

Black Stem Borer Management Trials 2015-16



UGA5209019

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Xylosandrus germanus – Black Stem Borer

“Ambrosia Beetle” (Curculionidae: Scolytinae)



Female drills a hole ~1 mm in diameter, and hollows out a channel into heartwood of (usually small) physiologically stressed trees.



larva/pupa in brood chamber

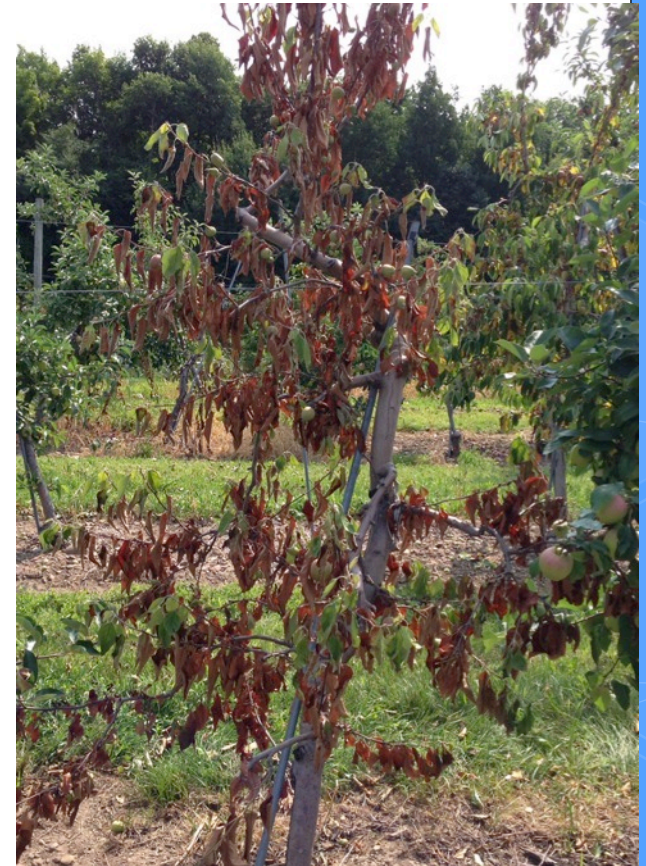
- ❖ Adults overwinter in galleries at the base of infested trees
- ❖ Females emerge from overwintering sites to infest new sites after 2-3 days with temps $\geq 68^{\circ}\text{F}$
- ❖ Female cultures a symbiotic fungus, *Ambrosiella grosmanniae*
- ❖ Food for larvae and adults
- ❖ Opportunistic colonizers of weakened or physiologically stressed trees (which produce ethanol)
 - ❖ flooding, drought stress, cold
 - ❖ injury
 - ❖ “apparently healthy” trees also attacked



Liz Tee 2013

Damage

Discoloration and blistering of bark; compressed sawdust toothpicks from adult tunneling.
Tree's vascular system is shut down: wilting, dieback, death.



History

- ❖ Introduced from eastern Asia - first found in NY in 1932, now widespread in US
- ❖ Ambrosia beetle, general wood borers
- ❖ Attacks many ornamental/forest species
- ❖ American beech, maple, dogwood, black walnut, oak, magnolia
- ❖ Apple and sweet cherry reported in 1982
- ❖ Identified >30 sites with trees dying 2013-16; some at levels of 30%; occurs statewide
- ❖ plantings 1–15 yrs old; Gala, Fuji, Honeycrisp, Ginger Gold commonly affected
- ❖ Similar reports from MI, NJ, NC (some may be *X. crassiusculus*, Granulate Ambrosia Beetle)

