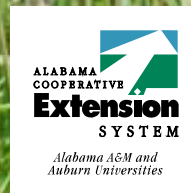


# Cogongrass Seed Production Across Alabama and Georgia

**Nancy J. Loewenstein<sup>1</sup>,  
James H. Miller<sup>2</sup> and Stephen F. Enloe<sup>1</sup>**  
**1-Auburn University and 2-USDA Forest Service**



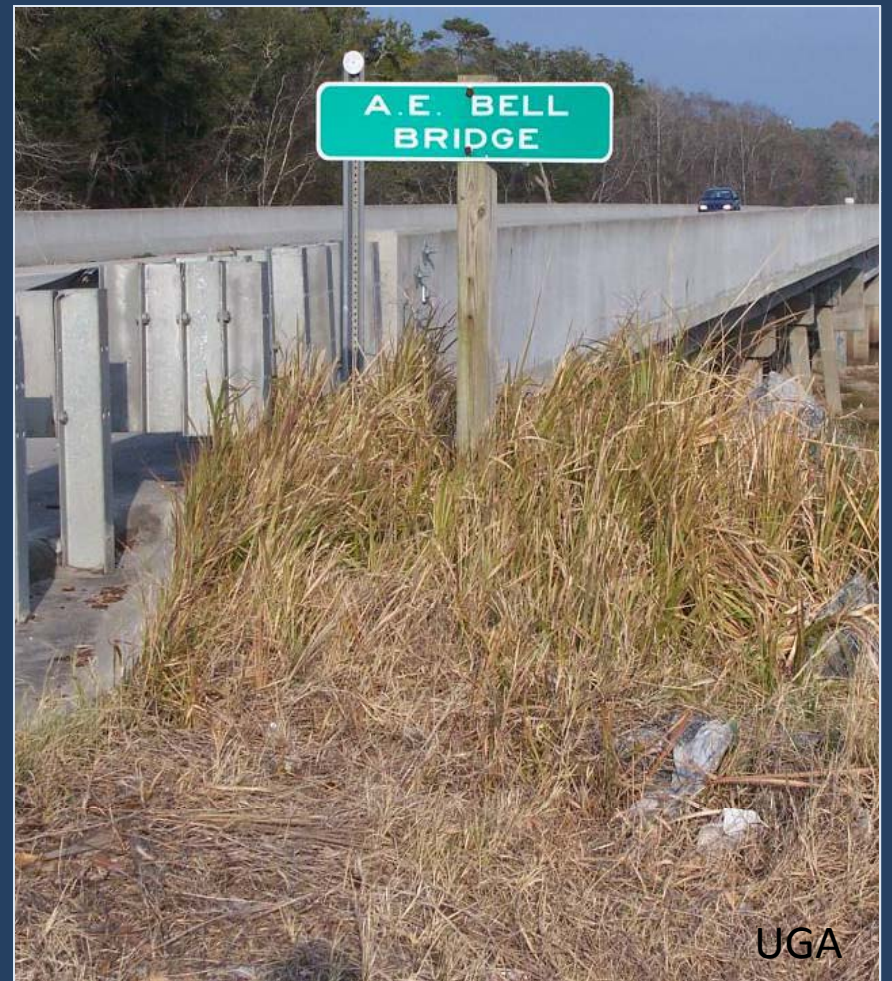
# Cogongrass spread



# Cogongrass dispersal via rhizomes



NJL



UGA



NJL



NJL

# Cogongrass seed dispersal

- wind
- vehicles
- equipment
- clothing
- agronomic products





NJL

## What do we know?

- Capable of prolific flowering
- Reports of seed viability highly variable
- Obligate outcrosser ... must cross pollinate with plant of different genetic material
- Seed fill generally fairly low
- High germination rate
- Seed longevity generally < 1 year

- McDonald et al. (1995, 1996)
- Shilling et al. (1997)
- Holly and Ervin (2007)
- Yager (2007)



NJL

- ☼ Are there regional differences in cogongrass seed production?
- ☼ Do outlying populations of cogongrass produce viable seed?

# Cogongrass Flower/seed heads



- Cylindrical in shape
- 2-8 inches in length
- Silvery white in color
- Light fluffy dandelion-like seeds
- Blooms from late March to early June (flowering time depends somewhat on local climate)

From: Evans et al. 2008. Field Guide to the Identification of Cogongrass





Just-opened cogongrass flowers are often more purple than white.



- ✿ How long do the flowers last?
- ✿ When is the seed viable?



May 4



May 6



May 11

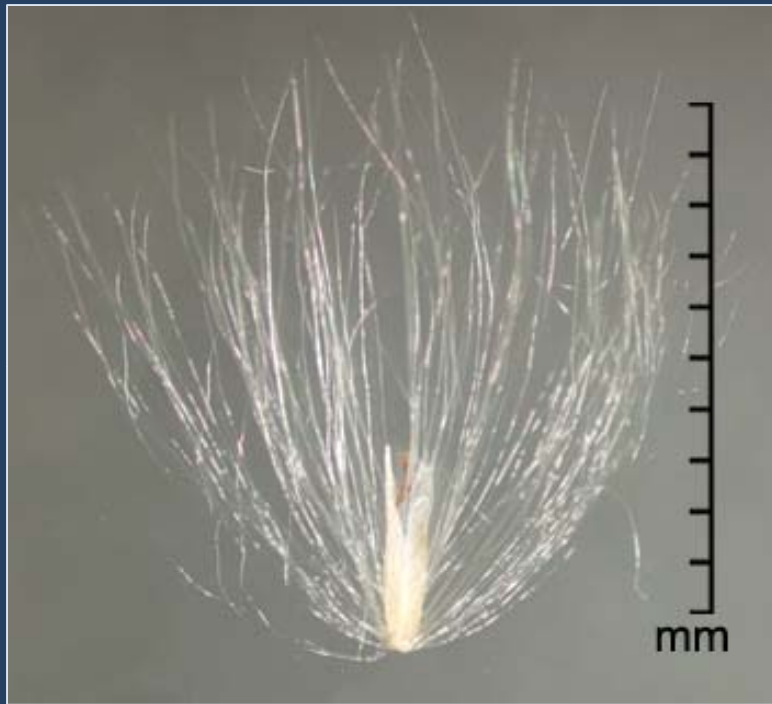


May 20

Auburn, AL 2009



cogongrass seeds



## Federal Noxious Weed Disseminules of the U.S.

[Home](#) | [Browse](#) | [Identify](#) | [About key](#) | [Glossary](#)

Flowering is stimulated by ...



mowing, fertilization ...



