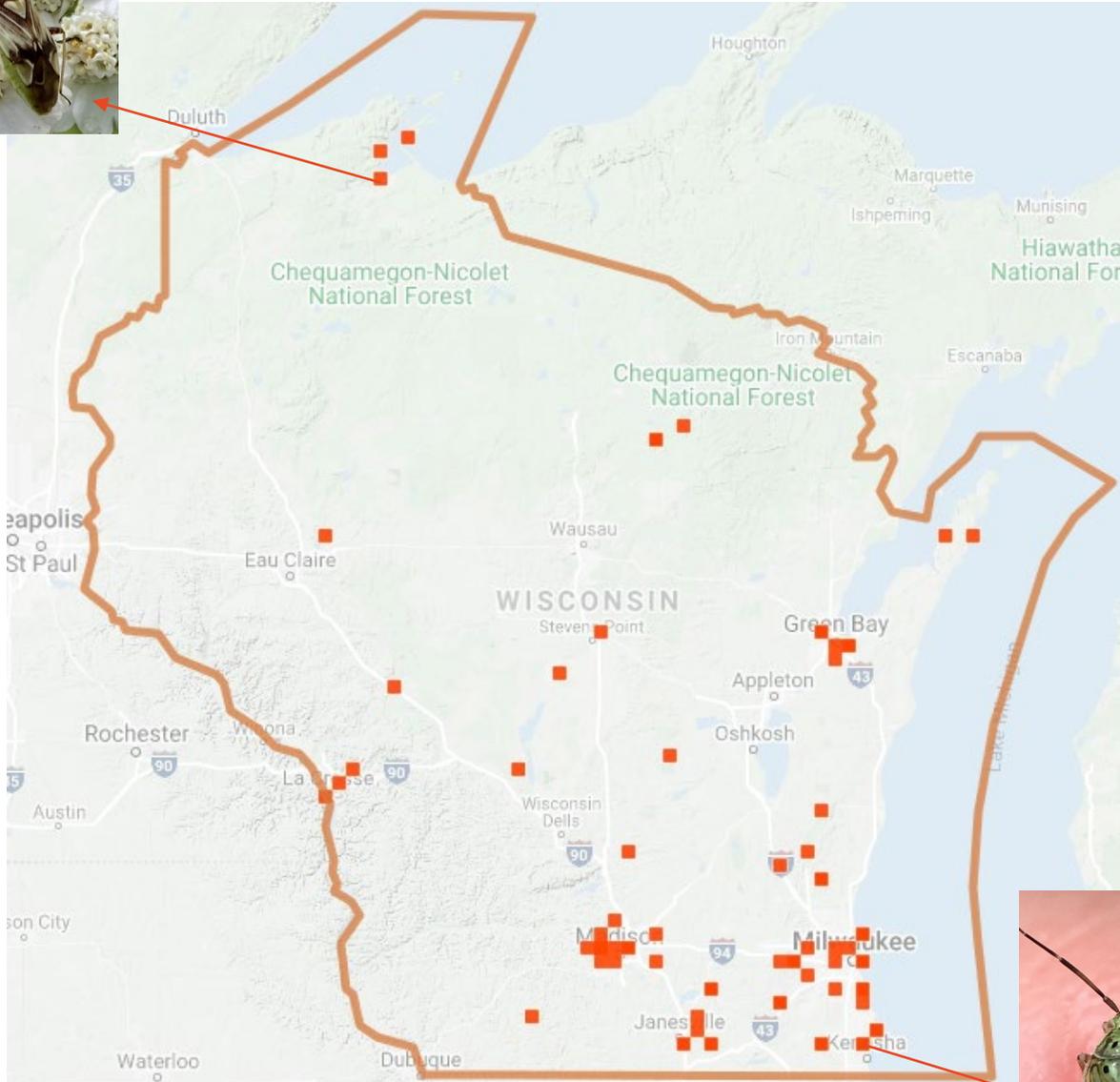




Alfalfa Trap Cropping to Manage Tarnished Plant Bug in WI Strawberry

Matt Hetherington and
Christelle Guédot



Lygus Bugs

Widely-distributed genus
of ~40 species

Present throughout WI

Lygus lineolaris most
prevalent

Polyphagous Pests

Lygus lineolaris feeds on
385 hosts¹

Introduce pathogens

Reduce fruit size and quality

Cause aesthetic damage



1) Young, O. P. (1986). *Annals of the Entomological Society of America*, 79(4), 747-762.