Trapping

ex. P. Schultz, VA Tech
C. Ranger, USDA, OH

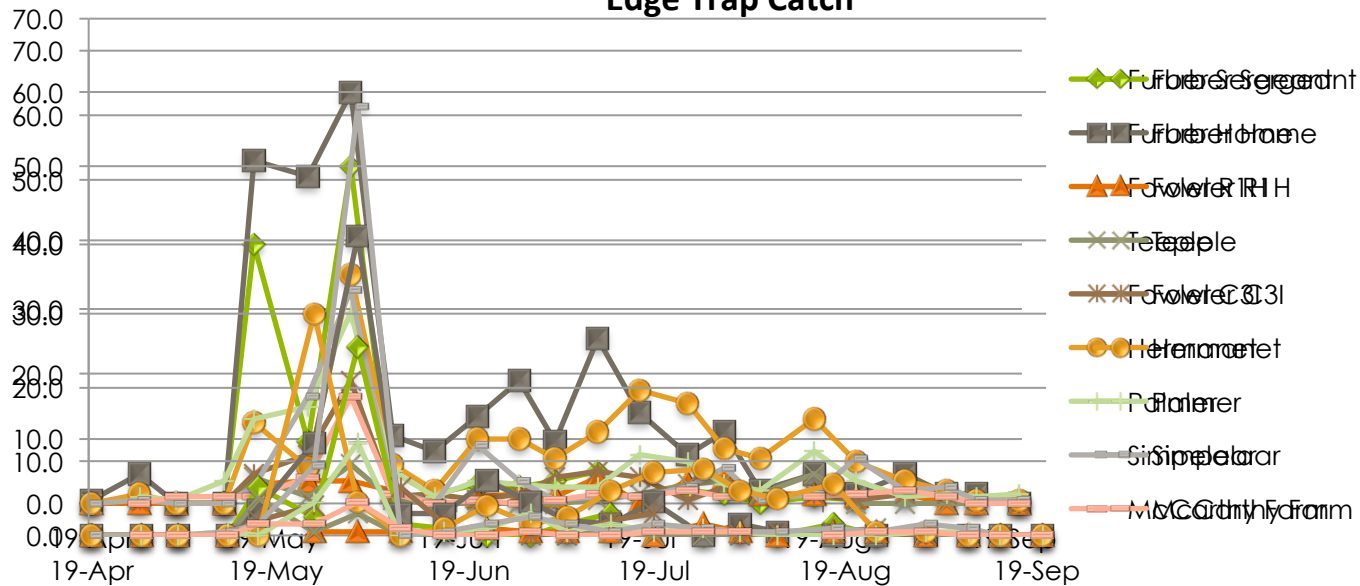


- ✦ Inverted “Simply” juice bottle traps, with rectangular openings cut in side panels
- ✦ Baited with AgBio ethanol lures
- ✦ Hung 2-3 feet off the ground
 - ✦ Placed on edge of woods next to orchard
 - ✦ Also in interior of orchard
 - ✦ Traps checked weekly



BSB weekly trap catch 2016

2016 Black Stem Borer - Wayne Co.
 2016 Black Stem Borer - Wayne Co.
 Interior Trap Catch
 Edge Trap Catch



- ❖ First catch in WNY on April 26 (vs. May 5 in 2015)
- ❖ 1st adult flight through June 15; peak May 16-June 1
- ❖ 2nd adult flight extended until late Sept; peak in mid-July
- ❖ Higher counts along edges than in interiors

2015 - Preventive trunk sprays in apples

- ❖ potted 2-yr old Mutsu trees from nursery
- ❖ pots placed into larger pot, flooded to induce stress
- ❖ placed in the rows between orchard trees; 5 pots per replicate, 4 reps, on 2 farms in WNY
- ❖ trunks of the potted plus orchard trees sprayed using handgun sprayer on May 7-8, before main adult flight
 - ❖ chlorpyrifos (Lorsban Advanced); 1.5 qt/100 gal
 - ❖ lambda-cyhalothrin (Warrior II); 2.56 fl oz/100 gal
 - ❖ gamma-cyhalothrin (Declare); 2.05 fl oz/100 gal
 - ❖ untreated check (potted trees only)
 - ❖ Grower Standard (Lorsban using airblast sprayer)
- ❖ all trees examined for infestations after 1st flight (July 9); final eval: potted trees destructively sampled August 19

Control Trial

Each Plot:
10-12
orchard
trees
plus
5 potted
trees

I Check	III Declare
I Warrior	III Lorsban
I Declare	III Check
I Lorsban	III Warrior
II Check	IV Declare
II Lorsban	IV Warrior
II Declare	IV Lorsban
II Warrior	IV Check

