Maximizing Yields of Pea & Lentil

Optimizing Agronomy

Cropsphere January 14th, 2020

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Maximizing Yield

Seeds/acre = # plants x seed/plant

- Optimizing plant density
- Maximize crop growth and health
- Manage pest
- Harvest management = seeds in the bin

Maximizing seed increase

SPG Strategy for 2025
Lentils 27 bu/ac (^3)
Peas 43 bu/ac (^4)
Yield – factors we control

Yield Potential = Genetics = VARIETY SELECTION

Yield limiting – ROTATION; FIELD SELECTION; SEED QUALITY; SEEDING RATE; FERTILITY

Yield robbers – PESTS; HARVEST LOSSES

Yield

Increasing inputs

Potential
Attainable
Actual
Rotation & Field Choice

Seeded acres of pea and lentil in Saskatchewan (1970 to 2019)

2010 – peas 4 year rotation
2010 – canola 8 year rotation

Peas grown in 2014

2010 – peas 4 year rotation
2010 – canola 8 year rotation

Peas grown in 2014
Seed Quality

Good quality is critical!

Seed Testing Provides:

1. Germination/vigor
2. TKW
3. Disease levels
4. Mechanical damage/herbicide damage

Seeding Rate = Target Plant Stand x Seed Size (TKW)

% Emergence
Seed Quality from 2019 (preliminary results)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Pathogen</th>
<th>2019 interim</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% PFS</td>
<td>Mean % Infection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lentil</td>
<td>Ascochyta lentis</td>
<td>97.9</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Colletotrichium lentis</td>
<td>80.8</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>Botrytis spp.</td>
<td>91.8</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>Sclerotinia sclerotiorum</td>
<td>94.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Pea</td>
<td>Ascochyta spp.</td>
<td>21.4</td>
<td>4.9</td>
</tr>
<tr>
<td></td>
<td>Botrytis spp.</td>
<td>92</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>Sclerotinia sclerotiorum</td>
<td>97.7</td>
<td>0.5</td>
</tr>
</tbody>
</table>

3 labs - 20/20 Seed Labs Inc., Prairie Diagnostic Seed Lab, and Discovery Seed Labs Ltd
Aschochyta % Infection on Pea Seed
2019 preliminary (>=3 samples)
Seeding rates

<table>
<thead>
<tr>
<th>Crop</th>
<th>Target plant population (#/m²)</th>
<th>Seed Size (TKW in g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lentil</td>
<td>120 – 130 (190-210 new)</td>
<td>26 – 73</td>
</tr>
<tr>
<td>Pea</td>
<td>75 - 85</td>
<td>150 – 280</td>
</tr>
</tbody>
</table>

Seeding Rate = Target Plant Stand x Seed Size (TKW) (% Emergence)

Adapted from Dr. Shirtliffe – U of S
Seed Treatment

15% YIELD INCREASE in lentils...when disease present

Source: Hwang et al, 92 & 96– Alberta Research Council
Seed Treatment

Higher Risk
• Low tannin variety
• Disease on seed
• Seeding early (cold)
• Wet soils
• History of disease
• Mechanical damage
• PLW / wireworm risk

Lower Risk
• High tannin variety
• Good seed quality
• Mid seeding date
• Warm moist soil
• No history of disease
Fertility - Phosphorous

- Pulses are good scavengers, acidify root zone, and are colonized by AM fungi (increase root surface area) *when roots are healthy!*
- Balance nutrient requirements by using removal rates
- Seed place up to 15-20 lbs/acre of P2O5 with (1” spread on 9” spacing)

### Nutrient Removal Rates In Seed (lbs/bu)

<table>
<thead>
<tr>
<th></th>
<th>Nitrogen</th>
<th>Phosphorus</th>
<th>Potassium</th>
<th>Sulfur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pea</td>
<td>2.3</td>
<td>0.7</td>
<td>0.7</td>
<td>0.3</td>
</tr>
<tr>
<td>Lentil</td>
<td>2.0</td>
<td>0.6</td>
<td>1.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Canola</td>
<td>1.6</td>
<td>0.8</td>
<td>0.4</td>
<td>0.25</td>
</tr>
<tr>
<td>Wheat</td>
<td>1.5</td>
<td>0.57</td>
<td>0.33</td>
<td>0.1</td>
</tr>
</tbody>
</table>

