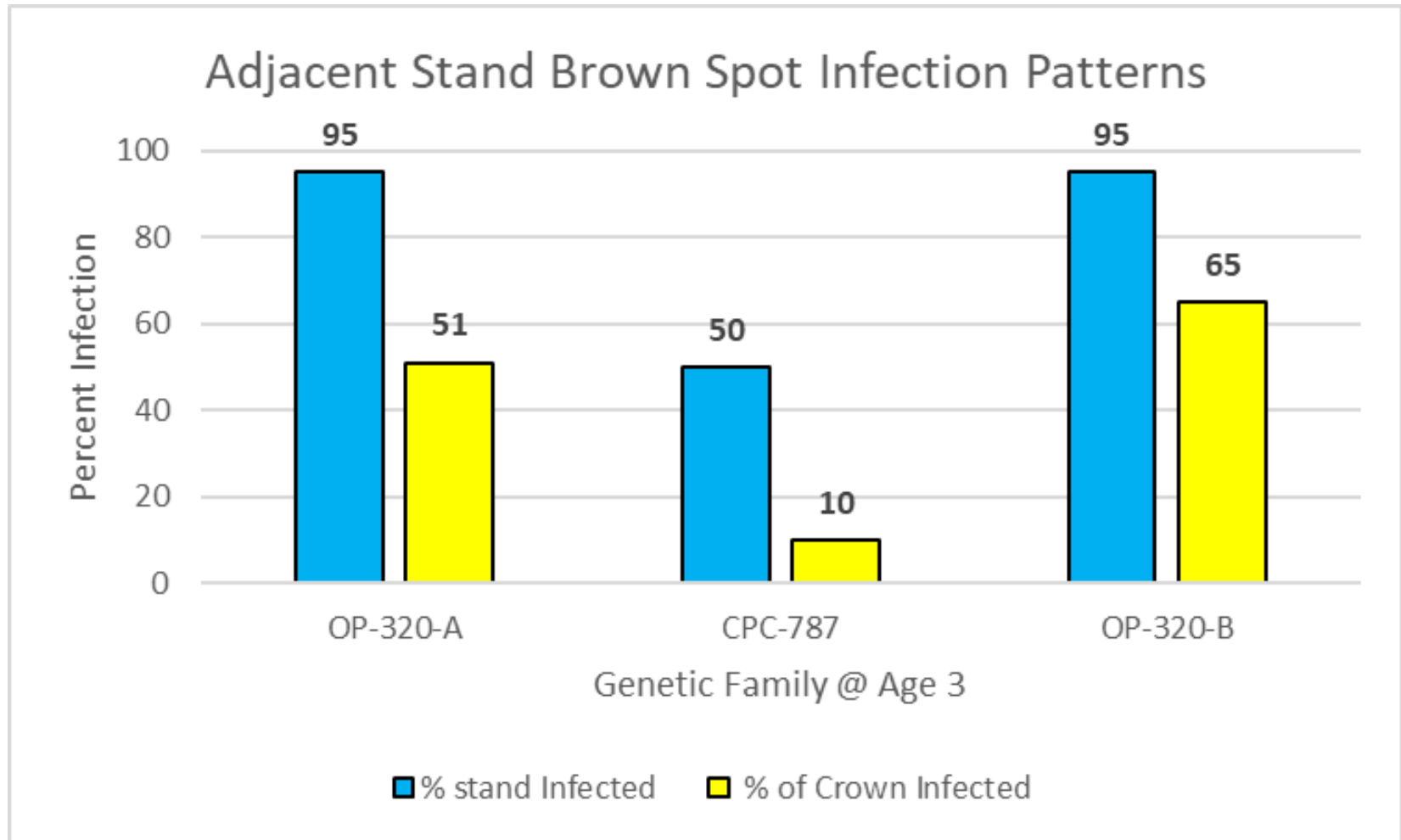
Average Brown Spot Infection



## ➤ Genetic Families are coded to avoid misconceptions due to potential observational errors

- ❑ CPC = Controlled Pollinated Cross
- ❑ OP = Open Pollinated

# Loblolly Pine Observational Genetic Resistance To Brown Spot





# Genetic Resistance Patterns – Observational Evidence

## Age 3 Loblolly Pine Plantation



**Family OP-320,  
Sub-stand A**



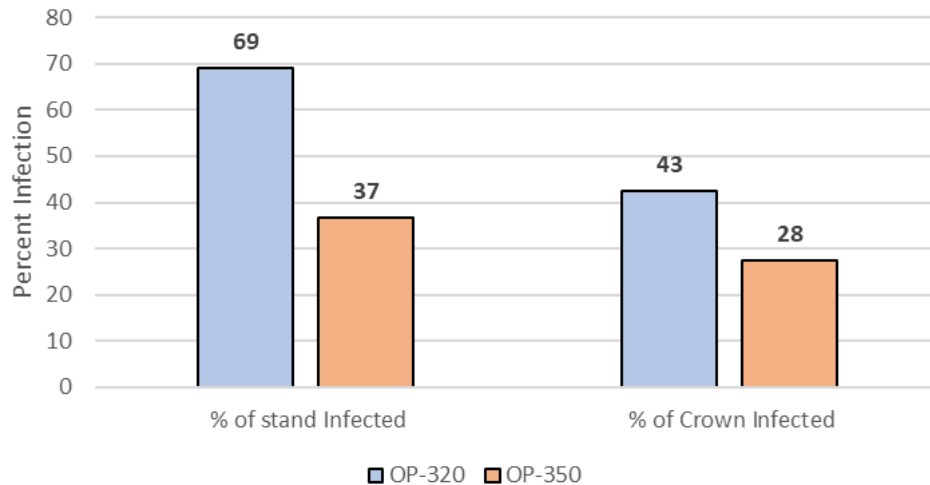
**Family CPC-787,  
Sub-stand B**



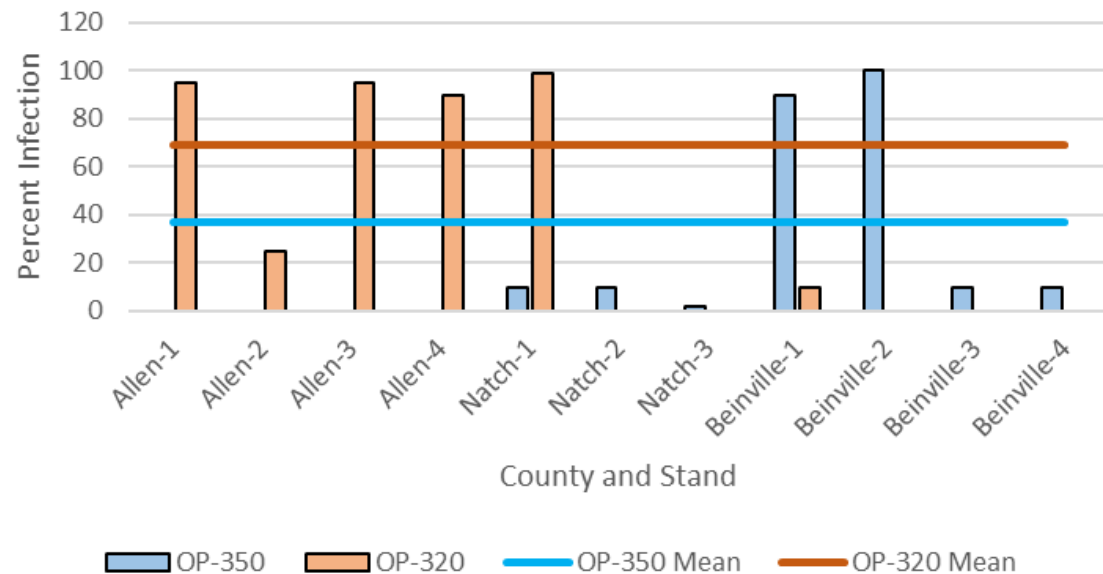
**Family OP-320,  
Sub-stand C**

