

Forest Health Update and Discussion

Bud Mayfield

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RWU 4552: Insects, Diseases and Invasive Plants



USDA Forest Service, Southern Research Station
KY-TN State Line Meeting, 11 Oct 2016



USDA Forest Service, Southern Research Station

RWU 4552: Insects, Diseases and Invasive Plants

- **Unit locations:** Asheville NC, Pineville LA, Athens GA
- **New Unit Charter** in 2015-2016
 - www.srs.fs.usda.gov/idip
- **Quarterly Newsletter** w/ FHP since Jan 2015
 - www.srs.fs.usda.gov/idip

How can we serve you??



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KY-TN State Line Meeting, 11 Oct 2016



Outline

- Pollinators
- Hemlock Woolly Adelgid
- Thousand Cankers Disease
- Emerald Ash Borer
- Cogongrass

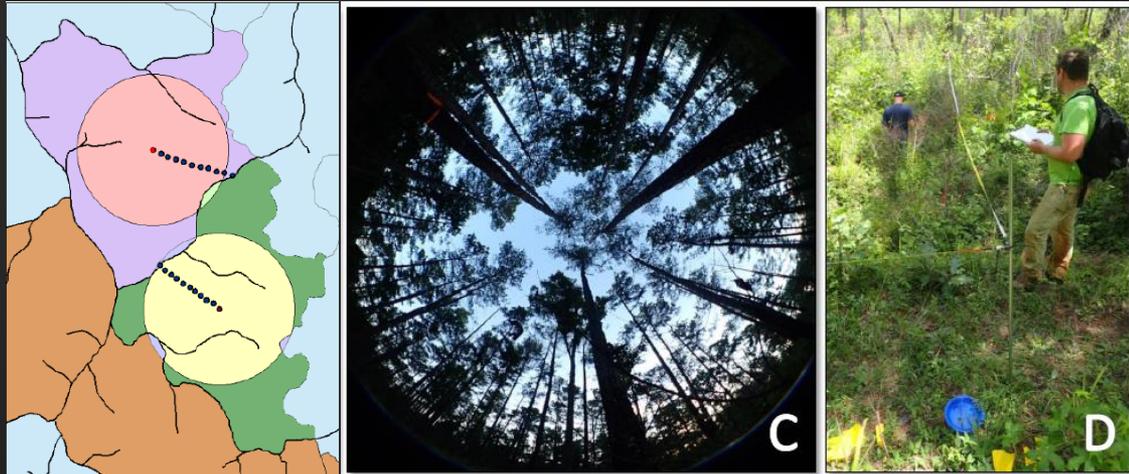


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Pollinator responses to forest management

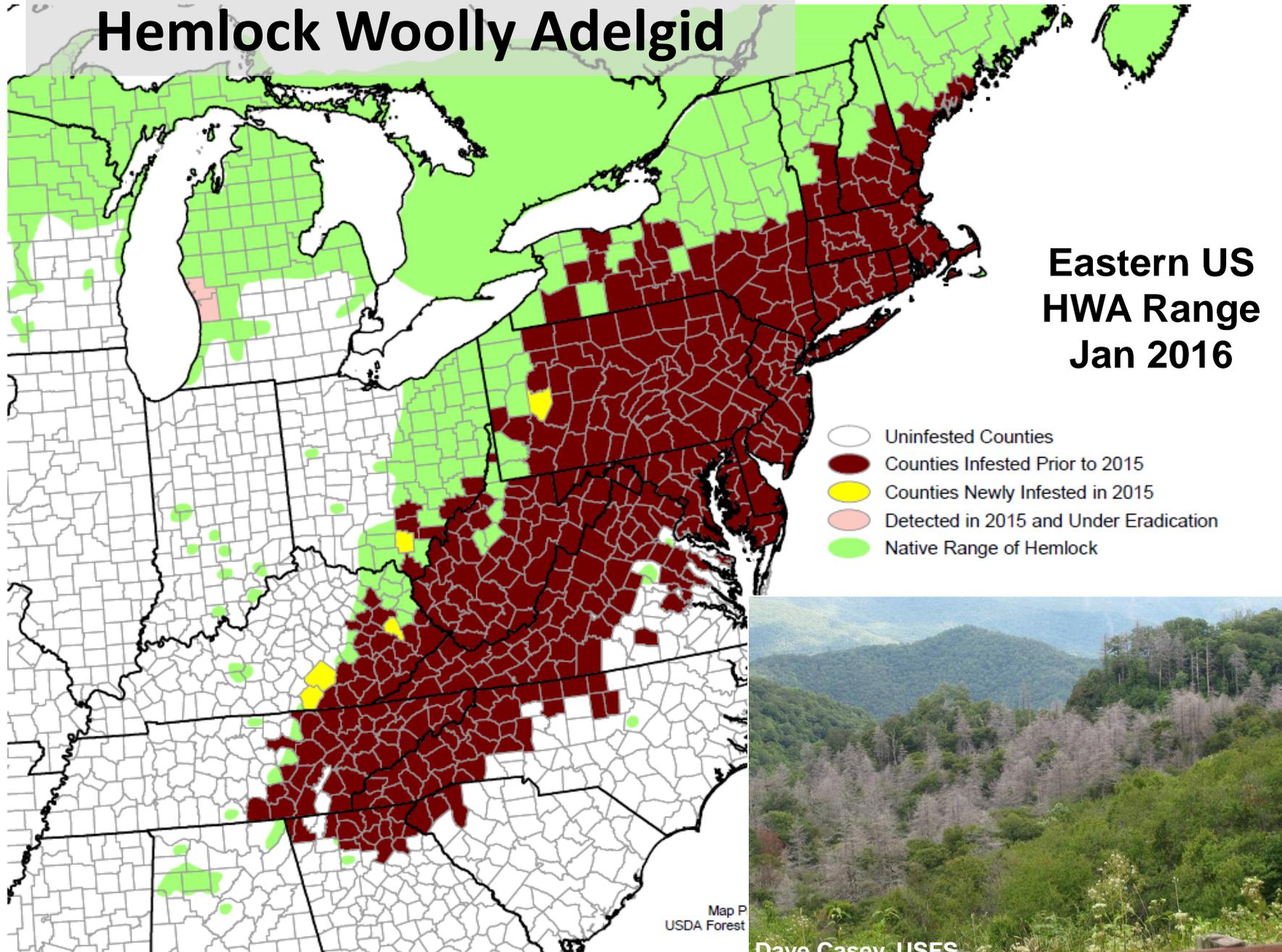
- Pollinator conservation increasingly important
- Privet removal: benefit to pollinators up to 5 yrs
- How does burn block size affect bees, butterflies?
- M. Ulyshen, S. Horn, J. Hanula, Univ. GA



