Pulse Disease Update and Outlook
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Agronomy Update
January 7, 2020
The Year that was 2019
Pulse Acreage

2019 Pulse Acreage - Alberta:

- Total acreage of 2,348,548 (↑ 11%)
  - Field pea = 1,800,200 acres
  - Lentil = 387,000 acres
  - Faba bean = 43,420 acres
  - Dry bean = 57,250 acres
  - Chickpea = 60,100 acres
  - Soybean = 6,100 acres
Pulse Acreage

Weather-wise:
• All depended on where your farm was

Disease-wise:
• Same

• It was not a good year for pulse crops!
2019 Weather

- Red Deer was wet
  - Normal: 165 mm
  - Actual: 198 mm
  - 20% more

- Lethbridge was dry
  - Normal: 116 mm
  - Actual: 62 mm
  - ~ 50%

* June and July
2019 Weather

Red Deer was cool
- ~ 12 years

Lethbridge was hot
- ~ 6 years

* June and July
2019 Weather

- Red Deer for summer
  - 8 days above 25°C

- Lethbridge for summer
  - 51 days above 25°C

* May - August
2019 Weather

- Red Deer for summer
  - 8 days above 25°C
  - 0 days above 30°C

- Lethbridge for summer
  - 51 days above 25°C
  - 16 days above 30°C

* May - August
Diseases of Field Pea
Mycosphaerella blight

• (AKA Ascochyta blight)
• Still the #1 foliar disease problem in field pea
• Spreads by rain splash
• Prefers moderate temperatures
• Yield loss varies from 20-50% (or higher)
Mycosphaerella blight

- Small purple to brown lesions on leaves, stems and pods
- Interferes with photosynthesis
- Crop lodges
- Reduces seed weight, size, number and quality
  - Seeds - shrunken with dark brown discoloration
2019 Survey Areas

- Divided into 3 areas:
  - South
    - south of Hwy 1
  - East
    - south of Hwy 16
    - east of Hwy 56
  - West
    - south of Hwy 16
    - west of Hwy 56
2019 Mycospharella Survey

- Scale of 1 - 7
  - 1 = clean / no disease
  - 2 = a few flecks (< 5%)
  - 3 = numerous flecks (≥ 5%)
  - 4 = lesions (< 25%)
  - 5 = lesions (< 50%)
  - 6 = lesions (< 75%)
  - 7 = lesions (≥ 75%)

Scale provided by Dr. Michael Harding
# 2019 Mycospharella Survey

<table>
<thead>
<tr>
<th></th>
<th># Fields</th>
<th>Incidence</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>30</td>
<td>16%</td>
<td>1.1</td>
</tr>
<tr>
<td>East</td>
<td>32</td>
<td>100%</td>
<td>2.8</td>
</tr>
<tr>
<td>West</td>
<td>36</td>
<td>100%</td>
<td>3.8</td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>81%</td>
<td>2.2</td>
</tr>
</tbody>
</table>

**Incidence** – was the disease present?

**Severity** – how bad was it (1-7)?
Sclerotinia

- Caused by *Sclerotinia sclerotiorum*
  - Same pathogen that infects canola
  - Foliar disease with similar symptoms
  - Bleaching, white cottony mold, black sclerotia
  - Infects all plant parts
    - high water content
  - Tends to be patchy
Sclerotinia

• Usually not of economic importance in pea
• Except in wet years / thick canopies
  – High moisture in the canopy
• Perfect conditions in central Alberta in 2019
2019 Disease Surveys

- Included in field pea surveys
- Noted when seen in fields
- Found in about 58% of fields in Central Alberta
  - Throughout July and August
Downy Mildew

• Disease we only see in wet years
• Not of huge economic importance
• Humid conditions / thick canopy
• Early infections affect plant growth and/or death
• Late infections reduce yield
Downy Mildew

• Symptoms:
  – Yellow discoloration on top surface of leaf
  – Fluffy grey growth on bottom surface of leaf
    • Looks like mouse fur
  – Can cover the entire plant
  – Tends to be very patchy / random
  – Usually middle of plant, most dense
2019 Disease Surveys

- No formal survey done
- Noted when seen in fields
- Found in some fields in Central Alberta (Lacombe)
- North of Edmonton, quite a few cases reported
Root rot Diseases
Root rot diseases

• Symptoms – above and below ground
  • Poor or no emergence
  • Seedlings die
  • Stunted growth
  • Yellowing of plants
  • Discoloration of roots
  • Patches in the field
  • The entire field
Root rot diseases

• The root rot complex:
  • *Fusarium sp.*
  • *Rhizoctonia*
  • *Phythium*
  • *Ascochyta* (can play a role)
  • *Aphanomyces*
Root rot diseases

• The root rot complex:
  • *Fusarium*
  • *Aphanomyces*

• Two main pathogen groups of focus
  • One very widely distributed and opportunistic
  • One highly aggressive on pea and lentil

• Occur together
• Are very difficult to distinguish
  • DNA test
2019 Root Rot Survey

Healthy

Moderate

Severe
2019 Disease Survey

• Summer started off pretty dry
• Very few reports early in the season
• Weather changed in Central Alberta
• A lot of reports of problems!
• Root rot showed up in many areas
  • Especially *Aphanomyces*
## 2019 Root Rot Survey