***Lygus* in Strawberry - Damage**

Fruit malformation ('catfacing')
Apical seediness
Often damage entire cluster



Lygus Damage



Frost Damage

***Lygus* in Strawberry - Seasonality**

Season-long pest in strawberry

Adults overwinter in protected areas

Emerge when temperatures consistently exceed 49°F

Populations grow on spring weeds, before moving to strawberry

Monitoring and Managing *Lygus*



Sweep sampling (pre-bloom) –
Threshold: 4 adults/20 sweeps

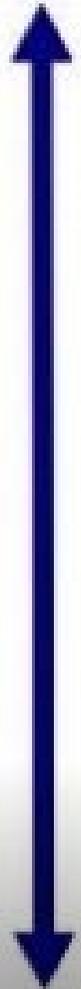
Tapping flowers – Threshold: 1
insect/1-4 clusters

Visual monitoring for injury

White sticky cards

Intervention

Toxicity



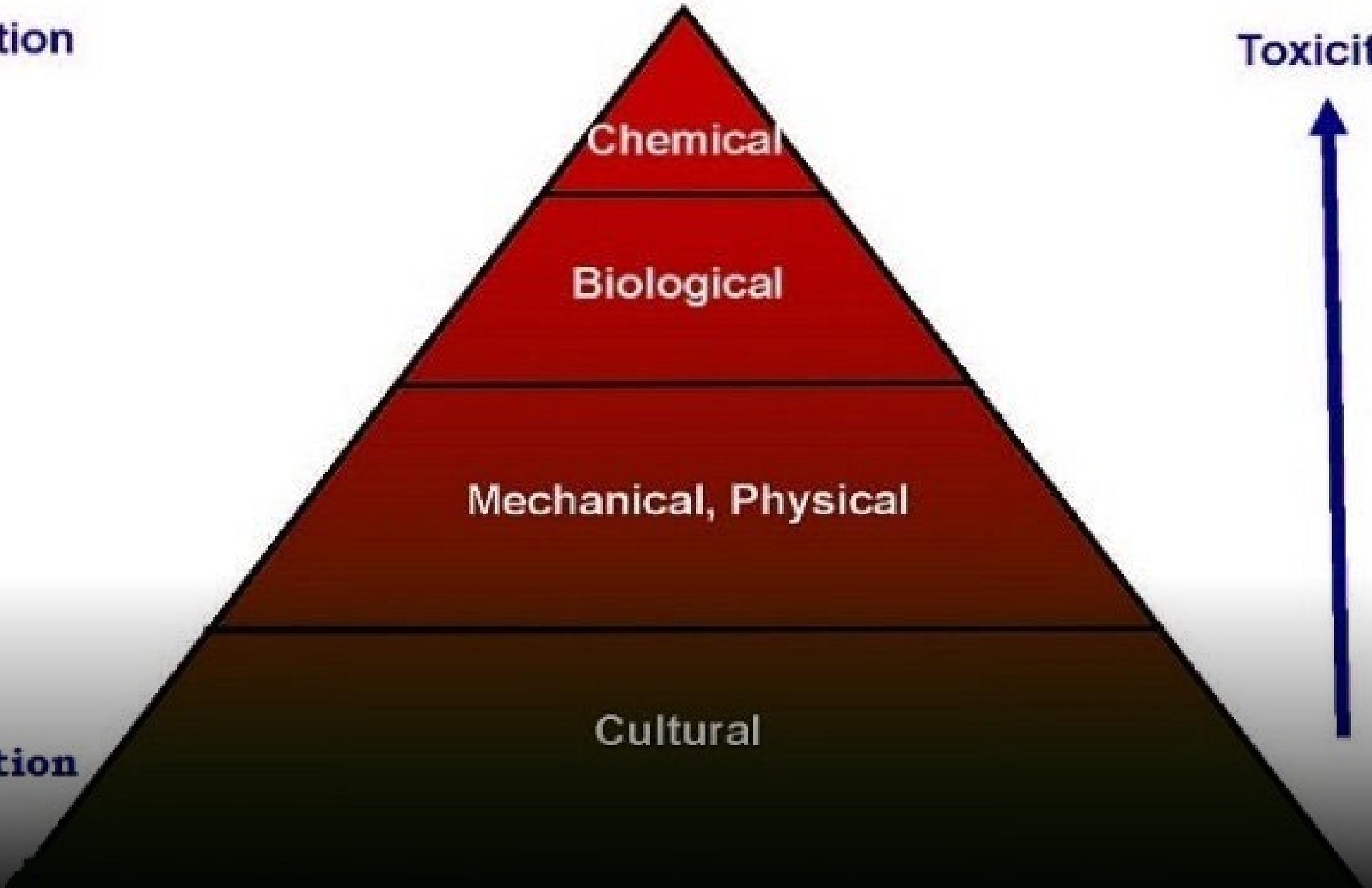
Chemical

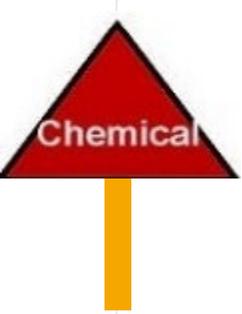
Biological

Mechanical, Physical

Cultural

Prevention





Chemical Control

Class	Brand Name
Sulfoximine	Closer
	Transform
Pyrethroid	Danitol
	Brigade
Carbamate	Sevin
Insect Growth Regulator	Cormoran
Choratonal Organ Disruptor	Beleaf

Biological Control

Peristenus digoneutus – Spreading west

Anaphes iole