P removed in grain
Peas @ 50 bu = 35P
Lentil @ 30 bu = 18P
Fertility Project

- 2019 (SPG funded)
- Yorkton, IH, SC, Scott, Outlook
- 5 P rates
- 3 S rates
- Various N applications
- Yield and protein
- PRELIMINARY RESULTS

P Response in Peas (2019)
Preliminary Data - 1 site (IHARF)
(4 pmm P), Chris Holzapfel

WARC – Jessica Weber 2019
Fertility - Nitrogen

- Good nodulators and fix the majority of N requirements when roots and nodules are healthy
  - Proper inoculant
  - Store safely (live organisms)
  - Apply at label rates

- In low N soils (<15 lbs/acre available) may benefit from starter N

Dr. Schoenau (2017-19) – starter N tolerance

Lentils, pea, chickpea – 10 lbs/acre
Soybeans, dry beans – 10-20 lbs/acre
Faba beans – 30 lbs/acre

Granular = peat
Peat = liquid
Granular > liquid

**Granular = peat**
**Peat = liquid**
**Granular > liquid**
Why Are PULSES so Difficult to GROW??

WEEDS?  DISEASE?

Combination of Both

Requires a combination of agronomy practices

A GLANCE at what’s in the WORKS
Weed control

- Early weed removal is important with poor competitors such as peas and lentils
- 7/10 early applications > yields over later applications (AAFC AB) with PEAS
- CWFP: up to 4 weeks after emergence (peas) and up to 10 node (lentils) (5-10 node)

Source: AAFC Alberta
Weed control – Herbicide Layering

Utilizing two to three herbicides in sequence from different herbicide groups to tackle tough-to-control weeds and to stave off weed resistance

• Soil residual products and/or burndown options
• Early weed control
• HR management
• Soil activity provides control into growing season
• Better in crop control because weeds smaller
### Soil Residual Herbicides

<table>
<thead>
<tr>
<th>Product</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority (sulfentrazone)</td>
<td>14</td>
</tr>
<tr>
<td>Authority Supreme (sulfentrazone + pyroxasulfone)</td>
<td>14 + 15</td>
</tr>
<tr>
<td>Avadex® (triallate)</td>
<td>8</td>
</tr>
<tr>
<td>Edge® Granular (ethalfluralin)</td>
<td>3</td>
</tr>
<tr>
<td>Fierce® (flumioxazin + pyroxasulfone)</td>
<td>14 + 15</td>
</tr>
<tr>
<td>Focus® (pyroxasulfone + carfentrazone)</td>
<td>14 + 15</td>
</tr>
<tr>
<td>Sencor® (metribuzin)</td>
<td>5</td>
</tr>
<tr>
<td>Heat® Complete (saflufenacil + pyroxasulfone)</td>
<td>14 + 15</td>
</tr>
<tr>
<td>Bonanza® / Rival® / Treflan® (trifluralin)</td>
<td>3</td>
</tr>
<tr>
<td>Valtera® (flumioxazin)</td>
<td>14</td>
</tr>
</tbody>
</table>

### Burnoff Herbicides

<table>
<thead>
<tr>
<th>Product</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim® (carfentrazone)</td>
<td>14</td>
</tr>
<tr>
<td>CleanStart® (glyphosate + carfentrazone)</td>
<td>9 +14</td>
</tr>
<tr>
<td>Express® SG (triburon)</td>
<td>2</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>9</td>
</tr>
<tr>
<td>Goldwing® (MCPA Ester + pyraflufen-ethyl)</td>
<td>4 + 14</td>
</tr>
<tr>
<td>Heat® (Saflufenacil)</td>
<td>14</td>
</tr>
</tbody>
</table>

Not all products registered for both peas and lentils & watch timing restriction (fall vs spring)!

