Pulse Disease Issues

Kent McKay, NCREC
Area Extension Agronomist
Minot, ND
Pulse Disease Issues

- 12 years of field observations

- Disease is a concern, however, not a significant problem as with other crops

- What are the major disease concerns in field pea, lentil, chickpea?

- Fungicide and seed treatment trial results
Field Pea Disease Issues

- Soil-borne diseases have caused more problems than foliar diseases
  - Seed Treatment considerations

- Powdery mildew
  - Potential of being the most serious foliar disease

- Ascochyta blight:
  - Different species than lentil or chickpea
  - Peas have shown excellent tolerance

- Sclerotinia:
  - Semi-leafless peas have exhibited good tolerance
Seed Treatment Considerations:

- Early planting = cold soil conditions
- Often planted under heavy residue (no-till)
- 40° soils; peas could take 14+ days to emerge = more susceptible to seed rot
- Loss in stand = can’t afford it!!!
Seed Treatment Considerations:

- 2002/2003: Isolated seed rot issues
  - Cold, wet May: delayed emergence
  - Tight rotation: peas on canola
    - Fusarium, Rhizoctonia, and Pythium caused isolated problems and reduced pea stands
- Seed Treatment Options:
  - NDSU Extension Service circular PP622
    - North Dakota Field Crop Fungicide Guide
Fungicide seed treatments for pea

- **Apron or Allegiance**
  - Controls *pythium* only
  - Little or no impact on rhizobia

- **Maxim**
  - Seed rots: fusarium, rhizoctonia (except *Pythium*)
  - Impact on rhizobia (safe?)

- **ApronMaxx**
  - fusarium, rhizoctonia, *pythium*

- **Captan**
  - fusarium, rhizoctonia
  - Moderate impact on Rhizobia
Field pea seed treatments at Minot, 2003.

<table>
<thead>
<tr>
<th>Fungicide seed treatment</th>
<th>Stand plants/ A</th>
<th>Yield bu/ A</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Inoculant, no seed trt</td>
<td>264,859</td>
<td>32</td>
</tr>
<tr>
<td>Inoculant, no seed trt</td>
<td>267,059</td>
<td>34</td>
</tr>
<tr>
<td>Kodiak</td>
<td>238,766</td>
<td>36</td>
</tr>
<tr>
<td>Kodiak + Allegiance</td>
<td>242,812</td>
<td>37</td>
</tr>
<tr>
<td>Apron</td>
<td>267,094</td>
<td>34</td>
</tr>
<tr>
<td>ApronMaxx</td>
<td>250,906</td>
<td>35</td>
</tr>
<tr>
<td>Captan</td>
<td>254,953</td>
<td>33</td>
</tr>
<tr>
<td>LSD 0.05</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>CV%</td>
<td>15.6</td>
<td>8.6</td>
</tr>
</tbody>
</table>
Field pea seed treatments at Langdon, 2003.

<table>
<thead>
<tr>
<th>Fungicide seed treatment</th>
<th>Stand plants/ A</th>
<th>Nodulation no./ plant</th>
<th>Yield bu/ A</th>
</tr>
</thead>
<tbody>
<tr>
<td>No inoculant, no seed trt</td>
<td>323,750</td>
<td>30</td>
<td>49</td>
</tr>
<tr>
<td>Inoculant, no seed trt</td>
<td>259,000</td>
<td>35</td>
<td>47</td>
</tr>
<tr>
<td>Kodiak</td>
<td>259,000</td>
<td>39</td>
<td>51</td>
</tr>
<tr>
<td>Kodiak + Allegiance</td>
<td>279,234</td>
<td>24</td>
<td>49</td>
</tr>
<tr>
<td>Apron</td>
<td>271,141</td>
<td>23</td>
<td>49</td>
</tr>
<tr>
<td>ApronMaxx</td>
<td>287,328</td>
<td>29</td>
<td>50</td>
</tr>
<tr>
<td>Captan</td>
<td>356,125</td>
<td>18</td>
<td>48</td>
</tr>
<tr>
<td>LSD 0.05</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>CV%</td>
<td>22.5</td>
<td>54.3</td>
<td>10.5</td>
</tr>
</tbody>
</table>
## Field pea seed treatments at Carrington, 2003.

