Influence of Snap Bean Planting Date on Yield and Virus Symptoms

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Virus Issues

- Causes yield and quality losses
  - Quality effects
    - Discoloration or malformation of pods
    - >3 to 5% pass over the field
    - Symptoms can develop over 12 to 24 hr time frame
    - Severity varies by planting date/harvest date
      - Most severe with snap beans planted June 10 to June 20/30
      - Harvest August 10 to 20
    - Severity varies by geographic location
      - East of Lake Winnebago
      - North of Lake Winnebago
      - Green Lake and Fond du Lac Co.
Virus Issues

- Causes yield and quality losses
  - Yield Effects
    - Yield effects are difficult to quantify
      - Cannot establish a “0” virus control
    - Yield effects appear more prevalent as planting date is delayed
      - Planted late June or later - lower yields
      - Difficult to separate from other effects
        - Drought effects
        - Excessive rainfall
    - Typically see severe stunting of the crop or foliar symptoms
      - Pin bean drop
    - Yield response varies by location
      - 25-75% yield reductions in NE WI
      - 10-80% losses in IL (irrigation)
      - Central Sands - foliar symptoms - yielded 4 tons on average
Goal

- Develop integrated approach that would optimize yield and quality impacts and maximize returns
  - Cost of management
    - Direct cost related to pesticide use
    - Indirect cost – non adapted varieties
      - Lower yielding
      - Lower quality
  - Integrate cultural practices
    - Avoidance – adjust planting date
      - NE and NC WI stop planting by June 20
Objectives

- Determine effect of planting date, varietal differences in susceptibility to virus, and aphid management strategy on yield and quality.

- Evaluate the impact of management system on aphid pressure and development of virus symptoms.
Material and Methods

- Arlington Horticulture Farm – 2002 and 2003
- RCB with 4 reps and 3 level factorial
  - Planting date
    - 5/22, 6/19, 7/15 - 2002
    - 6/18, 7/2, 7/18 - 2003
  - Variety
    - MV185 (R), Hystyle (S)
  - Insect management strategy
    - +/- Gaucho seed treatment
    - +/- Stylet oil
Materials and Methods (Cont.)

- Managed snap bean according to current production recommendations
  - Leaf hopper management
    - Sevin until pin bean stage
  - Leafhopper and European Corn Borer management
    - Capture from pin bean stage until harvest

- Data collection
  - Yield, size grade
  - Phenological development
  - Soybean aphid per plant
  - Virus symptoms
Pest Pressure

- **Little aphid pressure during 2002**
  - First found on 7/29
  - 1-5 aphids per leaf
    - 3rd planting only (1-2 trifoliate)
    - 2nd planting flowered on 7/24
    - 3rd planting flowered on 8/20
  - Few if any aphids after 8/7

- **Higher aphid pressure during 2003**
  - First found aphids 8/1
    - Aphids varied with treatment
      - 3rd planting - first trifoliate (9/18)
      - 2nd planting - bloom (9/2)
      - 1st planting - 1 - 2” beans (8/14)
Aphid Density by Planting Date - 2003

- First
- Second
- Third

Planting Date

Aphids/leaf

First: a
Second: a
Third: b
Snap Bean Yield by Variety - 2003

Yield (ton/A)

<table>
<thead>
<tr>
<th>Variety</th>
<th>1-3's</th>
<th>4-5's</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-type</td>
<td>a</td>
<td>b</td>
<td>a</td>
</tr>
<tr>
<td>S-type</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>

Legend:
- 1-3's
- 4-5's
- Total
Disease Severity 9/ 1-2002

Crop injury (%)

<table>
<thead>
<tr>
<th>Variety</th>
<th>none</th>
<th>Gaucho</th>
<th>Oil</th>
<th>Gaucho + Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>R type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Variety
Yield Response to Variety and Insecticide Treatment - 2002

Variety

R type
S type

Yield (Ton/A)

none
Gaucho
Oil
Gaucho + Oil

Variety
Yield Response to Planting Date and Insecticide Treatment - R type - 2002

- Planting Date: First, Second, Third
- Insecticides: none, Gaucho, Oil, Gaucho + Oil

Yield (Ton/A)
Yield Response to Planting Date and Insecticide Treatment - S type - 2002

Yield (Ton/A)

- First
- Second
- Third

Planting Date

- none
- Gaucho
- Oil
- Gaucho + Oil
Summary

- Yield possibly affected by aphid transmitted virus
  - Aphids preferred youngest snap bean
  - 2002- (+) yield response to Gaucho in S type

- Yield differed by variety
  - S out yielded R
  - S better size

- Yield affected by planting date
  - Influenced by variety and insecticide treatment in 2002
  - Drought in 2003 had largest effect

- S-type showed injury
  - Last planting only – 2002
  - Both planting dates in 2003
Conclusions

- When is it economical to use virus resistant varieties?
- Should seed treatment be used when planting R-types late?
- Recommendations should vary by geographic region within the state