2009 NW Orchard
& Vineyard Show

New tactics for control of grape berry moth

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Grape berry moth

VineBALANCE
Sustainable Viticulture in the NORTHEAST

Metamorphosis of grape berry moth management

- Early 1900's
  - Reliance on cultural and biological tactics, arsenical insecticides
- Mid 1900's
  - Broad-spectrum neurotoxins: DDT, parathion, methyl parathion, etc

VineBALANCE
Sustainable Viticulture in the NORTHEAST

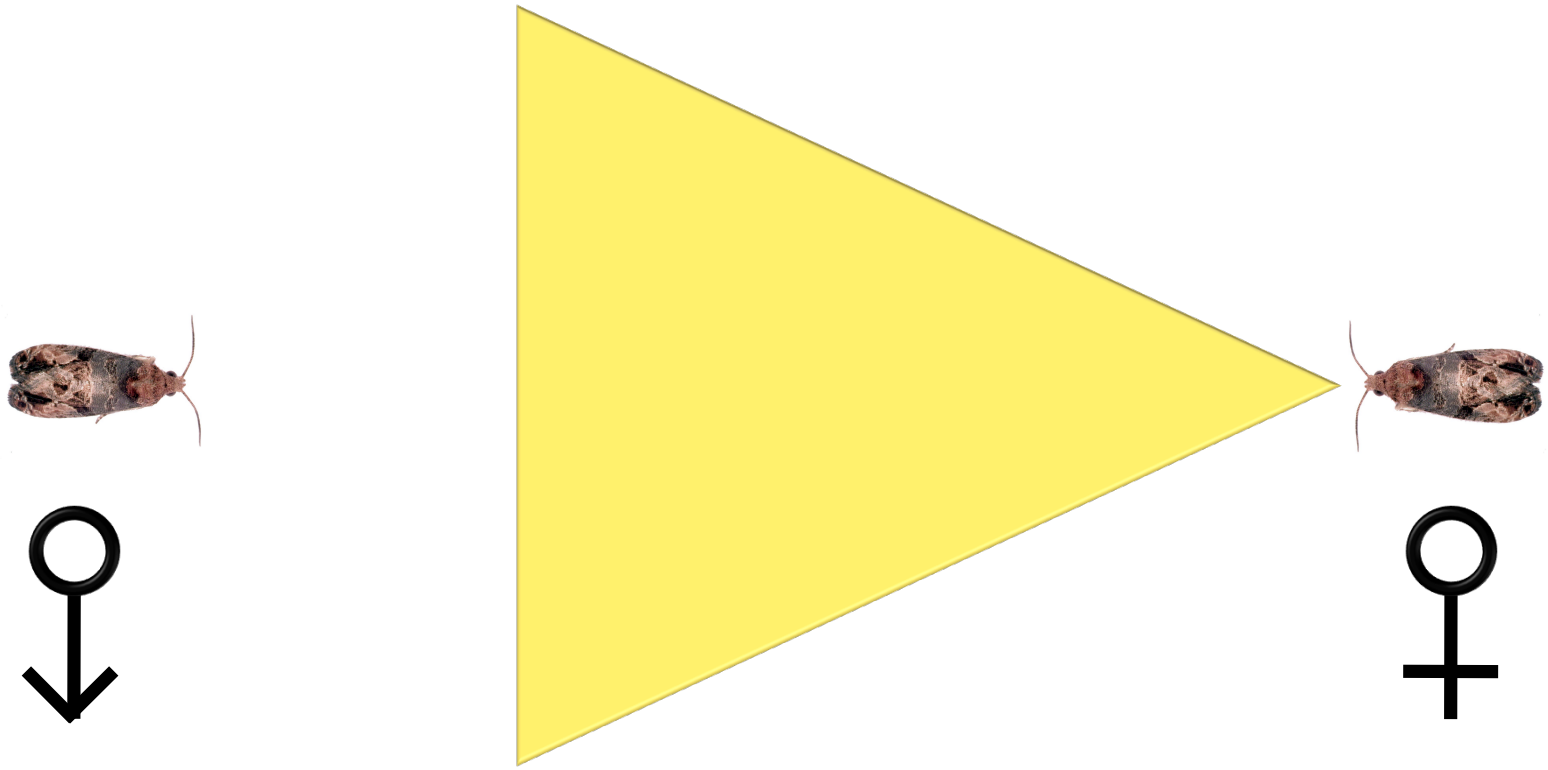
Metamorphosis of grape berry moth management

- Late 1900's
  - Identification of sex pheromone and first mating disruption products
  - Cornell's Risk Assessment Protocol developed and implemented
  - Food Quality Protection Act, insecticide restrictions
- Early 2000's
  - Further restrictions on broad-spectrum pesticides
  - More selective insecticides available to growers
  - Increasing interest in sustainable viticulture

