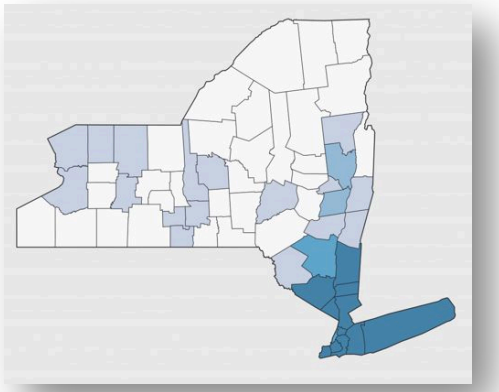
Integrated BMSB Management in Organic Pepper
HVRL, Highland NY 2013



BMSB use of Alternates Host 'Tree of Heaven', *Ailanthus altissima*

BMSB nymph on Jalapeno Pepper

Trap and Kill Station

Use of *Beauveria bassiana* strain GHA in organic mgt.

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2013 BMSB Injury to Organic Pepper Hudson Valley, NY

The Brown Marmorated Stinkbug (*Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae) is an invasive species that made its way from Asia to North America, first officially documented in Allentown, PA in 2001 likely arriving several years earlier.

The insect has spread across a number US States. The species was first documented in NY in the Hudson Valley Region in 2008. In 2012 the pest cause significant injury to pome fruit in three NY counties.

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2013 BMSB Injury to Organic Pepper Hudson Valley, NY

- On August 12th, 15% injury was observed in a 1-acre organic planting of Jalapeno Pepper in Marlboro, NY.

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River


BMSB in Jalapeno Pepper
12th August, Marlboro, NY
15% feeding injury
Averaging 4 nymphs per plant

2013 BMSB Injury to Pepper Marlboro, NY

- On August 12th, 15% injury was observed in a 1 acre organic planting of Jalapeno Pepper.

- Integrated pest management using 4 components employed to reduce BMSB field populations.

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2013 BMSB Injury to Pepper

- Employing 3 applications of Mycotrol-O @ 16 oz./A were made on 14 August, 1 & 14 September.

- Pheromone lure combinations (USDA # 10 + MDT) were attached to netting, used to attract BMSB away from agricultural commodity as a component of the trap and kill stations (T&K).

- Bifenthrin (Bifenthure EC) insecticide applied at 3 fl.oz./ gallon treated netting was use to kill the insect upon exposure.

- High intensity lighting was used in 1 of 2 T&K sites

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Proceedure:

- Net traps were established along a 1-acre Jalapeno pepper field spaced 30 meters apart
- Each net was made of Blockade™ Insect Screen 36 x 25 mils by PAK Unlimited, INC.
- Onto each net were placed two #10 and two 'Rescue' MDT BMSB lures
- To a single trap was added a 500W light.
- On day 0 (9 September) , each net were sprayed with 0.75 gal. of Bifenthrin 10DF solution using 3.0 oz./gal.
- On days 1-2, nets were monitored with no captures of BMSB observed.
- On day 3, lures and overnight light were added.
- Continued sampling of netted traps were made through October.

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MDT
USDA #10
Hudson Valley
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Proceedures Con't

