Co-Creating Attract-and-Kill Systems for Management of Brown Marmorated Stink Bug in Apple Orchards

Northeast Sustainable Agriculture Research & Education

Collaborators

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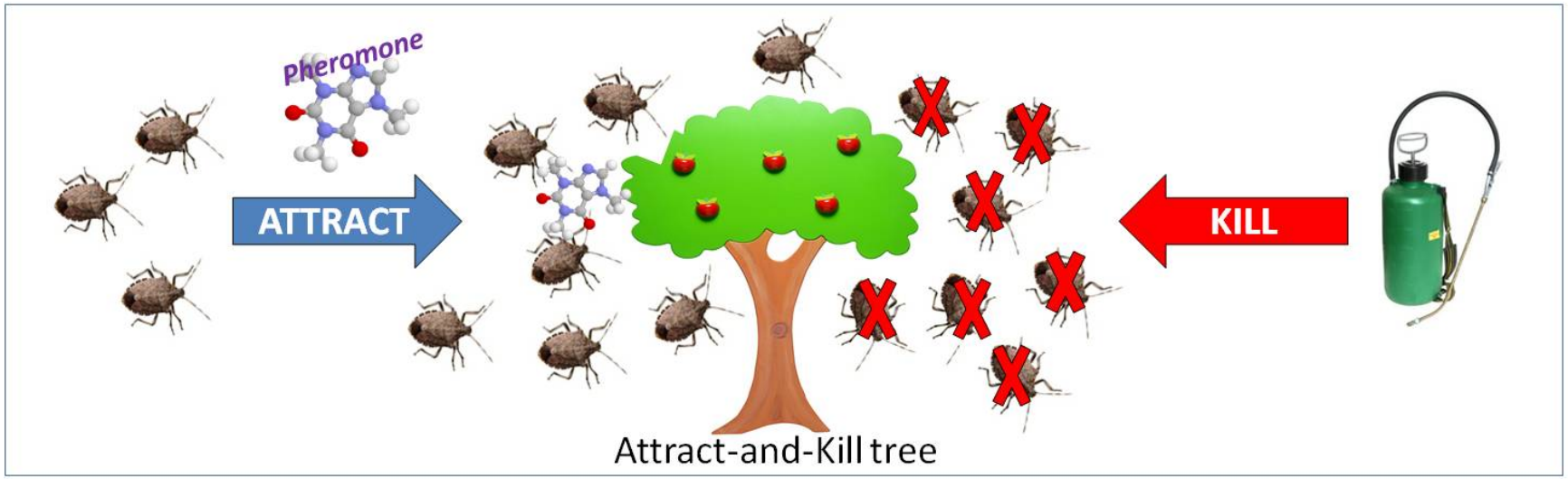
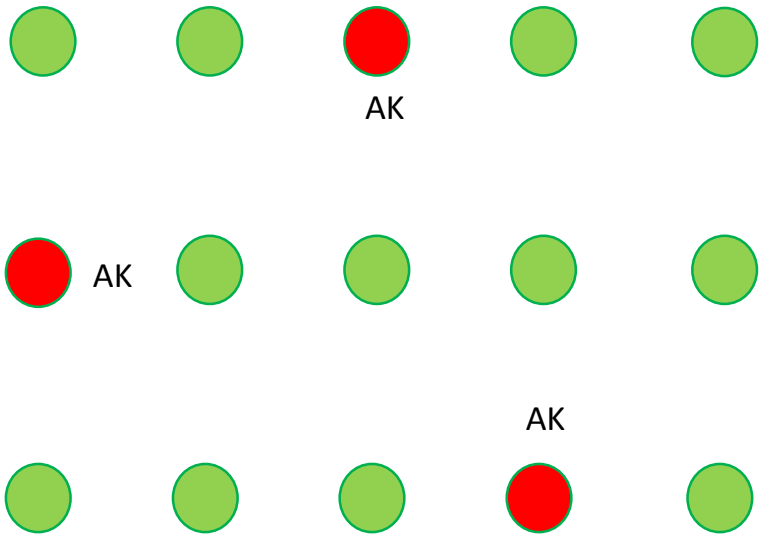
Project Goals