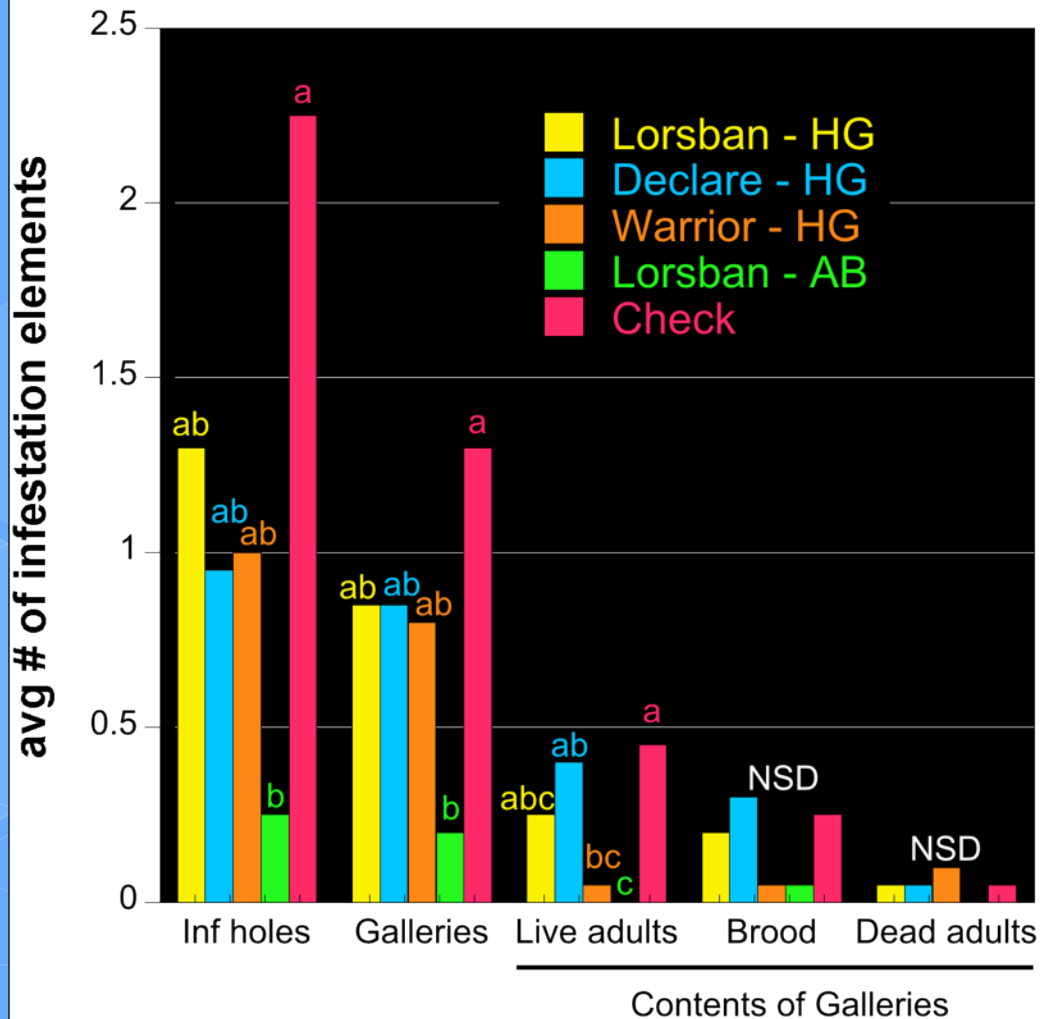
Wooded Margin



Control Trial

Final Evaluations – Aug 12

Final Infestation Evaluation - Farm 1

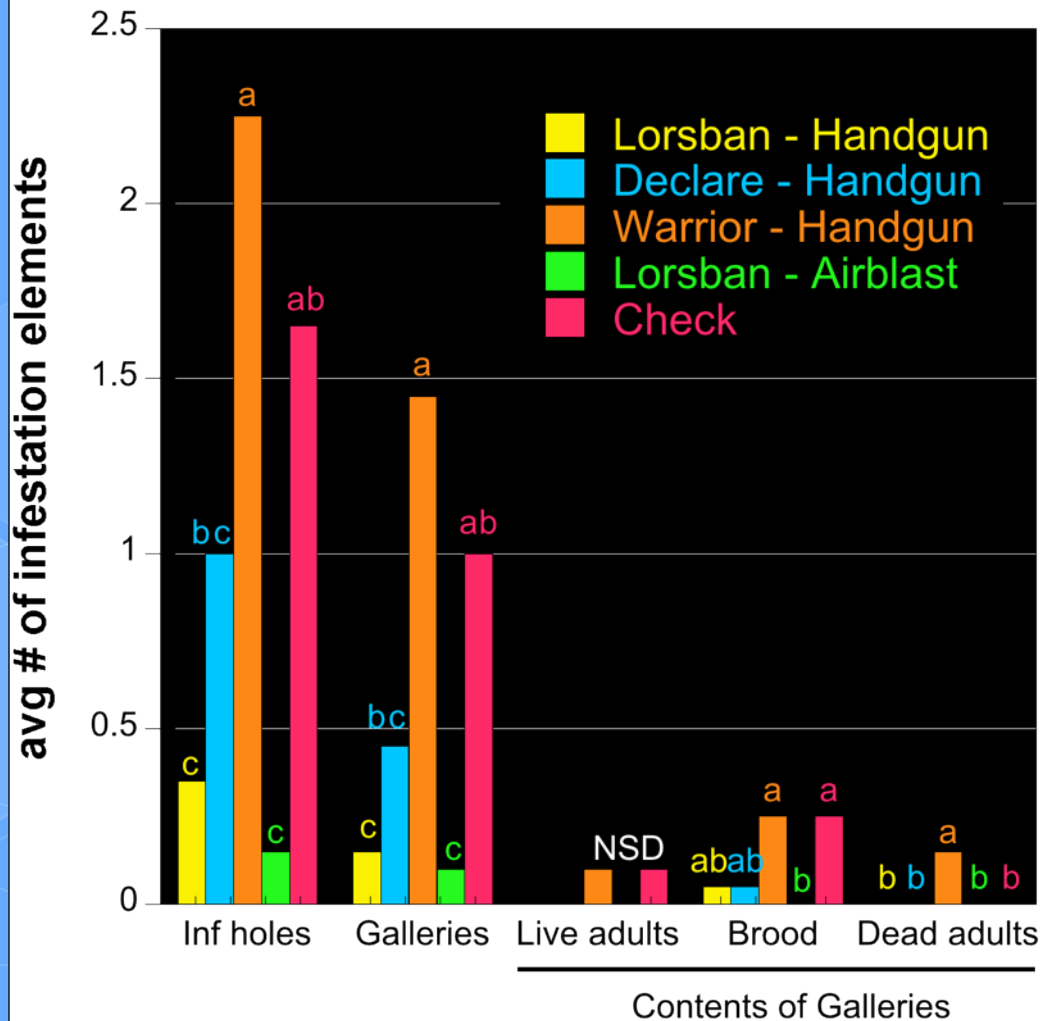


- ✧ Slight trend toward lower infestations in sprayed vs. check treatments
- ✧ No real separation among handgun treatments
- ✧ Grower Standard/Lorsban Airblast lower in all categories (not pertinent because of confounding plot effects)

Control Trial

Final Evaluations – Aug 12

Final Infestation Evaluation - Farm 2



- ✧ Lorsban Handgun plots generally had the lowest infestations
- ✧ Pyrethroid products did not perform as well as Lorsban
- ✧ Grower Std/Lorsban Airblast again lower in all categories

Control Trial

2016 – Trunk Sprays *plus* Repellent

- ❖ potted/flooded nursery trees; set directly in adjacent woods
- ❖ individual ethanol lures additionally affixed to each tree
- ❖ trunks sprayed using Solo backpack sprayer on May 10
 - ❖ chlorpyrifos (Lorsban Advanced); 1.5 qt/100 gal
 - ❖ chlorpyrifos + lambda-cyhalothrin (Cobalt); 1.3 qt/100 gal
 - ❖ permethrin (Perm-Up); 10 fl oz/100 gal
 - ❖ fenpropathrin (Danitol); 16 fl oz/100 gal
 - ❖ untreated check
- ❖ trees arranged in circular groupings; 2 sites, 20 reps/site
- ❖ half of groupings had a dispenser of repellent (Verbenone) located in center
 - ❖ anti-aggregation pheromone component of certain bark beetles
 - ❖ repels pine beetles in forest stands; also, *X. germanus* in field trials
- ❖ half of trees examined (destructively sampled) for infestations after 1st flight (**July 6**); remaining trees evaluated on **August 19**

