



# LUARS Research 2020 Highlights!

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*Presentation shared with TBARA Members, March 9, 2020!*

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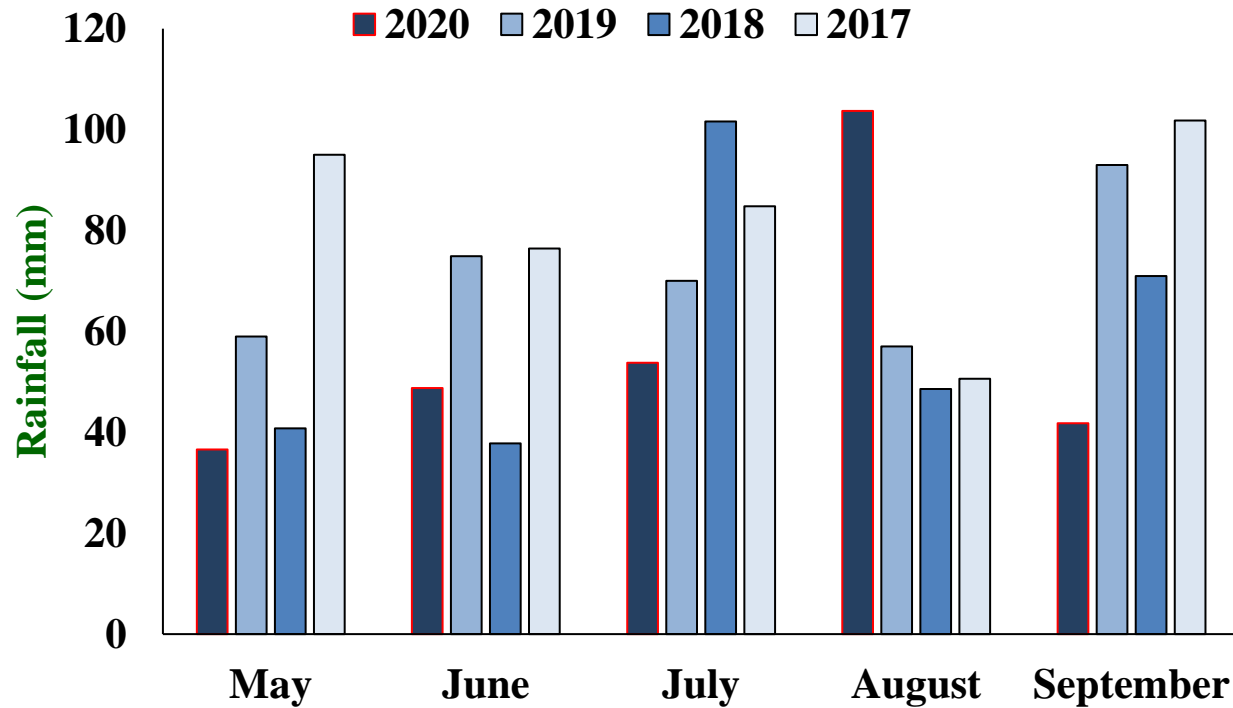
# WEATHER

	<u>2020</u>	<u>2019</u>	<u>2018</u>
<b>Rain (mm)</b>	💧 344	482	393
<b>T-Max °C</b>	☀️ 26.9	24.5	26.3
<b>T-Min °C</b>	-4.3	-4.3	-4.8
<b>GDD</b>	1427	1213	1238
<b>CHU</b>	2163	1918	2123

☀️ **Hot summer with daily temperatures of 31°C in June and 34°C in July!**

💧 **Dry summer with rainfall of only 102.6 mm during June and July**

## Rainfall at LUARS (mm)



**Dry in May, June, and July at planting and during growth!**

# Spring Wheat Varieties - Yield MT/ha

**2020**

Variety	Grain	Straw
Easton (CERS)	4.46	5.23
AAC Starbuck (CWRS)	3.63	5.60
AAC Russel VB (CWRS)	3.59	4.85

Trial mean for grain yield was **2.83 MT/ha** which is **extremely low** compared to previous years, because of **hot and dry weather!**

**Averaged over 2019-2020**

Variety	Grain	Straw
Easton (CERS)	5.18	6.61
AAC Wheatland (CWRS)	4.78	5.62
AAC Russel VB (CWRS)	4.68	5.94

Since Easton is not considered HRW by RHL, AAC Wheatland and AAC Starbuck (both CWRS) are recommended for cultivation in 2021!