Check labels!
Herbicide Layering Project

- Research conducted throughout the province lead by Dr. Christian Willenborg
  - volunteer canola, kochia and mustard

- Season long-suppression of wild mustard at Scott & Saskatoon:
  - Metribuzin spring applied
  - Edge (fall) + metribuzin spring applied
  - Pyroxasulfone (fall) + metribuzin spring applied
  - Combined applications were most efficacious
Untreated Check

28 DAE

56 DAE
Fall Pyroxasulfone
Fall Pyroxasulfone & Spring Metribuzin

28 DAE

56 DAE
Other Options

Chemical weed control
• Weed wiping
• Precision applications

Mechanical weed control
• Inter-row harrowing
• Rotary hoe
• Clipping

Cultural/Agronomics
• Seeding date
• Seeding rate
Combinations of Inputs

• What inputs have the most impact on yields?
• Are some inputs additive?
• How can we combine inputs to be most effective?
Lentil Input Study

Collaborators: Chris Holzapfel, Michael Hall, Bryan Nybo, Garry Hnatowich, Eric Johnson, Dr. Steve Shirtliffe, and Sherrilyn Phelps
Lentil Input Study

Factor One: Seeding Rate
- 130 viable seeds/m² (40lb/ac ; 0.67 bu/ac)
- 190 viable seeds/m² (60lb/ac ; 1 bu/ac)
- 260 viable seeds/m² (80 lb/ac ; 1.3 bu/ac)

Factor Two: Weed Control
- Pre-seed burn off (glyphosate)
- Pre-seed residual (Focus)

Factor Three: Disease Control
- No Fungicide
- Single
- Dual
Residual herbicide was effective **71%** of the time

10 / 14 site years

- **66%** increase in annual weed control
  - Volunteer canola, Kochia, Cleavers
  - Wild oats, Green foxtail

Residual herbicide not effective **29%** of the time

4 / 14 site years

- Weeds not in control spectrum
- Glyphosate provided great control
- Limited secondary flushes
- Poor soil activation

*Preliminary Results*
Weed Density (plants ft\(^2\))

Worst vs. Best Case 72% Reduction

Glyphosate

Weed Biomass (kg ha\(^{-1}\))

Seeding Rate

Herbicide

13 Site - Years

*Preliminary Results

65% 48% 33%

Worst vs. Best Case 72% Reduction

130 190 260 130 190 260

Glyphosate

Focus

Worst vs. Best Case 72% Reduction

13 Site - Years

*Preliminary Results

65% 48% 33%
5 pl/ft²

Standard (130 seeds/m² & Glyphosate) 5% Yield Loss
Vs.
Enhanced (190 seeds/m² & Focus) 1% Yield Loss
10 pl/ft²

Standard (130 seeds/m² & Glyphosate) **9.5% Yield Loss**

Vs.

Enhanced (190 seeds/m² & Focus) **3% Yield Loss**
Standard (130 seeds/m² & Glyphosate) 14% Yield Loss

Vs.

Enhanced (190 seeds/m² & Focus) 4% Yield Loss
30 pt/ft^2

Standard (130 seeds/m^2 & Glyphosate) 28% Yield Loss
Vs.
Enhanced (190 seeds/m^2 & Focus) 8% Yield Loss
Effect of Seeding Rate & Application Timing on Disease Incidence

- **21 DAIA**
- **14 DAIA**

*Preliminary Results*

![Graph showing the effect of seeding rate and application timing on disease incidence. The graph displays the percentage of disease incidence at different seeding rates and fungicide applications.](image-url)
High Yielding (9/15 Site Years)

Yield Gains (bu per ac)

- None
- Single
- Dual

- None
- Single
- Dual

- None
- Single
- Dual

*Preliminary Results

Disease Risk

Yield Gains:
- 130
- 190
- 260

Glyphosate
Focus
None
Single
Dual
### Low Yielding (6/15 Site Years)