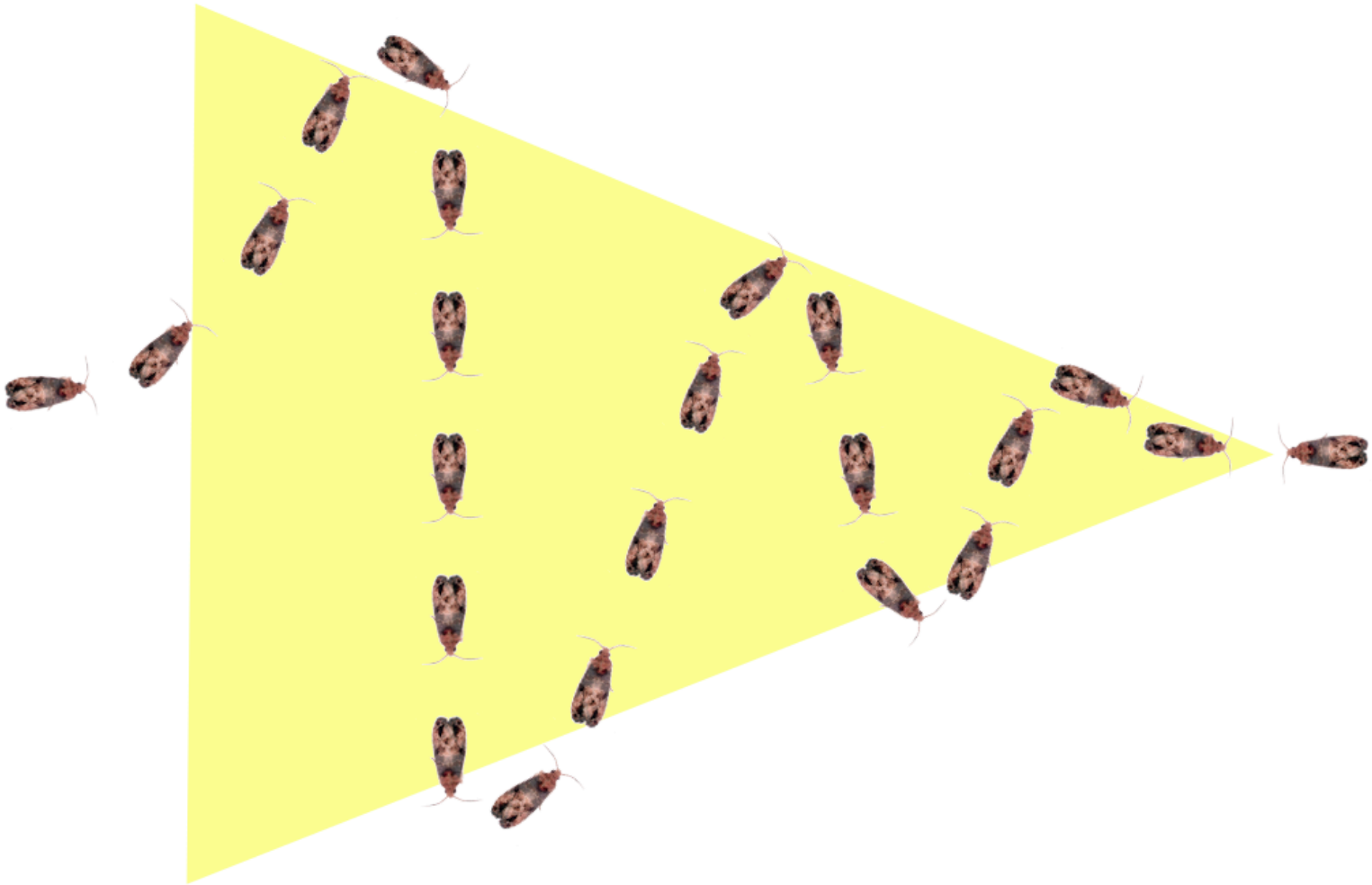
Mating disruption

- Pest management technique that uses synthetic sex pheromones to disrupt the reproductive cycle of insects.

Mating disruption principle

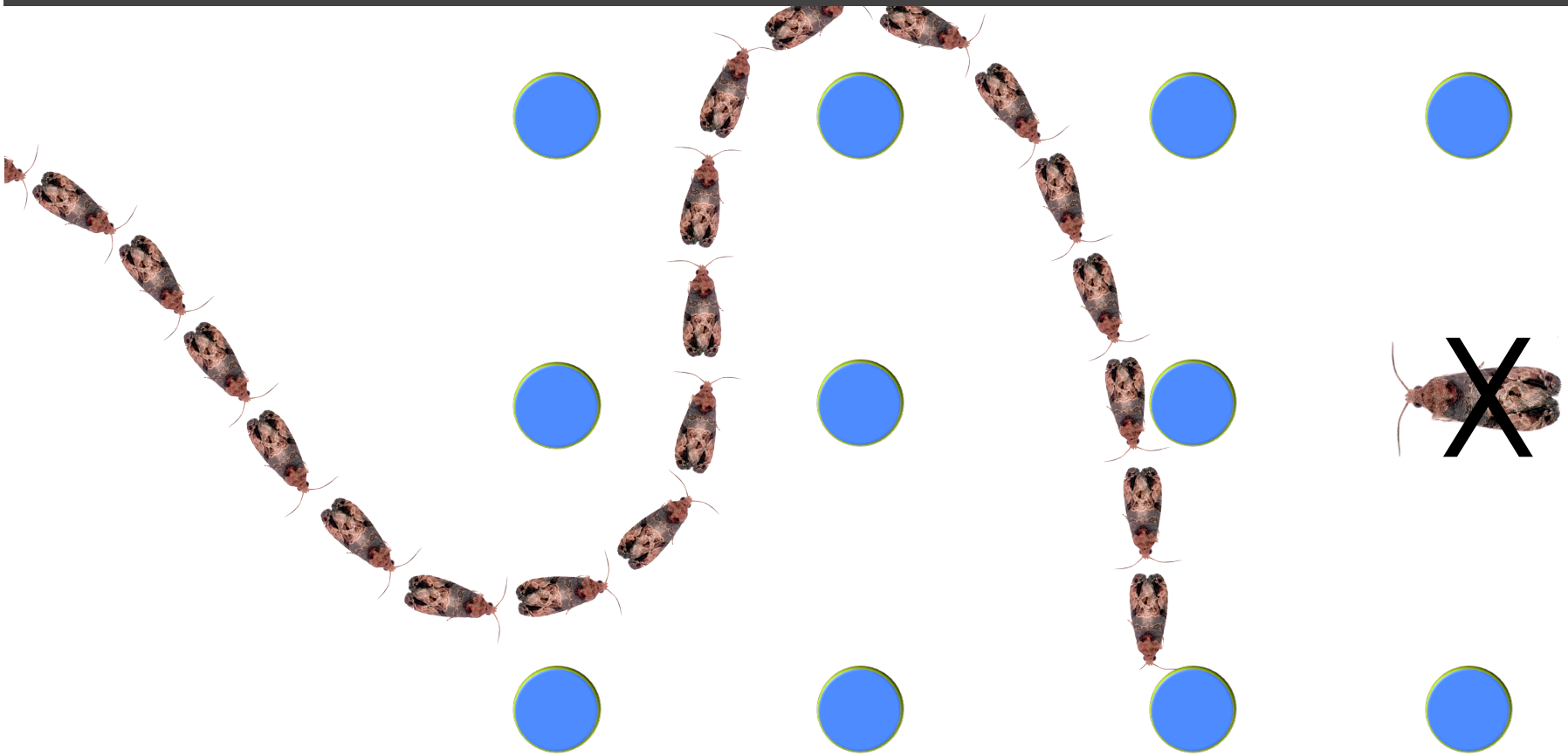


Mating disruption principle



Mating disruption principle

Mating disruption principle



Grape berry moth mating disruption

- Studies in NY and Ontario demonstrated efficacy of twist ties for mating disruption
- But, low adoption of twist ties for GBM control
  - Most effective with moderate to low pest pressure
  - Needed season-long release
  - Labor to apply
  - **Cost/efficacy relative to insecticides**