Plot Set-Up



applying trunk sprays



flooding pot to stress trees



verbenone pouch



adult males



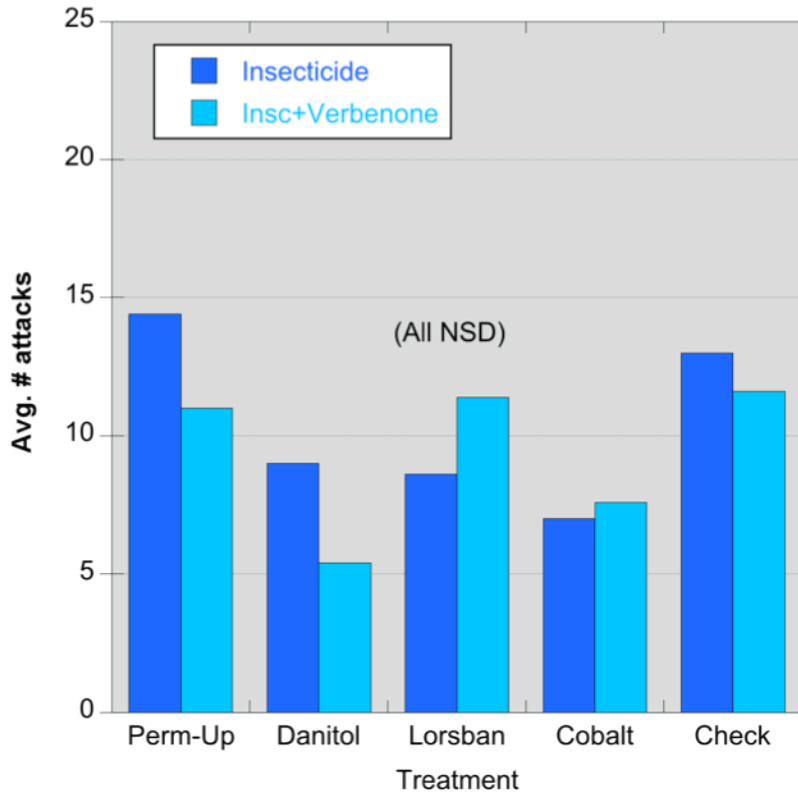
adult females



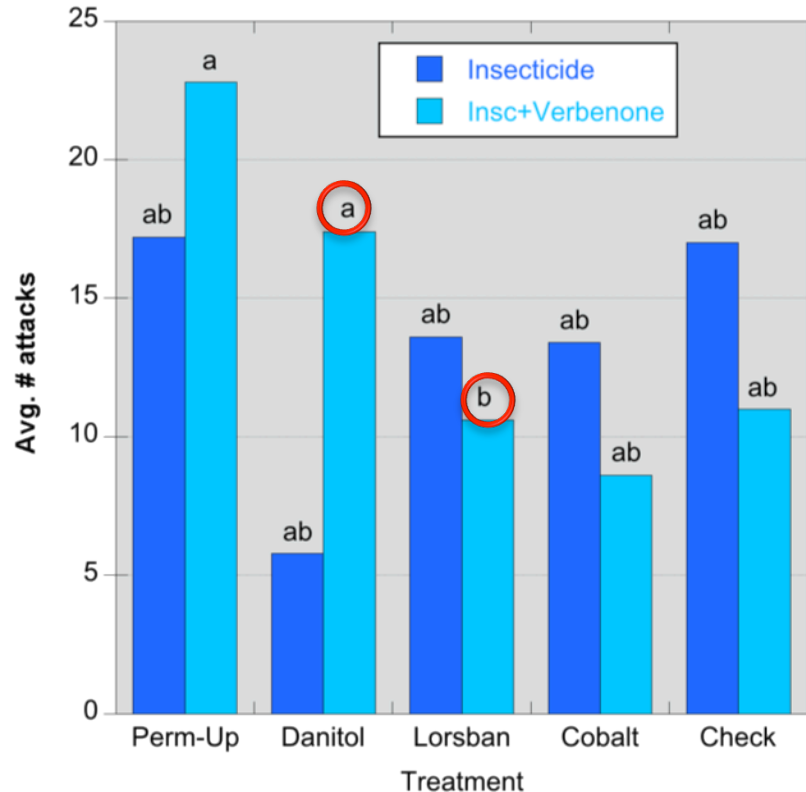
brood

Results

Number of Attack Sites - Furber (Prelim) 2016



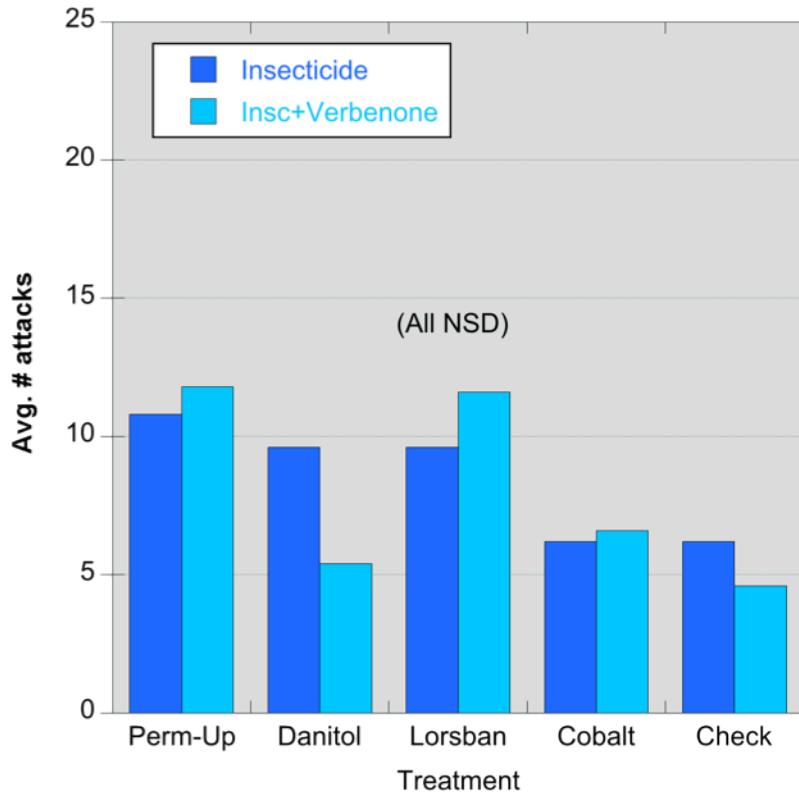
Number of Attack Sites - Furber (Final) 2016