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Hemlock Woolly Adelgid



**Eastern US
HWA Range
Jan 2016**

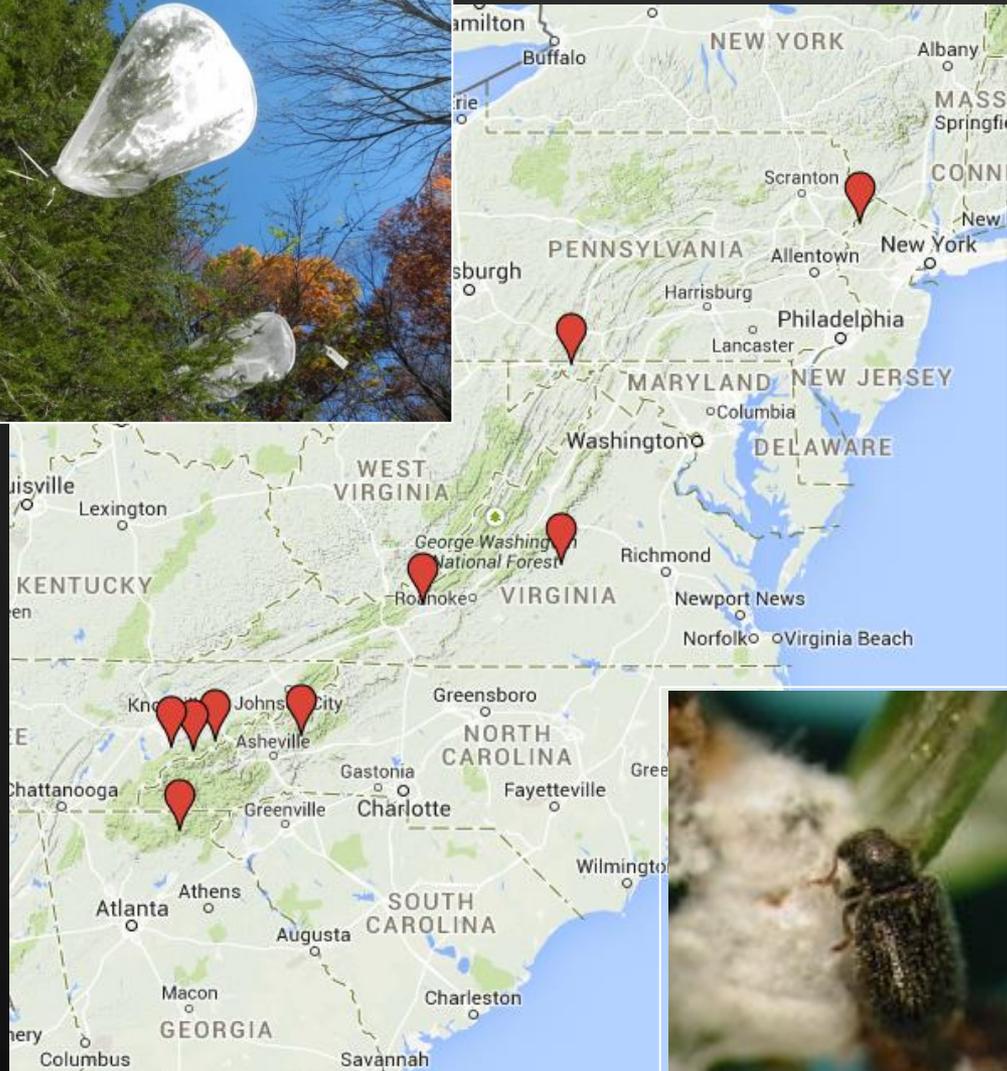


Dave Casey, USFS



Coop. *Laricobius nigrinus* Impact Assessment

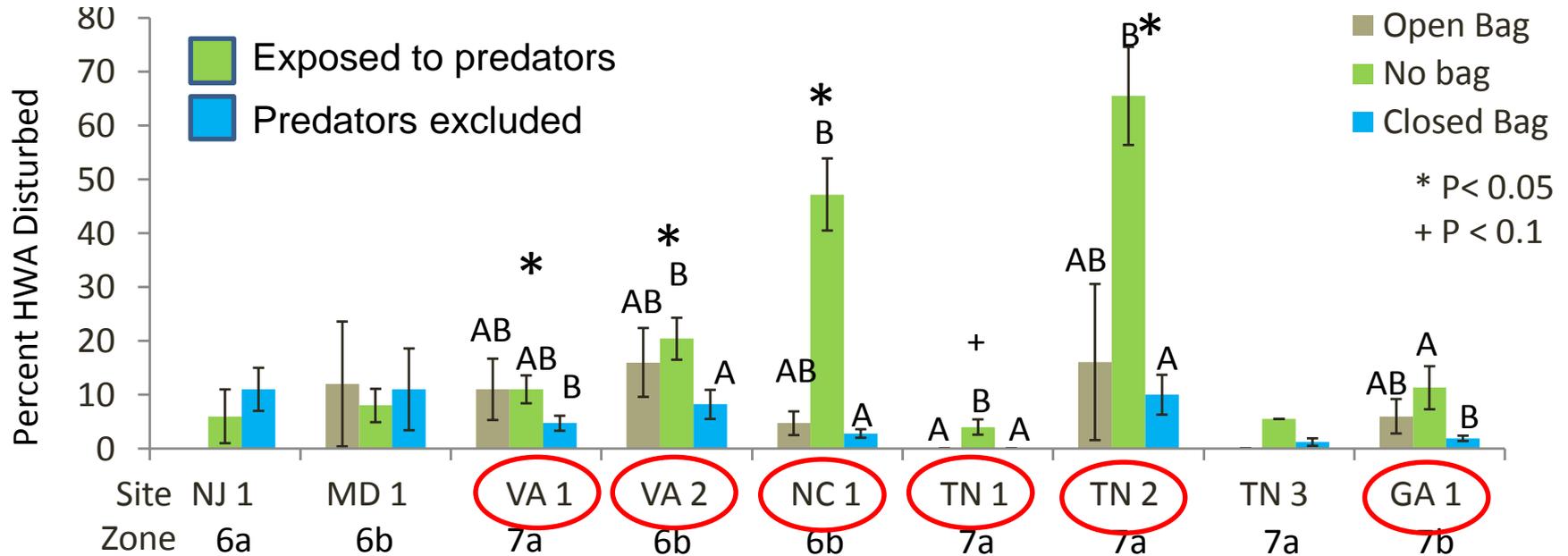
Heminger et al. (Va. Tech, U. Tenn, U. Mass, USFS)