**2020**

<b>Variety</b>	<b>Grain</b>	<b>Straw</b>
<b>Synasolis (6-row)</b>	<b>5.16</b>	<b>4.85</b>
<b>TR1867 (2-row)</b>	<b>5.00</b>	<b>5.65</b>
<b>Chambly (6-row)</b>	<b>4.89</b>	<b>6.16</b>

**Averaged over 2019-2020**

<b>Variety</b>	<b>Grain</b>	<b>Straw</b>
<b>Synasolis (6-row)</b>	<b>6.40</b>	<b>4.67</b>
<b>Boroe (6-row)</b>	<b>6.05</b>	<b>5.40</b>
<b>Chambly (6-row)</b>	<b>5.98</b>	<b>5.95</b>

**Only seven varieties (all six-row) were common in 2019 and 2020!**

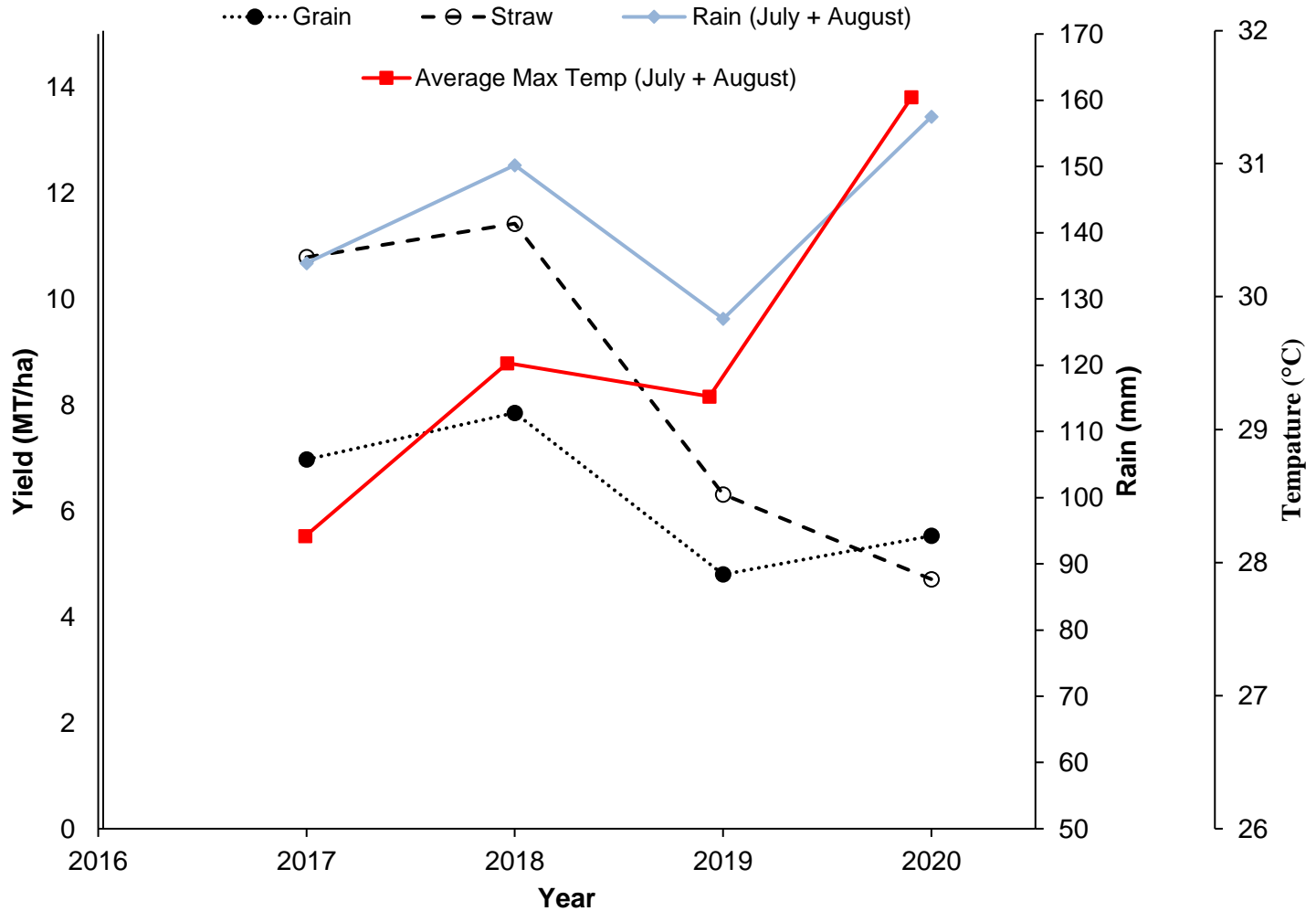
## 2020

Variety	Grain	Straw
Lowe	6.54	5.33 <sup>a</sup>
AB Brewnet *	6.31	5.89 <sup>a</sup>
CDC Fraser	5.96	5.04 <sup>ab</sup>
CDC Bow	5.53	4.71 <sup>ab</sup>