Generalist natural enemies



Cultural Control

Control broadleaf weeds early

Avoid mowing weeds during bud swell, bloom, or early fruit set

Alfalfa trap cropping?





Trap Cropping

Trap crops are plant stands that are deployed to attract, divert, intercept, and/or retain targeted insects or the pathogens they vector in order to reduce damage to the main crop¹.

1) Shelton, A. M., & Badenes-Perez, F. R. (2006). *Annual Review of Entomology*, 51, 285-308.



Trap Cropping

Trap cropping strawberries with alfalfa has shown promise for managing *Lygus* species in California¹ and Europe²

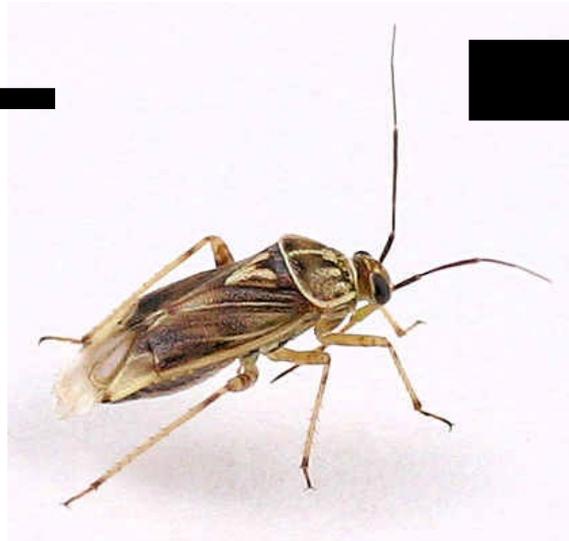
Has not been tested for *Lygus lineolaris*

1) Swezey, S. L., Nieto, D. J., & Bryer, J. A. (2014). *Environmental entomology*, 36(6), 1457-1465.

2) Accinelli, G., Lanzoni, A., Ramilli, F., Dradi, D., & Burgio, G. (2005). *Bulletin of Insectology*, 58(1), 9-14.

Hypothesis

Lygus lineolaris exhibits a preference for alfalfa and this preference can be exploited to improve *Lygus* management in Wisconsin