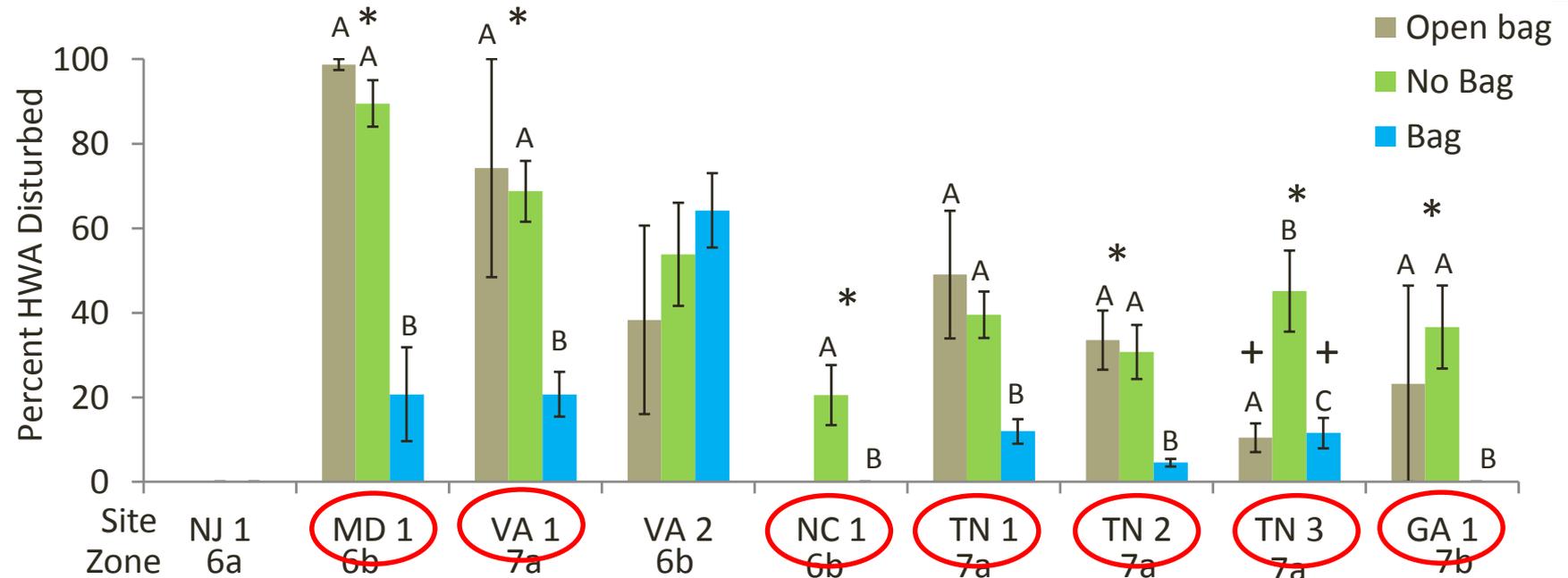
Delaware Water Gap	NJ
Rocky Gap	MD
James River S.P.	VA
Kentland	VA
A.M. School, Celo	NC
Bio Control Demo (GRSM)	TN
Blackberry Farm, Walland	TN
Elkmont (GRSM)	TN
Chatt. Nat. Forest	GA

Percentage of HWA Ovisacs Disturbed

2014-2015



2015-2016



Evaluating a Potential Area-wide IPM Strategy for Managing Hemlock Woolly Adelgid in the Eastern United States



Kenton Sumpter¹, Scott Salom¹, Carlyle Brewster¹,
Troy Anderson¹, Albert Mayfield III², Tom McAvoy¹