## Averaged over 2017-2020

Variety	Grain	Straw
CDC Bow	6.29 <sup>a</sup>	8.31 <sup>a</sup>
AAC Synergy	5.90 <sup>ab</sup>	6.52 <sup>ab</sup>
CDC Copeland	5.69 <sup>ab</sup>	6.42 <sup>abc</sup>

**\*AB Brewnet is a new variety to be available in spring 2022 had the best straw yield the second highest protein content 14.09%!**



# Spring Oats Varieties Yield MT/ha

**2020**

<b>Variety</b>	<b>Grain</b>	<b>Straw</b>
<b>CDC Arborg</b>	<b>6.05</b>	<b>5.66</b>
<b>AC Rigodon</b>	<b>5.83</b>	<b>5.07</b>
<b>AAC Douglas</b>	<b>5.79</b>	<b>5.16</b>
<b>Ore 3541M*</b>	<b>5.25</b>	<b>4.90</b>

**\*Ore 3541M was the highest yielding milling variety in 2020!**  
**Averaged over 2019-2020**

<b>Variety</b>	<b>Grain</b>	<b>Straw</b>
<b>CDC Arborg</b>	<b>6.01</b>	<b>5.76</b>
<b>AC Rigodon</b>	<b>5.93</b>	<b>5.45</b>
<b>Akina*</b>	<b>5.28</b>	<b>4.64</b>

**\*Akina** was the highest yielding milling variety when averaged over 2019 – 2020



**Seeded: August 26, 2019**

**2020**

<b>Variety</b>	<b>Grain</b>	<b>Straw</b>
<b>AAC Wildfire</b>	<b>5.10</b>	<b>7.02</b>
<b>Keldin</b>	<b>4.97</b>	<b>6.60</b>
<b>Gallus</b>	<b>4.88</b>	<b>7.05</b>
<b>CDC Falcon</b>	<b>4.56</b>	<b>6.37</b>

**Averaged over 2019-2020**

<b>Variety</b>	<b>Grain</b>	<b>Straw</b>
<b>Keldin</b>	<b>6.57</b>	<b>7.84</b>
<b>Gallus</b>	<b>6.27</b>	<b>8.00</b>
<b>AAC Gateway</b>	<b>5.63</b>	<b>7.59</b>
<b>Swainson</b>	<b>5.34</b>	<b>7.61</b>

**Extremely hot and dry weather in June and July 2020 influenced grain yield compared to the previous years!**

# Winter Wheat Varieties (Late Seeded)

## Yield MT/ha

Seeded: September 17, 2019

2020

Variety	Grain	Straw
<b>Adrianus</b> (CERW)	<b>5.90</b>	<b>6.22<sup>ab</sup></b>
<b>PRO 81</b> Soft Red	<b>5.73</b>	<b>6.42<sup>ab</sup></b>
<b>CDC Falcon</b>	<b>5.48</b>	<b>7.33<sup>ab</sup></b>
<b>AAC Gateway</b>	<b>5.03</b>	<b>7.84<sup>a</sup></b>

*Late Seeded Winter Wheat could be promising for crop rotation!*

The hot weather during 2020 was great for soybean yields!

**2020**

<b>Variety</b>	<b>Grain Yield</b>	<b>CHU</b>
<b>Bourke R2X</b>	<b>5.39<sup>a</sup></b>	<b>2400</b>
<b>Akras</b>	<b>5.25<sup>ab</sup></b>	<b>2375</b>
<b>Mahony R2</b>	<b>5.00<sup>abc</sup></b>	<b>2350</b>

**Averaged over 2019-2020**

<b>Variety</b>	<b>Grain Yield</b>	<b>CHU</b>
<b>Bourke R2X</b>	<b>3.57</b>	<b>2400</b>
<b>Lono R2</b>	<b>3.45</b>	<b>2450</b>
<b>NSC Tilston RR2Y</b>	<b>3.36</b>	<b>2400</b>

## Edible Beans varieties – Yield MT/ha

The hot weather in 2020 was great for Edible Bean yields!