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burned



unburned





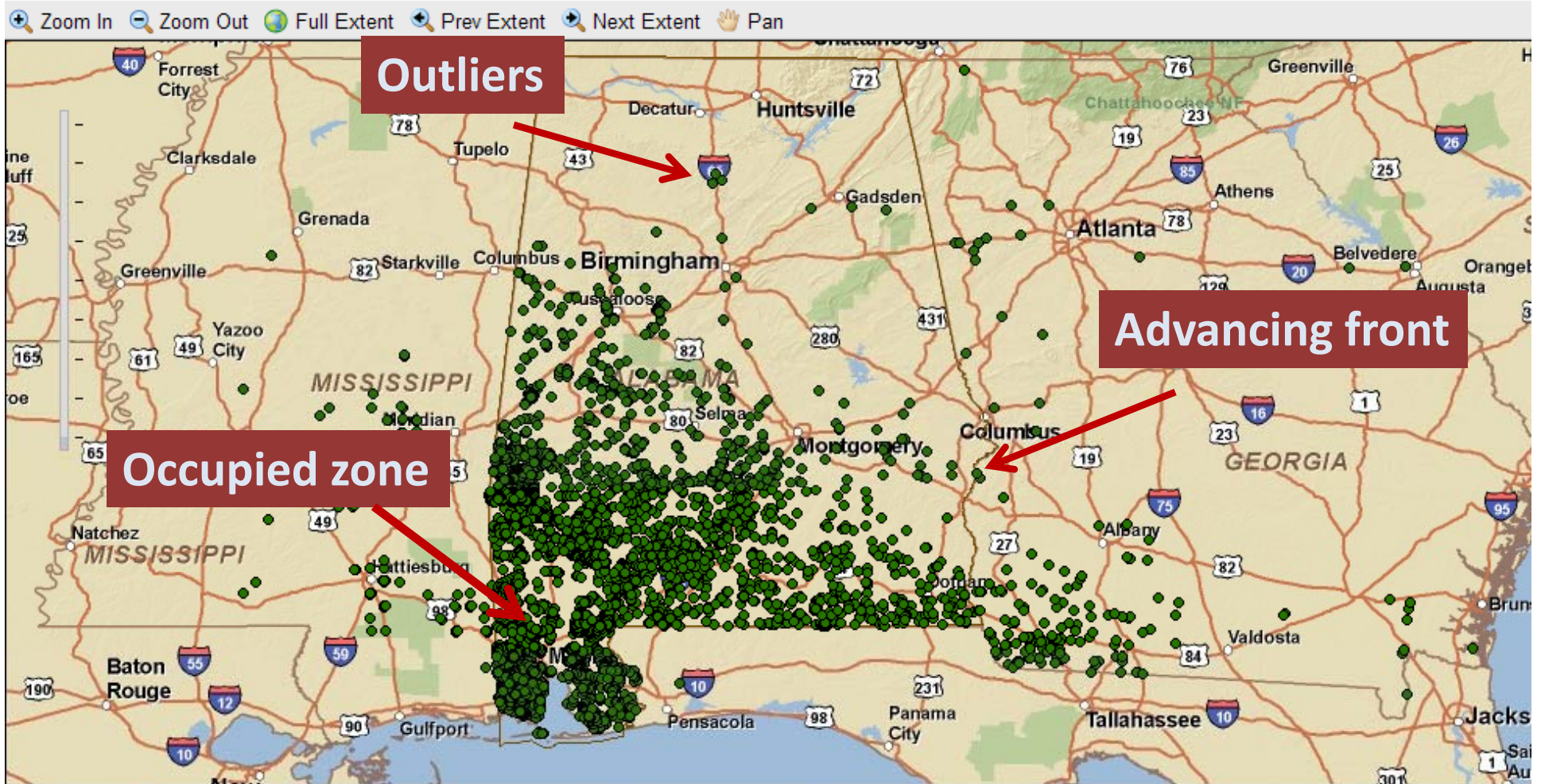
NJL

Spring herbicide treatments don't always eliminate flowering.

More work is needed on timing and efficacy of spring herbicide treatments for reduction of seed production.

# Methods

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Click map icons for more information

To zoom: Select zoom tool icon and drag a box over area of interest

To report cogon grass infestation contact your local [Alabama Forestry Commission Office](#).

Data updated daily by the Alabama Forestry Commission

Data as of 4/22/2010 11:18:58 AM (Refresh screen to update data)

6404

Number of Spots

seed heads were collected (with the help of volunteers) from populations across Alabama and Georgia

## 2008

- ☀ Alabama - 45 sites (21 counties)
- ☀ Georgia – 13 sites ( ? counties)
- ☀ 5 panicles/site

## 2009

- ☀ Alabama - 116 sites (18 counties)
- ☀ Georgia – 14 sites (8 counties)
- ☀ 10 panicles/site