**Preliminary Results**

<table>
<thead>
<tr>
<th>Glyphosate</th>
<th>Focus</th>
<th>Glyphosate</th>
<th>Focus</th>
<th>Glyphosate</th>
<th>Focus</th>
<th>Glyphosate</th>
<th>Focus</th>
<th>Glyphosate</th>
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<th>Focus</th>
<th>Glyphosate</th>
<th>Focus</th>
<th>Glyphosate</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Single</td>
<td>Dual</td>
<td>None</td>
<td>Single</td>
<td>Dual</td>
<td>None</td>
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<td>Dual</td>
<td>None</td>
<td>Single</td>
<td>Dual</td>
<td>None</td>
<td>Single</td>
<td>Dual</td>
</tr>
<tr>
<td>130</td>
<td>190</td>
<td>260</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Revenue (%) impact as weed populations increase

<table>
<thead>
<tr>
<th>Seeding Rate (seeds/m²)</th>
<th>Herbicide</th>
<th>5 Pl/ft²</th>
<th>10 Pl/ft²</th>
<th>15 Pl/ft²</th>
<th>20 Pl/ft²</th>
<th>% Diff. in Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>Glyphosate vs Glyph. + Focus</td>
<td>-2.1</td>
<td>7.8</td>
<td>14.0</td>
<td>20.9</td>
<td></td>
</tr>
<tr>
<td>190</td>
<td>Glyphosate vs Glyph. + Focus</td>
<td>4.2</td>
<td>14.1</td>
<td>20.3</td>
<td>27.2</td>
<td></td>
</tr>
<tr>
<td>260</td>
<td>Glyphosate vs Glyph. + Focus</td>
<td>1.2</td>
<td>12.3</td>
<td>19.2</td>
<td>26.9</td>
<td></td>
</tr>
</tbody>
</table>

Low- Yielding Sites (6/15 Sites)

<table>
<thead>
<tr>
<th>5 Pl/ft²</th>
<th>10 Pl/ft²</th>
<th>15 Pl/ft²</th>
<th>20 Pl/ft²</th>
<th>% Diff. in Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2.9</td>
<td>5.3</td>
<td>10.3</td>
<td>15.8</td>
<td></td>
</tr>
<tr>
<td>-2.7</td>
<td>5.5</td>
<td>10.5</td>
<td>16.1</td>
<td></td>
</tr>
<tr>
<td>-2.3</td>
<td>6.1</td>
<td>11.2</td>
<td>16.9</td>
<td></td>
</tr>
</tbody>
</table>

High- Yielding Sites (9/15 Sites)
Small Red Lentil Best Management Practice

Seeding Rate:
- 190 > 260 > 130 viable seeds/m² under “good” conditions
- 190 > 130 > 260 viable seeds/m² under “poor” conditions

Residual herbicides:
- was effective 71% of the time
- 65% reduction in weed establishment
- 72% reduction in weed biomass
- $$\text{Profit at plant densities} > 5 \text{ plants/ft}^2$$

Fungicide:
- 260 < 190 ≤ 130 unsprayed < 130 single/ dual
- Dry conditions: 1 pass
- Wet conditions: 2 passes?

Overall - Increased seeding rate (190) + residual herbicide + single fungicide

*Preliminary Results
Field Pea Input Study

Laryssa Grenkow, Western Applied Research Corporation
Eric Johnson, Agriculture and Agri-Food Canada
Stewart Brandt, Northeast Agricultural Research Foundation
Chris Holzapfel, Indian Head Agricultural Research Foundation
Bryan Nybo, Wheatlands Conservation Area
Anne Kirk, University of Manitoba
Sherrilyn Phelps, Saskatchewan Pulse Growers
**Field Pea Input Study**

- 2012-2014
- Scott, Swift Current, Melfort, Indian Head- SK ; Minto, MB

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Empty Input Package</th>
<th>Full Input Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeding rate (SR)</td>
<td>60 seeds/m² (105 lb/ac; 1.75 bu/ac)</td>
<td>120 seeds/m² (210 lb/ac; 3.5 bu/ac)</td>
</tr>
<tr>
<td>Seed treatment (ST)</td>
<td>None</td>
<td>Apron Maxx RTA (Fludioxonil + Metalaxyl-M &amp; S-isomer)</td>
</tr>
<tr>
<td>Inoculant type (GI)</td>
<td>Liquid Cell-Tech</td>
<td>Granular Cell-Tech</td>
</tr>
<tr>
<td>Starter N fertilizer (Fz)</td>
<td>None</td>
<td>34 kg N ha⁻¹ (granular 46-0-0 side-banded)</td>
</tr>
<tr>
<td>Foliar Fungicide (Fn)</td>
<td>None</td>
<td>1ˢᵗ - Headline EC (pyraclostrobin)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2ⁿᵈ - Priaxor DS (pyraclostrobin + fluxapyroxad)</td>
</tr>
</tbody>
</table>
**Grain Yield and Variability**