**2020**

Variety	Grain Yield	Market Class	Seed Coat Colour
<b>AAC Scotty</b>	<b>5.91</b>	<b>Cranberry</b>	<b>Cream/Red Spots</b>
<b>AAC Y015</b>	<b>5.83</b>	<b>Yellow</b>	<b>Yellow</b>
<b>ACC Whitehorse</b>	<b>5.71</b>	<b>Great Northern</b>	<b>White</b>

**Averaged over 2019-2020**

Variety	Grain Yield	Market Class	Seed Coat Colour
<b>AAC Scotty</b>	<b>4.02</b>	<b>Cranberry</b>	<b>Cream/Red Spots</b>
<b>AAC Shock</b>	<b>3.87</b>	<b>Navy</b>	<b>White</b>
<b>ACC Argosy</b>	<b>3.87</b>	<b>Navy</b>	<b>White</b>

**Basagran Forté offers good weed control in dry edible beans!**

**If prices are good, Edible Beans could be a good addition to the cropping systems!**

**Field Pea pods were eaten by geese and deer this year! Therefore, only biomass yields are reported!**

**2020**

<b>Variety (Kind)</b>	<b>Biomass</b>
<b>CDC Lewochko (Yellow Pea)</b>	<b>3.82<sup>a</sup></b>
<b>CDC Forest (Green Pea)</b>	<b>3.39<sup>a</sup></b>
<b>CDC Spruce (Green Pea)</b>	<b>3.31<sup>a</sup></b>
<b>AAC Carver (Yellow Pea)</b>	<b>3.22<sup>a</sup></b>

**CDC Lewochko is a new variety; CDC Forest and CDC Spruce were among the top biomass yielders in 2019.**

## Lentils Varieties – Yield MT/ha

**Lentil grain yields were extremely low compared to previous years because of hot and dry weather!**

**All varieties in 2020 yielded less than 0.5 MT/ha!**

**Averaged over 2019-2020**

<b>Variety (Kind)</b>	<b>Grain Yield</b>
<b>CDC Impulse CL (Green)</b>	<b>2.02</b>
<b>CDC Lima (Yellow)</b>	<b>2.00</b>
<b>CDC Rosetown (Yellow)</b>	<b>1.50</b>

- **Linseed Flax seed yields were extremely low compared to previous years because of hot and dry weather!**
- **All varieties in 2020 yielded less than 1 MT/ha**
- **Seed yield ranged from 0.28 to 0.74 MT/ha [Trial Mean 0.46 MT/ha]**
- **Seed yields were too low to properly evaluate the varieties**

**2020**

Variety	Seed	Straw
<b>LR344PC</b>	<b>2.42<sup>a</sup></b>	<b>5.40<sup>a</sup></b>
<b>L352C</b>	<b>2.23<sup>a</sup></b>	<b>4.91<sup>a</sup></b>
<b>L252</b>	<b>2.21<sup>a</sup></b>	<b>3.48<sup>b</sup></b>

**Averaged over 2018-2020**

Variety	Seed	Straw
<b>L252</b>	<b>4.45</b>	<b>6.46</b>
<b>L241C</b>	<b>4.17</b>	<b>7.25</b>
<b>L230</b>	<b>4.13</b>	<b>6.17</b>

P stands for ‘Shatter Reduction’ and C stands for ‘Clubroot Resistance’

LR344PC is both the LibertyLink® and TruFlex™ canola with Roundup Ready® Technology!

**Only L200 series were available during 2018-'20.**



The **hot and dry weather** this season during flowering reduced seed yields in canola!

**2020**

<b>Variety</b>	<b>Seed</b>	<b>Straw</b>
<b>5545CL (Clearfield)</b>	<b>2.53</b>	<b>5.21</b>
<b>L241C</b>	<b>2.52</b>	<b>6.01</b>
<b>BY6204TF (RR)</b>	<b>2.32</b>	<b>4.79</b>

L241C was a Liberty Check, C in L241C stands for ‘Clubroot Resistance’

**BY6204TF has DefendR rated blackleg resistance plus clubroot protection with Roundup Ready® Technology!**

We don’t recommend any Roundup Ready canola variety to have herbicide rotation after Roundup Ready Crops!

**Two varieties of Winter Canola; planted on September 6, 2019**

**Mercedes and Inspiration**

**‘did not survive the winter of 2019 – 2020!**

**This is the second year when winter canola failed to survive at LUARS in Thunder Bay!**

**This crop does not seem feasible for Thunder Bay winters yet!**

## Mustard Varieties – Yield MT/ha

The **hot and dry weather** this season during flowering reduced seed yields in mustard!

All varieties in 2020 yielded less than 1 MT/ha  
Averaged over 2018-2020

Variety (Type)	Seed	Straw
<b>AC200 (Oriental)</b>	<b>1.58</b>	<b>3.67</b>
<b>AAC Brown 120 (Brown)</b>	<b>1.44</b>	<b>3.49</b>
<b>AC Vulcan (Oriental)</b>	<b>1.39</b>	<b>3.04</b>
<b>Adagio (Yellow)</b>	<b>1.04</b>	<b>3.79</b>

**Mustard** is a **low input crop** used for culinary purposes, if sold in **retail** it could fetch a **higher market price** than canola!