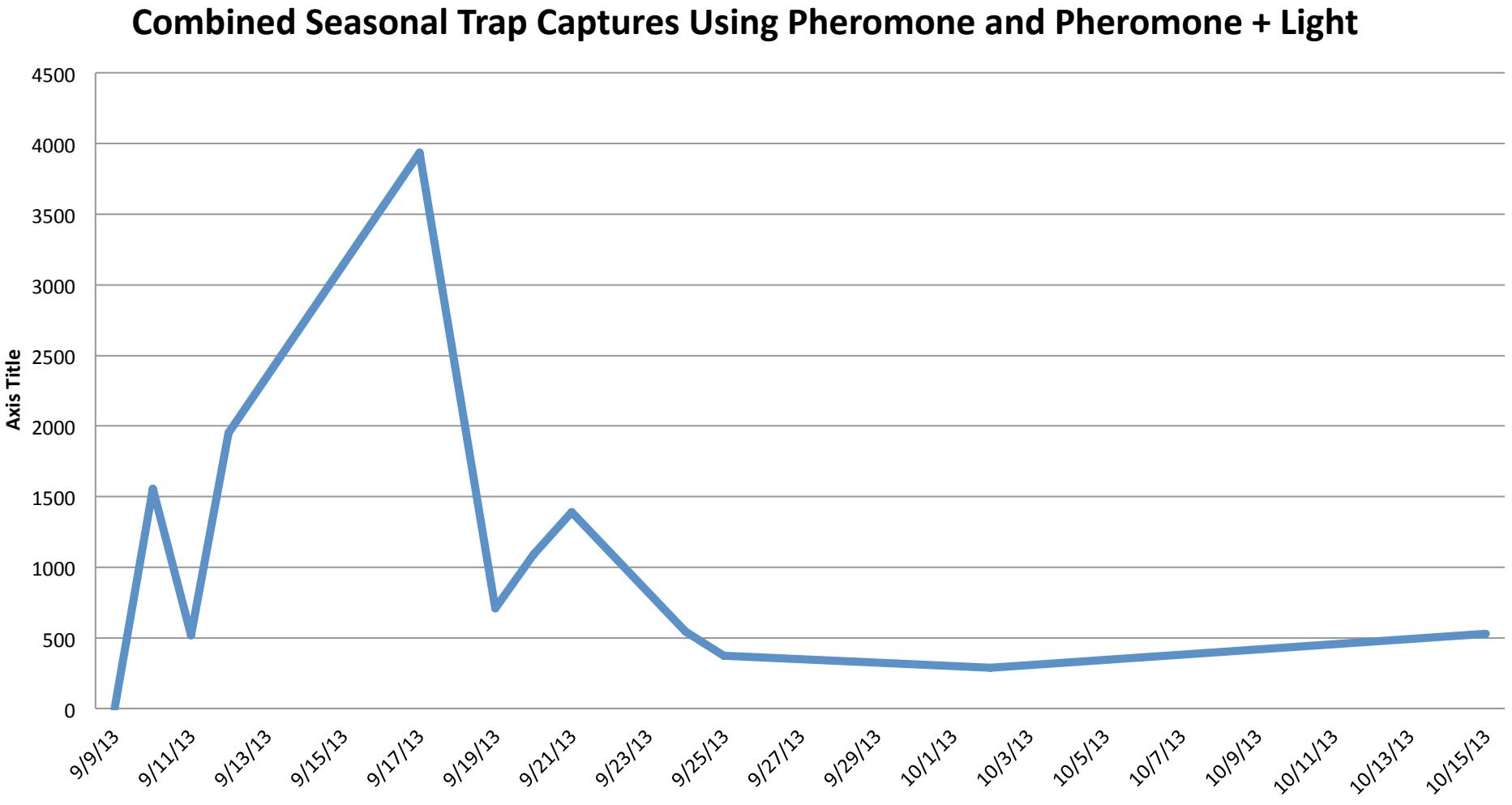
- Generator driven 500W Halogen light directed toward the field population of BMSB.
- Plastic sheets were used to define location and number of BMSB trap and kill data.
- Study was designed to:
    1. Determine the attractiveness of lights with net relative to net alone
    2. Determine the number of BMSB observed coming from field versus forest sides of trap

- BMSB populations were observed on Black Walnut and Tree of Heaven, which may have acted as intermediate hosts, fostering migrations to pepper in high numbers.
- BMSB locations on netting traps with pheromone were equally dispersed on the field and forested sides of net.
- Nights when lights were on, BMSB were heavily concentrated on the field side in front of the light with higher numbers observed.

Ailanthus altissima

Juglans nigra

Studies of the Brown Marmorated Stink Bug, *Halyomorpha halys* (Stål), in New York State