3 – anthers and stigmas, not shattering

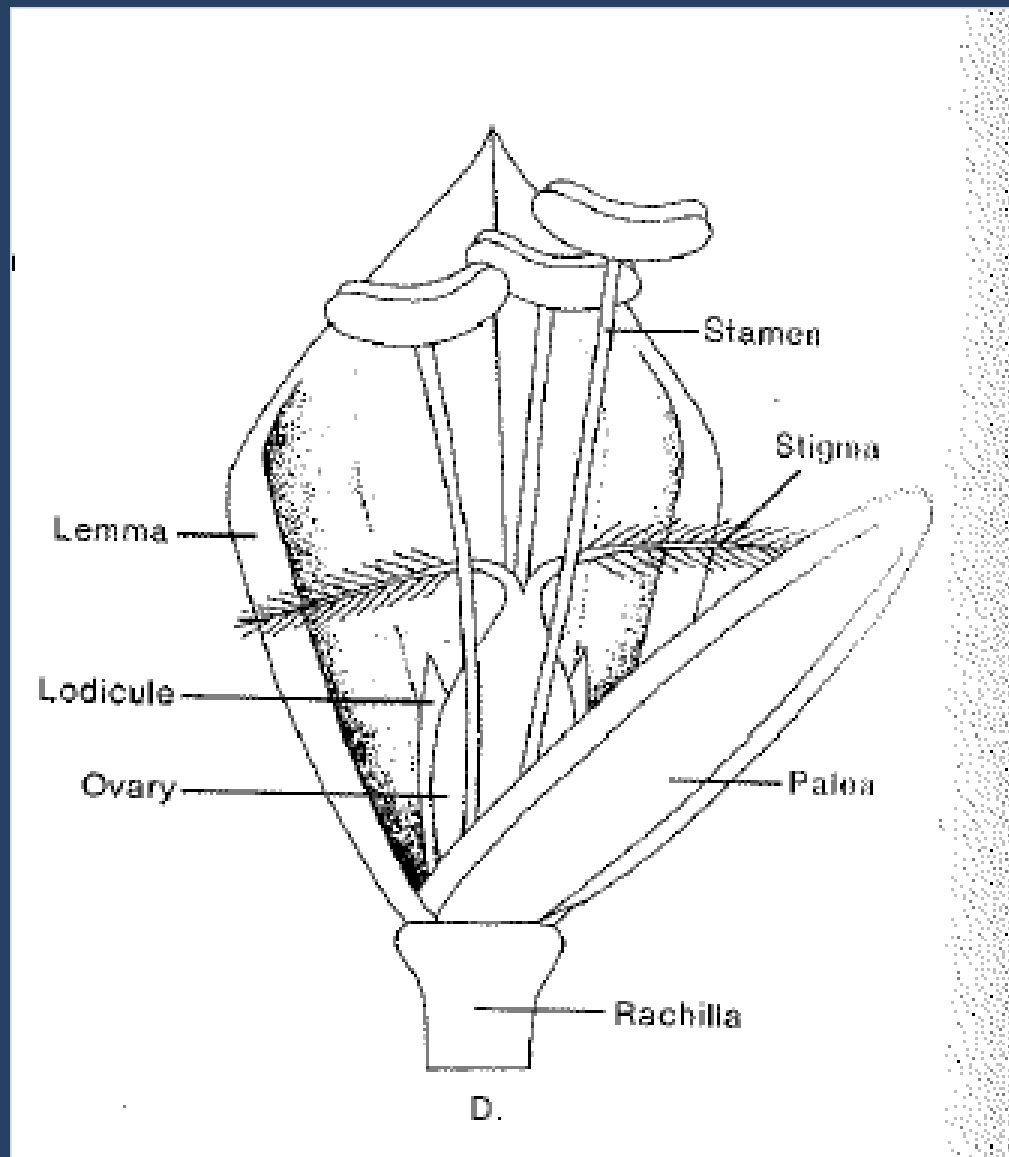


2 – stigmas, few anthers, beginning to shatter



1 – few stigmas, shattering

recorded length and maturity of each panicle



Generic grass flower  
Vascular Plant Taxonomy, 3<sup>rd</sup> Edition, Walters & Kiel



- Lined 9 cm petri dish with filter paper
- Moistened paper with deionized water
- Placed panicle in the plate, spreading the florets out with dissecting needles
- Sealed plate with Parafilm and placed in growth chamber



- ☀ 16 hr light, 8 hr dark
- ☀ 30 C/20 C
- ☀ 2 weeks (1 week in 2009)





124 5/30/08



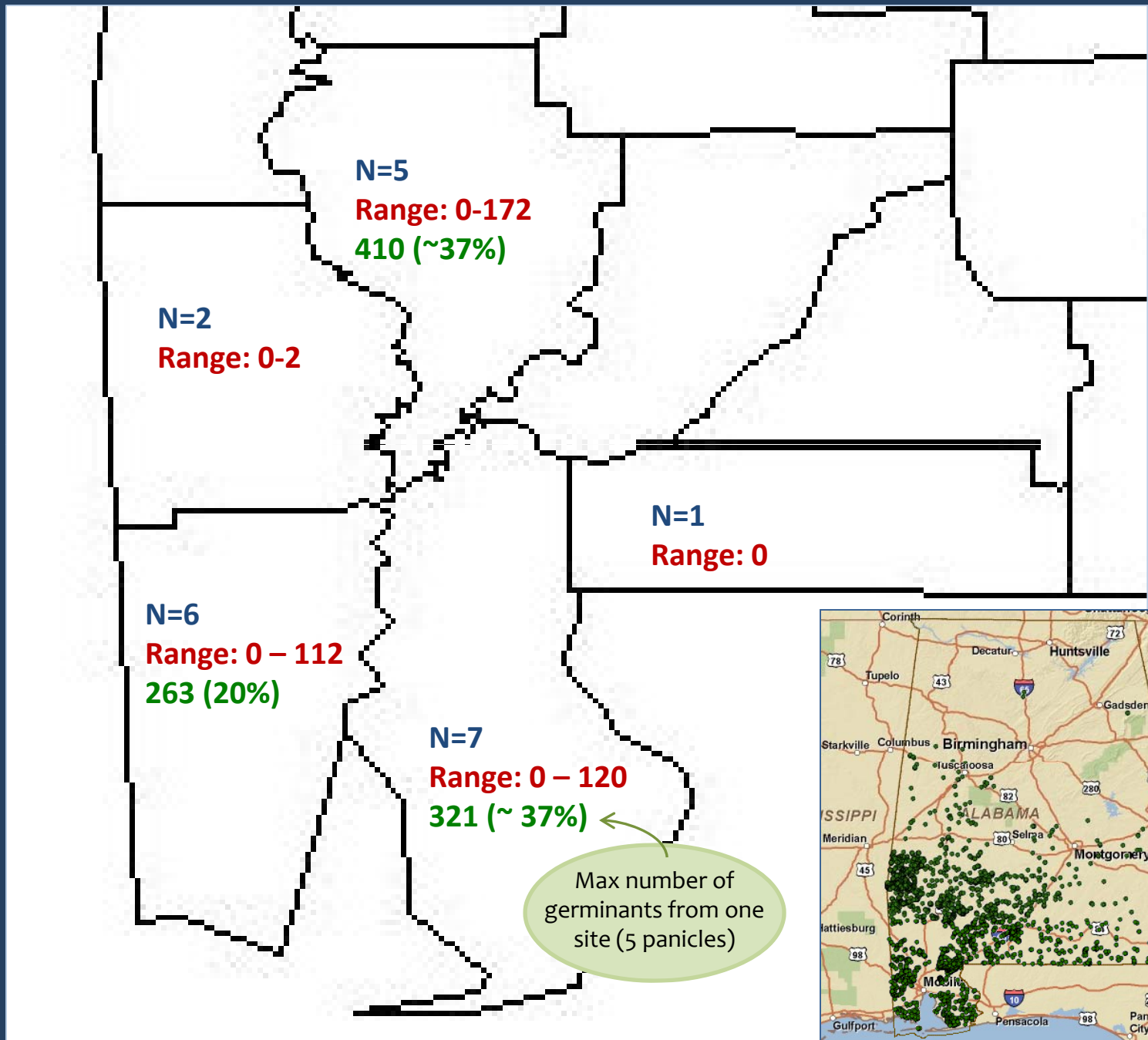




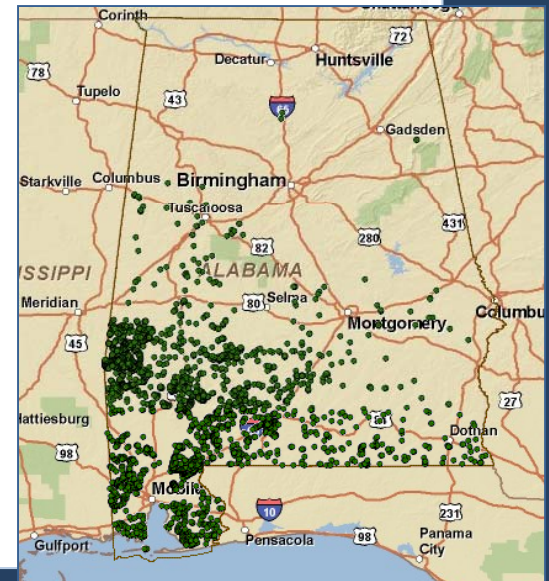
# Results

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2008



Max number of germinants from one site (5 panicles)



