Recent Advances in Lygus Management

Lygus hesperus Nymphs

Lygus Reduce Fruiting Sites

Insecticide Use in AZ Cotton

Major Threat to Cotton Production in AZ

- Over the last 5 years...
  - 45% of all insecticide sprays have been targeted at Lygus
  - 41% of the entire insecticide budget has been invested against Lygus
  - 66% of the yield loss has been attributed to Lygus

- Selective technologies have helped to stabilize & reduce usage overall (i.e., Bt cotton & whitefly IGRs in 1996)
- However, current usage reflects the importance of Lygus

Note height difference

- 3 Sprays
- 0 Sprays

- 45% of all insecticide sprays have been targeted at Lygus
- 41% of the entire insecticide budget has been invested against Lygus
- 66% of the yield loss has been attributed to Lygus
Studies Identified Effective Compounds
(3-fold increase in yield)

> 10-fold Increase in Yields

Yield in bales per acre

Sampling & Thresholds

Recent Questions in Lygus Management

Timing Late Season Controls
(when should you stop spraying?)
**Control of Nymphs is Key!**

- **Lygus Counts > Cut-out**
  - Bar chart showing Lygus chemical termination timing (LT1, LT2, LT3, LT4) with different treatments.
  - Graph indicating nymph reductions related to yield gains in LT2.

- **Large Yield Difference**
  - Graph comparing Lygus chemical termination x variety (LT1 << LT2)
  - Comparison between treatments DP422BR (early), DP33B (medium), and DP655BR (full).

**Spatial Study**
- Two townships, spring & early summer hosts (April - July).
- Cotton, alfalfa, seed alfalfa, fallow, weeds, and small grains; georeferenced.
- Sweeps (15 in. diam.) from each potential host weekly.
- Examine source/sink relationships among crops.

**Extension Program**
- Initiated in 2000 in response to extreme and negative interactions among producers of different crops.
- Communication/Awareness.
- Education.
- Systematic Survey/Research.

**Focal Cotton Fields (50)**
- Map showing focal cotton fields with various crop types: Focal cotton field, seed alfalfa, forage alfalfa, cotton, fallow.
Ring Analyses of Area & Distance Effects on Lygus

- Around focal cotton fields, estimate area of different crops within each 0.75 km concentric ring
  - Area of unidentified & unknown crops similar for each ring (ca. 21%)
- Each crop’s area within a ring is multiplied by the mean density of Lygus; Estimate of source potential
- Estimate the association between Lygus density in focal fields and the source potential of each crop type

Mean Lygus Density (adults & nymphs)

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>N</th>
<th>Lygus Density (log D + 1)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed Alfalfa</td>
<td>9</td>
<td>1.50a</td>
</tr>
<tr>
<td>Forage Alfalfa</td>
<td>34</td>
<td>1.45a</td>
</tr>
<tr>
<td>Fallow</td>
<td>3</td>
<td>1.44a</td>
</tr>
<tr>
<td>Cotton</td>
<td>72</td>
<td>0.69b</td>
</tr>
</tbody>
</table>

*Values in same letter not significantly different (P > 0.05)

Source : Sink Effects

<table>
<thead>
<tr>
<th>Ring</th>
<th>Crop Type</th>
<th>Coefficient from Multiple Regression (x 10^-6)t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 0.75 km</td>
<td>Seed Alfalfa</td>
<td>1.1**</td>
</tr>
<tr>
<td></td>
<td>Forage Alfalfa</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Fallow</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>Cotton</td>
<td>-0.58*</td>
</tr>
<tr>
<td>2) 0.75 - 1.5 km</td>
<td>Seed Alfalfa</td>
<td>0.7*</td>
</tr>
<tr>
<td></td>
<td>Forage Alfalfa</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Fallow</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>Cotton</td>
<td>0.1</td>
</tr>
</tbody>
</table>

no significant associations in rings 3 & 4; * P < 0.05; ** P < 0.001

Lygus Associations

- Seed alfalfa fields are sources of Lygus for cotton fields. This effect does not extend beyond 1.5 km.
- Cotton fields are sinks for Lygus. This effect disappears beyond 0.75 km.
- Strategic placement of crops could help alleviate Lygus problems.

Acknowledgments

- Virginia Barkley who supervised and others (7) who conducted the sampling
- Christa Ellers-Kirk for assistance with analyses
- Larry Antilla, Jerry Kerr and the rest of the ACRPC staff who provide crop maps & coordinates
- Steve Husman, Dave Langston, Jennifer Jones and cooperating growers involved with the implementation of the Maricopa Community Wide Lygus Action Plan
- ACGA and Cotton Incorporated who supported (pce) the Lygus termination studies
Information

- All University of Arizona crop production & crop protection information is available on our web site.
  - Arizona Crop Information Site (ACIS), at
  - http://ag.arizona.edu/crops