<table>
<thead>
<tr>
<th>Fungicide seed treatment</th>
<th>Stand (plants/ A)</th>
<th>Nodulation 1=profuse 9=no nodules</th>
<th>Yield (bu/ A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No inoculant, no seed trt</td>
<td>250,906</td>
<td>4.0</td>
<td>49</td>
</tr>
<tr>
<td>Inoculant, no seed trt</td>
<td>226,625</td>
<td>3.8</td>
<td>59</td>
</tr>
<tr>
<td>Kodiak</td>
<td>271,141</td>
<td>4.0</td>
<td>52</td>
</tr>
<tr>
<td>Kodiak + Allegiance</td>
<td>254,953</td>
<td>4.0</td>
<td>51</td>
</tr>
<tr>
<td>Apron</td>
<td>259,000</td>
<td>3.5</td>
<td>55</td>
</tr>
<tr>
<td>ApronMaxx</td>
<td>267,094</td>
<td>4.3</td>
<td>55</td>
</tr>
<tr>
<td>Captan</td>
<td>254,953</td>
<td>5.3</td>
<td>52</td>
</tr>
<tr>
<td><strong>LSD 0.05</strong></td>
<td><strong>NS</strong></td>
<td><strong>NS</strong></td>
<td><strong>NS</strong></td>
</tr>
<tr>
<td><strong>CV%</strong></td>
<td>10.2</td>
<td>25.2</td>
<td>13.6</td>
</tr>
</tbody>
</table>
Field Pea Disease Issues:

- **Powdery Mildew:**
  - Has the potential of being the most serious disease in field pea (planting date issue)
  - 2003: harvest issue rather than a yield loss issue
    - Should not affect seed quality or germination

- Yellow pea: resistant varieties available
- Green pea: no "true" resistant varieties yet
Powdery Mildew:

- Most significant foliar disease in pea
- Causes white “powdery” spots on leaves
- Wet, heavy dews help spread the disease to the pods
- Infected plants will not mature normally
- Can result in harvest problems (desiccation), seed size issues and yield loss
Powdery Mildew:

- Most often a problem with late plantings (mid-May or later)
- Infection typically occurs late in the season (late July-August)
- Yield loss typically doesn’t occur unless infection occurs prior to pod set
- Resistant varieties becoming available
- Quadris fungicide labeled for control
Field Pea Seeding Date Trials
Carrington 96-98, Minot 97-98, Langdon 98

Early May
Mid May
Late May
E-M June

Bu/acre

Carrington
Minot
Langdon
Questions or Comments on Field Pea Diseases?
Lentil Disease Issues:

- **Ascochyta blight:**
  - Seed-borne infections a concern
    - 1 to 2% seed infection can cause serious wide spread problems
    - Plant ascochyta free seed
  - LSP seed treatment highly recommended
    - Labeled in chickpea, Sect.18 for Lentil

- **Anthracnose:** need to monitor for in ND
Lentil Disease Issues:

- **Ascochyta blight:**
  - Different species than lentil or chickpea
  - Lesions develop on leaves, stems, pods
  - Can cause significant yield and quality loss in lentils

- **Quadris:** labeled for control
  - 6.2 fl oz/acre ($16/A)

- **Fungicide trial results:** Minot, 2002 & 2003
2003 Lentil Fungicide Trial
NCREC, Minot, ND

Yield lb/A

<table>
<thead>
<tr>
<th>Untreated</th>
<th>1 app Quadris 6.2 fl oz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1489</td>
<td>1562</td>
</tr>
</tbody>
</table>
Chickpea Disease Issues:

- Seed treatment considerations:
  - Ascochyta blight
  - Sclerotinia
Chickpea Seed Treatment Options:

- **Apron or Allegiance:**
  - A must for stand establishment

- **LSP:**
  - Highly recommended for seed-borne ascochyta control

- **Maxim:**
  - Fusarium, rhizoctonia

- **Dynasty/Protégé:** new for 2004
  - Seedling blights
## Large Kabuli Seed Treatment Trial
### NCREC, Minot. 2001