## Mobile County

- ✿ 0, 0, 0, 0, 0
- ✿ 1, 3, 3, 8, 8
- ✿ 2, 7, 11, 16, 25
- ✿ 2, 18, 27, 29, 38
- ✿ 2, 11, 30, 61, 62
- ✿ 24, 38, 42, 47, 112

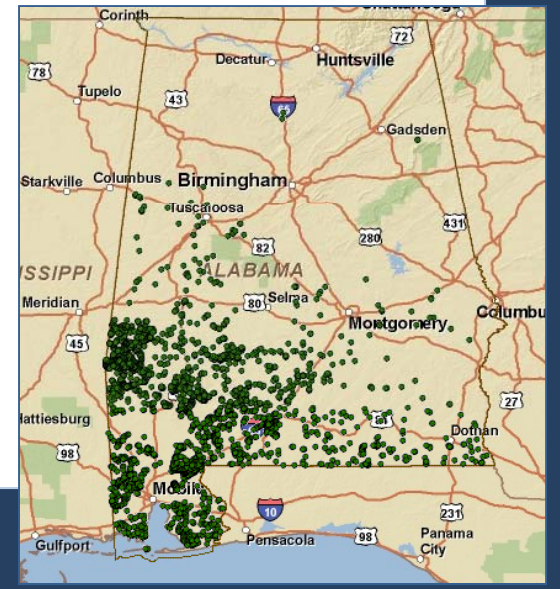
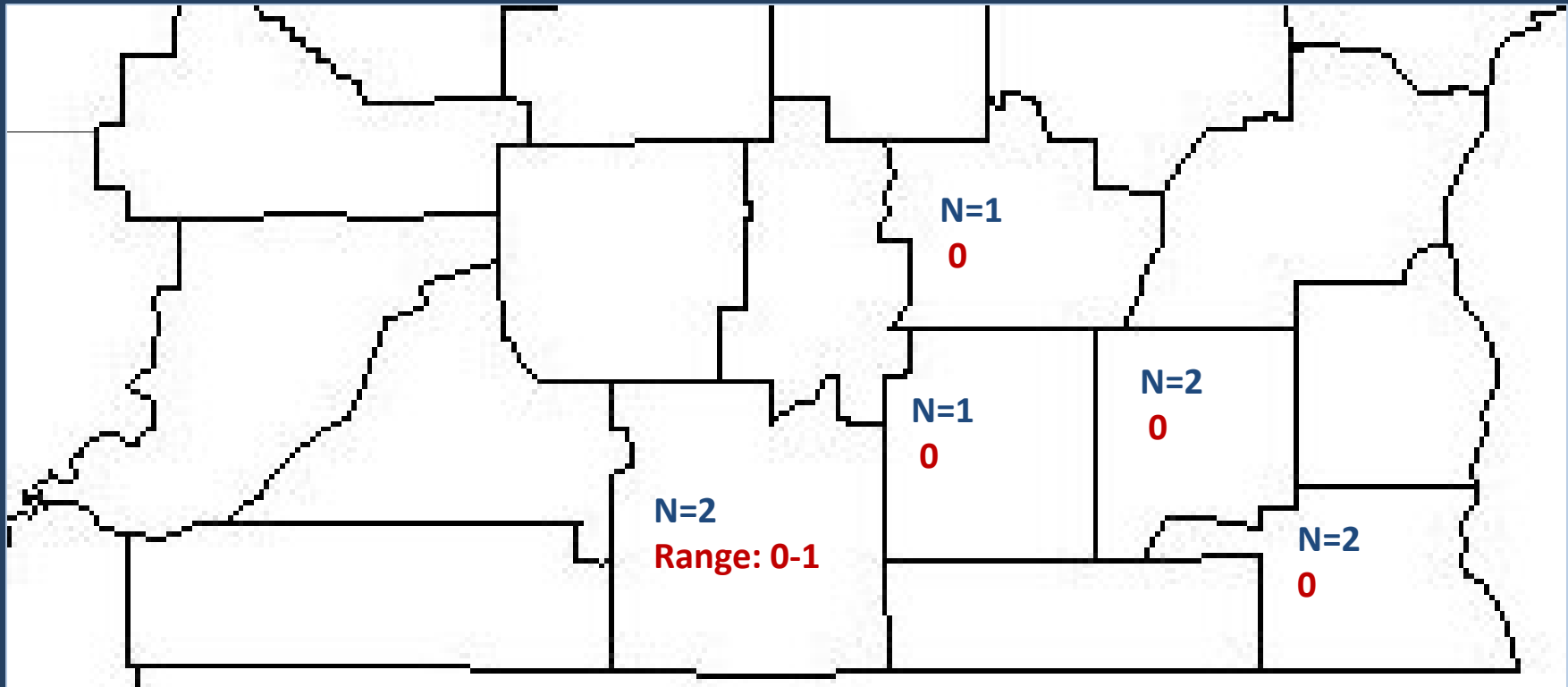
## Baldwin County

- ✿ 0, 0, 0, 0, 0
- ✿ 0, 0, 0, 1, 1
- ✿ 0, 1, 1, 3, 6
- ✿ 2, 2, 4, 5, 8
- ✿ 5, 26, 35, 55, 88
- ✿ 47, 48, 50, 56, 120

## Clarke County

- ✿ 0, 0, 0, 0, 0
- ✿ 0, 0, 0, 0, 0
- ✿ 0, 0, 0, 0, 0
- ✿ 0, 0, 0, 0, 1
- ✿ 6, 24, 82, 126, 182

Shilling et al. reported 350-500 spikelets per panicle (avg of 25/cm)



2008



2008

No germinants from outlier populations.

A few germinants from populations along expanding front.