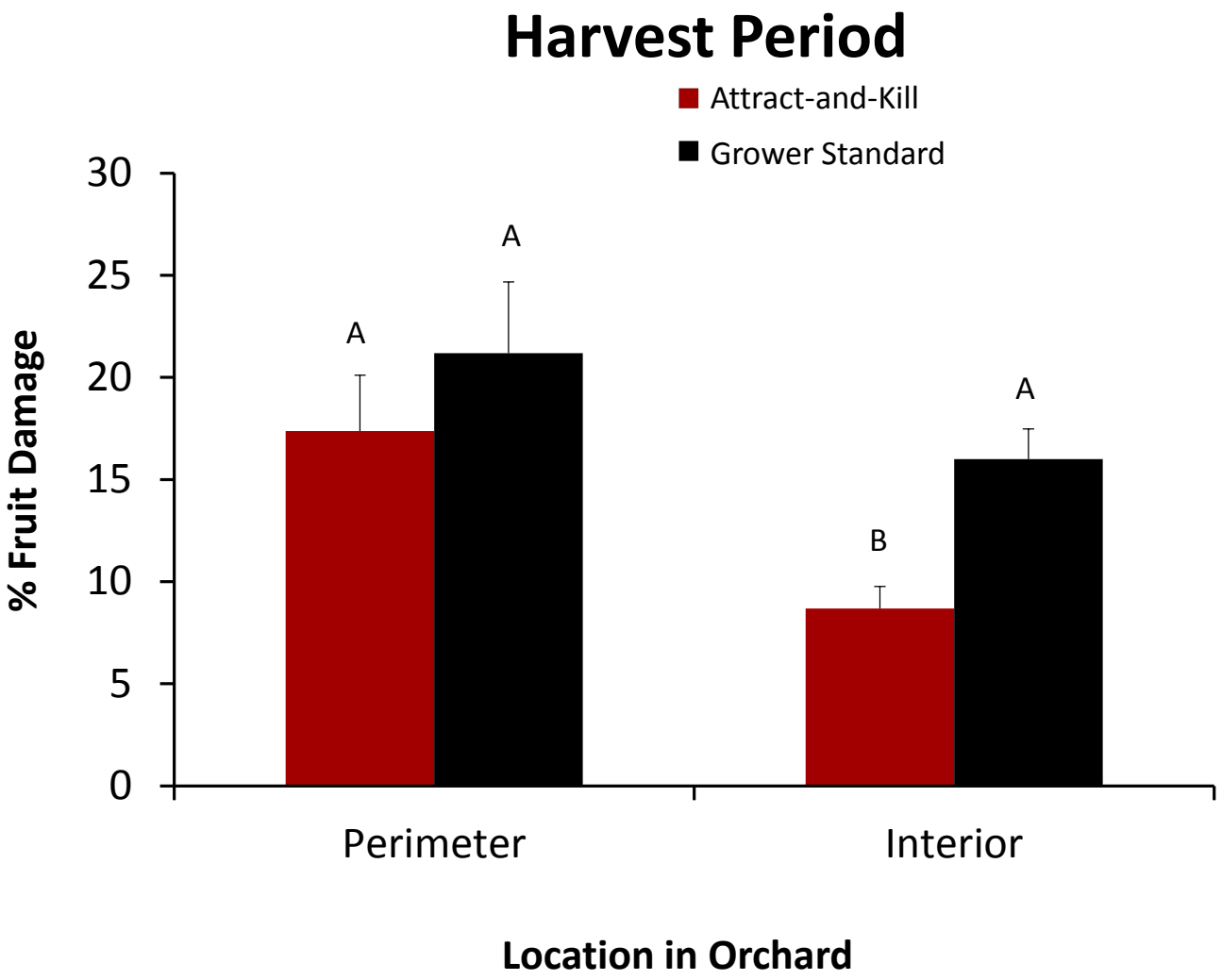
- Reduce amount of insecticide applied to block
- Enhance natural enemy abundance and reduce secondary pests
- Maintain high quality fruit!

