Rotational Crops Effects on Potato Production the the Red River Valley

Andy Robinson, Potato Extension Agronomist, NDSU / U of M  z.umn.edu/spud
Joel Ransom, Extension Agronomist, NDSU
Potato production background

- 200+ years of potato production in RRV
- 82,000 acres of potatoes produced in ND annually
- 50,000 acres of potato are grown in the RRV
  - Chip, seed, and fresh
- Average yield estimated at 340 cwt/a in 2015
Canola in rotation with potato

- Study in Newport, ME from 1997-2006 had 7 2-year rotations on a sandy loam.
- Fields were chisel plowed in the spring, then disked twice.
- Potatoes yield better with canola the prior year
  - 14.7% higher than green bean
  - 8.2% higher than barley/clover

BA=barley, CN=canola, GB=Green bean, RP=millet/rapeseed, SC=sweet corn, SY=soybean, PP=potato-potato

(Larkin et al., 2010)
Canola in rotation with potato

- Canola in rotation with potato had a 18-38% reduction of Rhizoctonia canker, black scurf, and common scab.

(Larkin et al., 2010)
Red River Valley study

- 1961-1963 study in Grand Forks, ND.
- Yield response of Pontiac potato was good with no tillage, and better than plowing.
- Clod weight was not consistent.
- Challenges: debris when planting, weed control

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (3 year average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No tillage</td>
<td>163 a</td>
</tr>
<tr>
<td>Deep till, fall</td>
<td>155 ab</td>
</tr>
<tr>
<td>Plow, fall</td>
<td>150 b</td>
</tr>
<tr>
<td>Deep till, spring</td>
<td>156 ab</td>
</tr>
<tr>
<td>Plow, spring</td>
<td>139 c</td>
</tr>
</tbody>
</table>

(French and Blake, 1966)
Challenges in production

• Dirt clods
  – Cause bruising, skinning, extra weigh to haul
  – Leads to increased fuel costs and entry of diseases in tubers.

• Potato diseases seem to be increasing

• Fresh potatoes: People Buy with Their Eyes

• Push for sustainable crop production
Purpose of the study

• Determine the effects of the previous crop (dry edible bean, canola, or wheat) on potato quality and yield.
What was done

• Location
  – Grand Forks, ND (2015 & 2016)
  – RCBD with 4 replicates

• 3 crops: canola (RR), navy bean, spring wheat. Two tillage types: minimal till and fall chisel plow

– Potatoes planted following crops (2016)
Rotational crops

• Plots
  – 10 x 40 ft

• Seeded
  – May 26, 2015
  – May 8, 2016

• Harvested
  – Sept 9, 2015
  – Aug 19, 2016
Rotational crop yield results

- Navy bean:
  - 2015: 2700 Lb/a
  - 2016: 1800 Lb/a

- Canola:
  - 2015: 1500 Lb/a
  - 2016: 1200 Lb/a

- HRSW:
  - 2015: 2500 Lb/a
  - 2016: 2000 Lb/a

- Wheat yield (Bu/a):
  - 2015: 60 Bu/a
  - 2016: 50 Bu/a
No significant differences
Graded yield of potatoes

Graded potato yield (cwt/a) following rotational crops.

- Canola Notill
- Canola Chisel
- Navy bean Notill
- Navy bean Chisel
- HRSW Notill
- HRSW Chisel

No significant differences
Dirt clod weight by treatment

No significant differences
Results of potatoes from 2016

• No difference between
  – Dirt clod weight
  – Potato yield
  – Tillage types
  – Potato cultivars

• Evaluation ongoing for tuber blemishes
Summary of work

• Numerically, potatoes following canola tended to have the higher yields.

• The 2016 year had more variability.

• Further years of work may better define effects of previous crop on potato.
Future Work

• Start a 3rd year of rotational crop study.

• Seek funding from the NPPGA for potato crop to follow 2016 plots.
  – Measure marketable yield, external blemishes, and clod weight.
Thank you

• Northern Canola Growers Association
• Northern Plains Potato Growers Association
Questions?

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