# Genetic Resistance Pattern – Observational Evidence

Average Brown Spot Infection

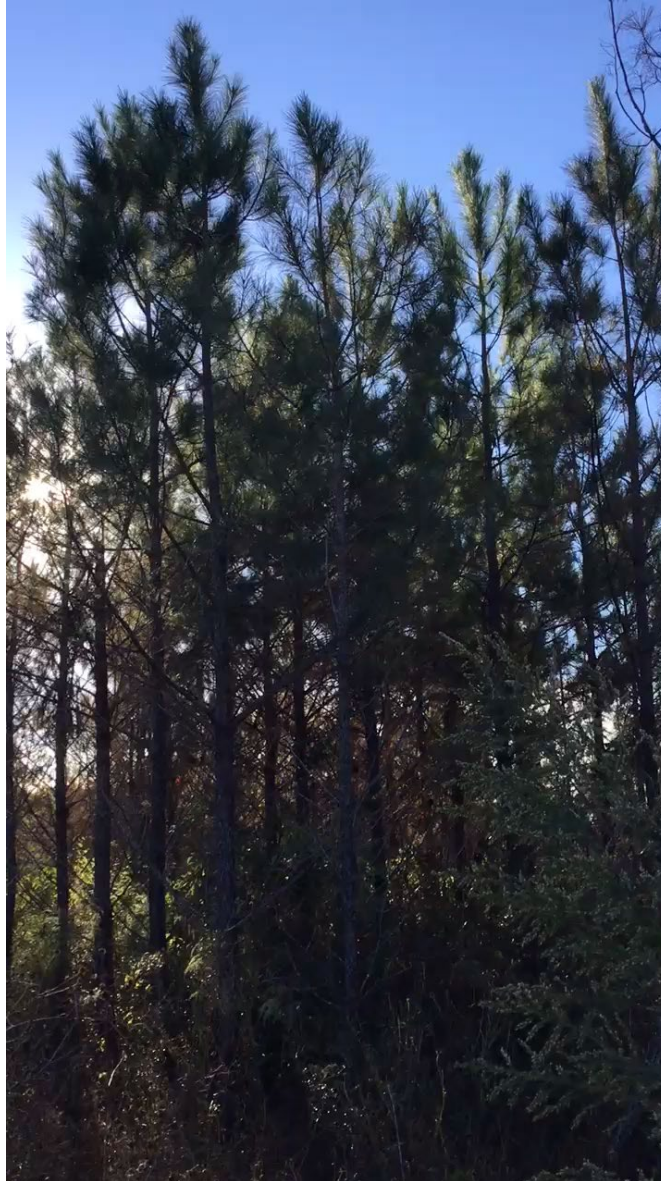


Percent Stand Infected OP-350 vs. OP-320





# Nutritional or Age Resistance Pattern – Observational Evidence



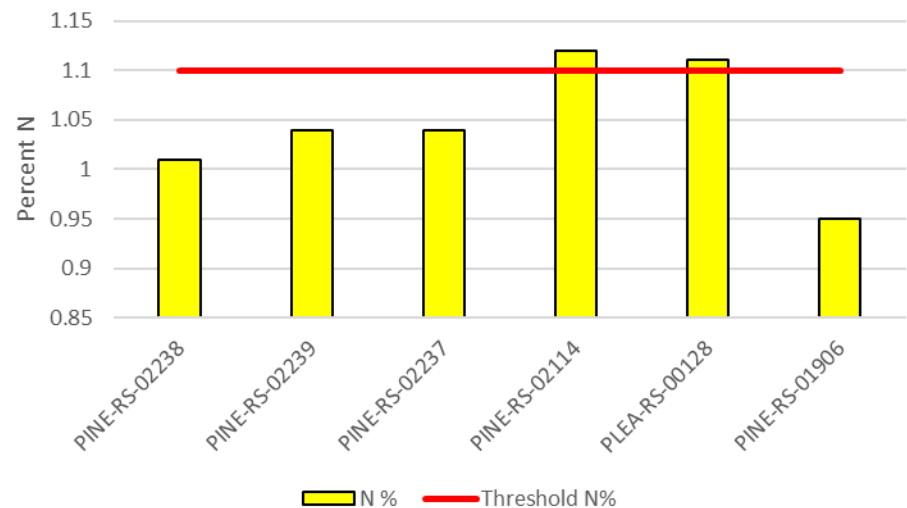


# Brown Spot Foliar Nutrient Levels

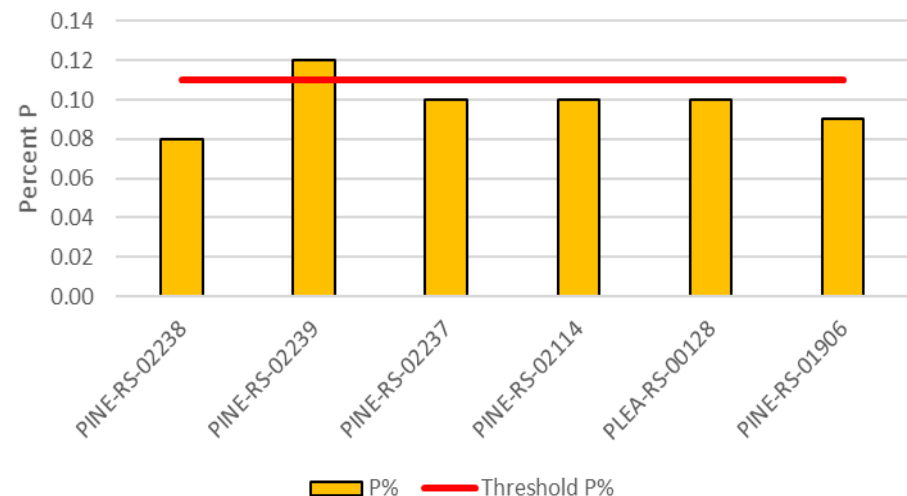
Location											NITROGEN		PHOSPHOUS		BORON	
State	County	Tract/Stand	Infection % of Crown	% stand Infected	% Dead	Age	Family	SAMPLE ID	Needle Cast Symptoms	L. acicola LAMP	N %	N RATE	P %	P RATE	B ppm	B RATE
LA	Allen	PINE-RS-02238	51	95	1	3	OP-320	2238	Symptomatic	positive	1.01	L	0.08	L	8	D