How Does Attract-and-Kill Work?



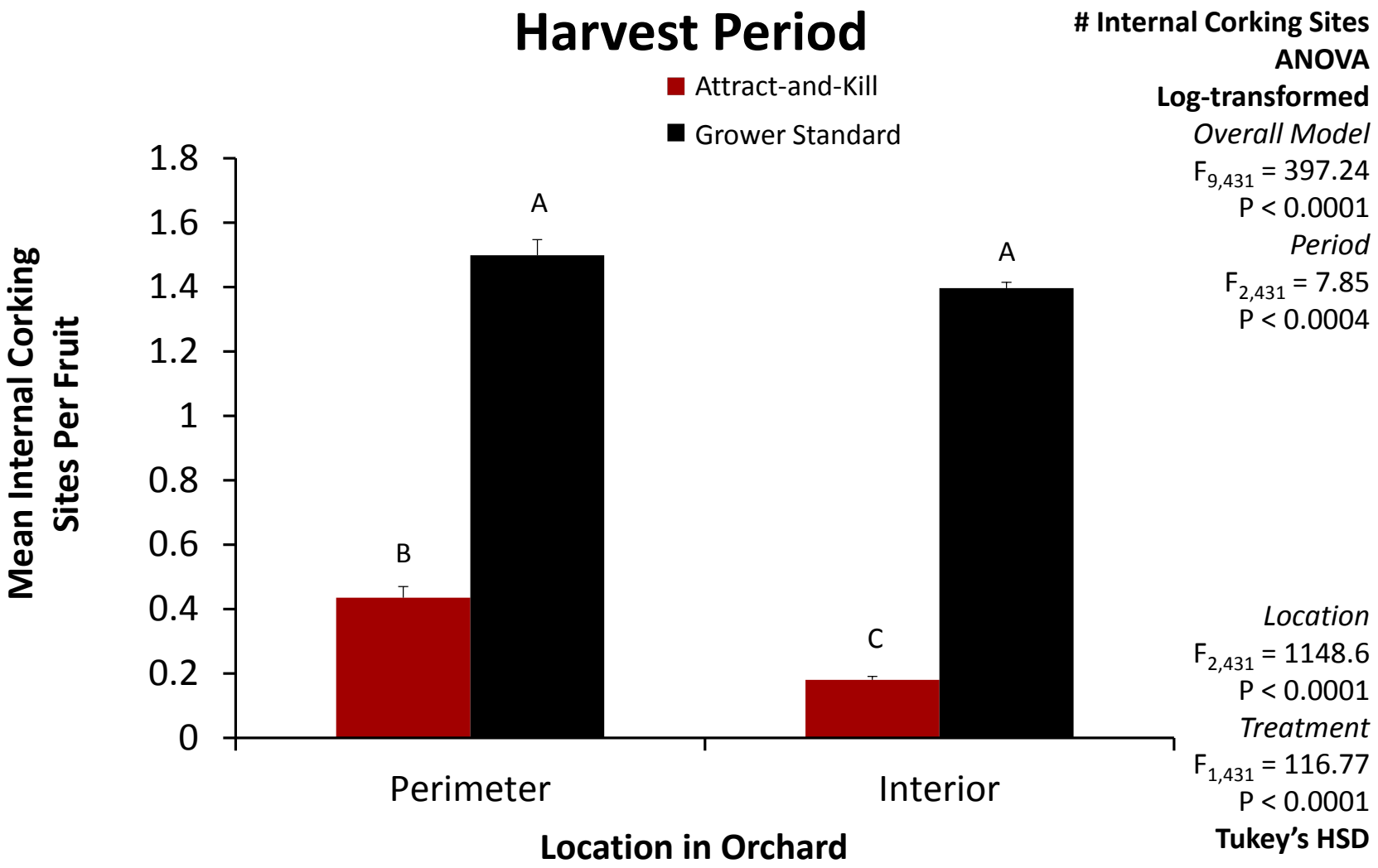
Method of Application - 7-d intervals



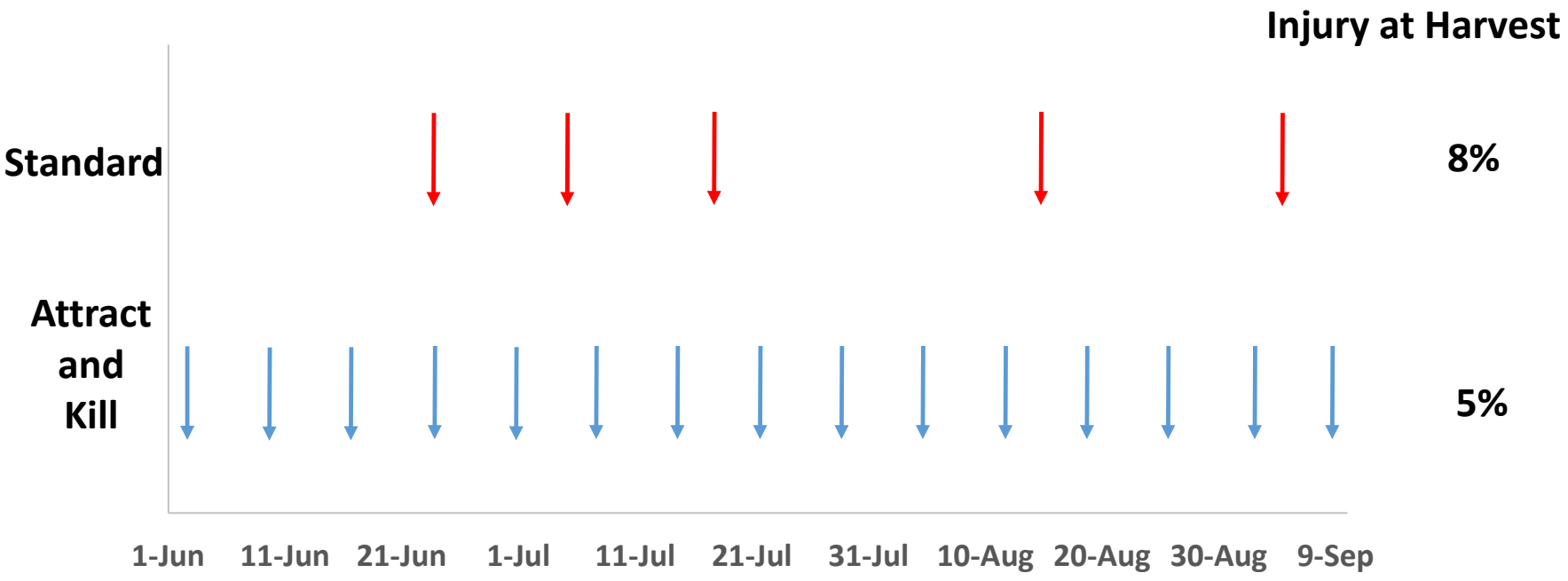


% Fruit Damage
ANOVA
Log-transformed
Overall Model
$F_{9,431} = 54.4$
$P < 0.0001$
Period
$F_{2,431} = 133.6$
$P < 0.0004$

Location
$F_{2,431} = 71.75$
$P < 0.0001$
Treatment
$F_{1,431} = 92.5$
$P < 0.0001$
Tukey's HSD