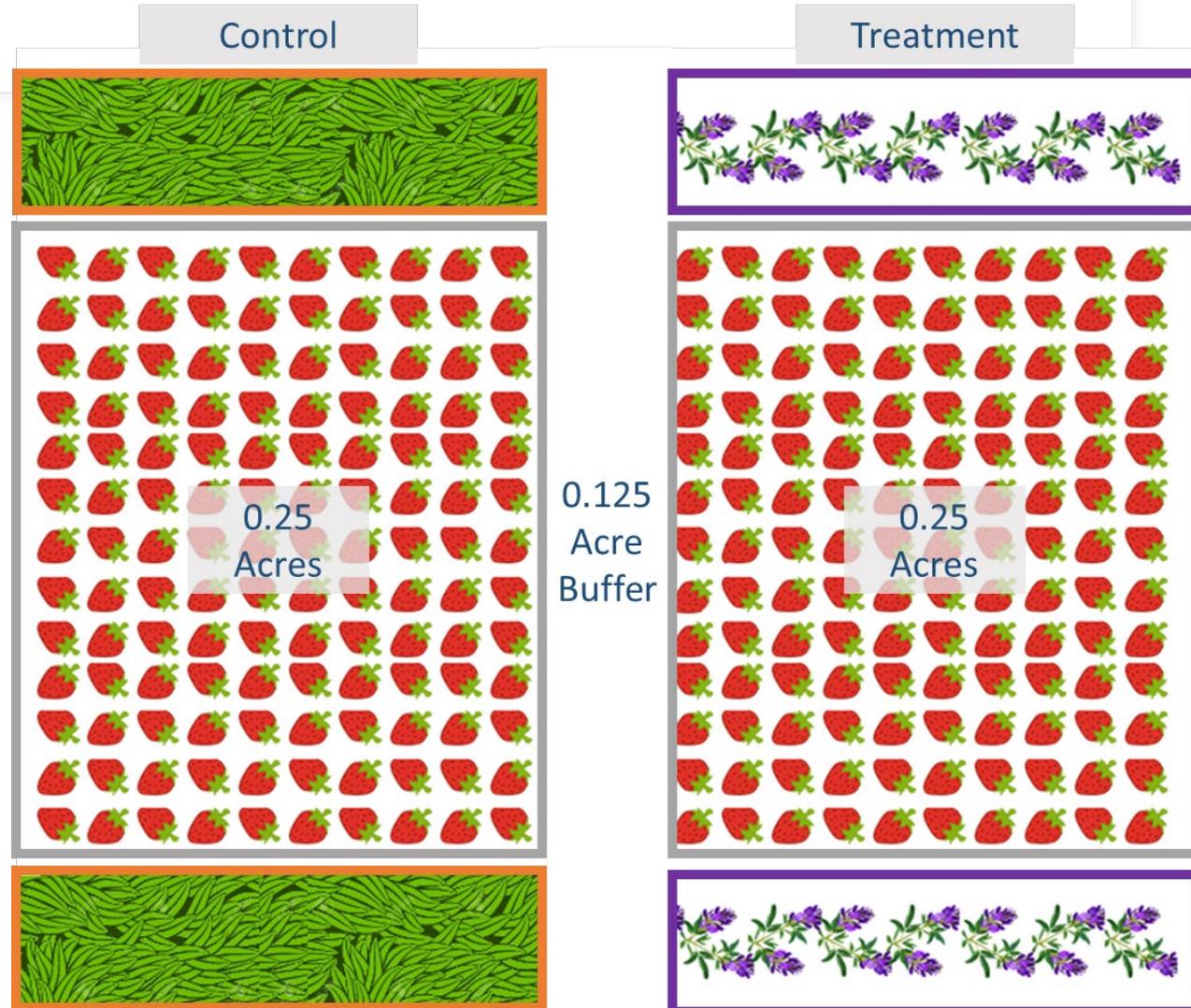
Plot Layout

0.25-acre paired strawberry plots

Separated by 0.125-acre buffers

Treatment = 0.5m strip of alfalfa

3 Farms in Southern WI



