Interactions Among Insect Defoliation, Insecticide Treatments, and Growth Rate in Genetic Families of American Chestnut

Ashley E. Case
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Department of Forestry Wildlife and Fisheries
October 30th, 2013 12:20pm Room 160 PBB

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Current Research

Methods

Study Site

Restoration Efforts

Preliminary Results

Weevil Emergence

Virtual Defoliation

The American Chestnut (*Castanea dentata*)

In Conclusion

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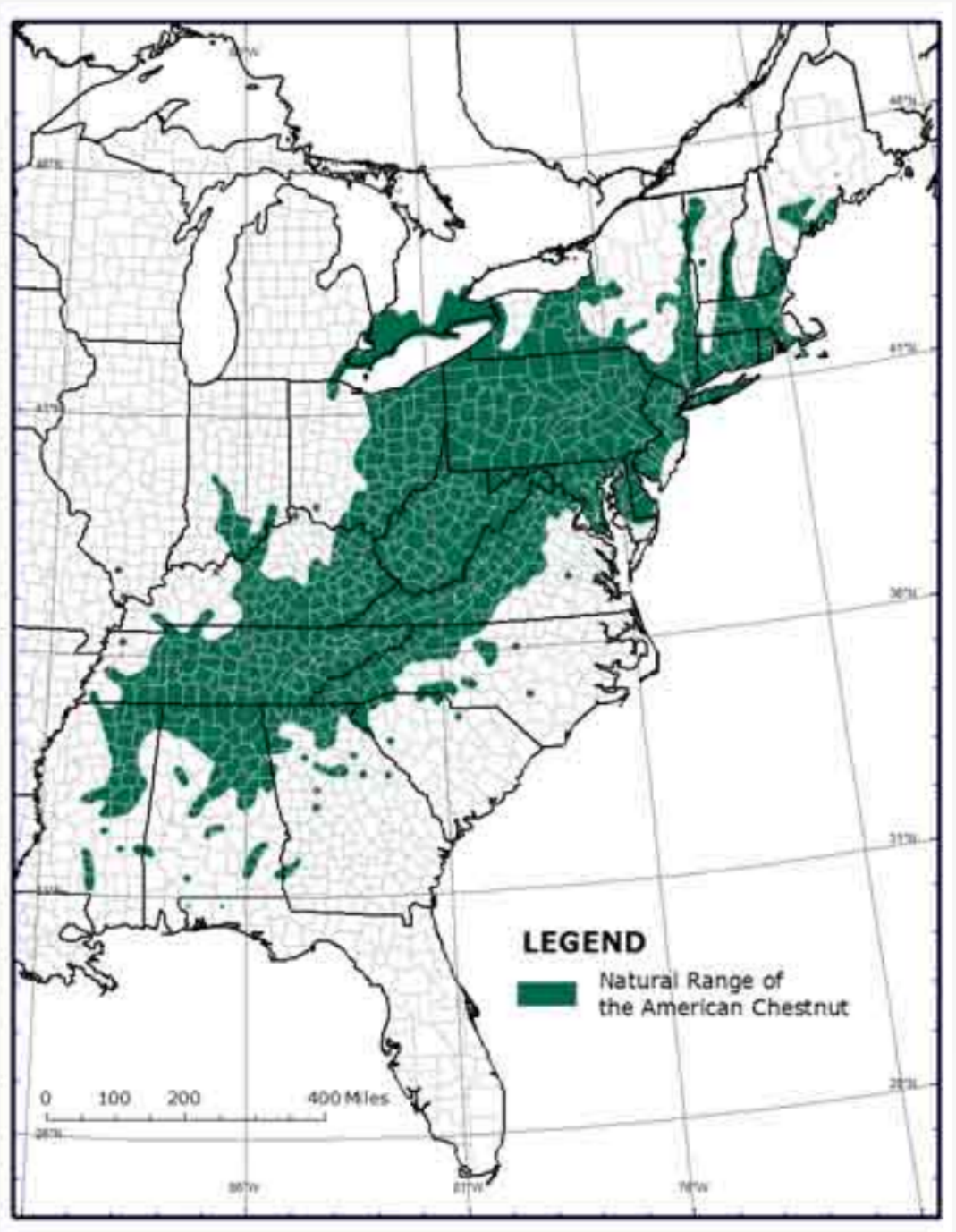
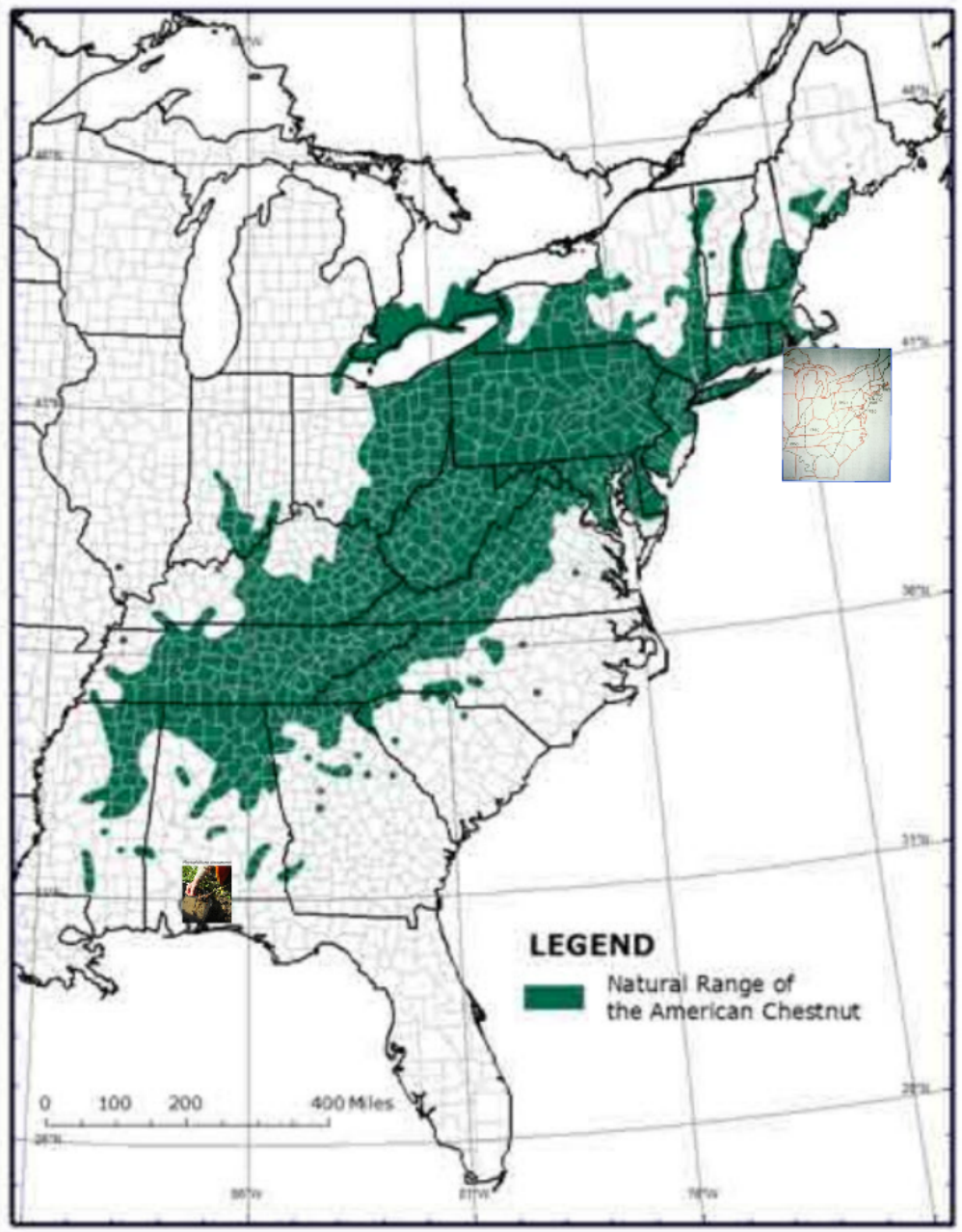
The American Chestnut

(Castanea dentata)