LA	Allen	PINE-RS-02239	10	50	0	3	CPC-787	2239	Symptomatic	negative	1.04	L	0.12	S	10	D
LA	Allen	PINE-RS-02237	5	25	0	7	OP-320	2237	Asymptomatic	negative	1.04	L	0.1	S	16	S
LA	Allen	PINE-RS-02114	75	99	7	4	CPC-737	2114	Symptomatic	negative	1.12	S	0.1	S	11	D-L
LA	Natchitoches	PLEA-RS-00128	75	99	15	6	OP-320	00128A	Symptomatic	negative	1.23	S	0.17	S+	8	D
								00128B	Symptomatic	negative	1.19	S	0.09	S	8	D
								00128C	Symptomatic	positive	0.97	L	0.07	D-L	11	D-L
								00128D	Symptomatic	negative	1.03	L	0.08	L	11	D-L
LA	Natchitoches	PINE-RS-01906	15	10	0	1	OP-330	1906	Symptomatic	positive	0.95	L	0.09	S	11	D-L

# Brown Spot Foliar Nutrient Levels

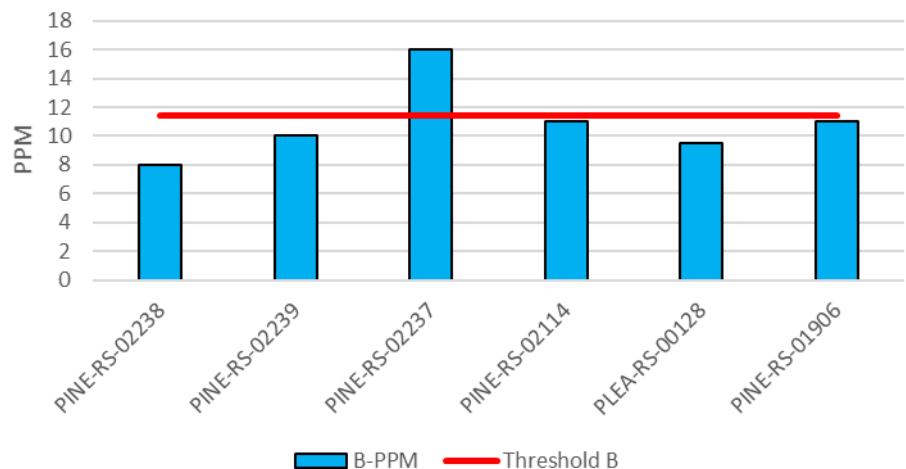
Brown Spot Foliar Percent N Levels



Brown Spot Foliar Percent P Levels



Brown Spot Foliar B Levels (PPM)



# Brown Spot Needle Blight

## ➤ Discussion:

- ☐ BSNB on loblolly pine has been reported across the Southeast
- ☐ Is BSNB a big enough concern to have the Tree Improvement Co-Ops look at genetic resistance patterns?
- ☐ Should the Tree Improvement Co-ops collaborate with Auburn and University of Georgia forest health programs to develop management strategies?

 **Manulife** Investment Management