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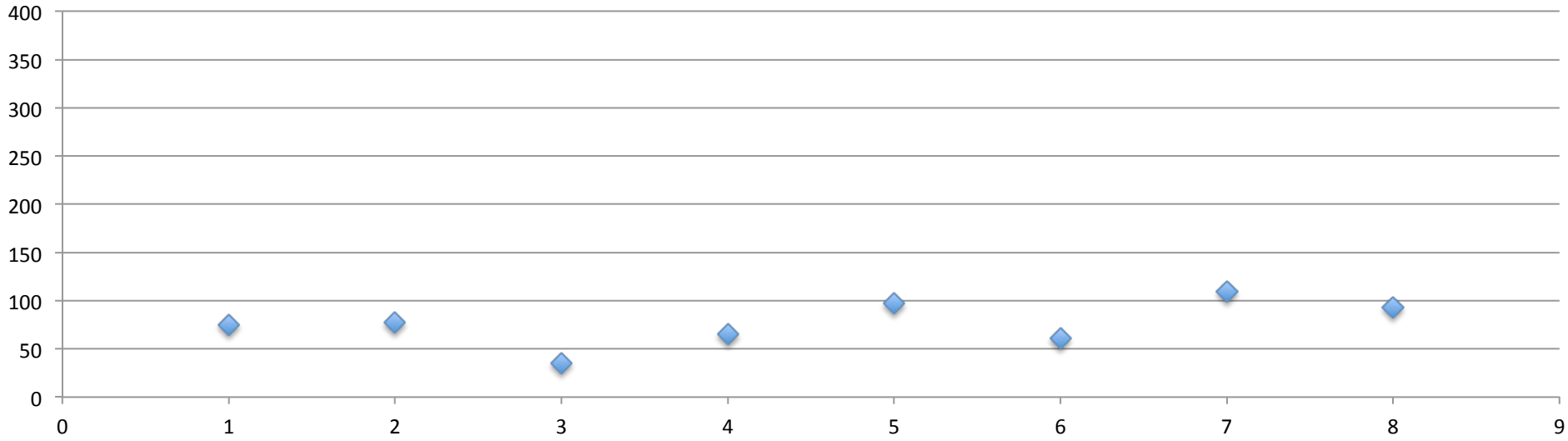
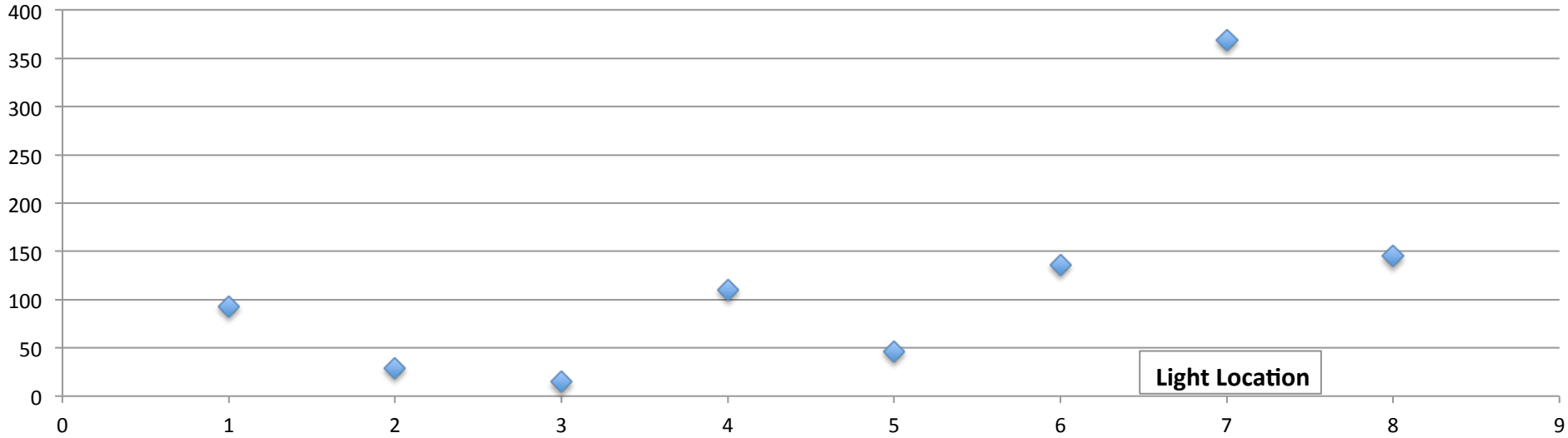