Grape berry moth mating disruption

- Wax matrix (SPLAT-GBM™) is a flexible formulation for application in vineyards
- Provided season-long control of *Oriental fruit moth*
- Additional work on Codling moth, other leps

SPLAT-GBM™

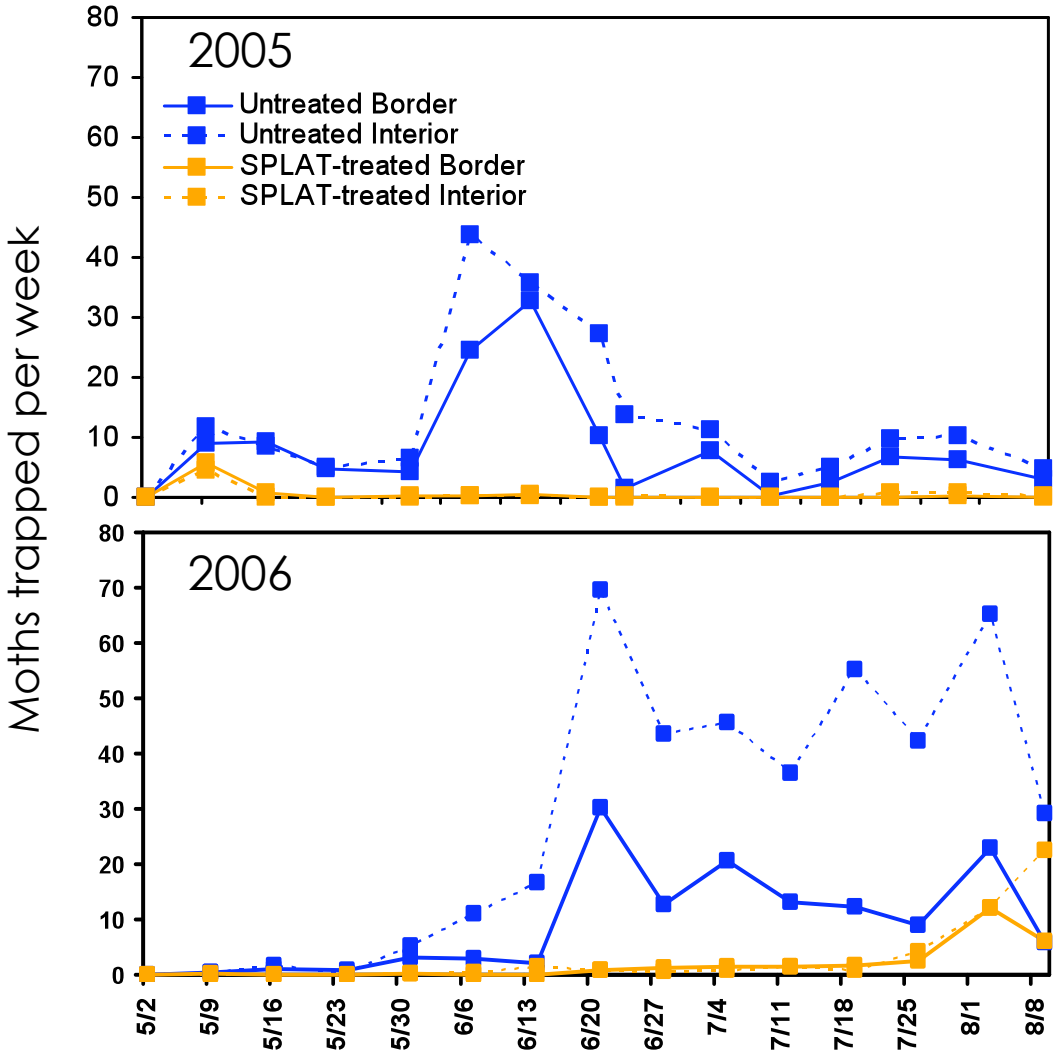
- SPLAT = Specialized Pheromone & Lure Application Technology
- Application is versatile (hand, mechanical)
- Can be 'charged' with one or more pheromones