LEGEND
Natural Range of
the American Chestnut
0 100 200 400 Miles


Restoring the
MIGHTY GIANTS
Courtesy of: The American
Chestnut Foundation


LEGEND
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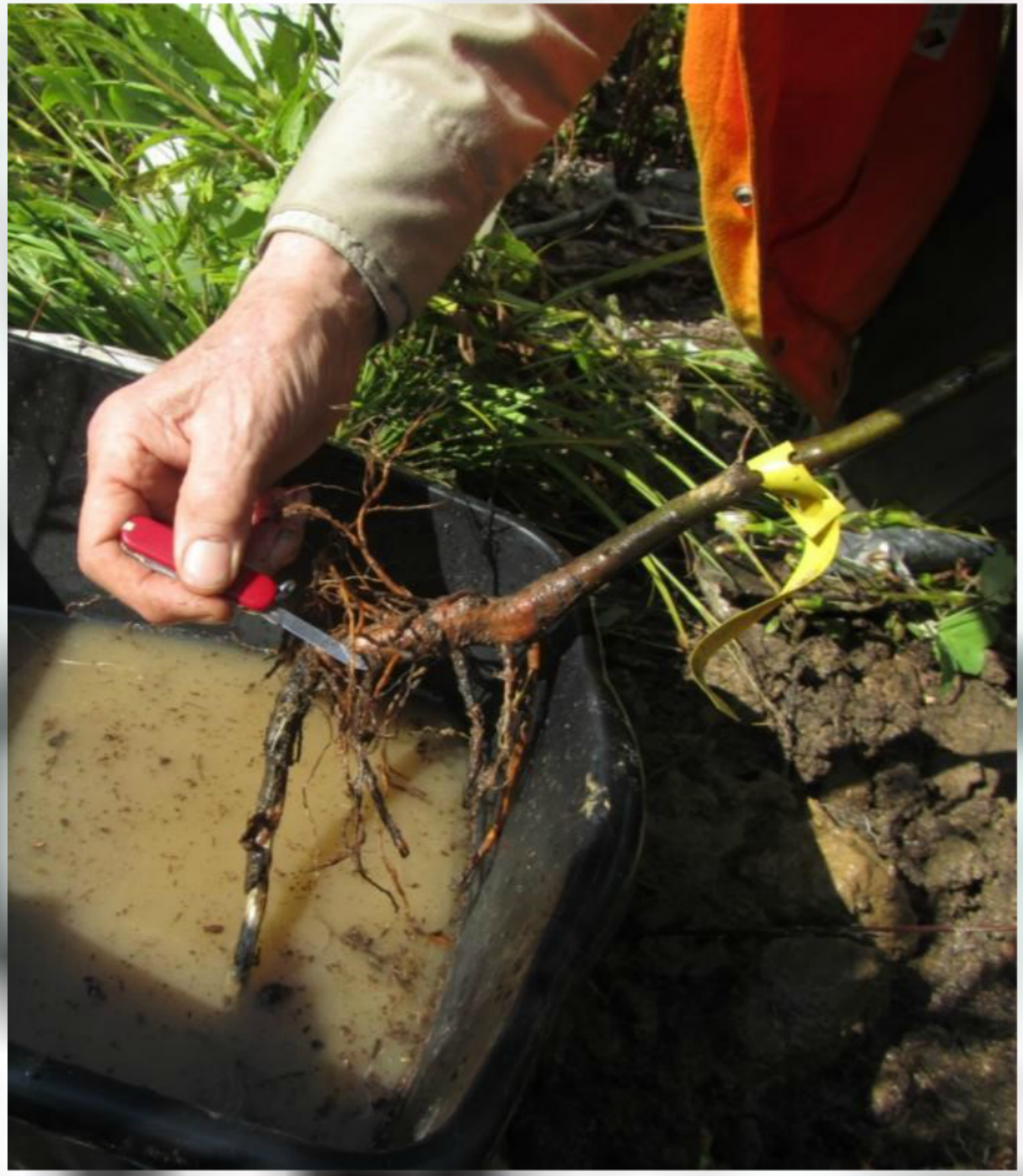
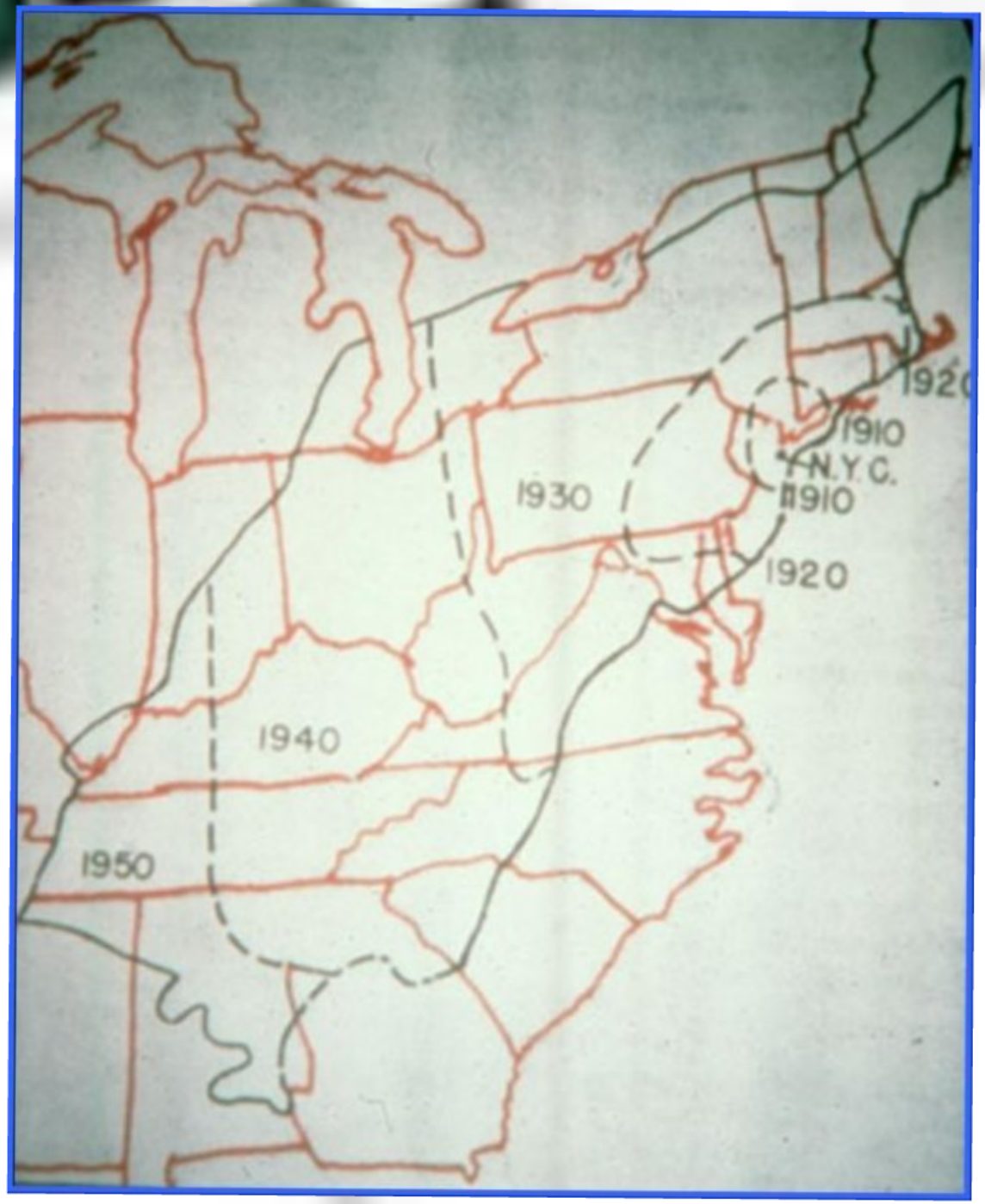
Phytophthora cinnamomi