Virginia Polytechnic and State University¹, USDA Southern Research Station²



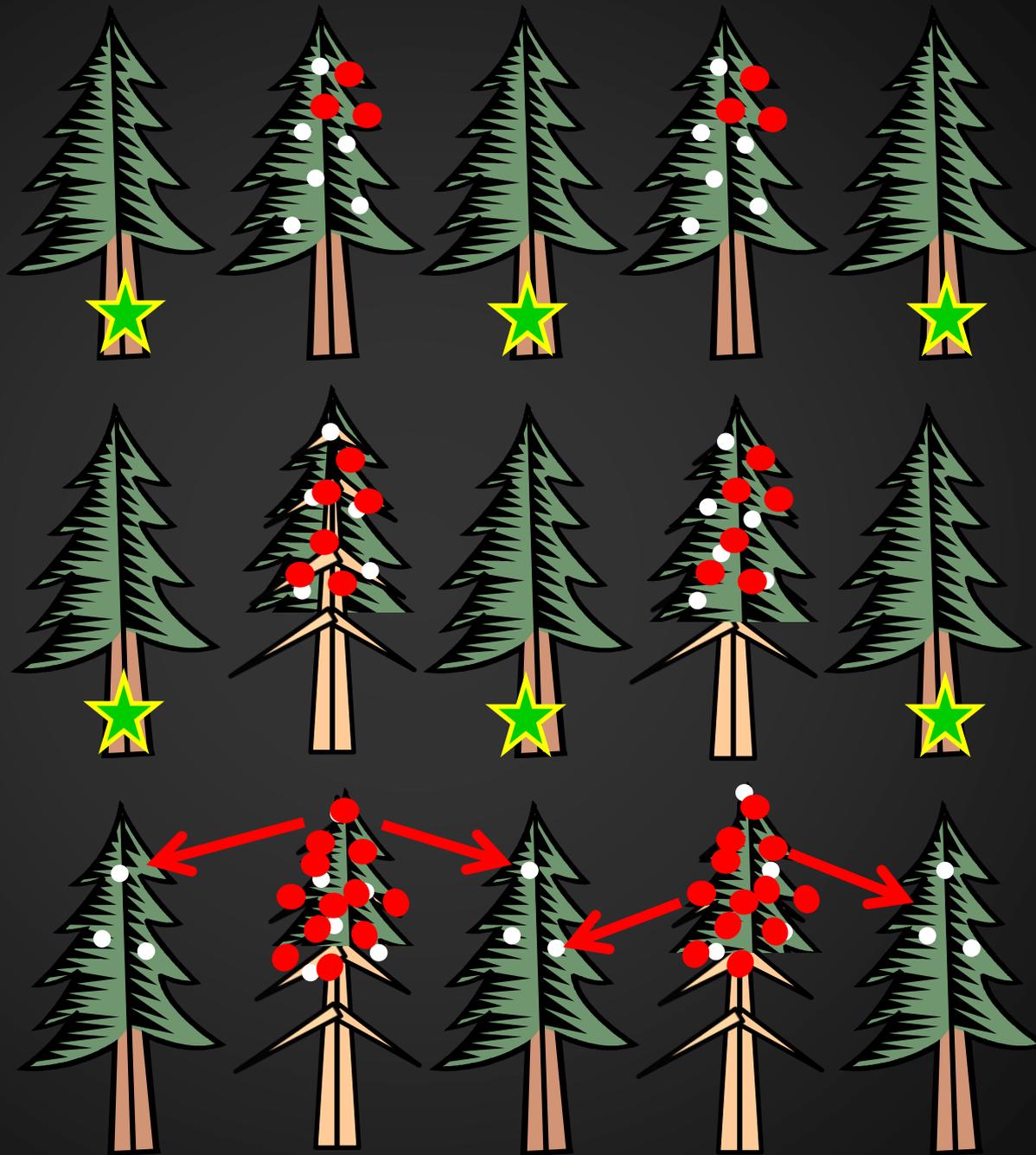
Integrated Chem-Bio Scenario (hypothetical)

Legend:

•• = HWA

••• = Predator

★ = Insecticide



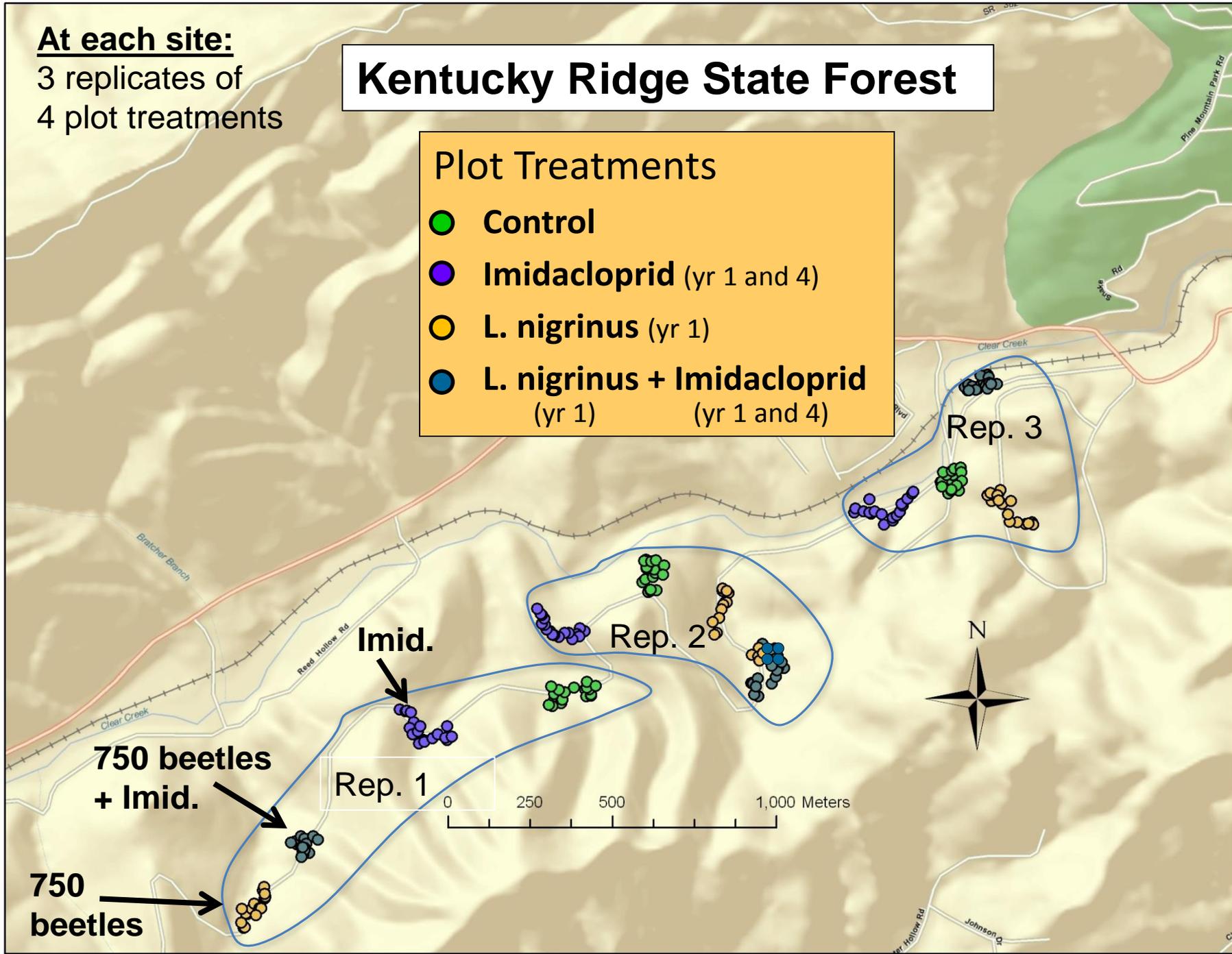
At each site:

3 replicates of
4 plot treatments

Kentucky Ridge State Forest

Plot Treatments

- Control
- Imidacloprid (yr 1 and 4)
- L. nigrinus (yr 1)
- L. nigrinus + Imidacloprid (yr 1) (yr 1 and 4)



Ln Recovery



Site/Year

2012

2013

2014

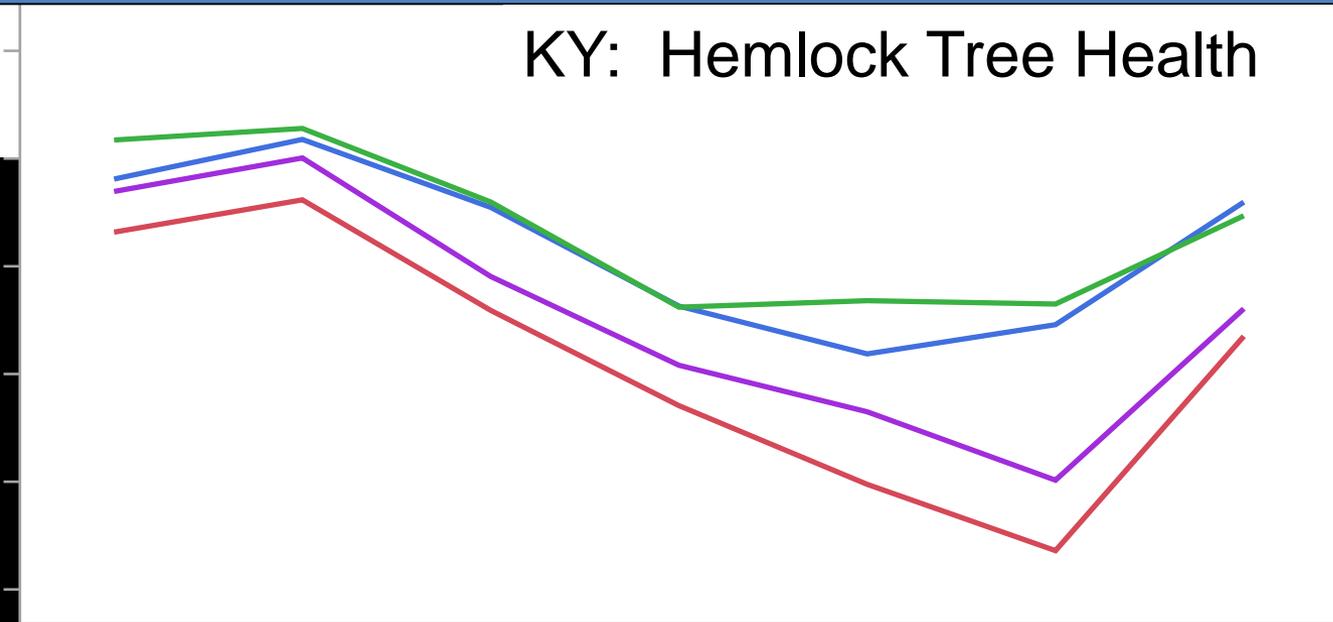
2015

KY	1 adult, 15 larvae	1 adult, 11 larvae	0 adult, 0 larvae	0 adult, 0 larvae
WV	No collection	0 adult, 38 larvae	0 adult, 0 larvae	0 adult, 0 larvae
TN	No collection	No collection	0 adult, 0 larvae	0 adult, 0 larvae