ISCA TECHNOLOGIES
Pest Management Tools & Solutions

2005-06 Large-plot mating disruption study

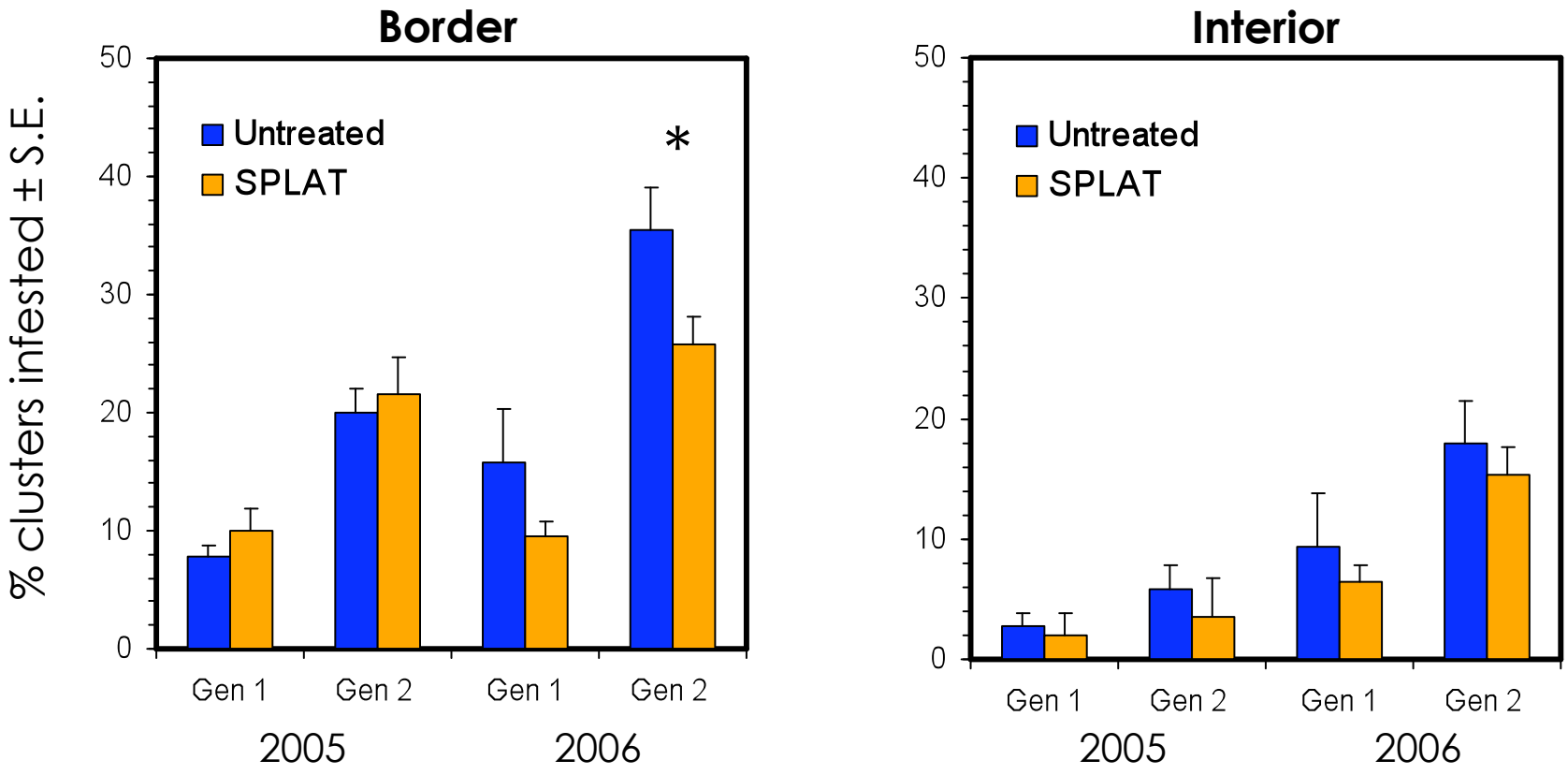
- 1 ml SPLAT-GBM™ per post (3% pheromone)
- Male GBM monitored weekly in traps baited with lures
- Sampled GBM infestation for 1st and 2nd generations

Male moth captures Large-plot mating disruption study



- Captures in SPLAT-treated plots significantly lower than untreated plots.
- High disruption for 10-12 weeks.

Percent cluster infestation Large-plot mating disruption study

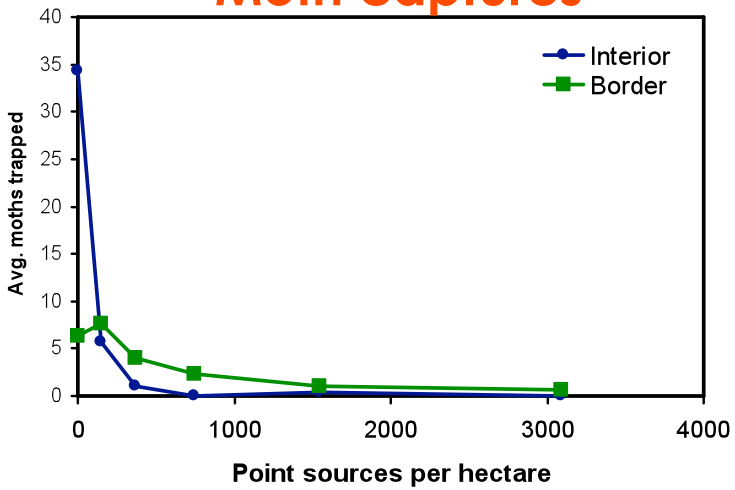


Effect of droplet density on male moth captures

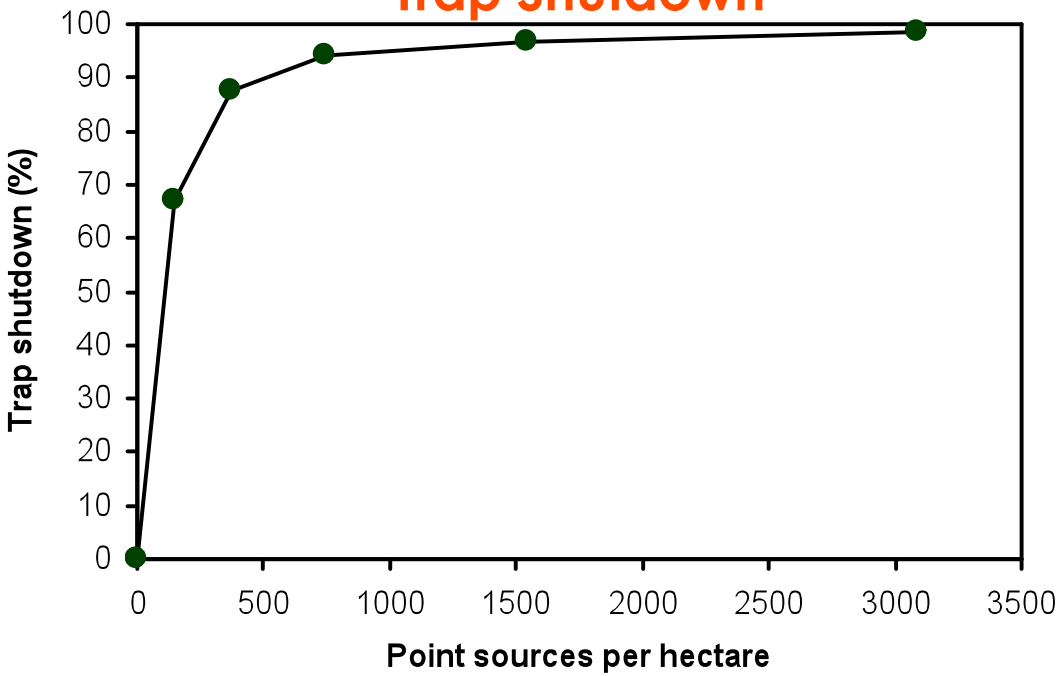
- Small plot experiment in 2006
- 0.2 ml drops at densities of 40, 160, 320, 640, or 1280 drops/acre
- Lure-baited trap in each plot, checked weekly May-August