Restoration Efforts

Breeding Programs

Connecticut Agricultural Experimental Station

American Chestnut Cooperators

Virulent

Hypovirulent

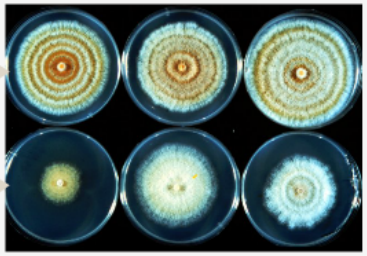
Breeding Programs

Connecticut Agricultural Experimental Station

American Chestnut Cooperators

Verulent →

Hypovirulent →



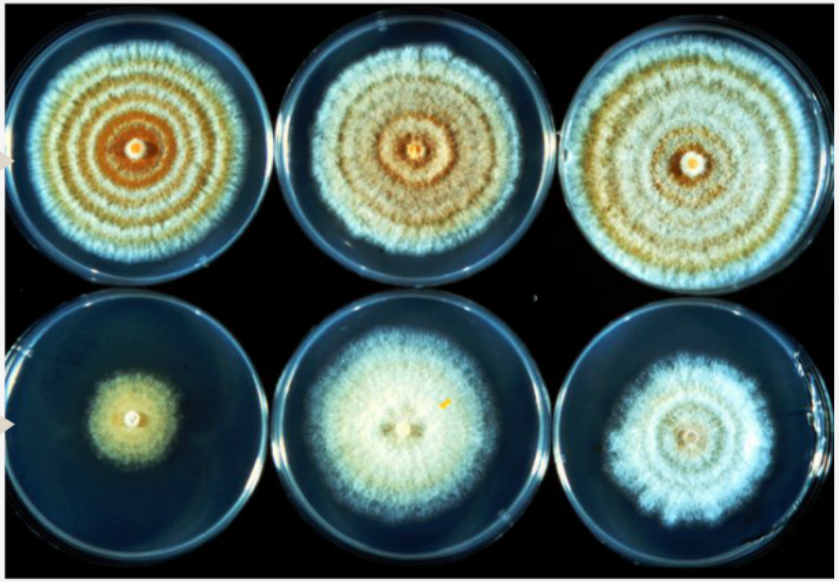
THE AMERICAN CHESTNUT FOUNDATION

Connecticut Agricultural Experimental Station

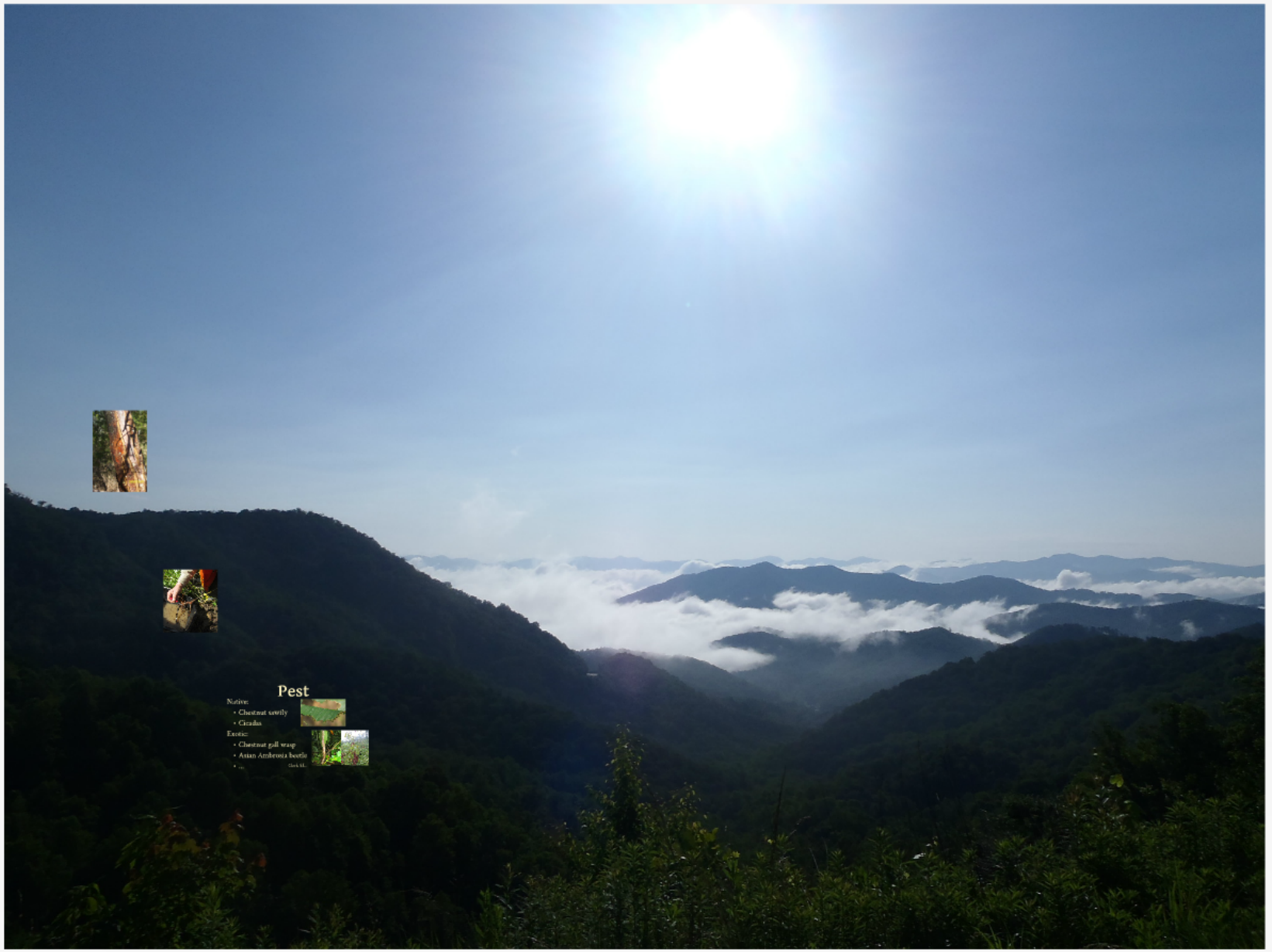
American Chestnut Cooperators

Verulent

Hypovirulent



Sarasota County Government


Pest
Native:
• Chestnut weevil
• Cicada
Exotic:
• Chestnut gall wasp
• Asian Ambrosia beetle

Pest

Native:

- Chestnut sawfly
- Cicadas

Exotic:

- Chestnut gall wasp
- Asian Ambrosia beetle
- ...

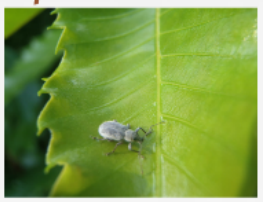
Clark S.L.

Current Research

Research Objectives

- *Assess defoliation and defoliation methodologies.*
- *Compare defoliation severity among insecticide treatments on American and hybrid chestnuts.*
- *Compare defoliation severity to growth rate.*
- *Monitor the timing of adult Asiatic Oak weevil emergence from soil.*
- *Compare root damage with insecticide treatments.*

Cyrtepistomus castaneus

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Cyrtepistomus castaneus

Research Objectives

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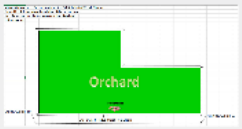
- *Compare root damage with insecticide treatments.*

Methods

Study Site

Insecticide Treatments

431 trees broken in to 108 blocks



1=Imidacloprid
2=Acephate
3=Dinotefuran
4= Water control

Data Analysis

Means of each response variable will be compared by genotype, month, or treatment using either a t-test or ANOVA and Tukey's HSD (α=0.05).

Sample Size

Root Damage

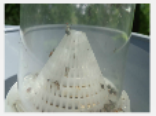
Trees will be excavated at the end of the study to assess root damages.

