Alfalfa Trap Cropping to Manage Tarnished Plant Bug in WI Strawberry

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Lygus Bugs

Widely-distributed genus of ~40 species

Present throughout WI

*Lygus lineolaris* most prevalent
Polyphagous Pests

*Lygus lineolaris* feeds on 385 hosts\(^1\)

- Introduce pathogens
- Reduce fruit size and quality
- Cause aesthetic damage

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**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
## Chemical Control

<table>
<thead>
<tr>
<th>Class</th>
<th>Brand Name</th>
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<tbody>
<tr>
<td>Sulfoximine</td>
<td>Closer</td>
</tr>
<tr>
<td></td>
<td>Transform</td>
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<tr>
<td>Pyrethroid</td>
<td>Danitol</td>
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<td></td>
<td>Brigade</td>
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<td>Carbamate</td>
<td>Sevin</td>
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<tr>
<td>Insect Growth Regulator</td>
<td>Cormoran</td>
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<tr>
<td>Choratonal Organ Disruptor</td>
<td>Beleaf</td>
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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 crop\(^1\).

Trap Cropping

Trap cropping strawberries with alfalfa has shown promise for managing *Lygus* species in California\(^1\) and Europe\(^2\)

Has not been tested for *Lygus lineolaris*

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: $p = 0.000144$

Graph showing box plots for different rows and perimeter, with significance levels indicated by asterisks.
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.
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 days\(^1\) from bloom-harvest to reduce *Lygus* population

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