# Alfalfa vs. Galega (2012-2020)

<b>Crop</b>	<b>Dry Matter Yield (MT/ha/year)</b>	<b>Protein* (%)</b>
<b>Alfalfa @ 13 kg/ha</b>	<b>4714</b>	<b>17.7</b>
<b>Galega @ 25 kg/ha</b>	<b>4978</b>	<b>19.9</b>
<b>Galega @ 35 kg/ha</b>	<b>5245</b>	<b>19.1</b>
<b>Galega @ 45 kg/ha</b>	<b>5098</b>	<b>20.4</b>

**Galega had a higher yield and higher protein content than alfalfa!**

**Galega could be a better fodder than alfalfa!**

**\*Averaged over 2016 to 2020 on first cut!**

<b>Treatment</b>	<b>DMY (kg/ha) 2020</b>	<b>DMY (kg/ha) Total 2018- 2020</b>	<b>% Protein 2018-2020</b>
<b>80:20 Alfalfa and Kernza</b>	<b>5761<sup>a</sup></b>	<b>14162</b>	<b>16.8</b>
<b>Kernza @ 70 seeds/m<sup>2</sup></b>	<b>3460<sup>a</sup></b>	<b>10606</b>	<b>13.0</b>
<b>Kernza @ 90 seeds/m<sup>2</sup></b>	<b>4384<sup>a</sup></b>	<b>12468</b>	<b>11.9</b>
<b>Kernza @ 110 seeds/m<sup>2</sup></b>	<b>3877<sup>a</sup></b>	<b>11779</b>	<b>12.6</b>
<b>Kernza @ 130 seeds/m<sup>2</sup></b>	<b>3618<sup>a</sup></b>	<b>11859</b>	<b>12.4</b>

**Kernza could be a good addition to forage mixtures. Due to its deep and prolific root system, it could be very good for soil health.**

# Optimizing Seeding Rate in Kernza and



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UNIVERSITY

# Comparing its Grain Production with Perennial Rye

**Yield MT/ha - 2020**

<b>Treatment</b>	<b>Grain</b>	<b>Straw</b>
<b>Kernza @ 70 seeds/m<sup>2</sup></b>	<b>0.21</b>	<b>8.94</b>
<b>Kernza @ 90 seeds/m<sup>2</sup></b>	<b>0.19</b>	<b>8.84</b>
<b>Kernza @ 110 seeds/m<sup>2</sup></b>	<b>0.36</b>	<b>10.41</b>
<b>Kernza @ 130 seeds/m<sup>2</sup></b>	<b>0.30</b>	<b>9.81</b>

**Averaged over 2018-2020**

<b>Treatment</b>	<b>Grain</b>	<b>Straw</b>
<b>Kernza @ 70 seeds/m<sup>2</sup></b>	<b>1.18</b>	<b>11.87</b>
<b>Kernza @ 90 seeds/m<sup>2</sup></b>	<b>1.09</b>	<b>11.88</b>
<b>Kernza @ 110 seeds/m<sup>2</sup></b>	<b>1.30</b>	<b>12.68</b>
<b>Kernza @ 130 seeds/m<sup>2</sup></b>	<b>1.16</b>	<b>12.60</b>