Assess Defoliation

Categorical Defoliation Assessment

Numerical Defoliation Assessment

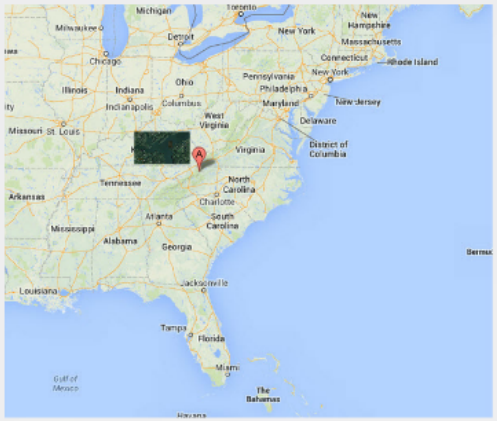
Weevil Emergence



Growth Rate

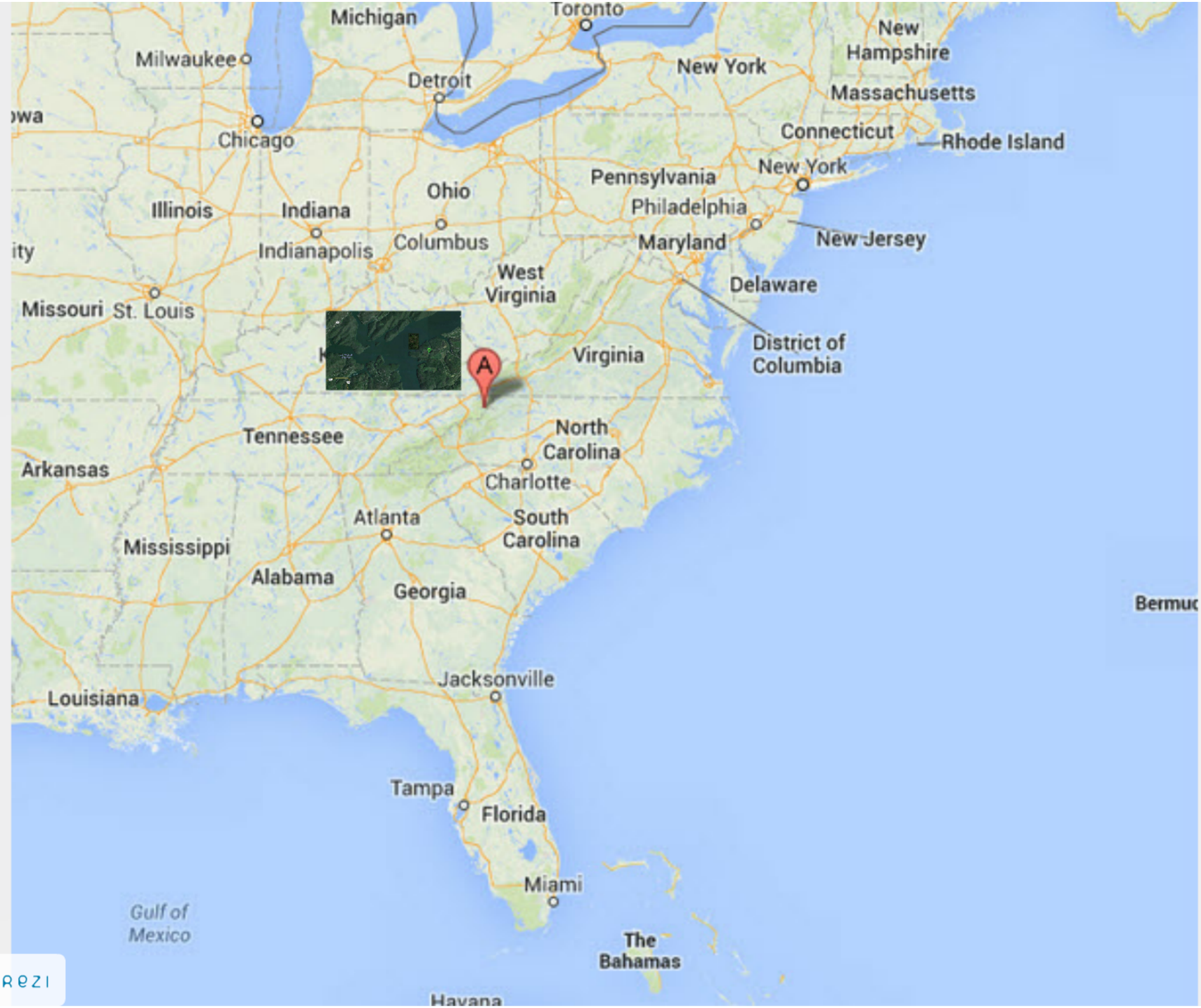
RCD and Height measured monthly.

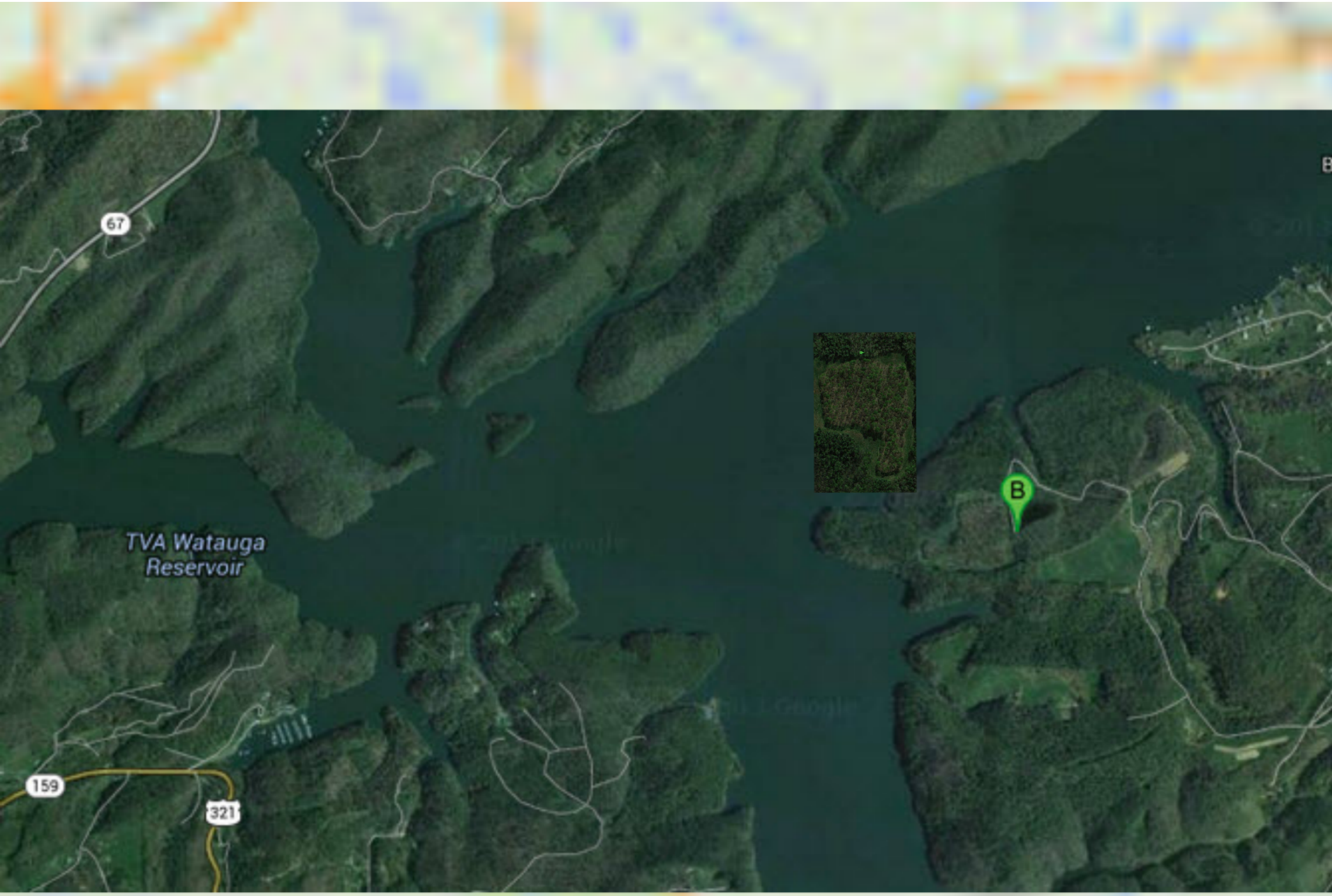
Study Site



- 431 seedlings
- 31 Conical insect traps

A


Michigan
Toronto
Milwaukee
Detroit
New York
New Hampshire
Massachusetts
Chicago
Connecticut
Rhode Island
Pennsylvania
New York
Ohio
Illinois
Indiana
Philadelphia
Indianapolis
Columbus
Maryland
New Jersey
West Virginia
Delaware
Missouri
St. Louis
District of Columbia
Virginia
A
Tennessee
North Carolina
Arkansas
Charlotte
Atlanta
South Carolina
Mississippi
Alabama
Georgia
Jacksonville
Louisiana
Tampa
Florida
Miami
Gulf of Mexico
The Bahamas
Havana