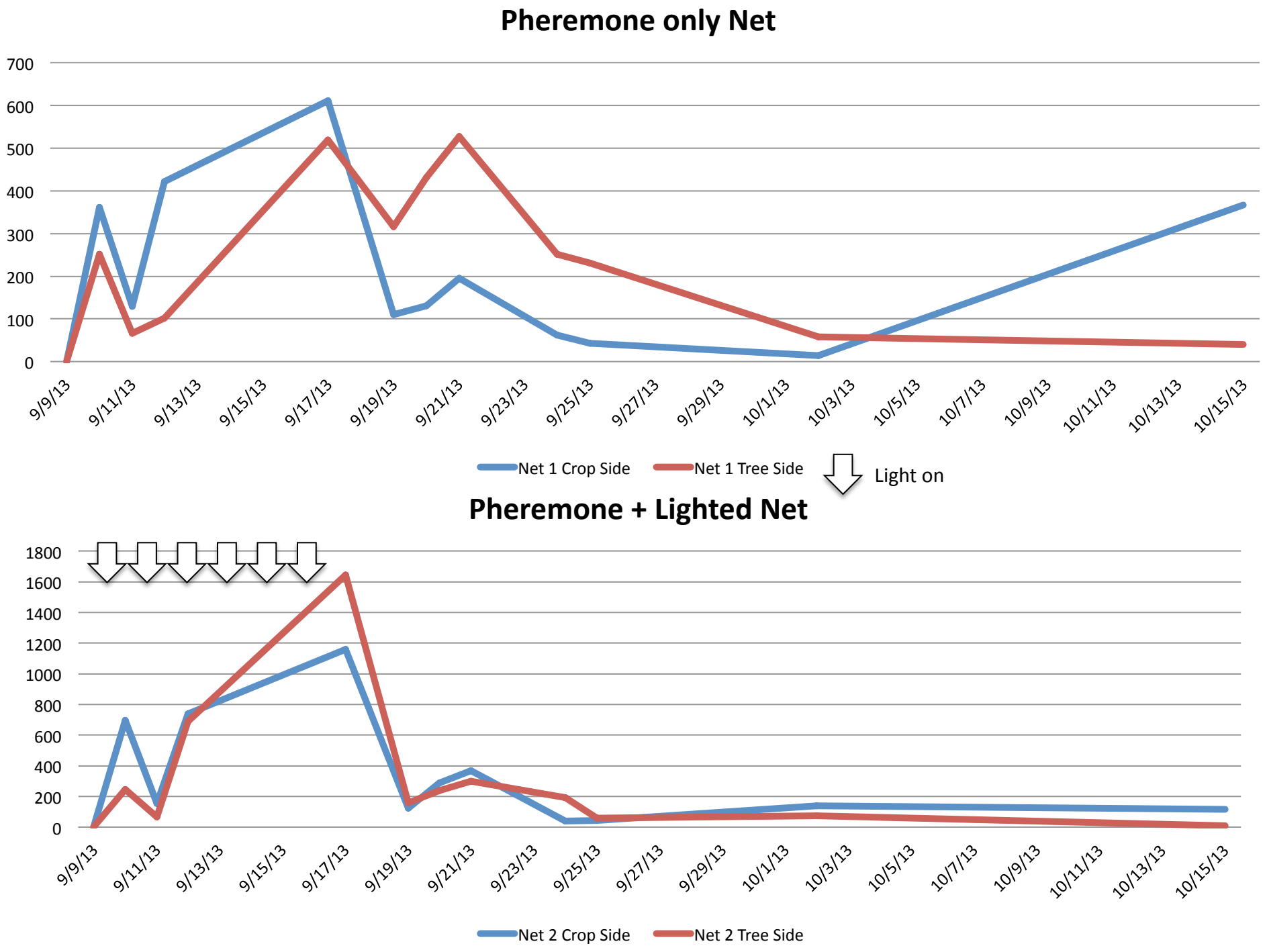
Adult BMSB Capture Locations Along the Base of Netting Of Two Trap Types on morning of 11 September, 2013