**Ace 1 (Perennial Rye) did not survive!**

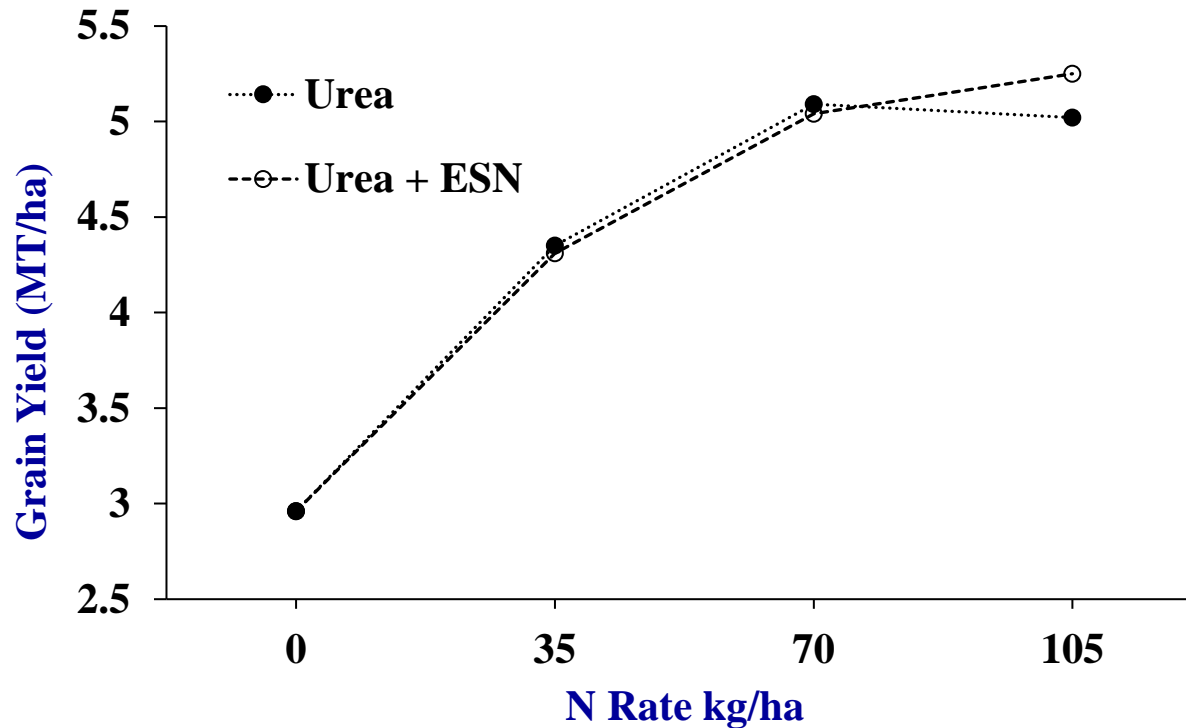
# Comparative Performance of Kernza, Perennial Rye, RR Alfalfa, Conventional Alfalfa, Sainfoin and Chicory

<b>Treatment</b>	<b>DMY (kg/ha) 2020</b>	<b>DMY(kg/ha) Total 2018-'20</b>	<b>% Protein 1<sup>st</sup> Cut 2018-'20</b>
<b>Kernza (Perennial Wheathgrass)</b>	<b>4960<sup>b</sup></b>	<b>13806</b>	<b>14.7</b>
<b>WL319HQ (RR Alfalfa)</b>	<b>8475<sup>a</sup></b>	<b>18005</b>	<b>18.1</b>
<b>WL354HQ (RR Alfalfa)</b>	<b>6732<sup>ab</sup></b>	<b>15093</b>	<b>18.7</b>
<b>135 (Conventional Alfalfa)</b>	<b>7777<sup>a</sup></b>	<b>16649</b>	<b>18.2</b>
<b>Instinct (Conventional Alfalfa)</b>	<b>7521<sup>ab</sup></b>	<b>16684</b>	<b>17.3</b>
<b>Mission HVXRR (RR Alfalfa)</b>	<b>6170<sup>ab</sup></b>	<b>14799</b>	<b>18.2</b>

**Perennial Rye, Chicory, and Sainfoin did not survive in 2020, and Kernza gave only one cutting. Roundup Ready Alfalfa variety WL319HQ could be recommended for cultivation on farms in and around Thunder Bay!**