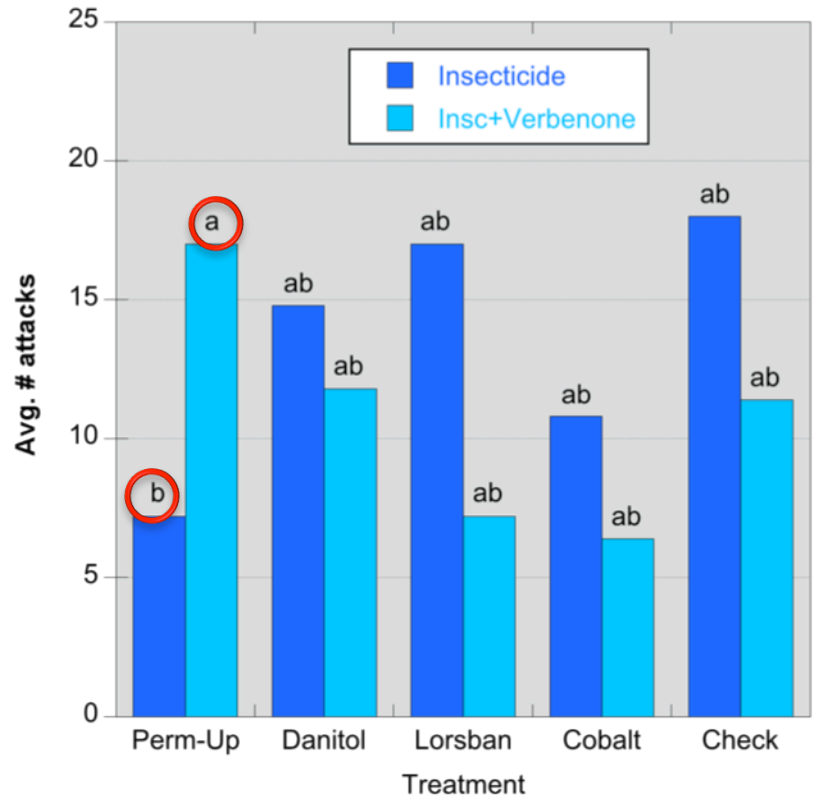
- ❖ Preliminary Evaluation: No difference among treatments
- ❖ Final: Increased damage in most treatments; Lorsban+Verbenone the only treatment that broke out statistically
- ❖ In no case did addition of Verbenone significantly improve control over using just the insecticide