#10 + MDT Lure only



#10 + MDT Lure + 500W Halogen Lamp




Pheremone only Net
700
600
500
400
300
200
100
0
9/9/13
9/11/13
9/13/13
9/15/13
9/17/13
9/19/13
9/21/13
9/23/13
9/25/13
9/27/13
9/29/13
10/1/13
10/3/13
10/5/13
10/7/13
10/9/13
10/11/13
10/13/13
10/15/13
Net 1 Crop Side
Net 1 Tree Side
Light on
Pheremone + Lighted Net
1800
1600
1400
1200
1000
800
600
400
200
0
9/9/13
9/11/13
9/13/13
9/15/13
9/17/13
9/19/13
9/21/13
9/23/13
9/25/13
9/27/13
9/29/13
10/1/13
10/3/13
10/5/13
10/7/13
10/9/13
10/11/13
10/13/13
10/15/13
Net 2 Crop Side
Net 2 Tree Side


BMSB Infested With
Beauveria bassiana strain GHA
(Mycotrol-O @ 16 oz./A)
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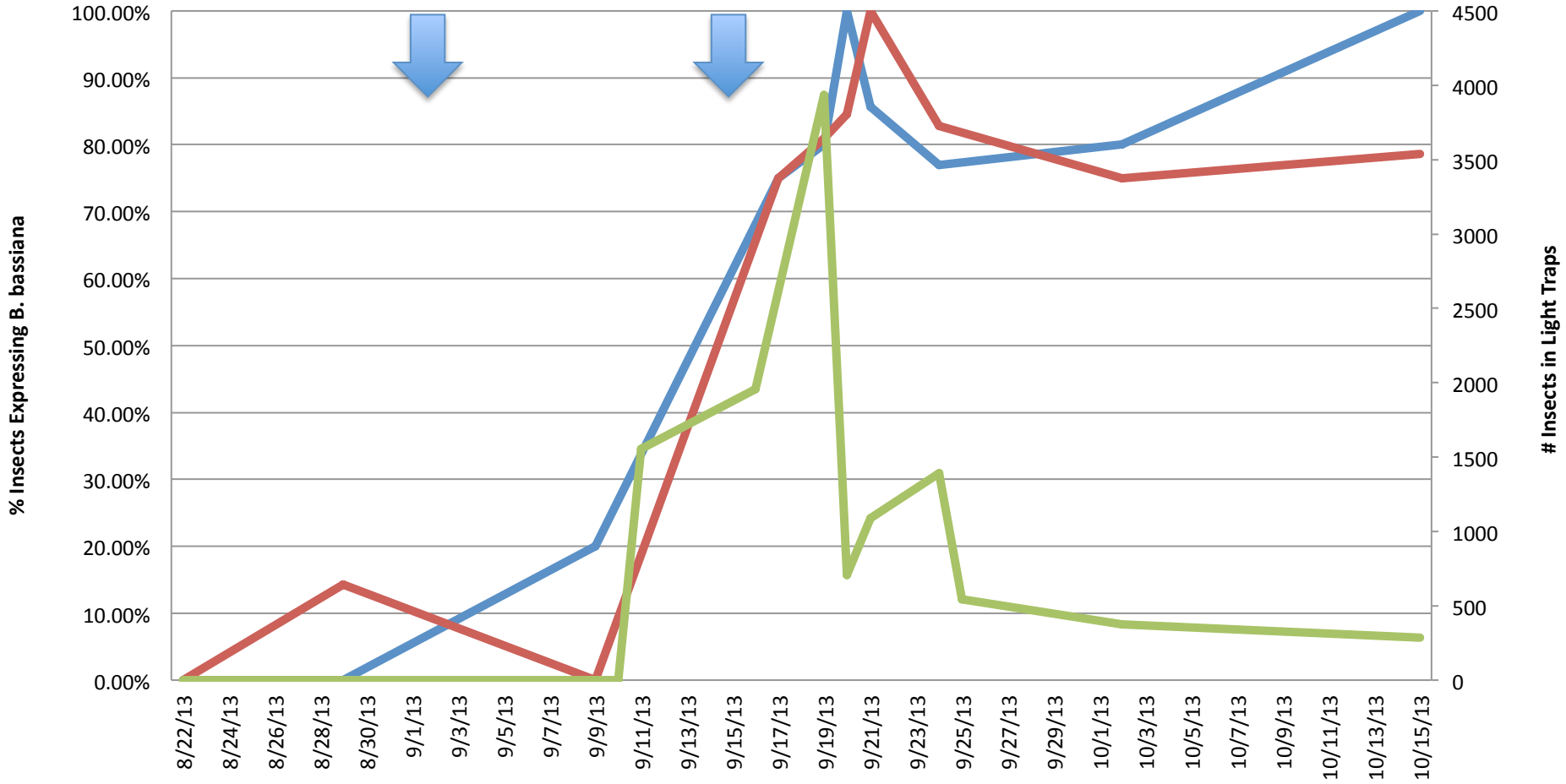
B. bassiana expression over Time



	8/22/13	8/29/13	9/9/13	9/10/13	9/11/13	9/16/13	9/17/13	9/19/13	9/20/13	9/21/13	9/24/13	9/25/13	10/2/13	10/15/13	
Net 1 infection	0.00%	0.00%	20.00%			73.66%		75.00%	80.00%	100.00%	85.71%	76.92%		80.00%	100.00%
Net 2 infection	0.00%	14.29%	0.00%			82.95%		75.00%	80.95%	84.62%	100.00%	82.76%		75.00%	78.57%
Population	0			0	1556	521	1954		3935	708	1090	1392	545	375	287

Beauvaria bassiana strain GHA applications *(Mycotrol-O @ 16 oz./A)*

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Key points to remember

- BMSB is arboreal, forest pest, very mobile to and out of agricultural crops
- Fruit damage takes 2-3 weeks for expression mid-late season.
- Low populations can equate to high feeding injury levels

Strategies for control

1. Early trapping **with Tedders trap + #10 and MDT combo lure**
2. **Scouting** pome and stone fruit **at first trap capture**
3. Border applications at first observation along border
4. Maintain border applications if BMSB presence continues
5. Alternate row applications at 4-7 days as BMSB enter orchard

Insecticide efficacy is critical

- Use materials **with greatest efficacy & longest residual**
- Maintain 'fresh' residue every 4-5 days when needed employing alternate row middle (ARM) applications.

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Thanks to the staff at the HVL for all their support:

Technical Assistant.....	Allen Clayton
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Summer Research Intern (CCE BMSB).....	Susan Weibman
PT Summer Intern	Brianna Flonc

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