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<th># Fields</th>
<th>Incidence</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>30</td>
<td>100%</td>
<td>3.4</td>
</tr>
<tr>
<td>East</td>
<td>32</td>
<td>92%</td>
<td>2.5</td>
</tr>
<tr>
<td>West</td>
<td>36</td>
<td>81%</td>
<td>2.6</td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>93%</td>
<td>2.6</td>
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Mostly Fusarium

Combination:
- Fusarium
- Aphanomyces

**Incidence** – was the disease present?

**Severity** – how bad was it (1-7)?
Diseases of Faba bean
Chocolate Spot

- Caused by Botrytis (grey mold)
- Spreads by rain splash, needs moisture
- Haven’t seen this disease for a few years
- Saw these disease in every field in 2019
- Unsure of the economic importance
  - Confounded by many other pathogens
Faba bean diseases

- Reddish brown / chocolate brown spots
  - Cover the leaves in a peppered appearance
  - Lesions join together
  - Darken to a greyish color with brown tinge

- Lesions interfere with photosynthesis
- Defoliation of leaves
- Stresses the plant / affects maturity
Faba bean diseases

- Other pathogens showing up
  - *Stemphylium*
  - *Alternaria*
  - Saprophytes (unknown spots / little concern)

- *Ascochyta fabae*
  - A potential disease problem
  - So far only a few suspected occurrences
  - Has shown up on DNA pathogen testing
2019 Faba bean Survey

- Scale of 1 - 5
  - 1 = clean / no disease
  - 2 = small lesions (1 - 2%)
  - 3 = small lesions (2 - 5%)
  - 4 = large lesions (5 - 10%)
    = defoliation
  - 5 = many lesions (> 10%)
    = leaves, stems, pods
    = severe defoliation
# 2019 Faba bean Survey

<table>
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<tr>
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<th># Fields</th>
<th>Incidence</th>
<th>Severity</th>
</tr>
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<tbody>
<tr>
<td>South</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>East</td>
<td>10</td>
<td>100%</td>
<td>3.3</td>
</tr>
<tr>
<td>West</td>
<td>10</td>
<td>100%</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>100%</strong></td>
<td><strong>3.25</strong></td>
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</table>

**Incidence** – was the disease present?  
**Severity** – how bad was it (1-5)?
Diseases of Lentil
Lentil disease concerns

- *Sclerotinia* white mould

- Only real foliar disease concern at the moment
  - Characteristic white cottony mold
  - Thrives in the dense/ moist canopy
  - Fungicides must be applied before canopy closure

- Didn’t see much in 2019
  - Conditions were not present where lentils were grown
Lentil disease concerns

- *Apanomyces* root rot
  - Major concern within root rot complex
  - Can be devastating to lentil

- No dedicated lentil surveys done in 2019

- Pea surveys showed it's out there
  - Same pathogen
Outlook for 2020
Disease Management

- Disease triangle
  - Host plant
  - Virulent pathogen
  - Favorable environment
Disease Outlook 2020

- 2019 was wet in Central Alberta
- Lots of inoculum out there!

- Mycosphaerella / Ascochyta (pea)
- Downy Mildew (pea)
- Sclerotinia white mold (pea, lentil)
- Chocolate Spot (faba bean)

Foliar diseases

- Pathogen
- Host
- Environment
Disease Outlook 2020

- *Aphanomyces* (pea, lentil)
- *Fusarium* (pea, lentil)

- 2019 was wet in Central Alberta
  - Spore load in soils are high!
  - Levels for Aphanomyces (may have) built up

Pathogen

Host

Environment
Disease Outlook 2020

• 2019 was dry in Southern Alberta
  • Less inoculum out there…
  • Still there…
  • Waiting…

• All diseases… all pulse crops
  • Foliar
  • Root rots

Pathogen → Host → Environment = 😞
Foliar Disease Management

• Crop Canopy
  – thickness

• Leaf wetness (at noon)

• Percent of plants showing symptoms

• 5 day weather forecast
## Host range of *Aphanomyces*

<table>
<thead>
<tr>
<th>Crop</th>
<th>Disease reaction</th>
<th>Oospores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peas</td>
<td>Susceptible</td>
<td>Yes</td>
</tr>
<tr>
<td>Lentils</td>
<td>Susceptible</td>
<td>Yes</td>
</tr>
<tr>
<td>Dry bean</td>
<td>Variable</td>
<td>Few</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>Variable</td>
<td>Yes</td>
</tr>
<tr>
<td>Chickpeas</td>
<td>Resistant</td>
<td>Few</td>
</tr>
<tr>
<td>Faba bean</td>
<td>Resistant</td>
<td>No</td>
</tr>
<tr>
<td>Soybean</td>
<td>Non-host</td>
<td>No</td>
</tr>
</tbody>
</table>
Disease management

- Choose fertile, well-prepared, well-drained soil
- Plant high quality seed
- Treat seed for *Fusarium* and other root rots
- Use best management practices
  - Use *rhizobial* inoculant
  - Control weeds and foliar diseases
- Plant a cultivar adapted for your growing region
  - Refer to Regional Variety Trials
- Rotate your crops!
Thanks!