Effect of droplet density on male moth captures

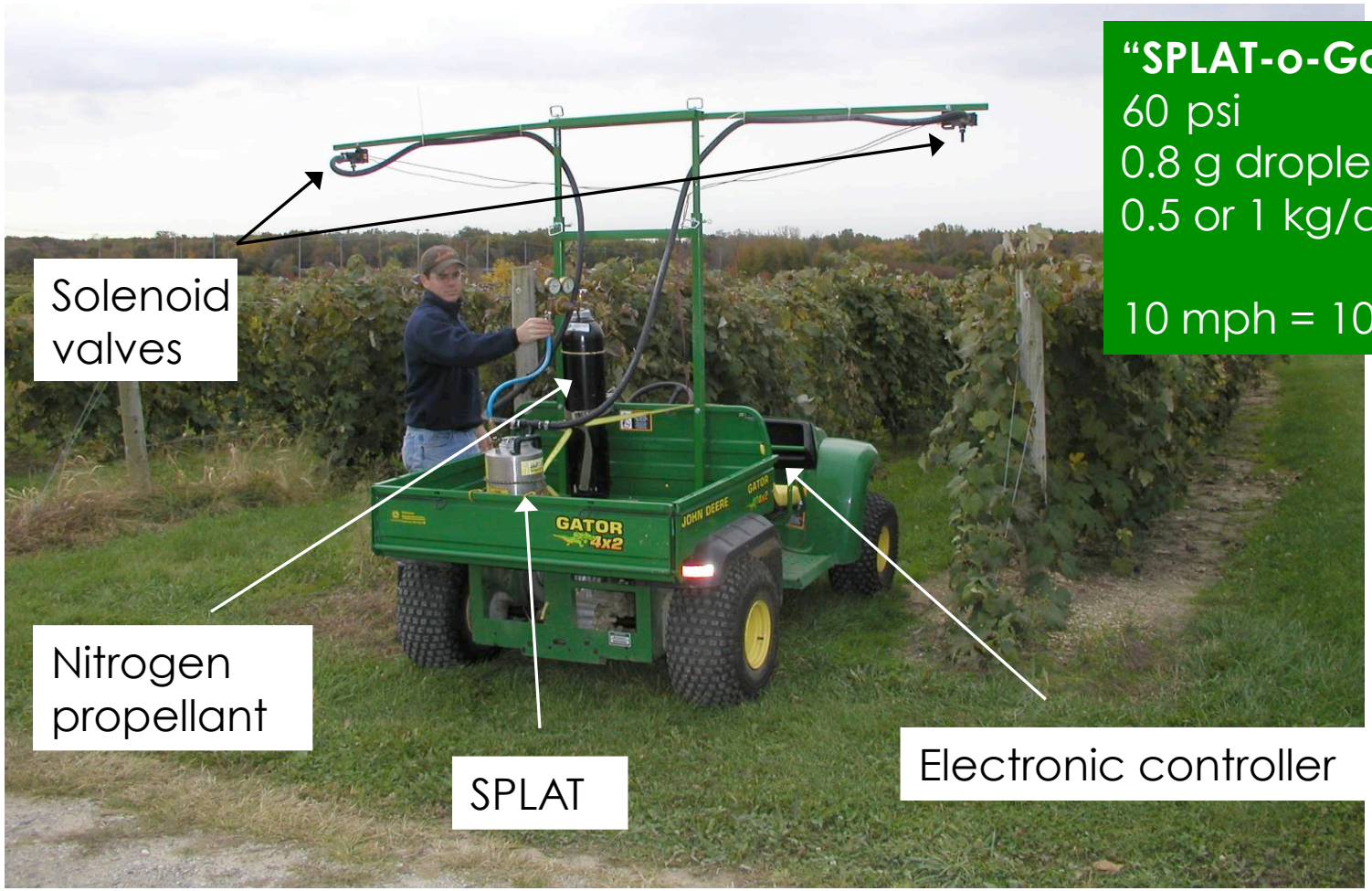
Moth captures



Trap Shutdown



Mechanical application of SPLAT-GBM™



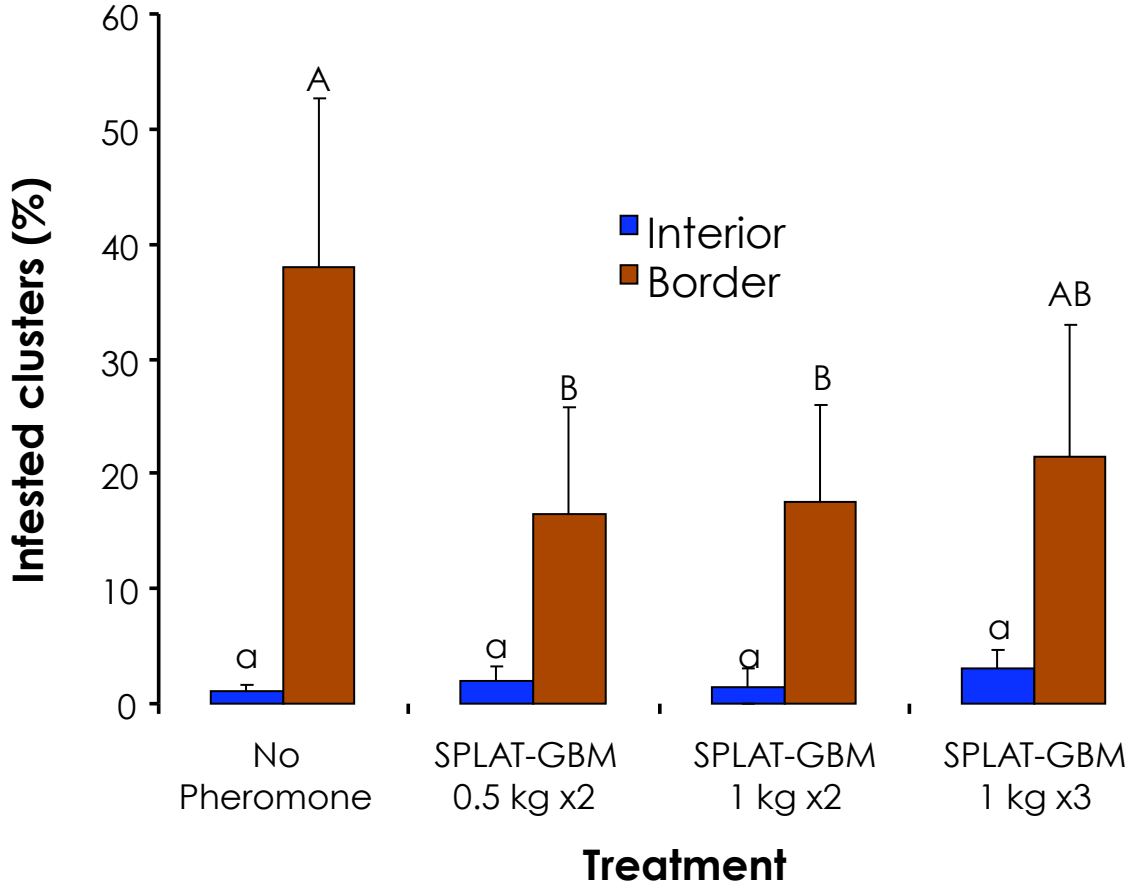
"SPLAT-o-Gator"
60 psi
0.8 g droplets
0.5 or 1 kg/acre