### Additive Effect

- **Granular Inoculant**
- **Seeding Rate**
- **Fungicide**

Add 3 > 2 > 1 Inputs

- Increased Yield & Decreased Variability

- Adding all 5 Inputs (seeding rate, fungicide, starter fertilizer, inoculant, seed treatment) did not improve yield or decrease variability
- Seed treatment in combination had no effect
- Seed treatment alone 2nd lowest yield & 2nd highest variability
- Empty lowest yield and greatest variability

---

*ST = Seed Treatment; Fz = Starter N Fertilizer; GI = Granular Inoculant; Fn = Foliar Fungicide; SR = High Seeding Rate*
Grain Yield and Variability

- Low-yielding site > variability compared to high-yielding sites
- Adding all 5 Inputs (seeding rate, fungicide, starter fertilizer, inoculant, seed treatment) DID improve yield and decrease variability
- Seeding rate most influential factor
- Fungicide higher response with high-yielding site
- Empty (low seeding rate & liquid inoculant) lowest yield & greatest variability

ST = Seed Treatment; Fz = Starter N Fertilizer; GI = Granular Inoculant; Fn = Foliar Fungicide; SR = High Seeding Rate
## Net Revenue

### High Yielding Sites

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$/ac Gain</th>
<th>Treatment</th>
<th>$/ac Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR+GI+Fn</td>
<td>72</td>
<td>Fn</td>
<td>10</td>
</tr>
<tr>
<td>ST+SR+GI</td>
<td>71</td>
<td>ST</td>
<td>9</td>
</tr>
<tr>
<td>SR+GI</td>
<td>53</td>
<td>ST+SR</td>
<td>2</td>
</tr>
<tr>
<td>SR+Fn</td>
<td>50</td>
<td>Empty</td>
<td>0</td>
</tr>
<tr>
<td>ST+SR+GI+Fn</td>
<td>50</td>
<td>ST+Fn</td>
<td>-13</td>
</tr>
<tr>
<td>(No. 11) Full</td>
<td>31</td>
<td></td>
<td></td>
</tr>
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</table>

### Low Yielding Sites

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$/ac Gain</th>
<th>Treatment</th>
<th>$/ac Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR</td>
<td>54</td>
<td>Full</td>
<td>-25</td>
</tr>
<tr>
<td>Fz</td>
<td>23</td>
<td>Fn</td>
<td>-25</td>
</tr>
<tr>
<td>ST+GI</td>
<td>18</td>
<td>Fz+Fn</td>
<td>-28</td>
</tr>
<tr>
<td>ST</td>
<td>8</td>
<td>ST+SR+GI+Fn</td>
<td>-29</td>
</tr>
<tr>
<td>ST+SR</td>
<td>6</td>
<td>SR+Fn</td>
<td>-33</td>
</tr>
<tr>
<td>(No. 9) Empty</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Field Pea Best Management Practice

Under “Good” growing conditions:

- Input combinations of **2 or 3 interacted in additive** fashion
- Generally, **yield increased** and **yield variability decreased** with each additional input added
- **Seeding rate, fungicide and granular inoculant** were the inputs that most consistently increased yields and economic return, especially when applied **all in combination**
- **Seed Treatment and Starter Fertilizer** provided inconsistent effects on yield

Under “Poor” growing conditions:

- Yield was **more variable** and input interactions were generally **not additive**
- Overall response to seeding rate and fungicide was significant; however, the **high cost of the fungicide** resulted in those treatments having the **lowest economic return**
- **Seeding rate** applied alone **maximized yield** and **economic return**
Do These Strategies Change in Aphanomyces Infected Soil?
Management strategies to improve field pea root health in aphanomyces contaminated soils