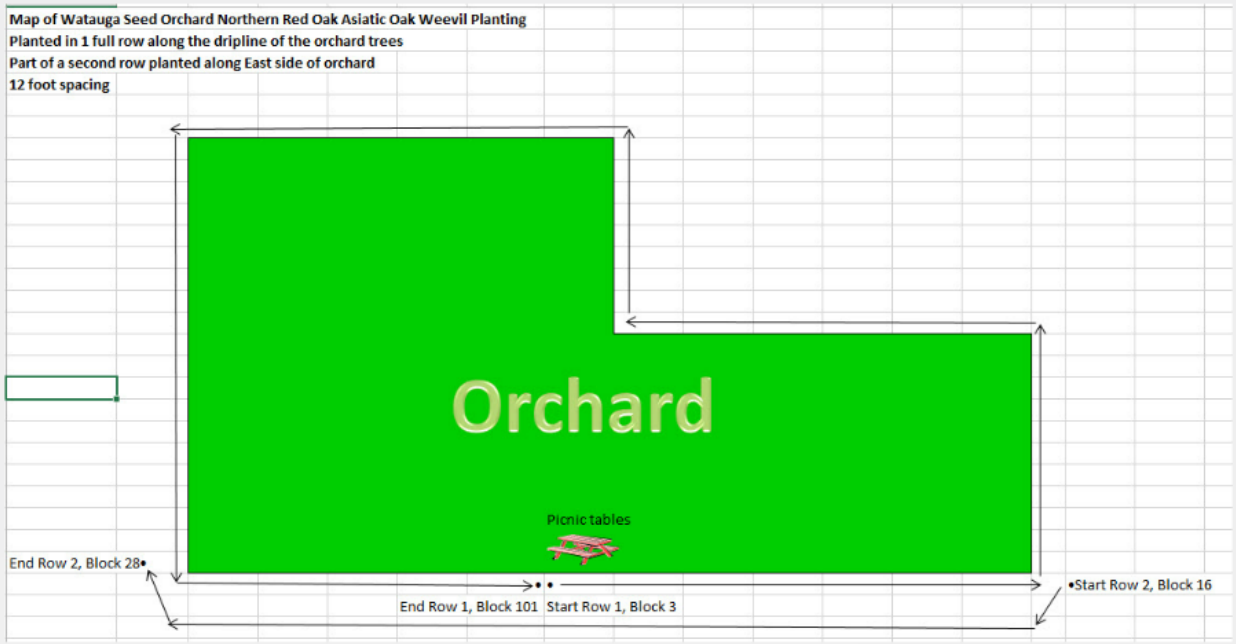

67
TVA Watauga
Reservoir
B
159
321


B

- 431 seedlings
- 31 Conical insect traps

Insecticide Treatments

431 trees broken in to 108 blocks



1=Imidacloprid

2=Acephate

3=Dinotefuran

4= Water control

Sample Size

	American	BC_3F_3
Imidacloprid	10	10

Sample Size

	American	BC_3F_3
Imidacloprid	10	10
Acephate	10	10
Dinotefuran	10	10
Water control	10	10
Total	**40**	**40**

Number of trees surveyed by generation and treatment in 2013.

Assess Defoliation

Categorical Defoliation Assessment

<5%

6-20%

21-40%

41-60%

61-80%

81-100%

Numerical Defoliation Assessment

Categorical Defoliation Assessment

<5%

6-20%

21-40%

41-60%

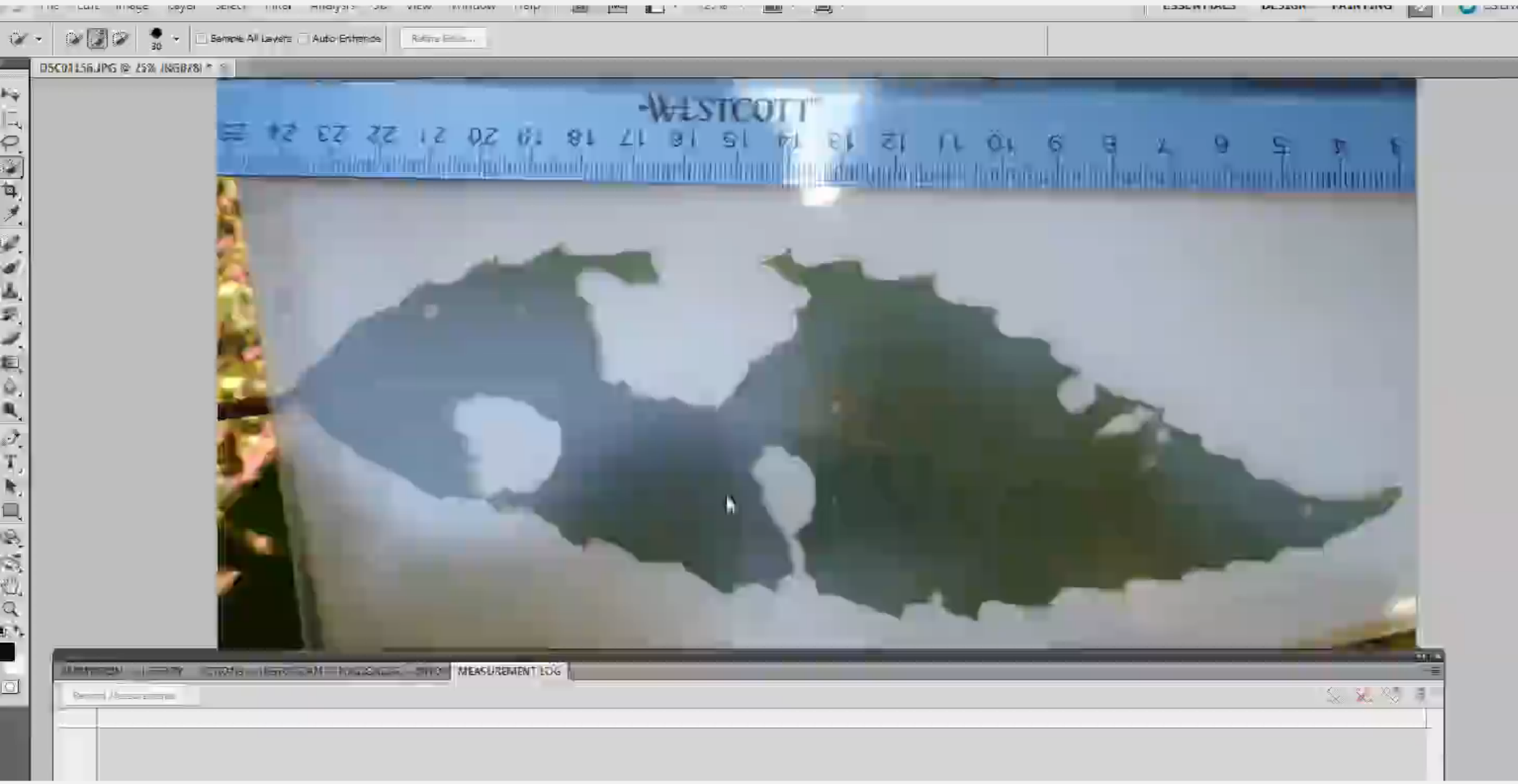
61-80%

81-100%

ment

Numerical Defoliation Assessment

Numerical Defoliation Assessment



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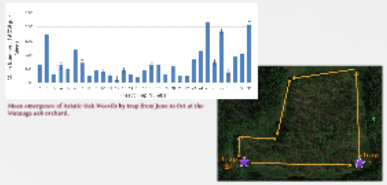
Means of each response variable will be compared by genotype, month, or treatment using either a t-test or ANOVA and Tukey's HSD (α=0.05).

Preliminary Results

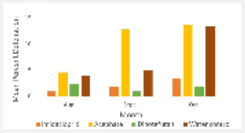
Weevil Emergence

Mean numbers of Asiatic Oak Weevils per week, at Watauga oak orchard in 2013. All points represent dates of collection.

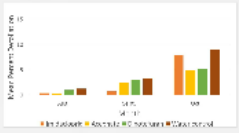


Mean emergence of Asiatic Oak Weevils by trap from June to Oct at the Watauga oak orchard.