N=2  
0

N=1  
0

N=1  
0-1

N=2  
0-2

N=1  
0

N=2  
0-1

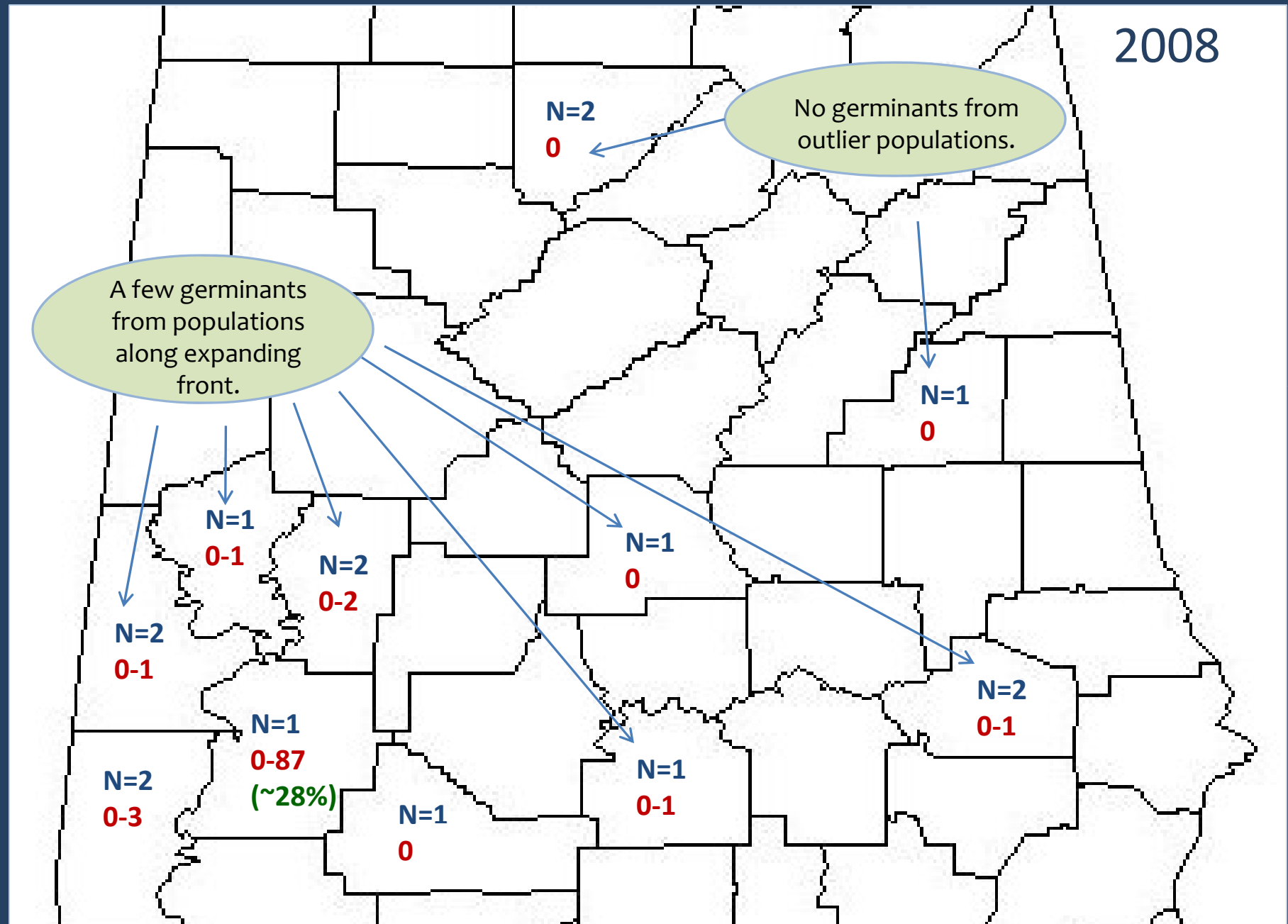
N=1  
0-87  
(~28%)