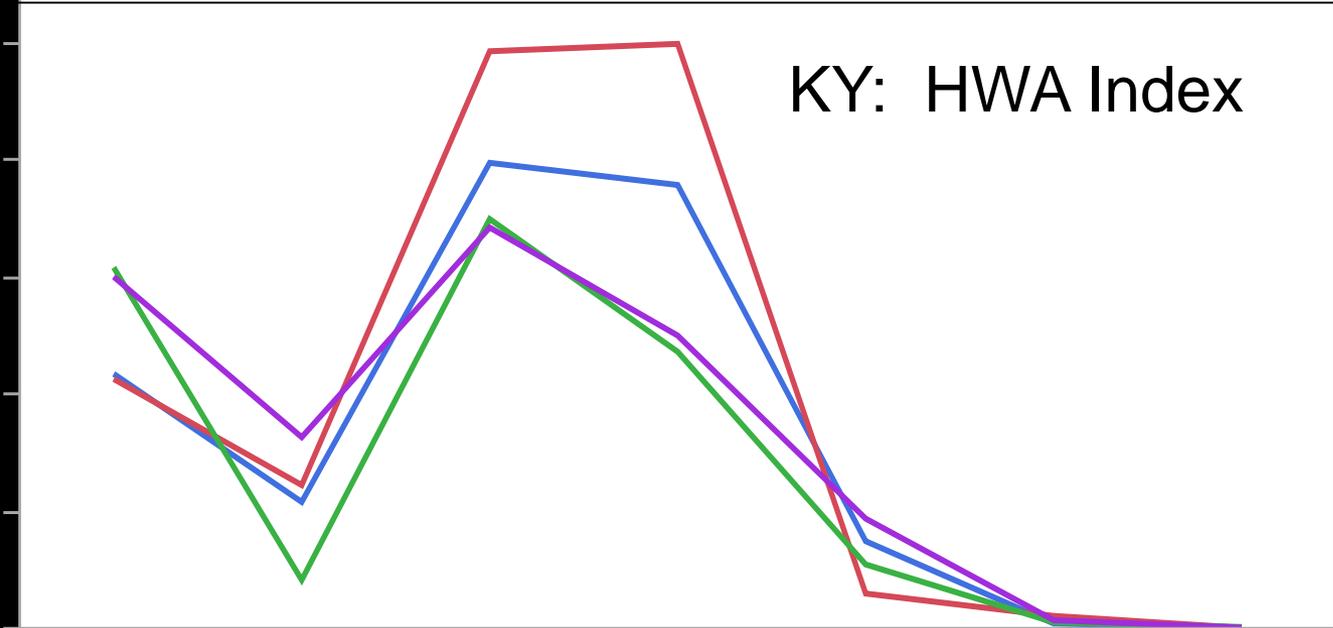
KY: Hemlock Tree Health

80

70



KY: HWA Index



First Release in the Carolinas of New Hemlock Woolly Adelgid Predator

by Bryan Mudder, SRS Forestry Technician

Posted on January 13, 2016 by Zoe Hoyle



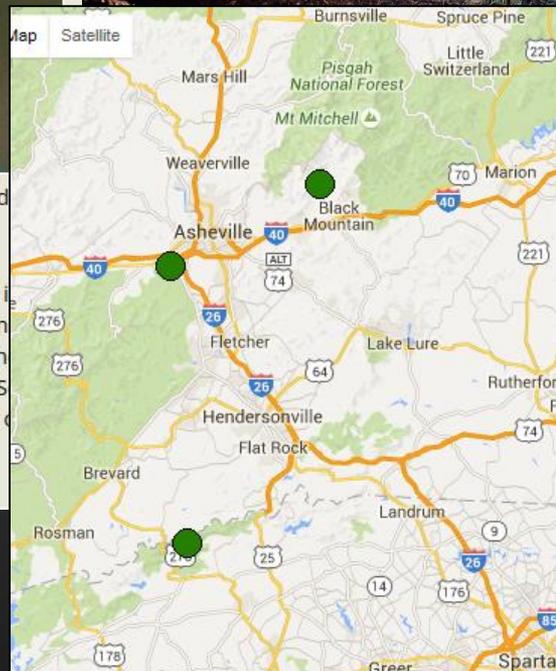
Bryan Mudder releasing biocontrol beetles on infested eastern hemlock tree at Bent Creek Experimental Forest

Laricobius osakensis



function as a foundation species, shading streams and providing essential habitat to birds and insects.

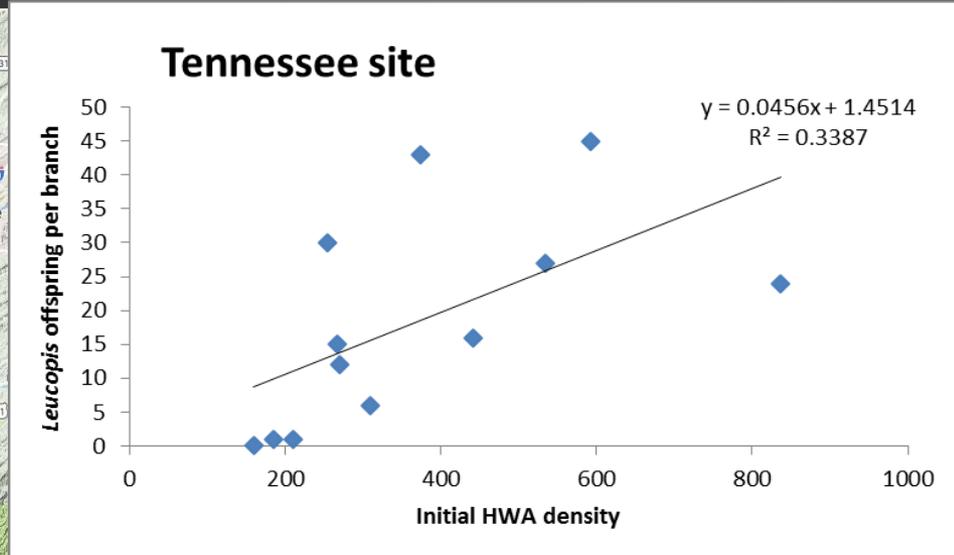
Laricobius osakensis is of particular interest because it is endemic to the same region of Japan as the adelgid and coevolved with the pest. Last week's releases near Asheville and Black Mountain in North Carolina, and along the Saluda River in South Carolina, were the first releases of *osakensis* in these states.



First Releases of Western US Silver Flies for Biological Control of HWA in the East



Darrell W. Ross¹, Arielle L. Arsenault-Benoit², Nathan P. Havill³, Albert E. Mayfield⁴, Kimberly F. Wallin^{2,5}, Mark C. Whitmore⁶, and Stephen D. Gaimari⁷



Silvicultural and Integrated Management Strategies for Restoring Hemlock to Degraded Southern Appalachian Forests



Robert M. Jetton¹, Albert E. Mayfield² and W. Andrew Whittier¹

¹Camcore, Department of Forestry & Environmental Resources, NC State University

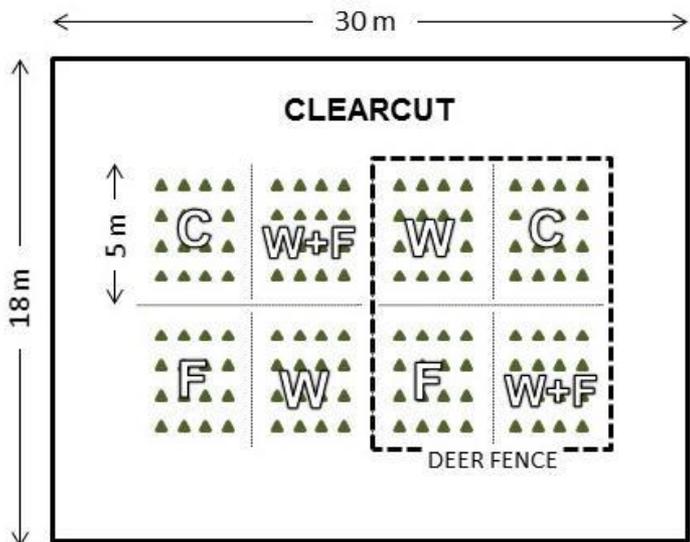
²Southern Research Station, USDA Forest Service