Visual Defoliation

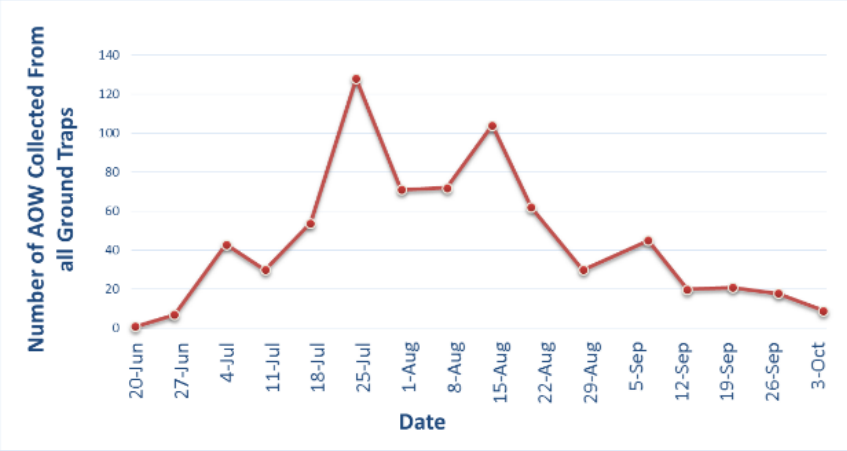


Mean Visual Defoliation Rating From Aug through Oct by Insecticide treatment on American Chestnut in 2013.



Mean Visual Defoliation Rating From Aug through Oct by Insecticide treatment on BCH's in 2013

Weevil Emergence



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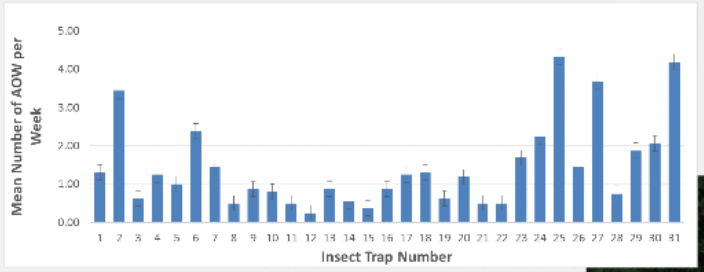

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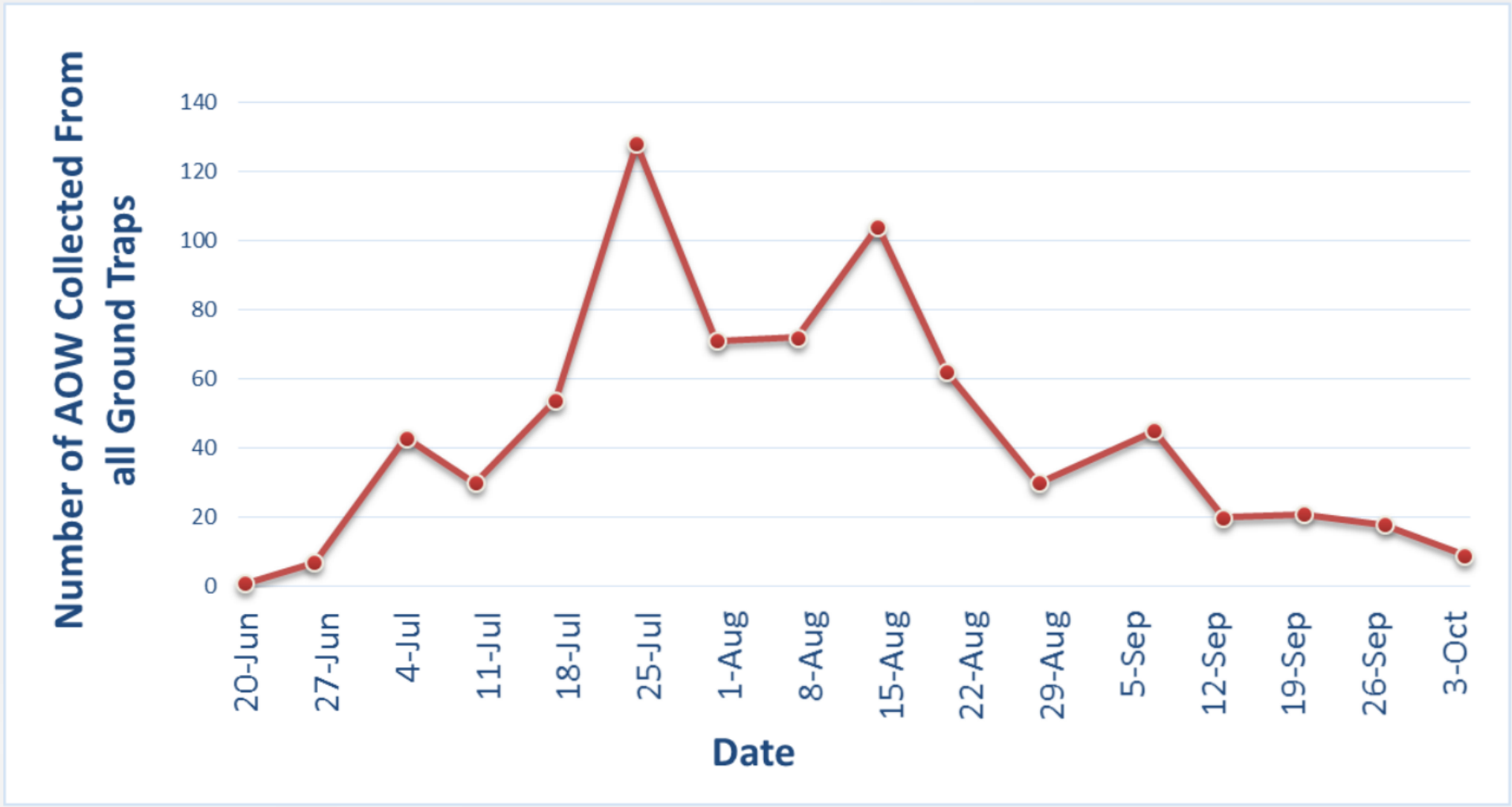

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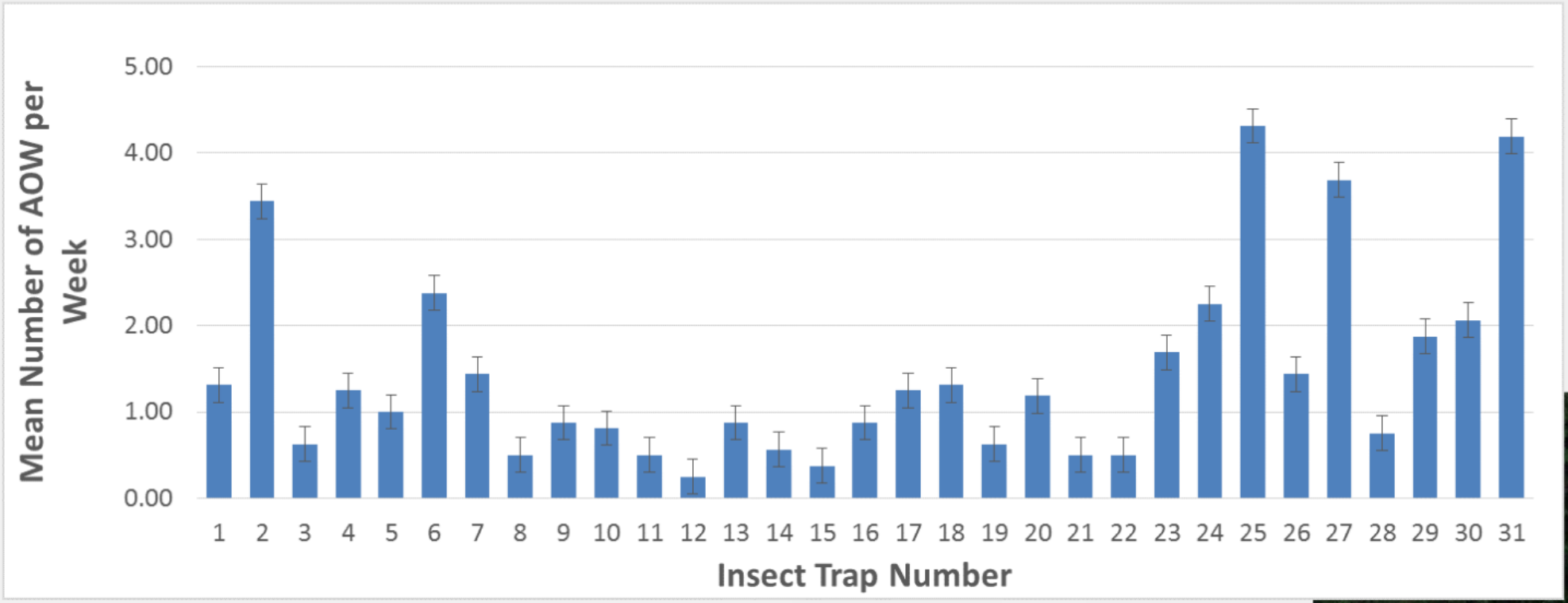