Results

Number of Attack Sites - Fowler (Prelim) 2016



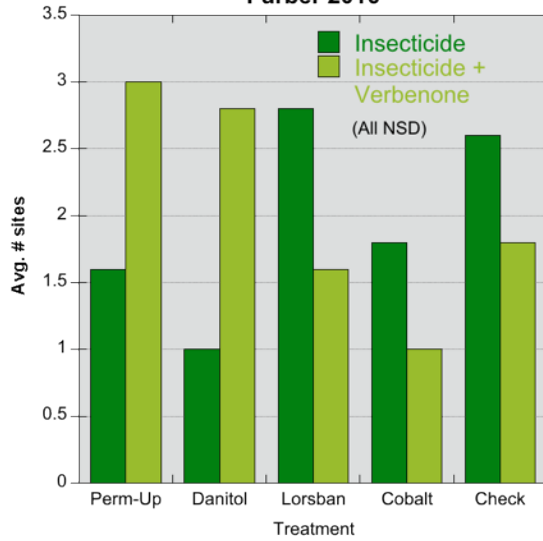
Number of Attack Sites - Fowler (Final) 2016



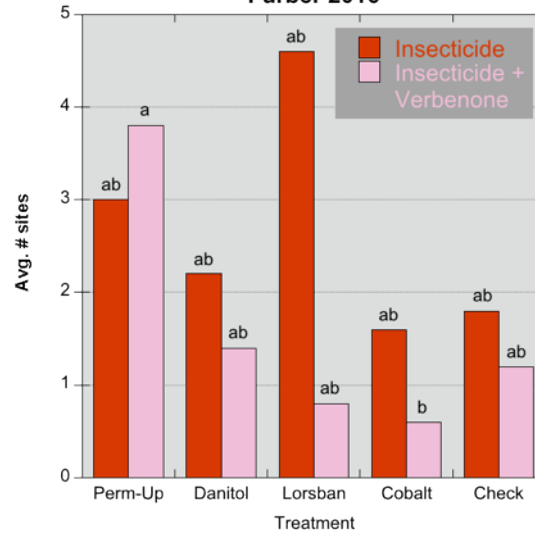
- ❖ Preliminary Evaluation: No difference among treatments
- ❖ Final: Increased damage in most treatments; Perm-Up (without Verbenone) the only treatment that broke out statistically
- ❖ In no case did addition of Verbenone significantly improve control over using just the insecticide

Results

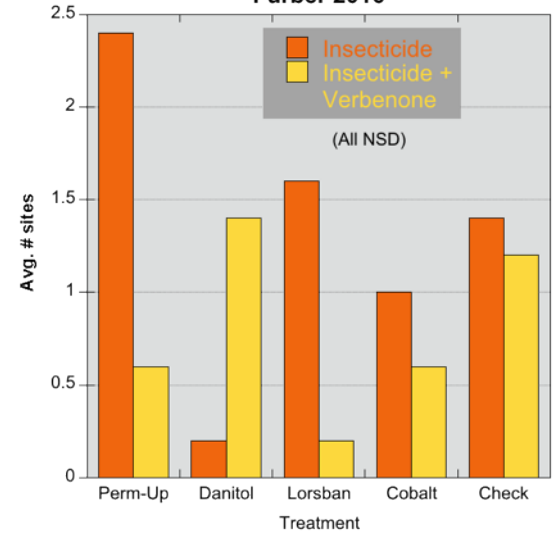
**Number of Sites with Live Adults
Furber 2016**



