


Multi-State Pheromone Trials

Early Season Results



Biology, Ecology, and Management of Brown Marmorated Stink Bug in Orchard Crops, Small Fruit, Grapes, Vegetables, and Ornamentals USDA-NIFA SCRI Coordinated Agricultural Project



GANTT CHART		Biology, Ecology, and Management of Brown Marmorated Stink Bug (BMSB) in Orchard Crops, Small Fruit, Grapes, Vegetables, and Ornamentals					
	Summer = Yellow	Fall = Orange	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
	Winter = White	Spring = Pink	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4</i>	<i>Year 5</i>

2.1 Develop effective monitoring tools for BMSB

2.1.1. Trap-based monitoring. (Years 1-3)

2.1.1.1. Identification of pheromone and other olfactory attractants.

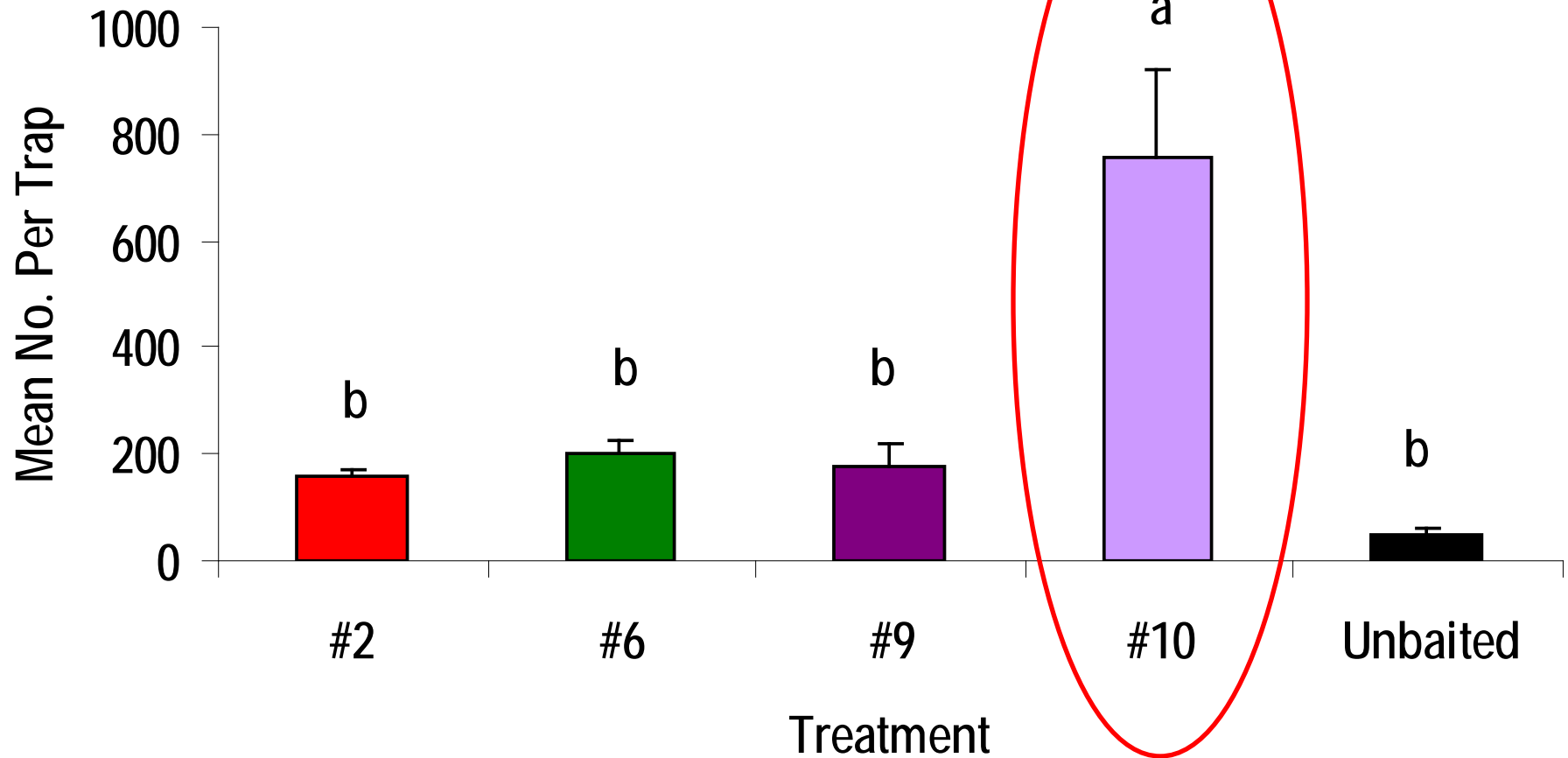
2.1.1.2. Optimization of pheromone and kairomone dispensers for monitoring BMSB.