Evaluating combinations of various management strategies to reduce the impact

1. Pre-seed herbicides- application of a dinitroaniline herbicide inhibited the production of motile zoospores to delay infection

2. Increased available nutrients- to boost early development & improve growth through to improve tolerance

3. Seed treatments- targets root rot complexes to improve tolerance
<table>
<thead>
<tr>
<th>TRT #</th>
<th>Herbicides</th>
<th>Starter Fertilizer</th>
<th>Seed Treatment</th>
<th>Foliar nutrient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Glyphosate</td>
<td>4N, 20 P</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>2</td>
<td>Glyphosate</td>
<td>4N, 20 P</td>
<td>vibrance maxx + intego</td>
<td>no</td>
</tr>
<tr>
<td>3</td>
<td>Glyphosate + trifluralin</td>
<td>4N, 20 P</td>
<td>vibrance maxx</td>
<td>no</td>
</tr>
<tr>
<td>4</td>
<td>Glyphosate + trifluralin</td>
<td>4N, 20 P</td>
<td>vibrance maxx + intego</td>
<td>no</td>
</tr>
<tr>
<td>5</td>
<td>Glyphosate + trifluralin</td>
<td>4N, 20 P</td>
<td>vibrance maxx + intego</td>
<td>yes</td>
</tr>
<tr>
<td>6</td>
<td>Glyphosate</td>
<td>20 N, 50 P, 20 K, 10 S</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>7</td>
<td>Glyphosate</td>
<td>20 N, 50 P, 20 K, 10 S</td>
<td>vibrance maxx + intego</td>
<td>no</td>
</tr>
<tr>
<td>8</td>
<td>Glyphosate + trifluralin</td>
<td>20 N, 50 P, 20 K, 10 S</td>
<td>vibrance maxx</td>
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<td>vibrance maxx + intego</td>
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<td>20 N, 50 P, 20 K, 10 S</td>
<td>vibrance maxx + intego</td>
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Trifluralin = Treflan/Rival/Bonanza
Scott, 2019

**Preliminary Data**

Gly = Glyphosate, Tri = Trifluralin, ST = Seed Treatment, VM = Vibrance Maxx, I = Intego, Fn = Foliar Nutrient

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</table>
Scott, 2019 @ 8 Weeks After Planting

Gly + 20 P, No ST/FN  vs  Tri + 50 P, 20K, 10S, VM+ I + FN
Yield Gains (bu/ac)

Scott Significant (P=0.0132)
Other Sites = NS

Preliminary Data

Gly= Glyphosate, Tri= Trifluralin, ST= Seed Treatment, VM= Vibrance Maxx, I= Intego, Fn= Foliar Nutrient

Scott Melfort, Outlook, Swift Current
Basic Strategy
- Glyphosate
- 20 P lbs/ac
- No Seed Treatment
- No Foliar Nutrients

Intensive Strategy
- Glyphosate + Trifluralin
- 20N, 50 P, 20 K, 10 S lbs/ac
- Seed Treatment
  (Vibrance Maxx + Intego)
- Foliar Nutrients
Management Strategies in Aphanomyces Infected Soils

Scott

Higher fertility regime tended to improve plant growth
• Yield Gains of 9 bu/ac at Scott, SK
• Tended to have less “pinching” of the roots compared to low fertility treatments
 • More developed roots increased tolerance to disease

Melfort, Outlook, Swift Current

Higher fertility regime appeared to slightly influence yield but not significant
• Very inconsistent among the different locations
SUMMARY – Recipe for Success

1) **Rotations** – longer is better, especially if root rots are an issue
2) **Plant densities** – target seeding rates based on TKW and factors influencing emergence
3) **Balance fertility** – in pulse year or prior to pulses (feed the crop); inoculant
4) **Manage weeds** – early weed control & herbicide layering
5) **Manage diseases** – thicker crops require closer management; consider environment
6) **Harvest management** – good quality in the bin

*Combinations of inputs and more intensely managed crops are higher yielding and less variable.*

*No one recipe – tailored for each farm based on level of risk, environment and production practices*
Thank you – questions?