N=2  
0-1

N=2  
0-3

N=1  
0

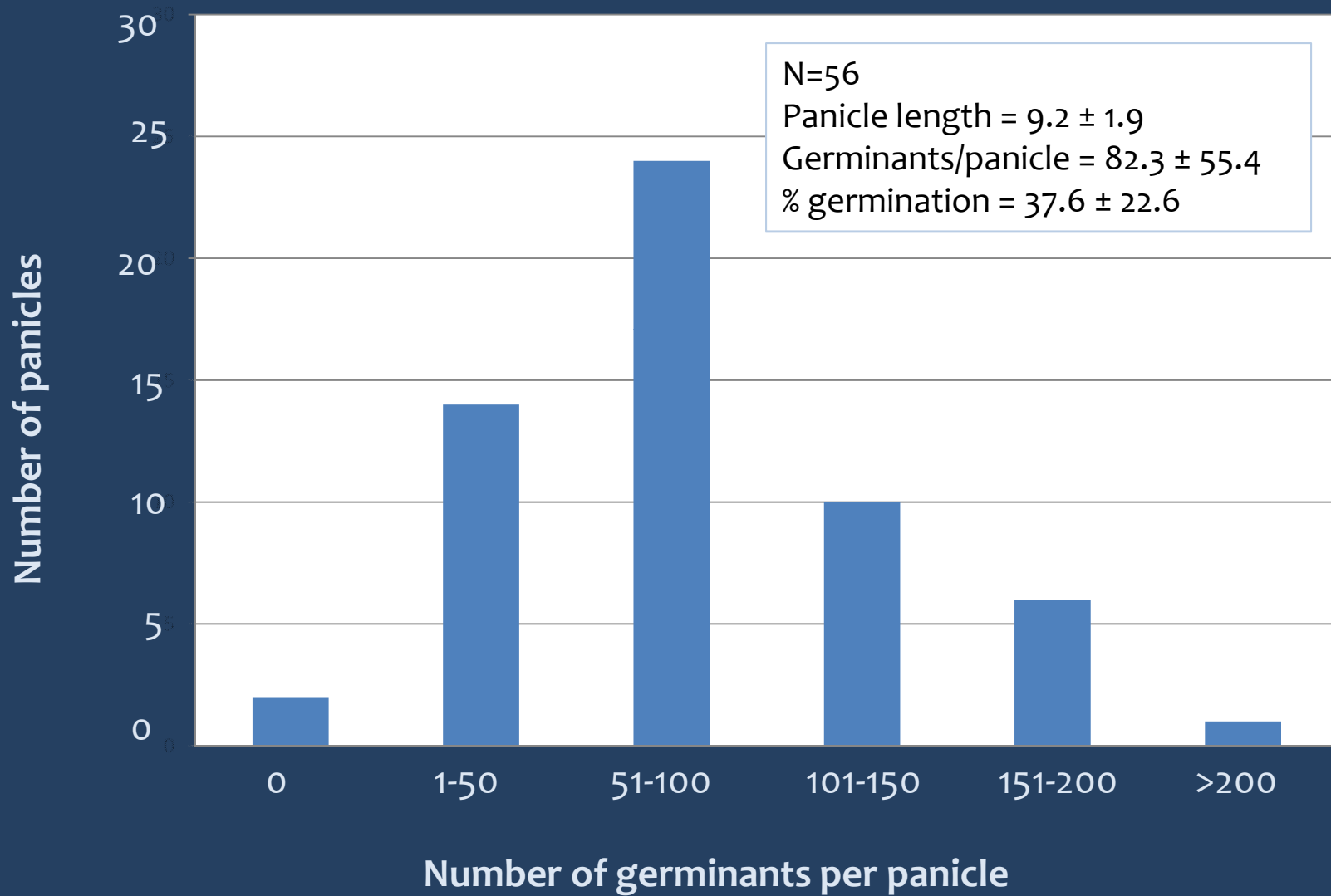
N=1  
0-1





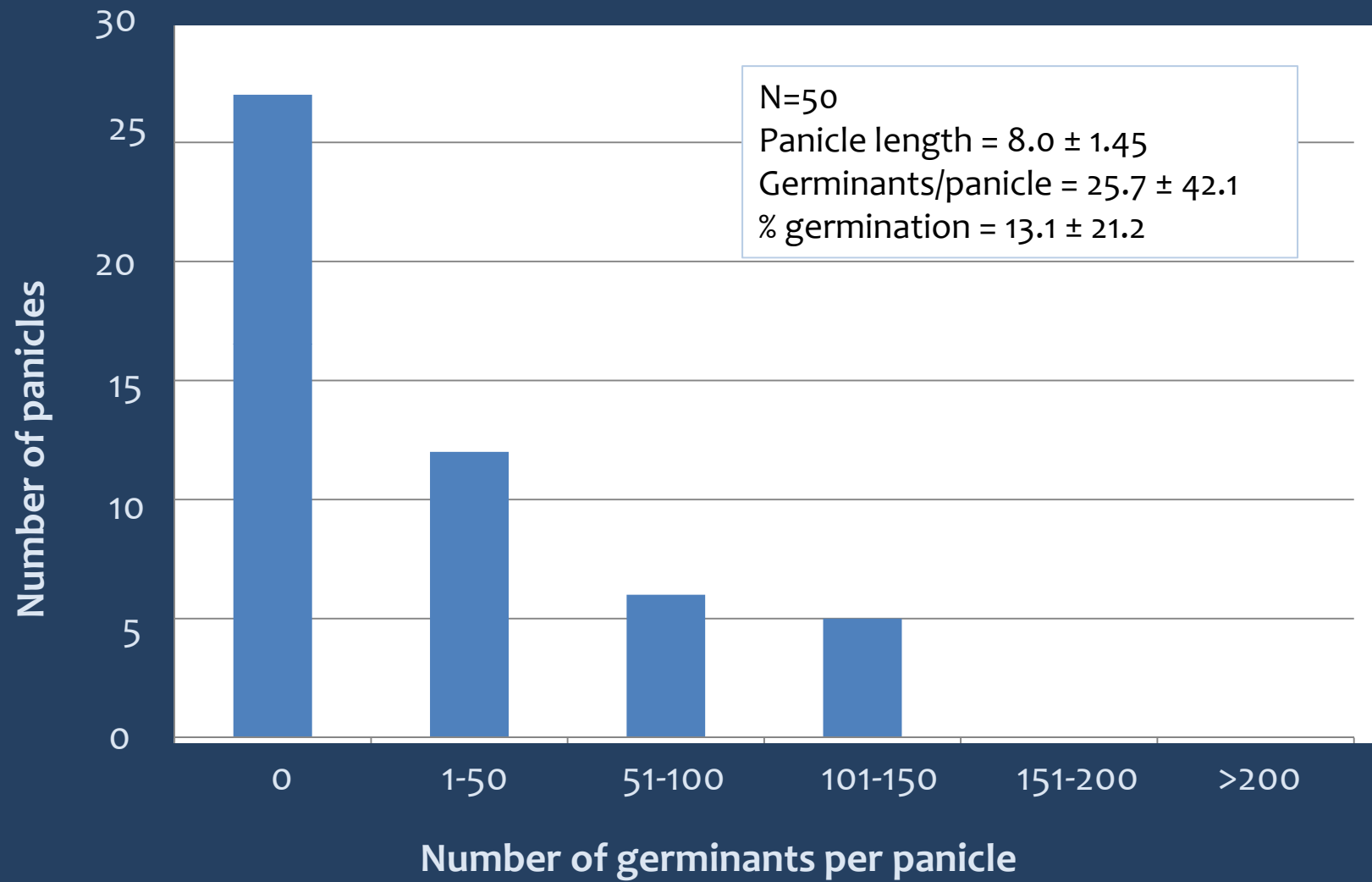
# Mobile County, AL

## Fresh seed

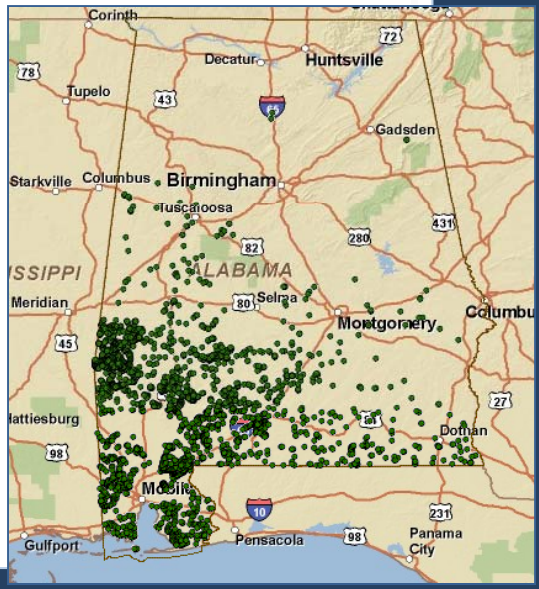