Harvest Period
Attract-and-Kill
Grower Standard
Mean Internal Corking Sites Per Fruit
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
A
A
B
C
Perimeter
Interior
Location in Orchard
Internal Corking Sites
ANOVA
Log-transformed
Overall Model
F9,431 = 397.24
P < 0.0001
Period
F2,431 = 7.85
P < 0.0004
Location
F2,431 = 1148.6
P < 0.0001
Treatment
F1,431 = 116.77
P < 0.0001
Tukey's HSD

Example Program:



Cost/Benefit of Commercial Attract-and-Kill Study

	Attract and Kill	Standard
Mean No. of BMSB Sprays	**15**	**3**
Percentage of Trees Sprayed	**3-4**	**100**
Cost of BMSB lures/per A/season	**$1500**	**0**
Cost of BMSB Sprays/per A/season	**$6-20**	**$30-100**

Other factors: fuel use, extra trips to field, labor costs, secondary pest management

Optimizing Attract-and-Kill and Long-Term Projections

1. **Lower cost lures**
    1. **Competition/Volume/Refinement of production**
    2. **Smaller doses**
    3. **Inclusion of Host Plant Volatiles**

2. **Fewer lures**
    1. **Fewer per tree and/or fewer baited trees**

3. **Less frequent spray applications**
    1. **Threshold + Perimeter-Based Management**

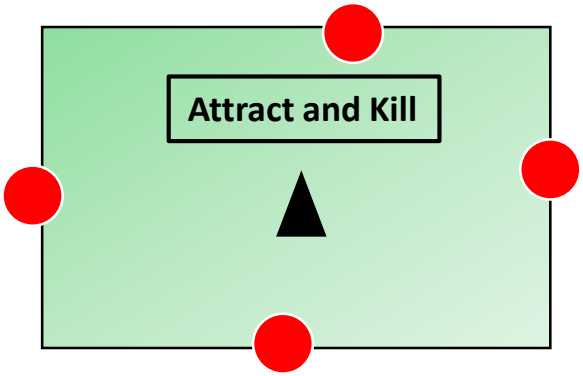
4. **Impact on farm-level management**

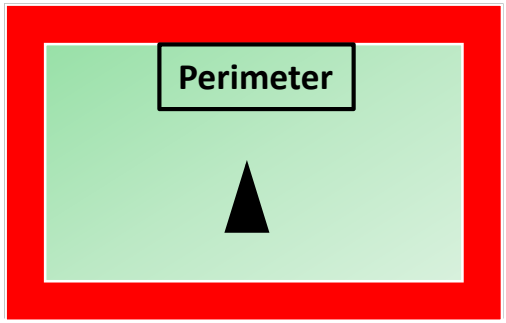
5. **Long-term reduction of BMSB populations**

Refinement of Perimeter-Based Management

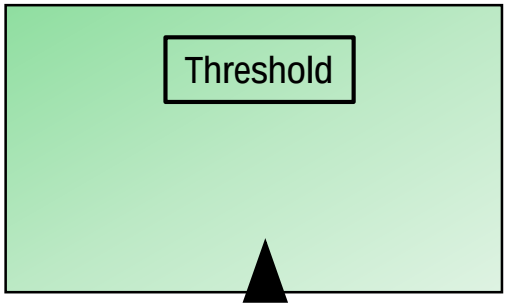
- Apple blocks managed by the following perimeter-based strategies and compared with treatment threshold:

1) AK – 7-d intervals
2) AK – 14-d intervals
3) Full Perimeter – 7-d intervals
4) Full Perimeter – 14-d intervals
5) Treatment Threshold (10 BMSB/Trap)
6) No Spray (Control)