2.2 Examine utility of conventional, organic, and alternative management tools

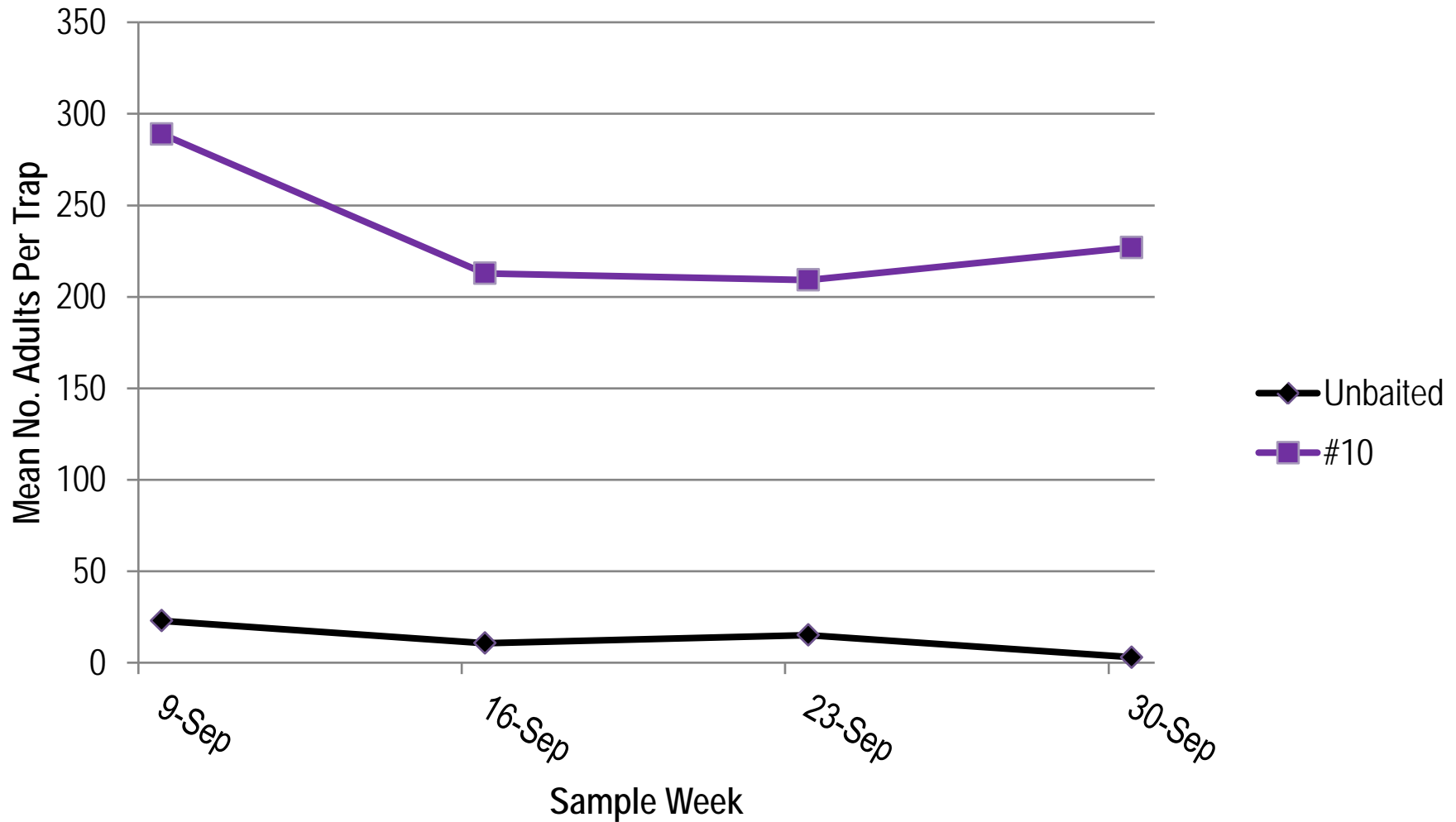
2.2.3. Develop attract-and-kill and mass trapping strategies for management of BMSB in commercial crops. (Years 2-5)