10 mph = 10 ac/h

2008 Comparison of application rates

- Replicated 1-7 acre vineyards
- 4 Treatments
  - Insecticides only (no mating disruption)
  - Insecticides + SPLAT 0.5 Kg/ac (X 2)
  - Insecticides + SPLAT 1.0 Kg/ac (X 2)
  - Insecticides + SPLAT 1.0 Kg/ac (X 3)

2008 Comparison of application rates



- Lower infestation at vineyard borders
- No effect of application rate

Mating disruption summary

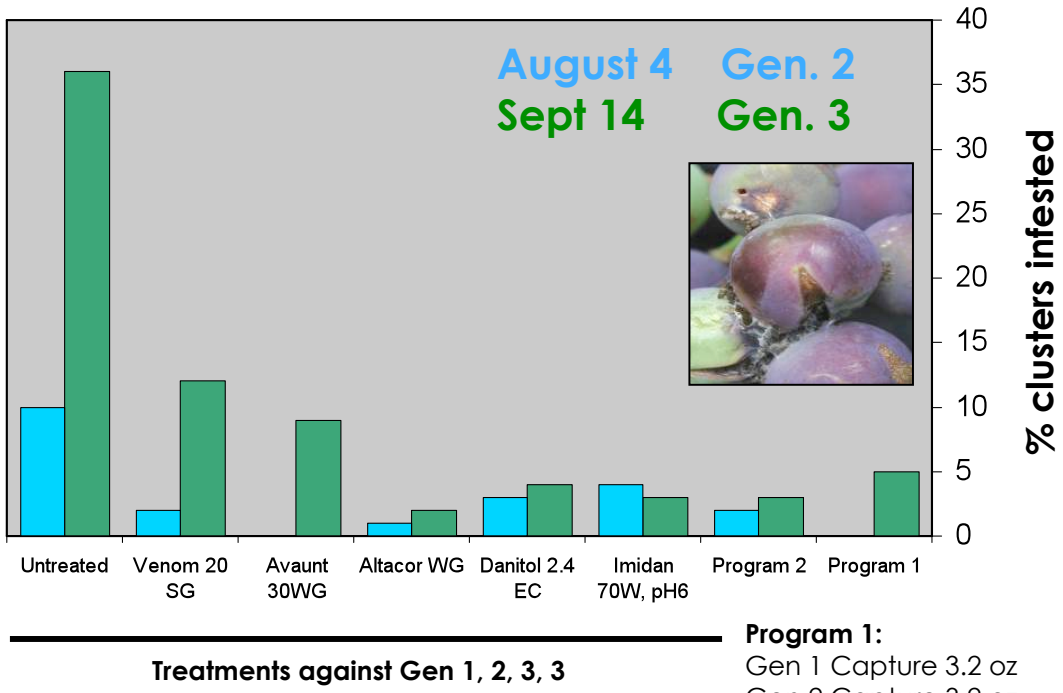
- Wax matrix formulation provides a flexible method for pheromone application to vineyards
- 0.5 or 1.0 Kg/ac rates reduced GBM infestation at vineyard borders
- Low labor and applicator costs provide economical method for vineyard treatment
- Working to improve droplet integrity and applicator design

Potential for new reduced-risk insecticides

- Intrepid - methoxyfenozide
- Confirm - tebufenozide

- Altacor – rynaxypyr
- Delegate – spinetoram
- Avaunt – indoxacarb

- Assail – acetamiprid
- Clutch - clothianidin
- Venom - dinotefuran



Program 1:
Gen 1 Capture 3.2 oz
Gen 2 Capture 3.2 oz
Gen 3 Danitol

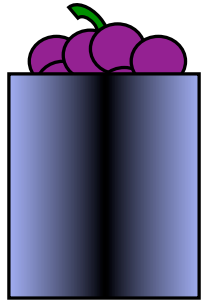
Program 2:
Gen 1 Danitol
Gen 2 Capture 6.4oz
Gen 3 Sevin, Sevin

Caged moth experiment

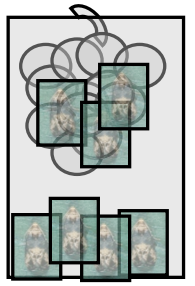
1. Dip clusters in treatment solutions for one minute

Treatment	Rate/ac	Class
Water		
Intrepid 2F	8.0 oz	IGR
Guthion 50 WP	1.5 lb	OP
Sevin 80S	2.5 lb	Carbamate
Danitol 2.4 EC	10.6 oz	Pyrethroid

1.



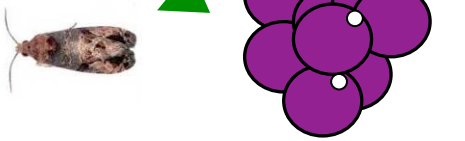
2.