Plot Establishment

Transplanted mature alfalfa plants every 0.3m

Seeded strip interior



Sampling

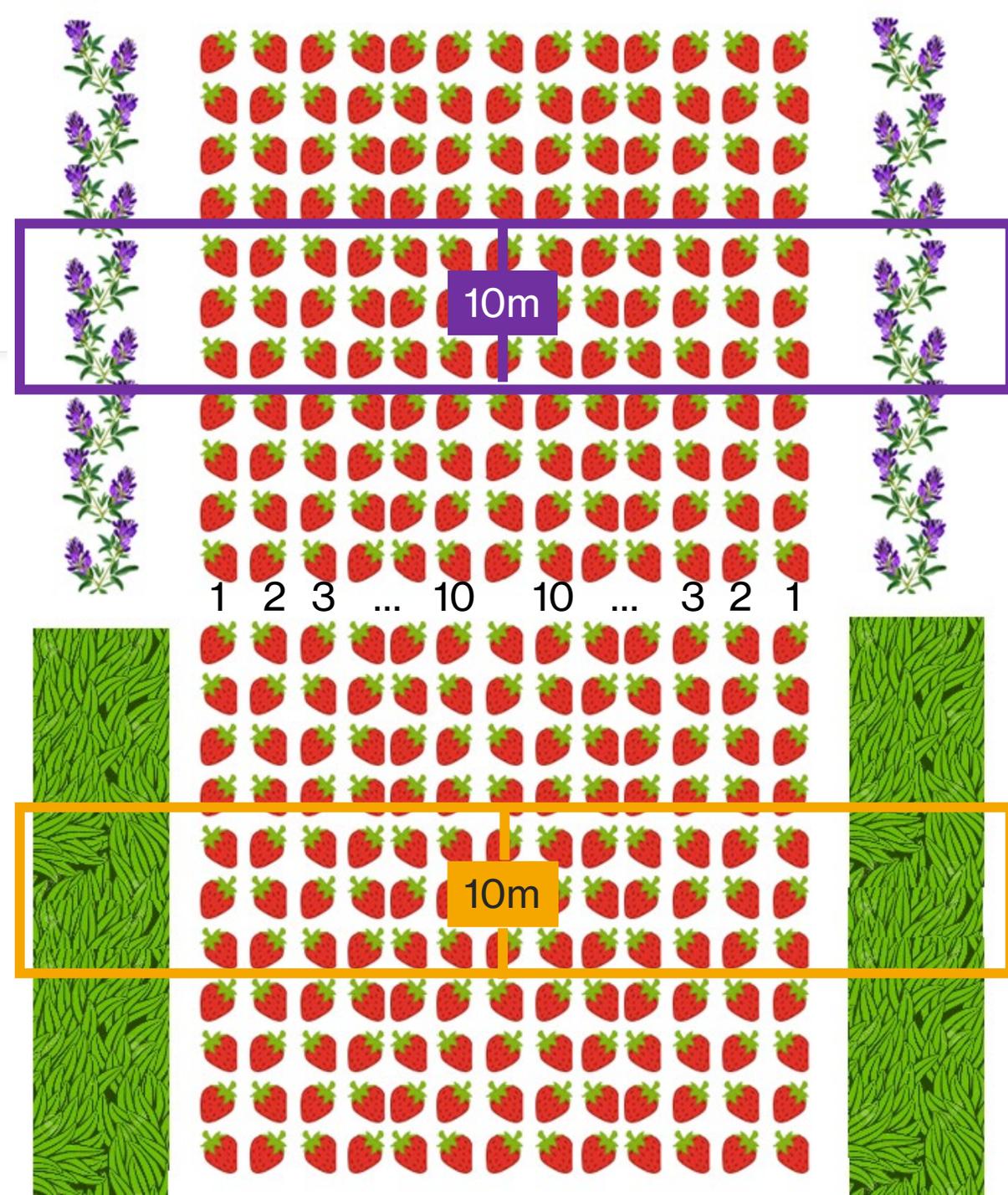
Weekly sampling (May-July)