Captures in Traps Baited With #10 Significantly Greater

9-30 September 2011

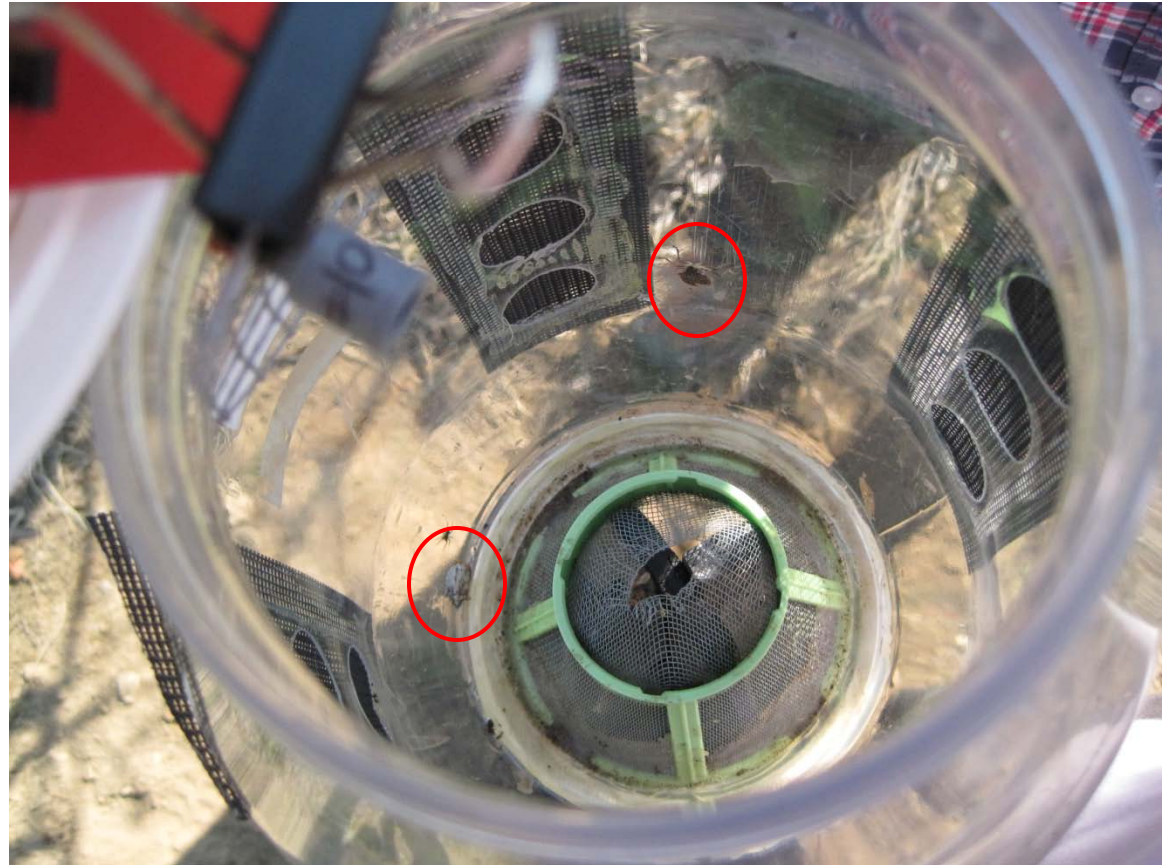


2011 Weekly Captures Comparing #10 and Unbaited Traps 18:1 Ratio (Baited: Unbaited)



Is #10 Attractive in the Early Season?

Pre-Trial (March 20-April 17, 2012)

