Variable Rate Soybean Seeding Study

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Background

- On-farm research trial in 2018.
  - Biological product

- Severe crusting
  - Planted 140K
  - Early stands 90K
  - Harvest stands 54K

- Average yield
  - 70 bu/ac

- Question?
  - How low can I go (seeding rates)?
2019 Growing Season
Data Collected—2019

- Early season stand counts
- Scouting notes—every two weeks
- Harvest stand counts
- Stem diameter
- Dectes stem borer pressure
- Yield
- Moisture
- Net return
Figure 1. Soybean seeding rate prescription map for 2019 field site.
## Results—2019

<table>
<thead>
<tr>
<th>Planting rate (seeds/ac)</th>
<th>Stand Count (plants/ac)</th>
<th>Emergence (%)</th>
<th>Stem Diameter (mm)</th>
<th>Dectes Stem Borer Infestation %</th>
<th>Moisture (%)</th>
<th>Yield (bu/ac)†</th>
<th>Marginal Net Return‡ ($/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80,000</td>
<td>65,833 C*</td>
<td>82 A</td>
<td>9 A</td>
<td>7 A</td>
<td>10.5 A</td>
<td>73 A</td>
<td>552.69 A</td>
</tr>
<tr>
<td>110,000</td>
<td>83,833 B</td>
<td>76 A</td>
<td>8 A</td>
<td>8 A</td>
<td>10.5 A</td>
<td>76 A</td>
<td>567.99 A</td>
</tr>
<tr>
<td>140,000</td>
<td>104,000 A</td>
<td>74 A</td>
<td>8 A</td>
<td>5 A</td>
<td>10.6 A</td>
<td>79 A</td>
<td>570.08 A</td>
</tr>
<tr>
<td>170,000</td>
<td>118,833 A</td>
<td>70 A</td>
<td>8 A</td>
<td>7 A</td>
<td>10.6 A</td>
<td>75 A</td>
<td>532.34 A</td>
</tr>
<tr>
<td>P-Value</td>
<td>&lt;0.0001</td>
<td>0.276</td>
<td>0.135</td>
<td>0.930</td>
<td>0.242</td>
<td>0.344</td>
<td>0.374</td>
</tr>
</tbody>
</table>

*Values with the same letter are not significantly different at a 90% confidence level.
†Yield values are from cleaned yield monitor data. Bushels per acre adjusted to 13% moisture.
‡Marginal net return based on $8.10/bu soybean and $60/unit of 140,000 seeds.
Results—2019

Figure 2. a) Yield response to plant population (determined by stand count), b) net return response to population (determined by stand counts), c) stem diameter by plant population (determined by stand counts), and d) Dectes stem borer infestation as related to stem diameter.
Summary –2019

- Plant stands ranged from 70% to 82% of the seeding rate.
- Stem diameter and Dectes stem borer infestation were not impacted by seeding rate or plant population at this site.
- Dectes stem borer infestation was relatively low, ranging from 5% to 7%.
- Yield and net return were not significantly different for the planting rates evaluated.
- The lowest seeding rate of 80,000 seeds/ac with plant stands averaging 66,000 plants/ac achieved yields as high as the 170,000 seeds/ac treatment.
2020 Growing Season
Data Collected—2020

- Early season stand counts
- Harvest stand counts
- Yield
- Moisture
- Net return
## Results—2020

<table>
<thead>
<tr>
<th>Early Season Stand Count (plants/ac)</th>
<th>Harvest Stand Count (plants/ac)</th>
<th>Moisture (%)</th>
<th>Yield (bu/ac)†</th>
<th>Marginal Net Return‡ ($/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80,000 seeds/ac</td>
<td>67,458 D*</td>
<td>63,708 D</td>
<td>10.1 A</td>
<td>81 A</td>
</tr>
<tr>
<td>110,000 seeds/ac</td>
<td>93,792 C</td>
<td>83,458 C</td>
<td>9.8 A</td>
<td>79 A</td>
</tr>
<tr>
<td>140,000 seeds/ac</td>
<td>119,542 B</td>
<td>99,417 B</td>
<td>10.0 A</td>
<td>81 A</td>
</tr>
<tr>
<td>170,000 seeds/ac</td>
<td>148,500 A</td>
<td>123,875 A</td>
<td>9.9 A</td>
<td>82 A</td>
</tr>
<tr>
<td>P-Value</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>0.314</td>
<td>0.685</td>
</tr>
</tbody>
</table>

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre corrected to 13% moisture.
‡Marginal net return based on $9.50/bu soybean and $50/140,000 seed unit.
Summary –2020

- Plant populations at this site ranged from 83% to 87% of the target seeding rate.
- Yield and net return was not different among the four seeding rates evaluated.
Future Plans?

- May adjust seeding rates
  - Depends on farmer preference
  - Input costs/farm profits

- Dr. Joe Luck’s group has been conducting these studies for years now
  - More information available
Resources

- Nebraska On-Farm Research Network
  - Website: https://cropwatch.unl.edu/on-farm-research
  - Publications (print or online)

- Virtual Field Days
  - Twitter: @OnFarmResearch
  - YouTube: Nebraska Extension On-Farm Research Network Channel
  - WCREEC: https://mediahub.unl.edu/media/14313

- CropWatch
  - Website: https://cropwatch.unl.edu
Question? Thank You!

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