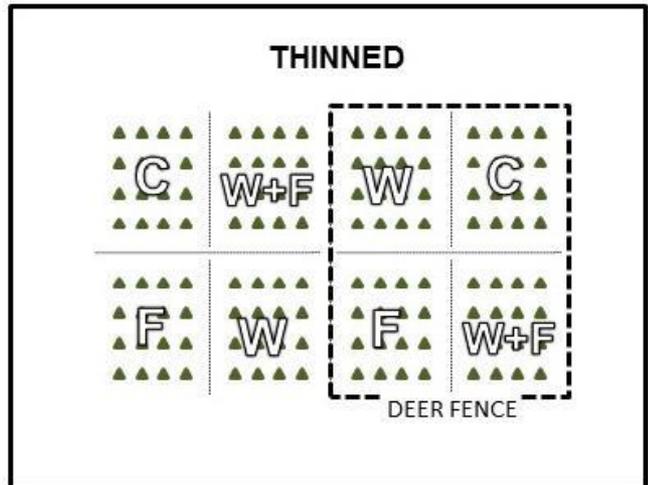
If we had a resistant hemlock, how would we go about putting it on the landscape?



Silvicultural Strategies for Restoring Hemlock

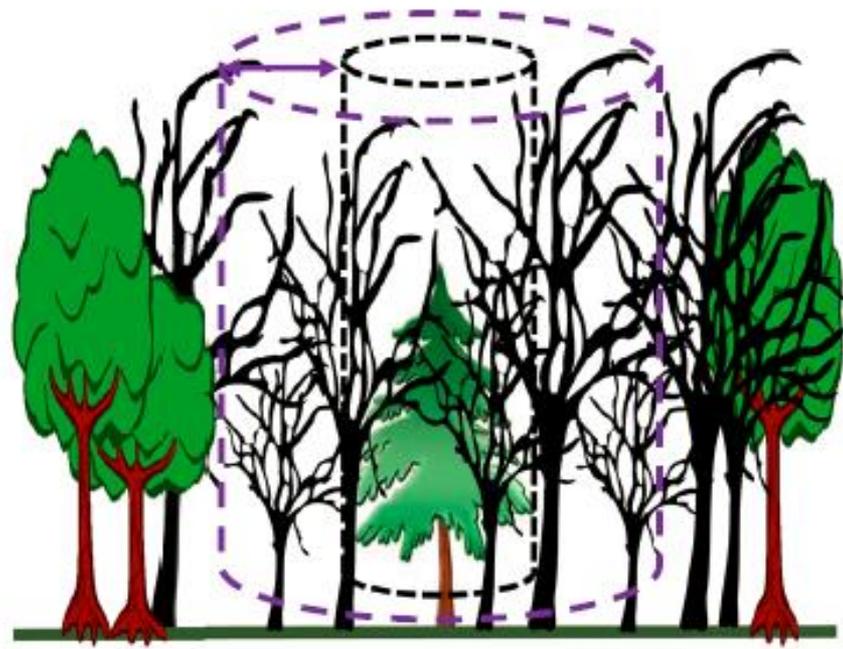
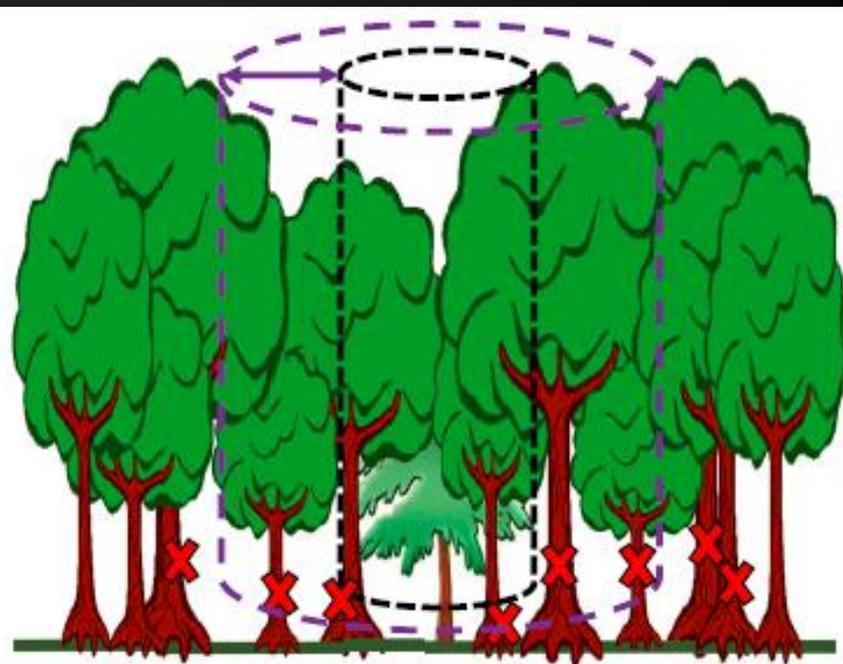


- C = Control
- F = Fertilized
- W = Weeds Controlled
- ▲ = Hemlock Seedling



Target-tree release to improve sustainability of hemlock in the southern Appalachians

R. Jetton, A. Mayfield, T. Keyser,
J. Rodrigue, H. Slayton, C. Miniati,
R.Rhea



Hemlock Take-Aways

- *Laricobius nigrinus* beetles reduce HWA winter densities, not a “silver bullet”
- More recently introduced predators (Lo, flies) showing promise, should help biocontrol effort
- Diversity of integrated tactics needed, including use of silvicultural strategies
 - Target tree releases
 - Regeneration strategies

Thousand Cankers Disease

- Killing *J. nigra* in West for decades, recognized in native range since 2010.
- Large potential impacts on lumber and veneer industries, log exports. State quarantines.
- Not yet the disaster in the East that was feared. WTB declining in TN last several years.