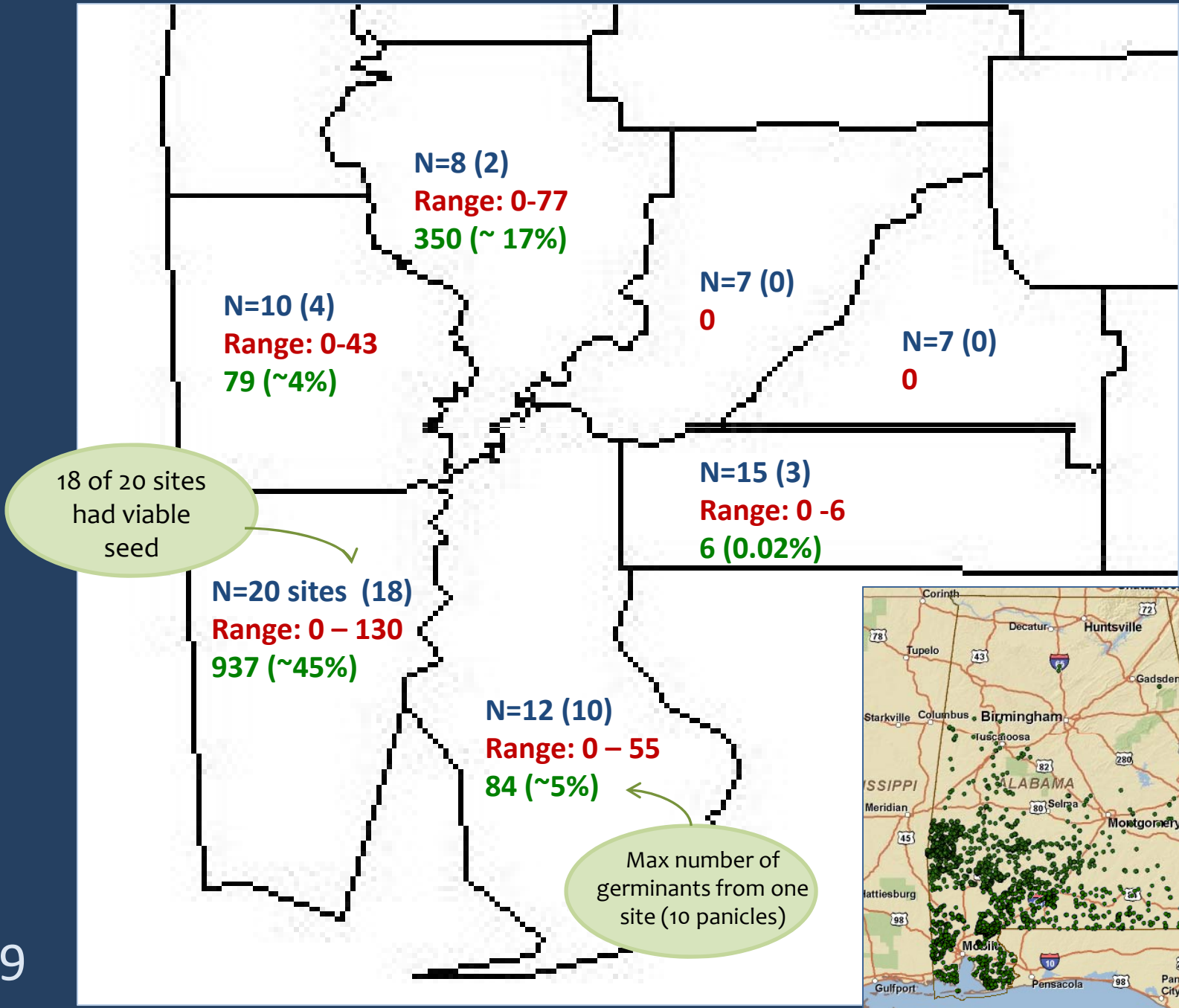


# Mobile County, AL

## 12 month old seed



2009



If you have ...

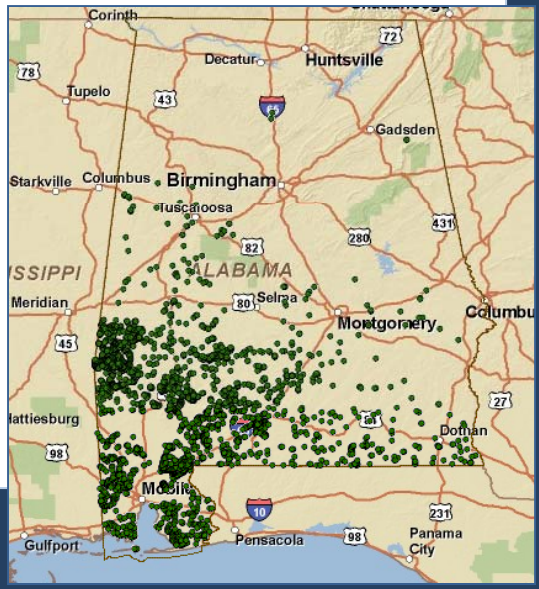
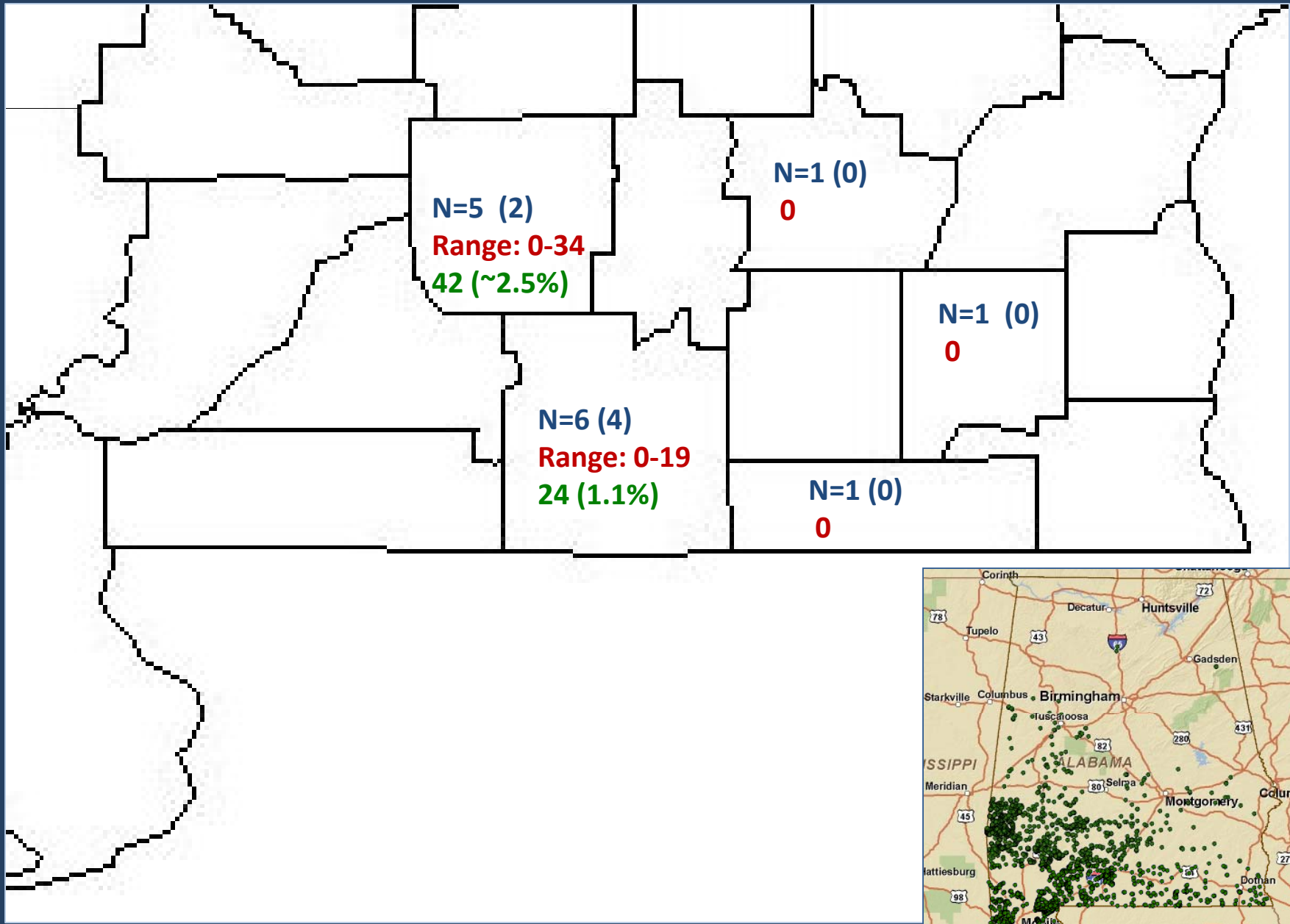
937 viable seeds/10 panicles (~45% germination)