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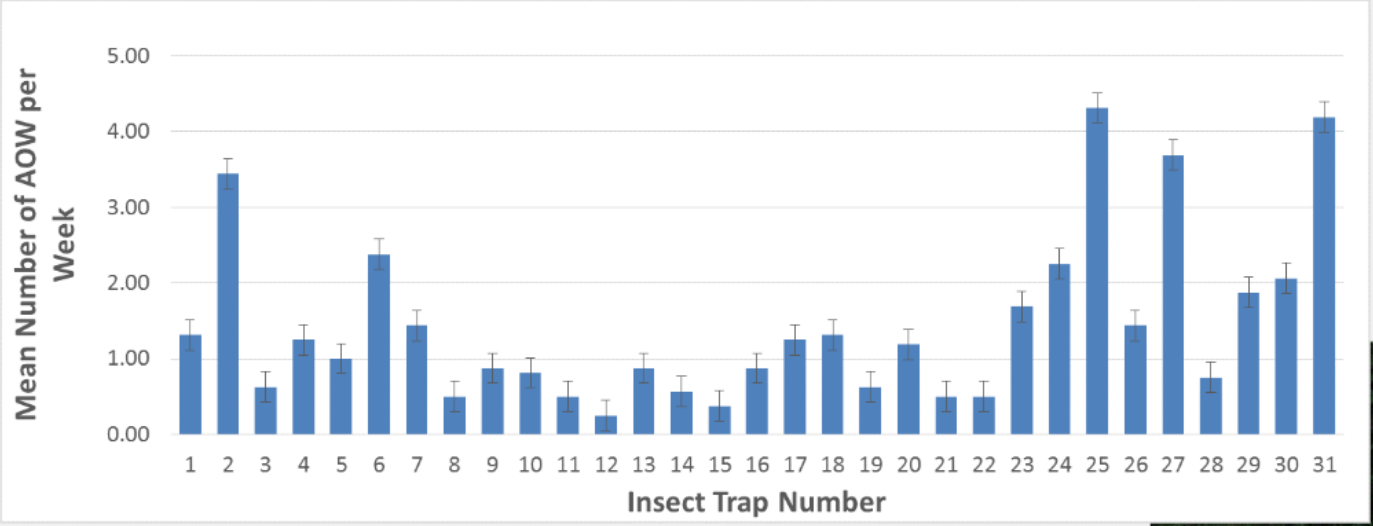

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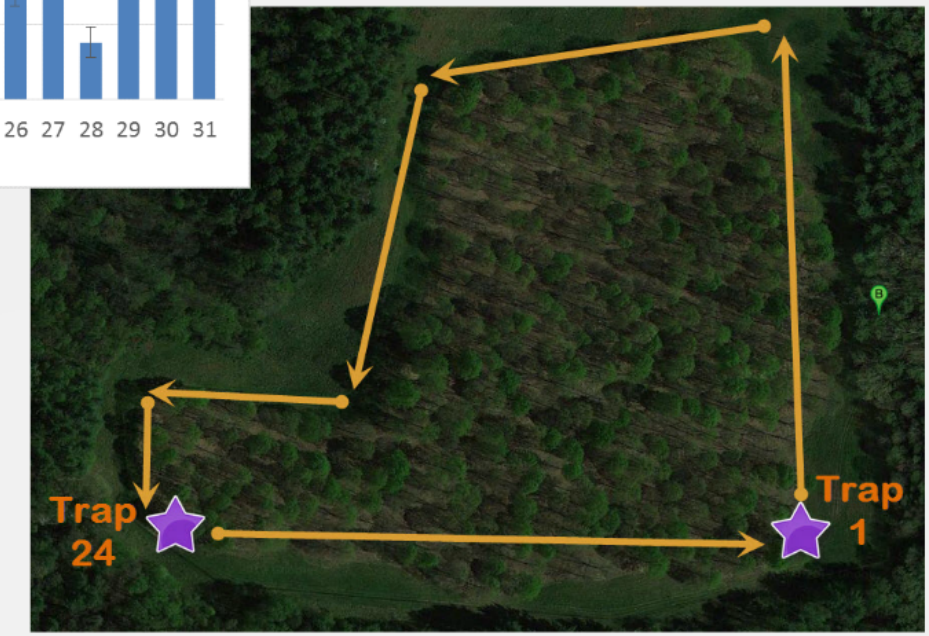
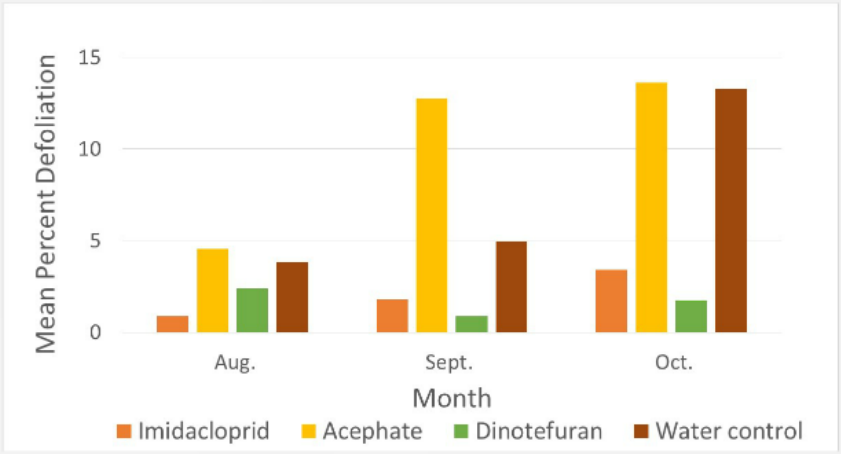
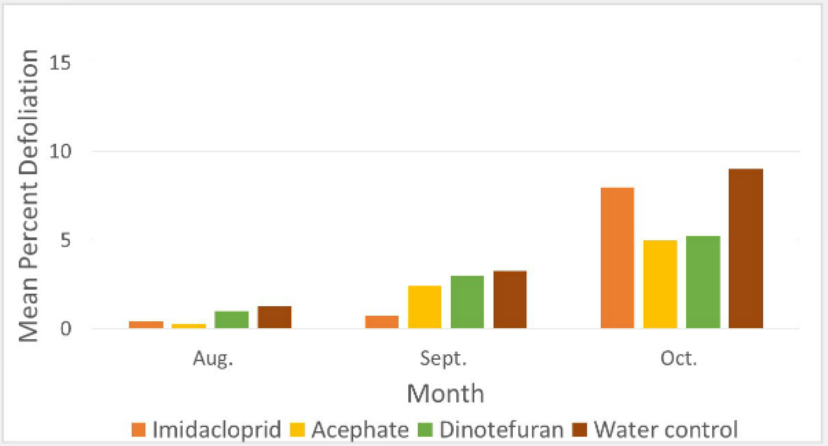