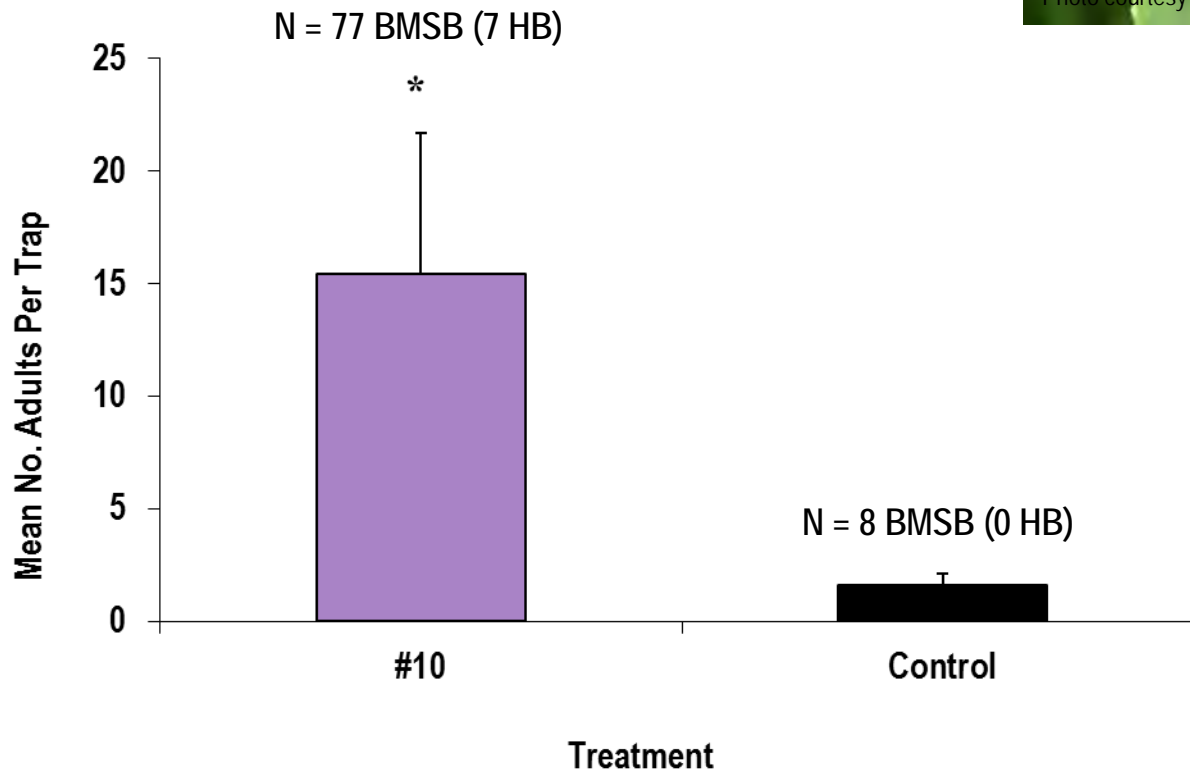


Early Season Attraction Documented for BMSB

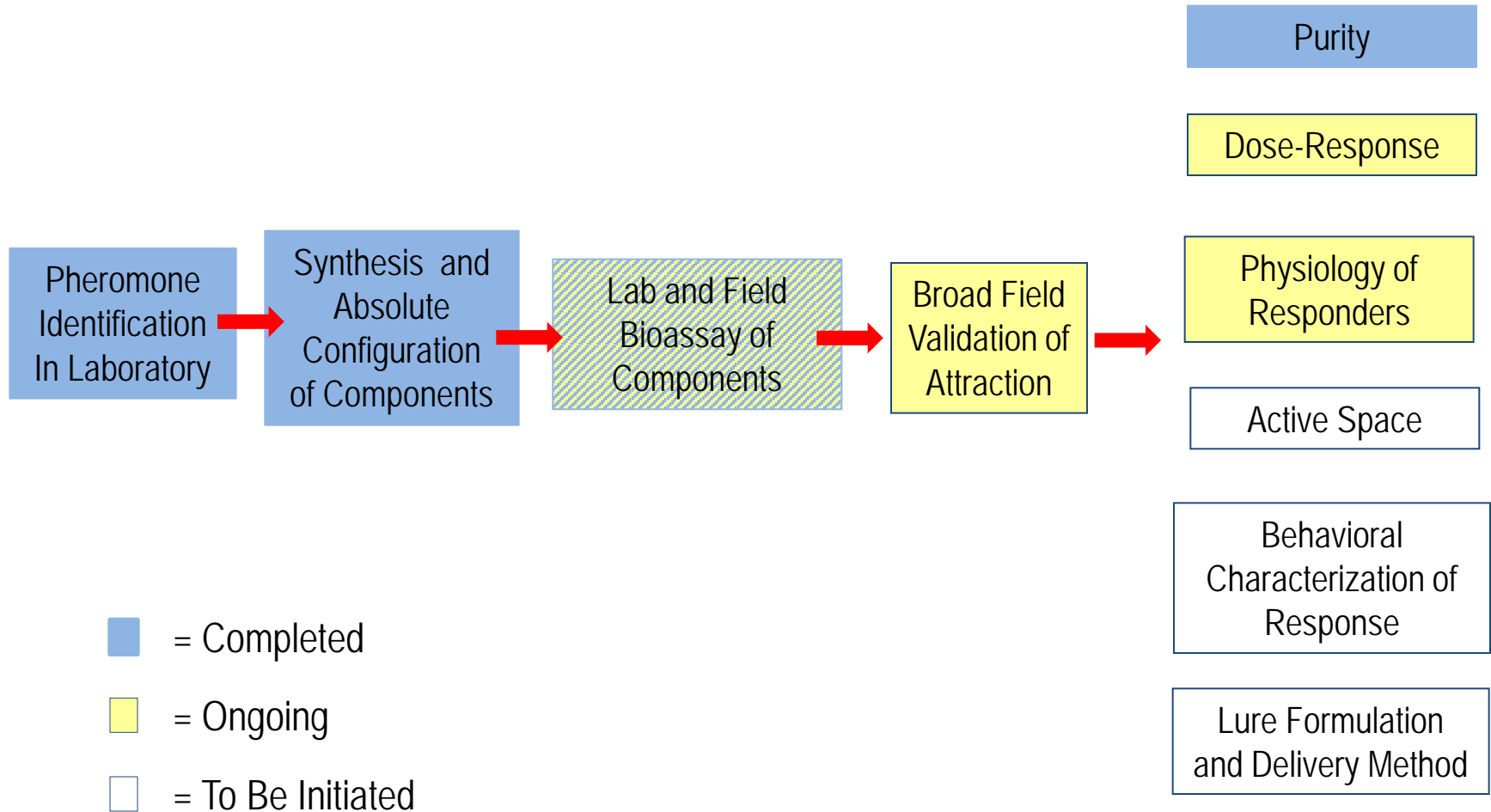
March 20-April 17, 2012



10:1 Ratio (Baited: Unbaited)



Development of Pheromone-Based Attractants



Key Questions for Multi-State Trial

- Is BMSB attracted to #10 in the early season?
- Is BMSB attracted to #10 season-long?
- How attractive is this stimulus relative to MDT and unbaited traps?