100 panicles/m<sup>2</sup> → 9370 seeds/m<sup>2</sup> →  
93.7 million seeds/hectare (37.9 million seeds/acre)

If you have ...

2 viable seeds/10 panicles (< 0.1 % germination)

100 panicles/m<sup>2</sup> → 20 seeds/m<sup>2</sup> →  
200,000 seeds/hectare (80,971 seeds/acre)



2009



2009

No germinants from outlier population.

A few germinants from some (but not all) populations along expanding front.

N=7 (0)  
0

N=7 (0)  
0

N=7  
0

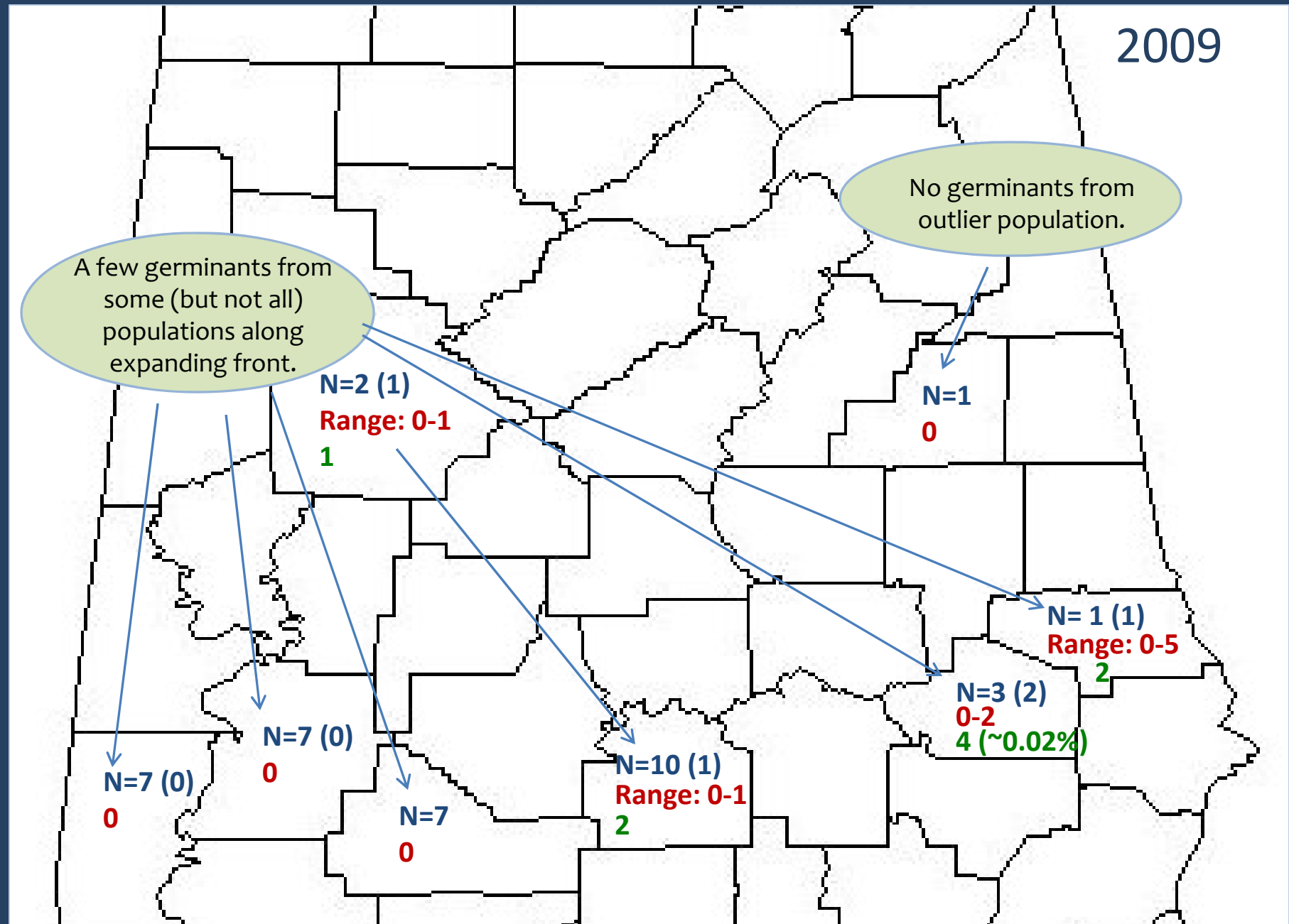
N=2 (1)  
Range: 0-1  
1

N=10 (1)  
Range: 0-1  
2

N=1  
0

N= 1 (1)  
Range: 0-5  
2

N=3 (2)  
0-2  
4 (~0.02%)



# Georgia

## ✿ 2008

✿ No germinants

## ✿ 2009

✿ 7 germinants

- 1 each from 4 different sites (3 counties)
- 3 from one site

# Possible sources of variation in seed viability



- seed maturity
- phenological differences
  - within an infestation
  - between genetic entities
- distance between 'clones'
- rhizome or seed origin
- weather and microsite

# Summary

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- ✿ Cogongrass seed production is variable *across* and *within* regions
  - ✿ Highest seed production occurred within the ‘occupied’ zone, but was still highly variable
  - ✿ Seed production was sporadic outside of the ‘occupied’ zone, but did occur
- ✿ Seed germination does appear to be high (seed set is variable)
- ✿ Seed longevity (in the lab) declined over time but exceeded one year
- ✿ Cogongrass spread by seed cannot be ignored!
- ✿ Viable seed may be present before seed heads appear fully mature.

# Acknowledgements

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## Funding:

- USDA Forest Service

## Seed collection:

- Alabama Forestry Commission
- Alabama Cooperative Extension System
- Georgia Forestry Commission

## Germination trials (2009):

- Denise Landers
- Scott Rose



Questions?

NJL