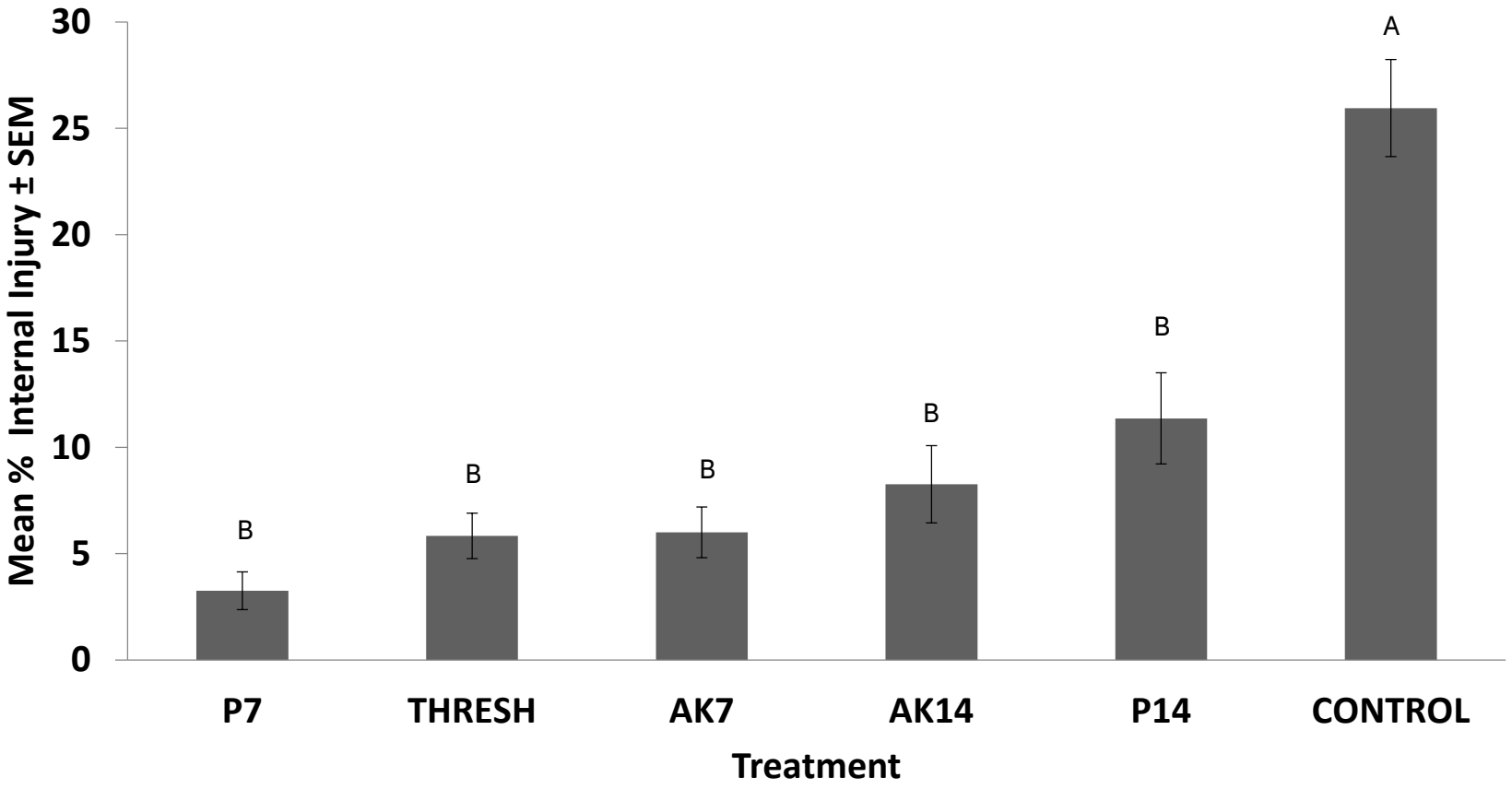




- Blocks monitored at center with baited trap. If threshold reached, ARM sprays triggered.



2015 Results



Acknowledgments

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