General Protocol

- Black pyramid traps and vented trap tops.
- Three odor treatments : 1) #10 (~10 mg load); 2) methyl decatrienoate (provided by Sterling); and 3) Unbaited Control.
- Collection jar provisioned with 1/2 DDVP Kill strip.
- Traps sampled and odor treatments re-randomized weekly.
- All #10 lures and kill strips are replaced every two weeks. MDT lures are replaced monthly.
- Traps are deployed in border area between wild host habitat or row crop and an agricultural production area and spaced 50 m apart. Maximum distance to protected crop ~10m.
- Traps were deployed in mid-April and left in place season-long.



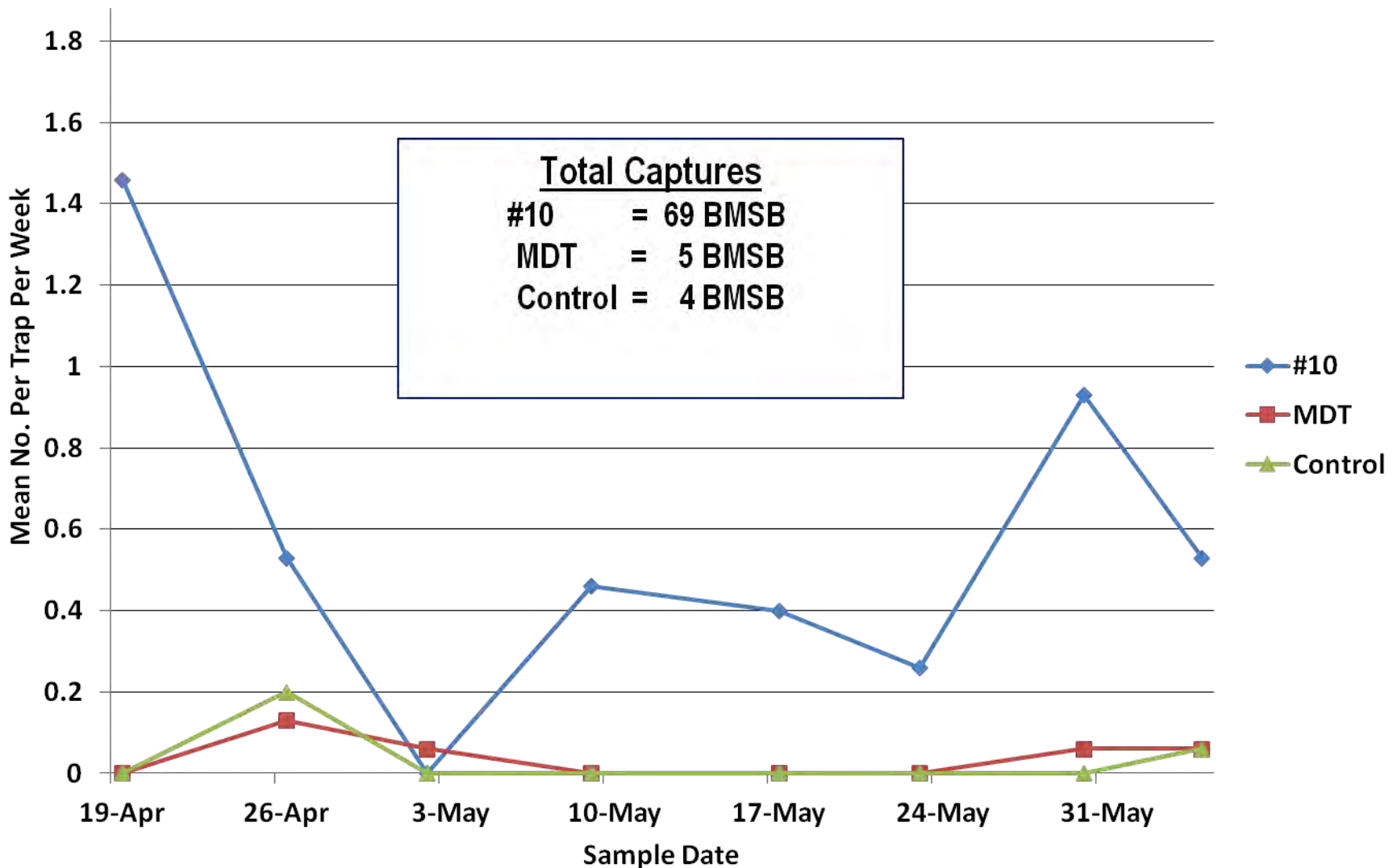
Results To Date

12.5 : 1 Ratio (Baited:Unbaited)

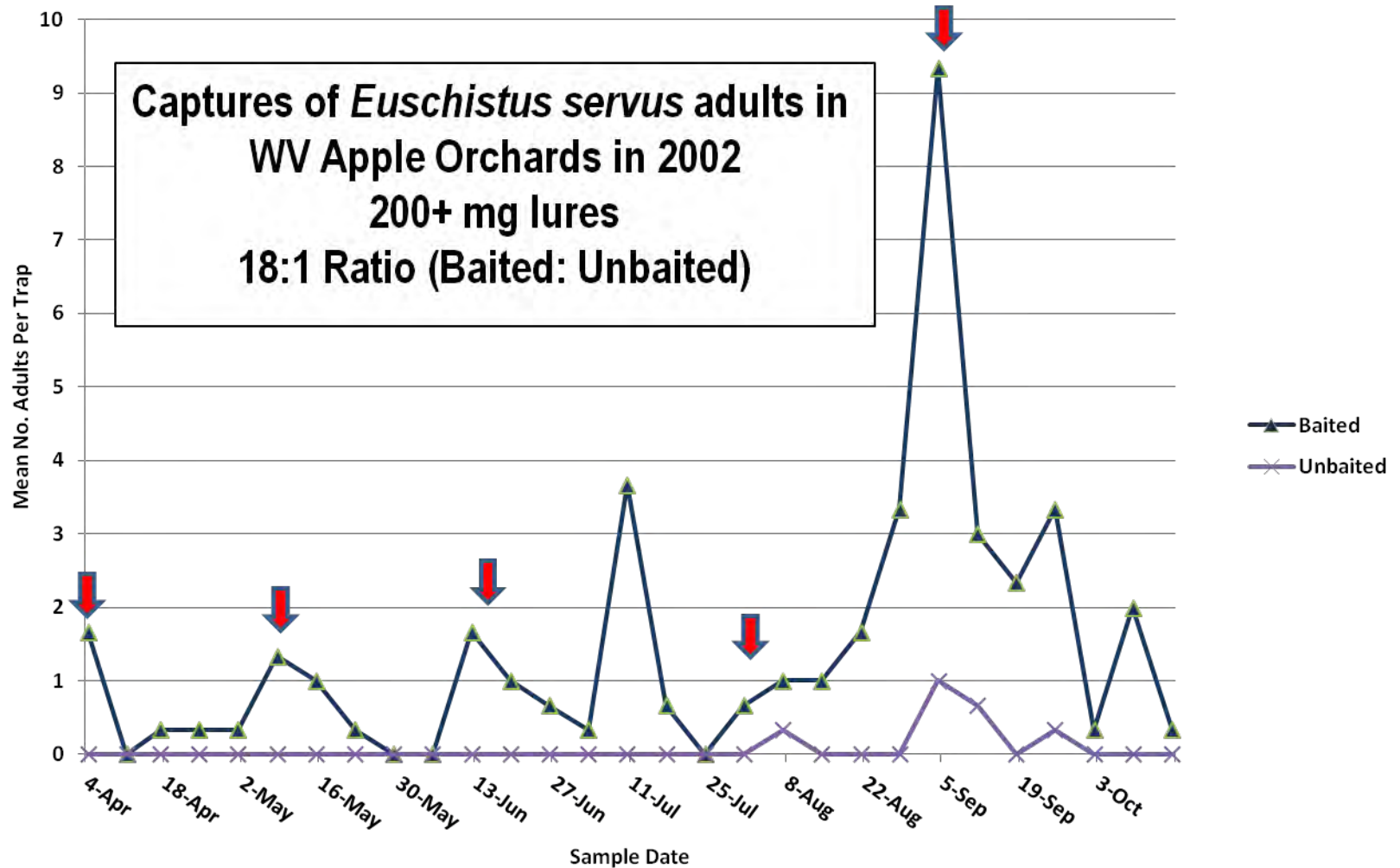
States	Crop	Reps	#10	MDT	Control
WV	Tree Fruit	9	41	2	1
MD	Tree Fruit	6	28	4	3
MD	Ornamentals	6	33	5(1)	1
MD	Vegetables	9	6	2(1)	2
NJ	Blueberry	5	22	1	0
NJ	Peach	5	3	3	0
NJ	Grape	5	40	1	0
DE	Mixed Veg	6	3	0	0
PA	Tree Fruit	15	17	6	5
NY	Tree Fruit	3	10	2	2
VA	Vegetables	5	6	3(1)	1
VA	Tree Fruit	5	14	1	2
VA	Grapes	5			
OR	Mixed Crops	6	3	0	0
NC	Mixed Crops	6	3	2	0
Totals			226	34 (3)	18