Thousand Cankers Disease Quarantine and Buffer Regulated Areas



Unchanged since
Nov 2014?

Thousand Cankers Disease

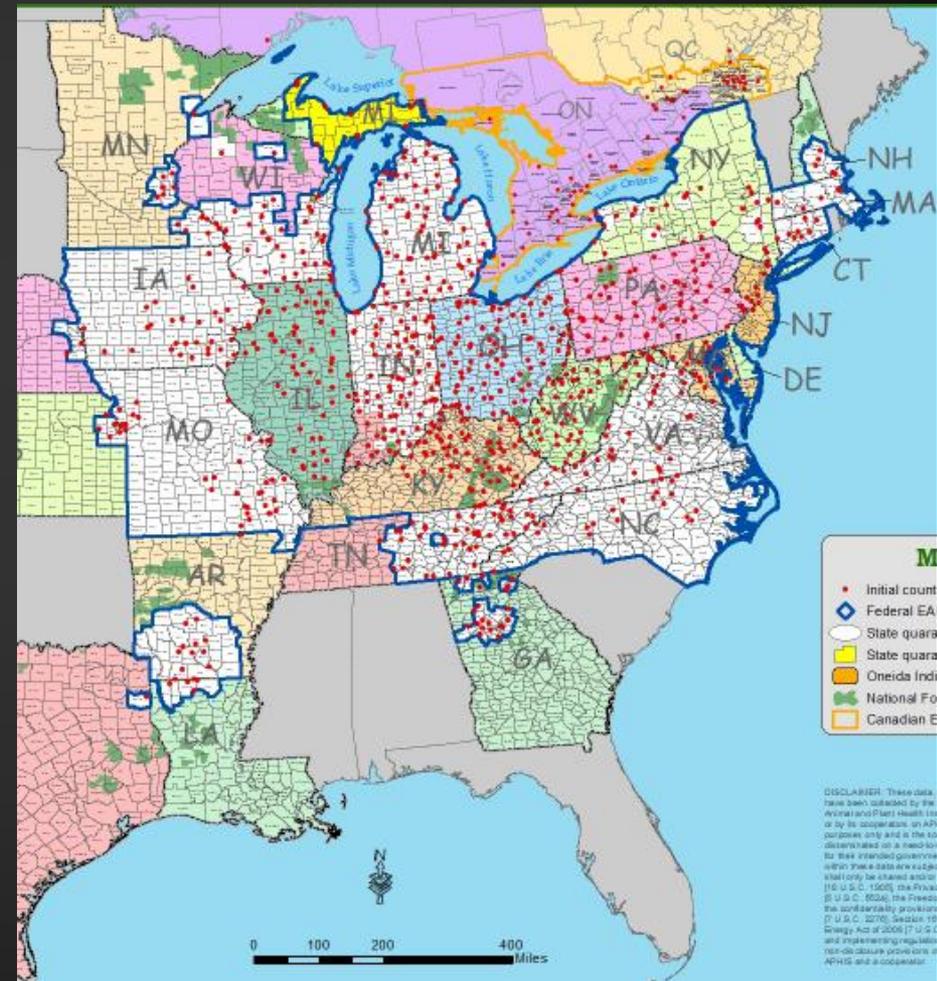
Recent UT-SRS-ARS-APHIS-Cornell Projects

- **Heat treatment schedule** for logs (beetle, pathogen)
- **Fumigation schedule** for logs (beetle)
- WTB can **re-infest heat/fum logs** when pheromone baited, unlikely when not baited
- **Permethrin** protects logs from re-infestation
- Beetles can **infest nursery stock** when pheromone baited, unlikely when not baited
- **Pathogenic fungi** reduce number of attacks, emergence



Emerald Ash Borer

- **Most expensive** forest insect in U.S. history
 - 1.6 billion/yr not including ecological and non-market values (Aukema et al. 2011)



SECOND EDITION

Insecticide
Options for
Protecting
Ash Trees
from Emerald
Ash Borer

North Central
Ipm
Center

Daniel A. Herms,
Deborah G. McCullough,
David R. Smitley,
Clifford S. Sadof,
Whitney Cranshaw

Biological Control: EAB parastoids

- Three parasitoid spp.
From native range
 - 1 egg, 2 larval
- 7-year study from MI shows nat. enemies reduce EAB population growth rates
- Thick bark prohibitive to larval parasitoids



USFS-FHP Entomologist Paul Merten releasing EAB parasitoids at Street Gap on the TN-NC border, summer 2016.

Gene Conservation of Rare Ash Spp.

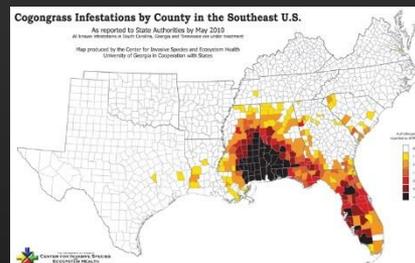
- **Camcore-USFS project** initiated summer 2016
- Targeting **4 rare southern species**
 - Blue ash (*F. quadrangulata*)
 - Pumpkin ash (*F. profunda*)
 - Carolina ash (*F. caroliniana*)
 - Texas ash (*F. texensis*)
- Collecting green and white also when encountered
- **Collections of blue ash in TN** at:
 - Cedars of Lebanon SP
 - Couchville Cedar Glade SNA
 - Long Hunter SP (no seed)
 - Bledsoe Creek SP



Blue Ash at Couchville Cedar Glade
State Natural Area, TN

Congongrass

- Rima Lucardi (SRS)
- New project addressing hybridization of wild-type with ornam. cultivar:
 - “Rubra”, “Red Baron” or “Japanese Bloodgrass”
 - Sold in nurseries and online, residential populations in KY
 - **More cold tolerant** than wild-type
 - **NOT sterile**, does hybridize
- Can cold-tolerant genes introgress into wild-type populations?



THANKS!

Bud Mayfield, USDA Forest Service SRS

Project Leader, RWU 4552

Insects Diseases and Invasive Plants

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