20 sweeps from the centermost 10m of each row

- Perimeter Row
- Strawberry 1, 2, 3, and 10

Clear sticky cards and Pitfall traps

- Perimeter
- Rows 2 and 10



Results

Lygus Abundance in Trap Cropped Strawberry

Treatment overall: $p=0.000881$

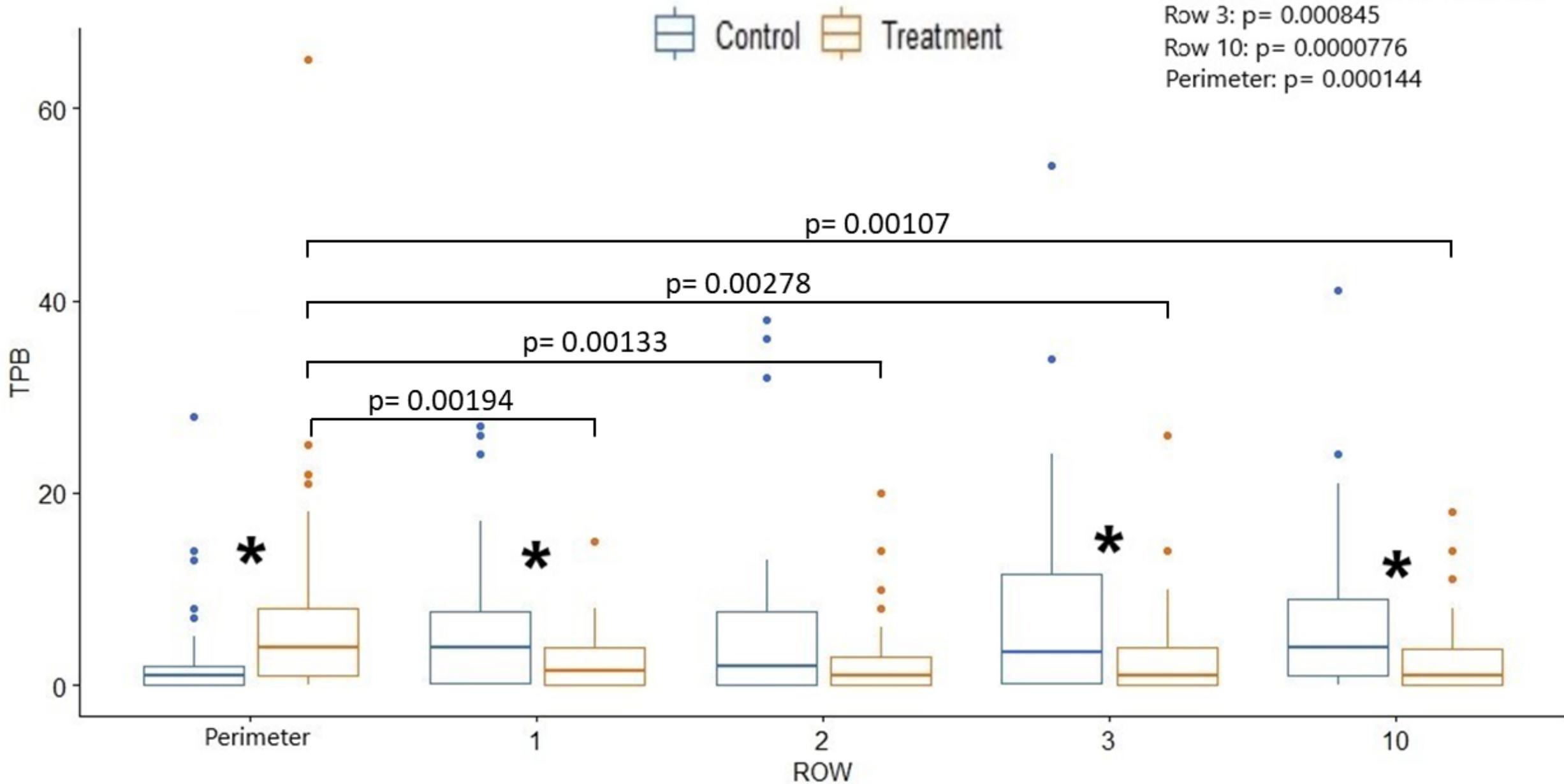
Row 1: $p=0.00871$

Row 2: $p=0.0233$ (Not Significant)

Row 3: $p=0.000845$

Row 10: $p=0.0000776$

Perimeter: $p=0.000144$



Conclusions

Incorporating modest perimeter plantings of alfalfa led to a 60% reduction in *Lygus* population, **without supplemental management**

Reduced average *Lygus* population from 7 to 2 adults/20 sweeps, from above the economic threshold (4 adults/20 sweeps) to below.



Moving Forward

Data are encouraging but need to be confirmed.

Process/analyze data on fruit injury and non-target effects.

Optimize recommendations

Implementing Alfalfa Trap Cropping

Recommendations based on work conducted in CA:

Size and Positioning:

1-1.5m-wide strips of alfalfa (40-60in)

0.5-1m away from your strawberries (reduce emigration)

***Lygus* Management/Harvest:**

Cut half of the strip (alternating) every 14-17 days¹ from bloom-harvest to reduce *Lygus* population

1) Godfrey, L. D., & Leigh, T. F. (1994). *Environmental Entomology*, 23(5), 1106-1118.

Acknowledgements

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