Commercial Orchards in WV/MD

10 mg experimental lure 17:1 Ratio (Baited: Unbaited)



What should we expect?



Principles of Monitoring

- Specific purpose of trap should dictate power.
 - Low – ecological studies (detecting movement)
 - Intermediate – IPM action thresholds
 - High – for detecting low numbers; eradication efforts.
- Monitoring should emphasize capturing a consistent proportion of targeted attracted insects and few non-targets. Specificity of lure and efficiency of trap.
- Environmental factors can cause variation in insect response (ex. Competition, varying weather conditions).
- Variation in state of targeted insect can affect response to traps (ex. Sex, age, physiological state).

What do we need to learn about #10 in 2012 to allow us to monitor BMSBs in 2013?

- Presence, abundance, and seasonal activity.
 - Dose-response and active space results to allow us to identify a loading that is behaviorally relevant for monitoring.
 - Behavioral attributes of the response – aggregation vs. point source responses.
 - Physiology of responders.
 - Season-long attraction.
 - Lure formulation and delivery mechanism.

Other Factors For Monitoring System

- Traps Type
 - Capture Mechanism
 - Capture
 - Retention
 - Non-targets/efficacy
 - Deployment Strategy
 - Where
 - When
 - How
- Commercialization of Stimulus/Attractant

Behaviorally-Based Monitoring

- Trap captures to reflect
 - movement into crops
 - population densities
 - injury in particular crops
- Captures can be used to develop thresholds for insecticide treatment or further scouting protocols.

Behaviorally-Based Management

- Next step after we understand behavioral responses to pheromone.
- Behavioral manipulation via mass-trapping, attract and kill devices or formulations, baited trap crops, etc.

Next Steps

- Carry on with season-long trial to better understand the power of the lure.
- Initiate studies that will enable us to understand as much as possible about this stimulus in 2012.
- Discussion section Wednesday afternoon/follow-up conference call.