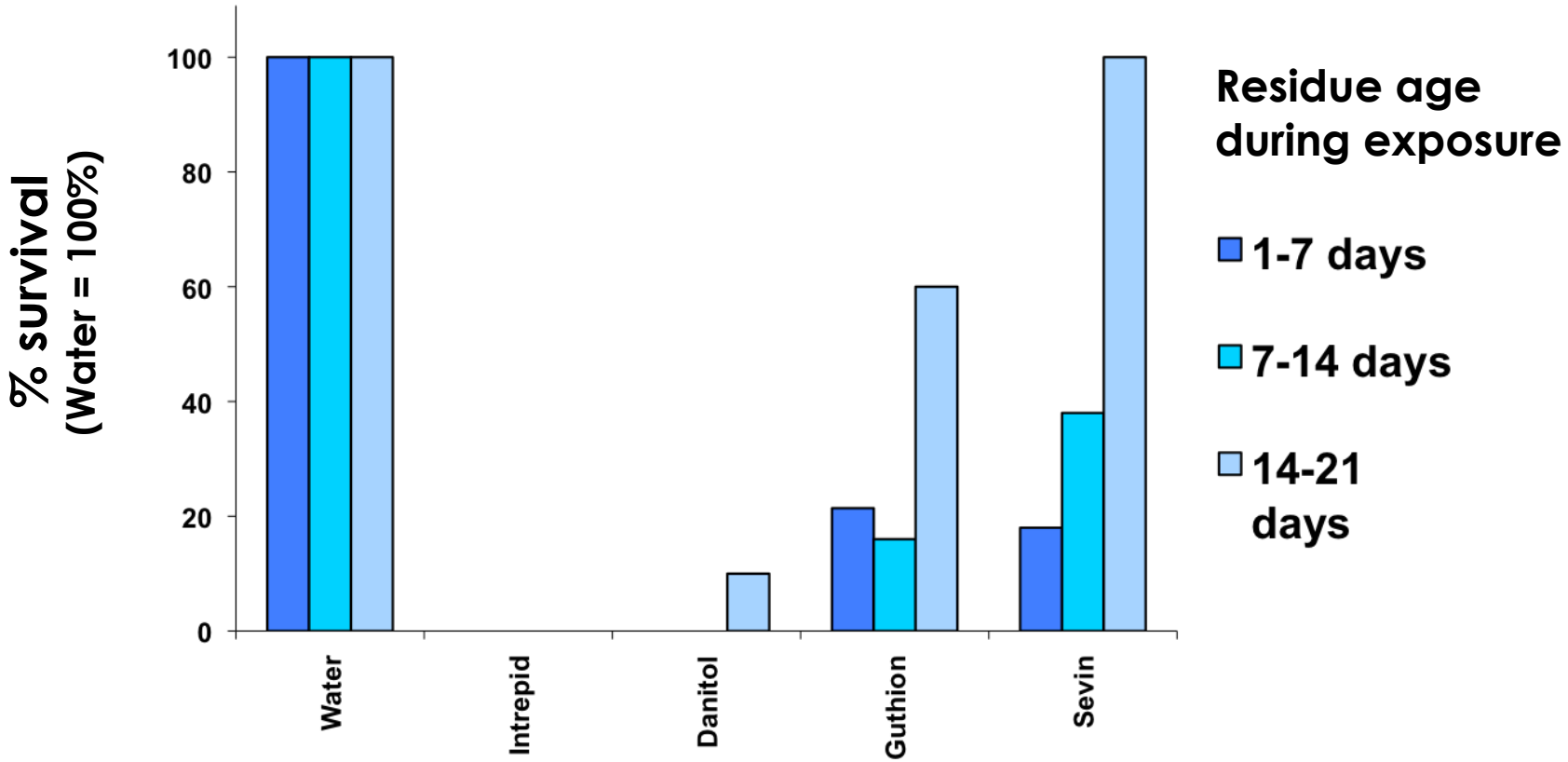
2. 20 adult moths caged onto clusters on DAY 1, 7, or 14

3. Clusters recovered 7 DAT to quantify adult survival, egglaying and survival to pupa/adult

3.



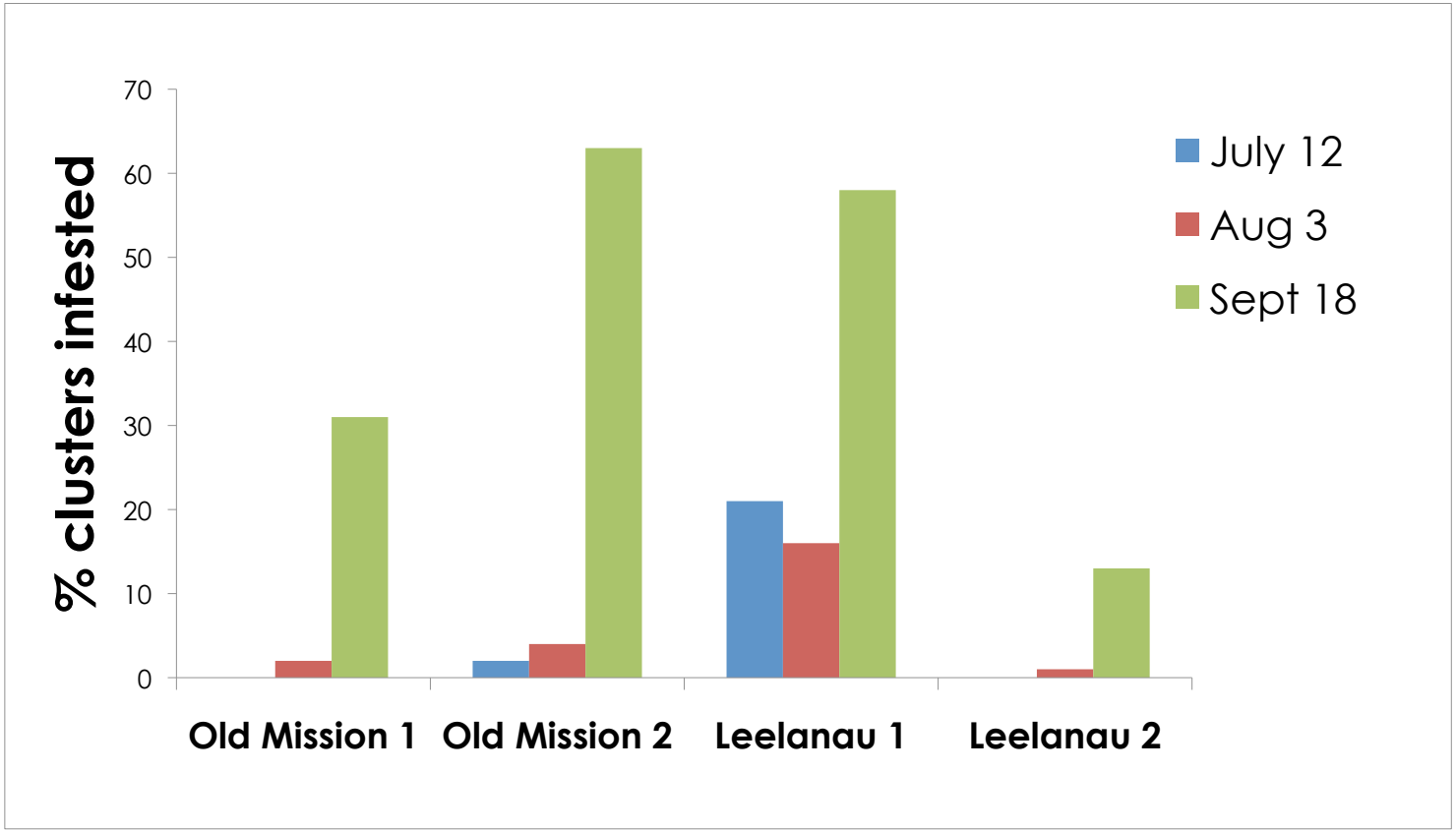
Residue age vs. GBM survival from egg to adult