<table>
<thead>
<tr>
<th>Fungicide seed treatment</th>
<th>Stand plants/ sq. ft</th>
<th>Yield lb/ A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated</td>
<td>0.7</td>
<td>185</td>
</tr>
<tr>
<td>Apron/Maxim</td>
<td>4.2</td>
<td>814</td>
</tr>
<tr>
<td>Apron/Maxim/Mertect</td>
<td>4.8</td>
<td>838</td>
</tr>
<tr>
<td>Captan/Allegiance</td>
<td>4.8</td>
<td>951</td>
</tr>
<tr>
<td>Captan/Allegiance/LSP</td>
<td>3.7</td>
<td>774</td>
</tr>
<tr>
<td><strong>LSD 0.05</strong></td>
<td><strong>1.5</strong></td>
<td><strong>216</strong></td>
</tr>
</tbody>
</table>
Ascochyta Blight:

**Current recommendations:**

- **Large kabuli types**
  - 4 fungicide application program (needs to be budgeted in all areas of the state)
  - 2 Bravo apps followed by 2 Strobi apps (either Quadris or Headline)

- **Desi/Small kabuli types more tolerant**
  - 1 or 2 fungicide applications can significantly increase yield under moderate/severe ascochyta pressure
  - Untreated yields respectable at Minot, Williston, Hettinger, and even Carrington
2000 – 2003 NDSU / MSU Chickpea Disease Research:

- **Researchers:**
  - NCREC, Minot, ND: Kent McKay, Mark Halvorson, Robert Gjellstad, Kristie Michels
  - CREC, Carrington, ND: Bob Henson, Blaine Schatz
  - HREC, Hettinger, ND: Eric Eriksmoen
  - WREC, Williston, ND: Neil Riveland
  - MSU: Perry Miller, Jack Riesselman
Chickpea Variety by Fungicide Trial

- **Carrington, Hettinger, Minot**
  - Large Kabuli: Dwelley, CDC Yuma, Sierra
  - Small Kabuli: B-90 (Amit)
  - Desi: Myles

- **Fungicide Treatments:**
  - Untreated
  - 1 app of Quadris (early bloom)
  - 2 apps. of Quadris (early bloom, pod stage)
  - 2 Bravo apps. followed by 2 Quadris apps
    (2 Bravo apps prior to flower: early bloom, pod stage)
2002-03 AVG Large Kabuli Yields

![Bar chart showing yield comparison for Dwelley, Sierra, and Yuma locations. The chart displays yields in lb/A for different treatments: Untreated, Q, Q/Q, B/B/Q/Q.](chart_image)
2002-03 AVG
Small Kabuli and Desi Yields

![Graph showing Small Kabuli and Desi Yields]

- Untreated
- Q
- Q / Q
- B / B / Q / Q

Yield in lb/A:
- B-90
- Myles
Effect of Fungicide Treatments on Ascochyta Seed Infection (%) in Chickpea Varieties, Minot 2002**

**Based on samples of 500 seed plated onto potato dextrose agar
2002-03 AVG
Large Kabuli Net Income

- Dwellley
- Sierra
- Yuma

Legend:
- Untreated
- Q
- Q / Q
- B / B / Q / Q
2002-03 AVG
Small Kabuli and Desi Net Income
2002-03 AVG
Large Kabuli Final Disease Rating

![Bar graph](chart.png)

- **Scale of 0-9**
- **untreated**
- **Q**
- **Q/Q**
- **B/B/Q/Q**

- **Dwelle**
- **Sierra**
- **Yuma**
2002-03 AVG Small Kabuli and Desi Final Disease Rating
Sclerotinia:

- **Pulse Crops:**
  - Not as susceptible as sunflower, canola or dry bean
  - Semi-leafless field pea similar tolerance or even better tolerance than soybean
  - Can be successfully used with other broadleaf crops in “stacked” rotations
Sclerotinia Hosts: Alternative Crops

Blaine Schatz’ Studies at Carrington REC
Sclerotia/Acre, Carrington 90-92

Sclerotia, lb/A

Black Bean
Pinto Bean
Crambe
Safflower
Soybean
Canola

Schatz
Sclerotia/Acre, Carrington 90-92

Sclerotia, lb/A

Blk Bn | Chkpea | Mustard | Lentil | Pea | Bckwht | Flax

Schatz