# N and S Management in Malting Barley

## Averaged over 2018-2020

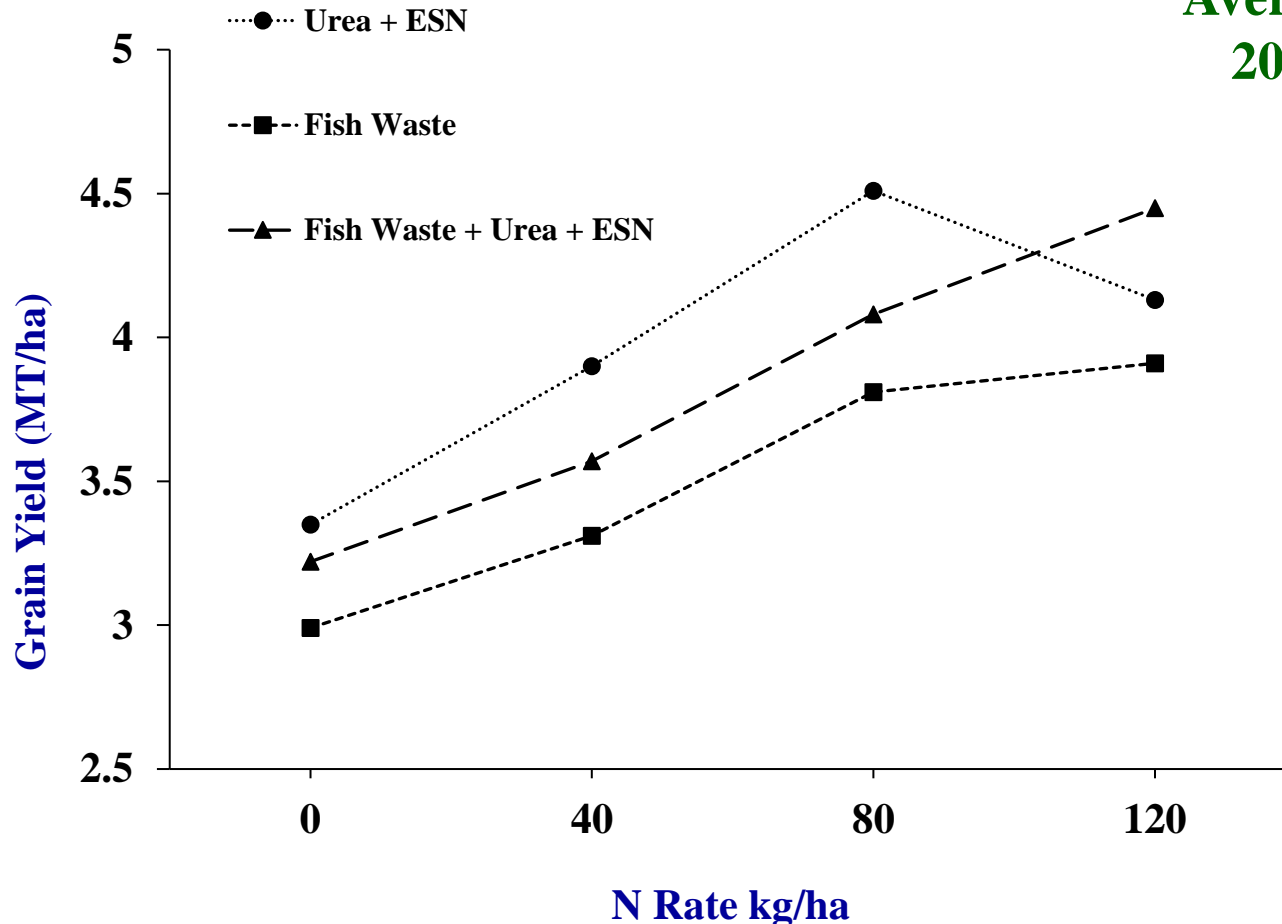


- Highest grain and straw yields were obtained from urea + ESN @ 105 kg N/ha (5.51 and 5.56 MT/ha, respectively).
- Sulphur applications didn't affect grain or straw yields.
- Application of urea + ESN could be better than application of urea alone!