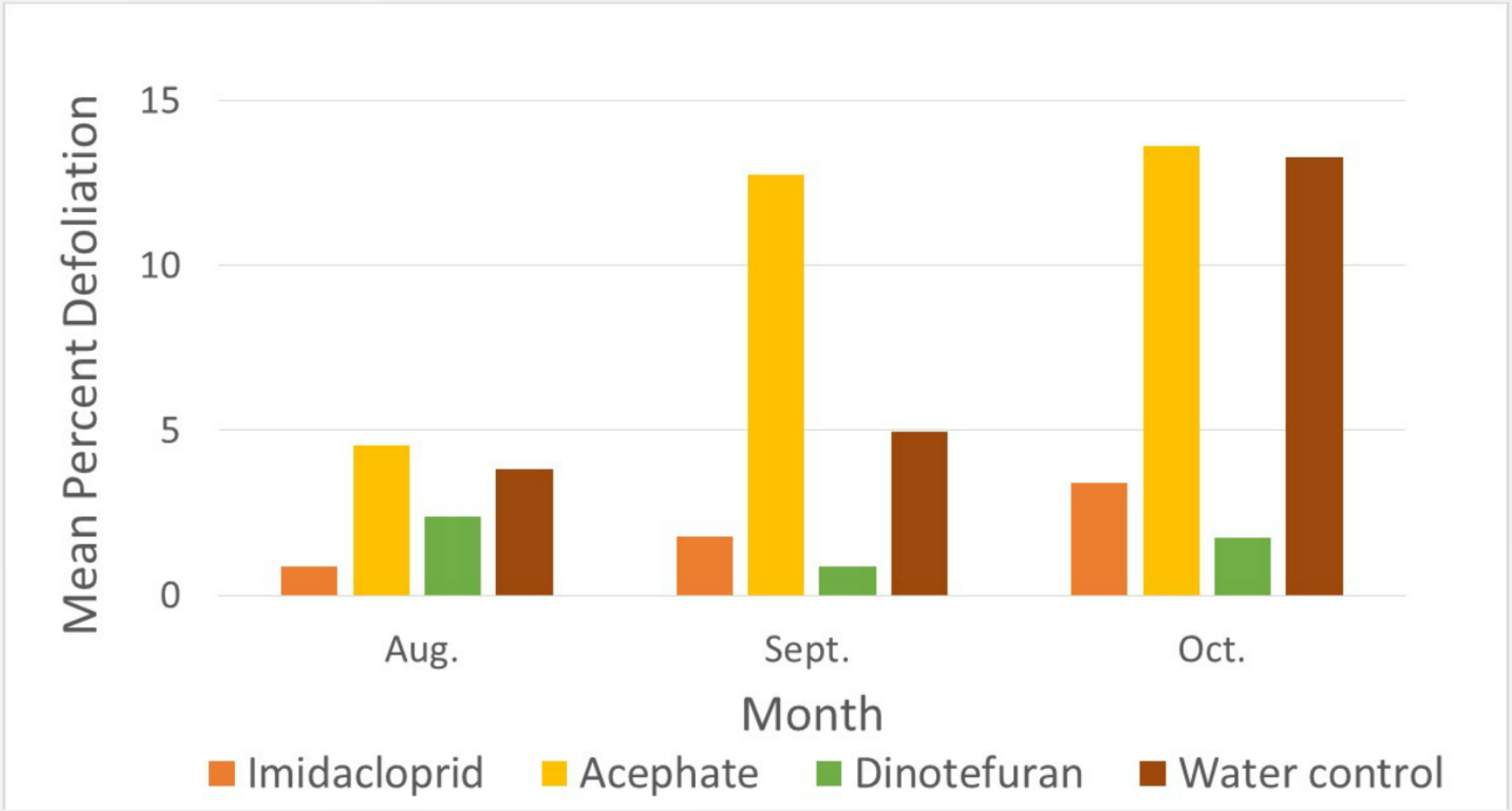
Visual Defoliation



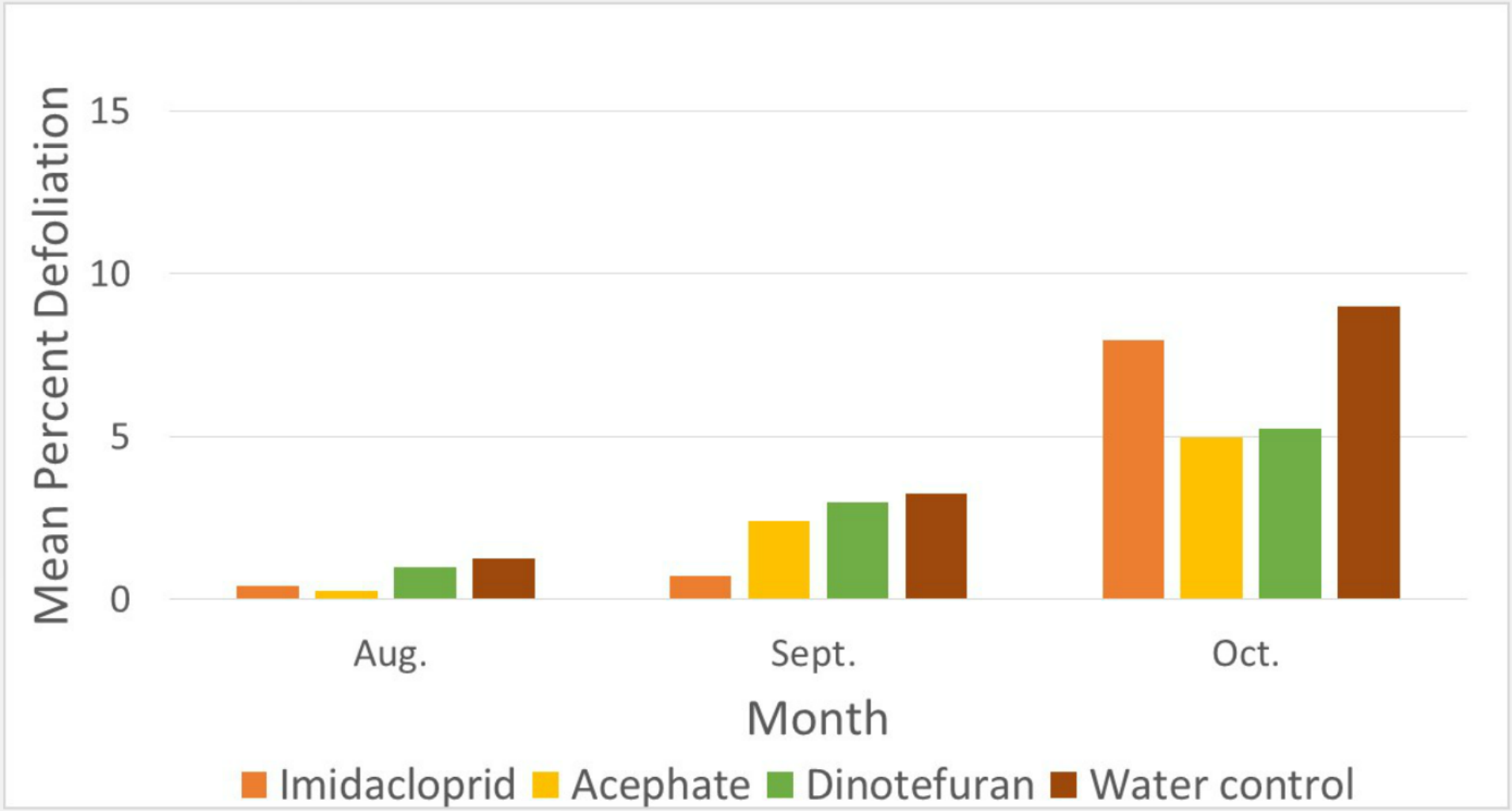
Mean Visual Defoliation Rating From Aug through Oct by Insecticide treatment on American Chestnut in 2013.



Mean Visual Defoliation Rating From Aug through Oct by Insecticide treatment on BC3F3 in 2013



Mean Visual Defoliation Rating From Aug through Oct by Insecticide treatment on American Chestnut in 2013.



Mean Visual Defoliation Rating From Aug through Oct by Insecticide treatment on BC3F3 in 2013

In Conclusion

The following individuals and agencies are sincerely thanked for their technical assistance with this project:

- Forest Service Region 8 staff and UT-TIP for assistance in site selection, site preparation and planting.
- All the students and Staff that have assisted it data collection at the University of Tennessee
- Forest Researcher Dr. Albert Mayfield USDA Forest Service.
- Partners of the Cherokee for financial support.
- Forest researcher Dr. Stacy Clark USDA Forest Service.
- Ken Profitt UT-TIP seed orchard manager.

Photos Courtesy of:

- Albert Mayfield USFS Forest Service
- Stacy Clark USFS Forest Service
- The University of Tennessee Tree Improvement Program (UT-TIP)
- The Connecticut Agricultural experiment Station <http://www.ct.gov/caes/cwp/view.asp?a=2815&q=376908>
- The American Chestnut Foundation <http://www.acf.org>

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