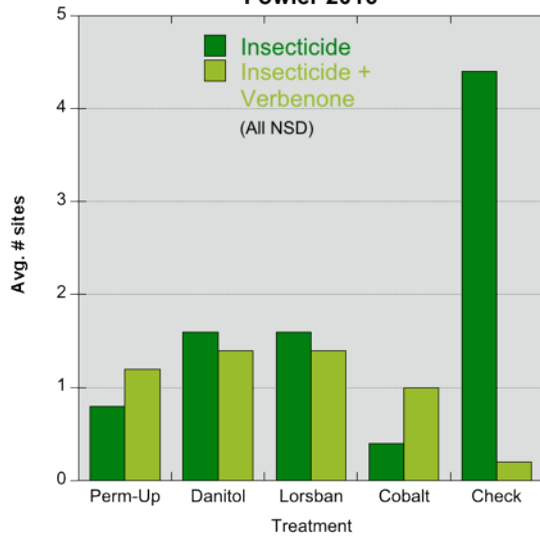
**Number of Sites with Dead Adults
Furber 2016**



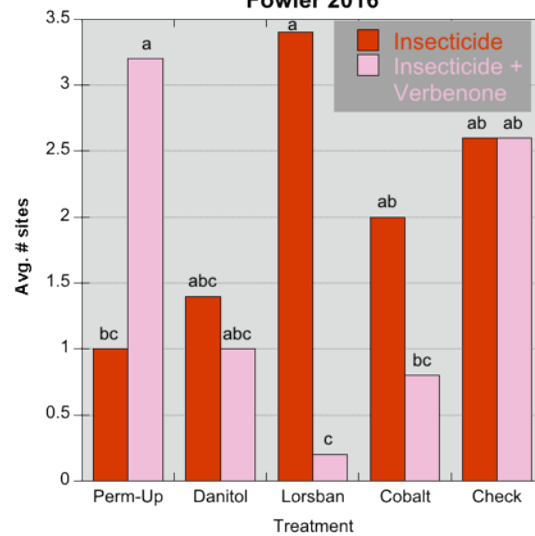
**Number of Sites with Brood
Furber 2016**



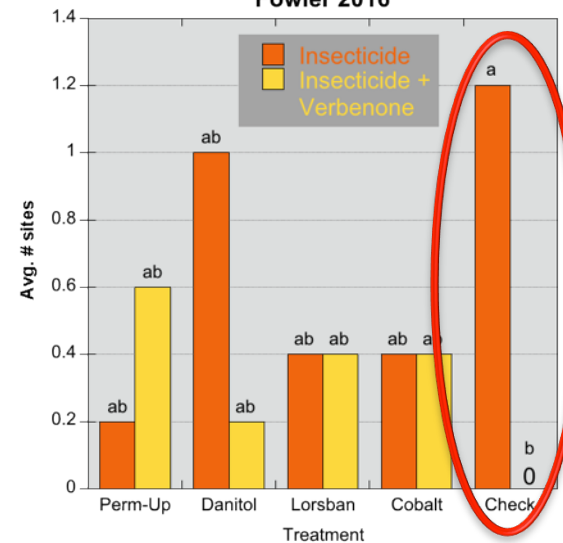
**Number of Sites with Live Adults
Fowler 2016**



**Number of Sites with Dead Adults
Fowler 2016**



**Number of Sites with Brood
Fowler 2016**



Still formulating recommendations

- ❖ Important to avoid stress to trees
 - ❖ site selection: water & air drainage, irrigation, frost protection
 - ❖ good disease prevention; fire blight, phytophthora
- ❖ Trapping/monitoring adults using ethanol lures is useful
- ❖ Remove and destroy infested trees – maybe wait until first flight is over
- ❖ Ambrosia beetles are difficult to control with insecticides
 - ❖ must be closely timed with beetle attacks
 - ❖ multiple applications probably necessary
 - ❖ long residual activity a plus
 - ❖ best timing likely against emerging OW adults
 - ❖ systemic insecticides not effective
 - ❖ loss of Lorsban imminent
- ❖ Possible further trials with Verbenone?



Cooperators & Assistants

- ✧ Todd Furber, Cherry Lawn Farms, Sodus, NY
- ✧ J.D. Fowler, Fowler Farms, Wolcott, NY
- ✧ Wafler Nursery, Wolcott, NY
- ✧ Reality Research, Lyons, NY
- ✧ Collaborators: John Vandenberg, Louella Castrillo, Michael Griggs, USDA, Ithaca, NY
- ✧ Chris Ranger, USDA ARS, Wooster, OH

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- ✧ NY Farm Viability Institute