GBM in NW Michigan

- Pest pressure?
- Trapping for GBM not the best indicator
  - MSU and Cornell are currently working on this
- Scouting is preferred method

GBM in NW Michigan, 2008

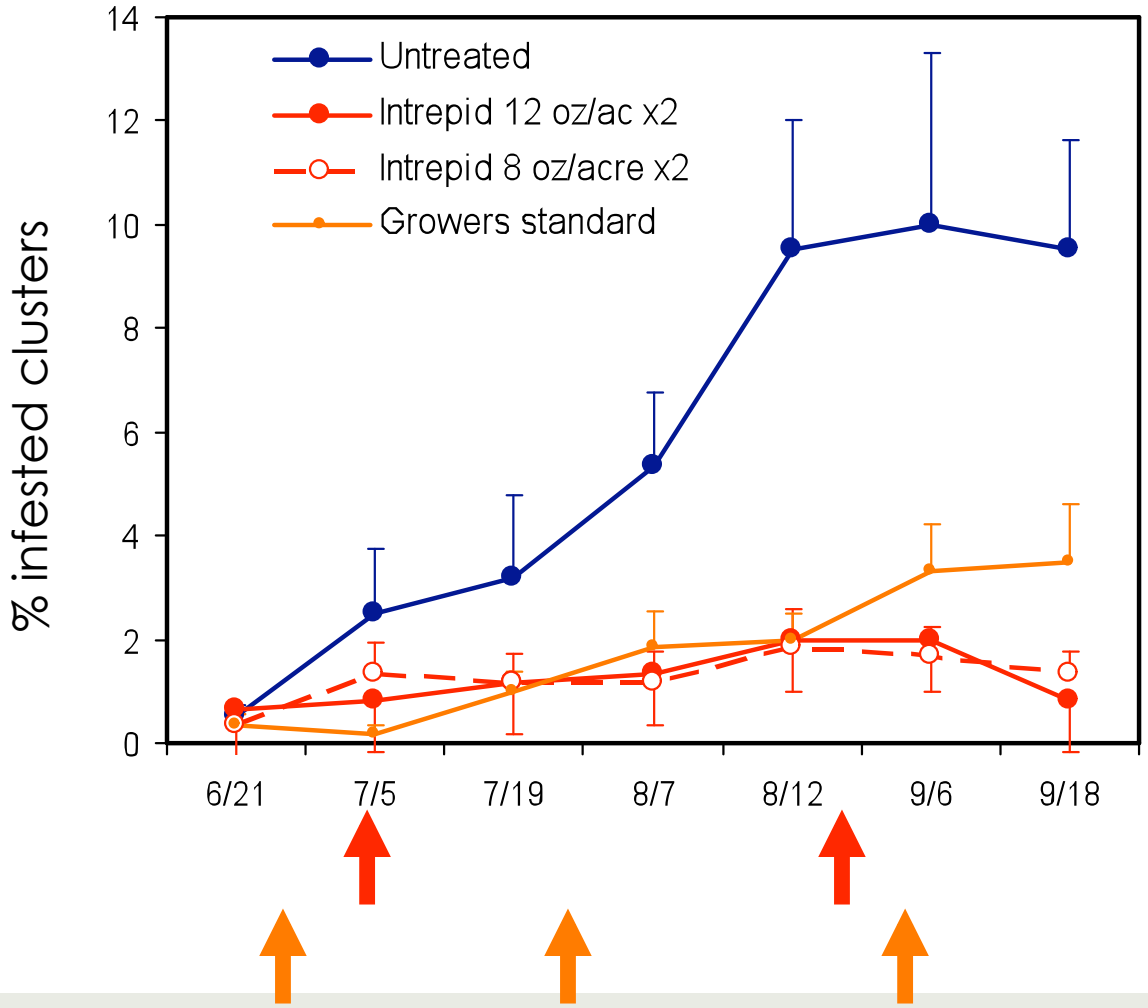


Improved GBM control through phenology-based application of selective insectices

Comparison of new insecticides and timings

Phenology-based sprays
Intrepid at 8 or 12 oz/ac

Risk Assessment Protocol
Sevin – Late June
Imidan – Mid-July
Baythroid – Late August



Summary

- Wax pheromone formulation shows promise for non-chemical control of GBM
- Mechanical applicator allows rapid treatment with pheromone wax
- Selective insecticides and other new products have great potential for GBM control with minimal side effects
- Integrating these tools into IPM programs will benefit workers, the environment, and beneficial insects

Acknowledgements

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