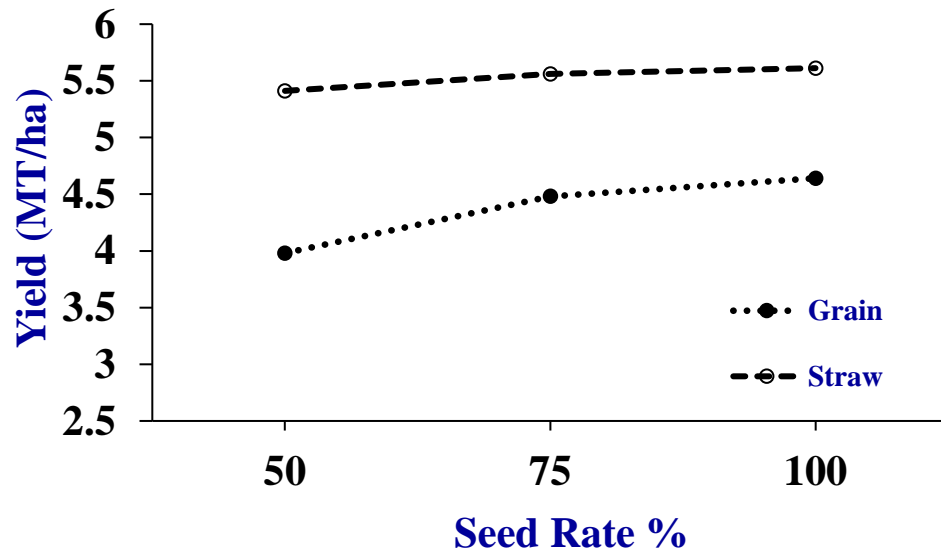
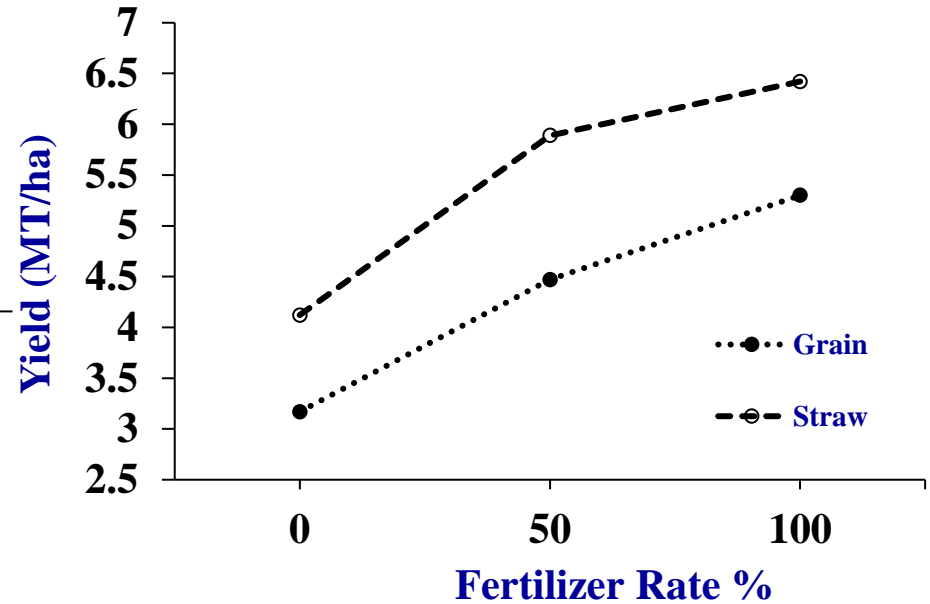
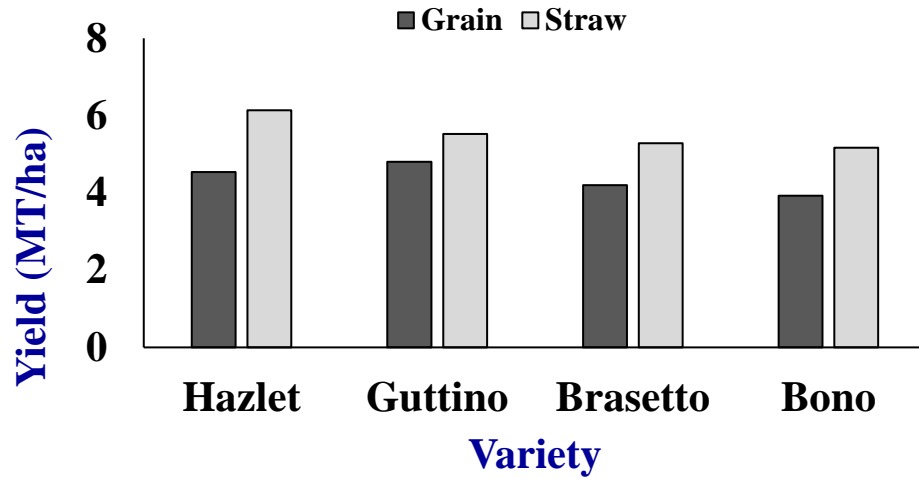
# Evaluation of Fish Waste as a Source of N in Wheat

Averaged over  
2018-2020



- Highest grain yield was obtained from urea + ESN @ 80 kg N/ha.
- Fish Waste application alone had the lowest grain yields!

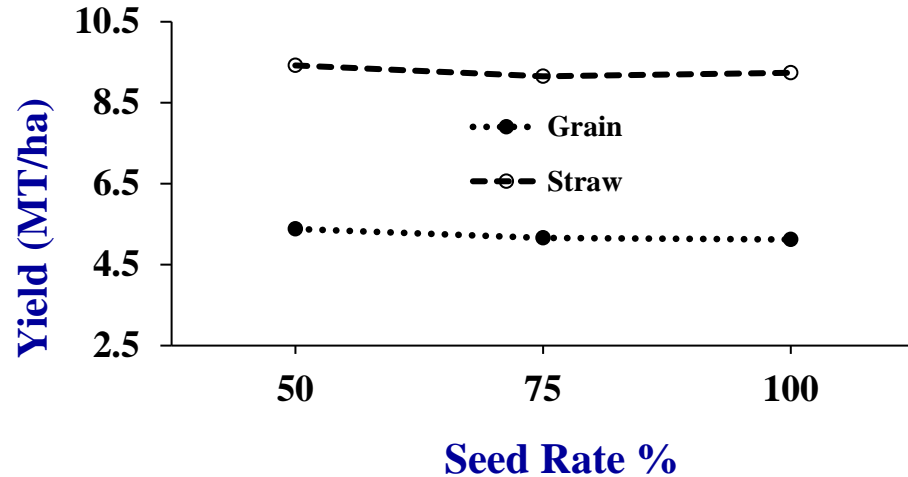
# Population and NKP Fertilizer Regimes for Winter Rye



**For best results, Grow either Hazlet or Guttino variety of Winter Rye at 100% recommended seed and fertilizer rates!**

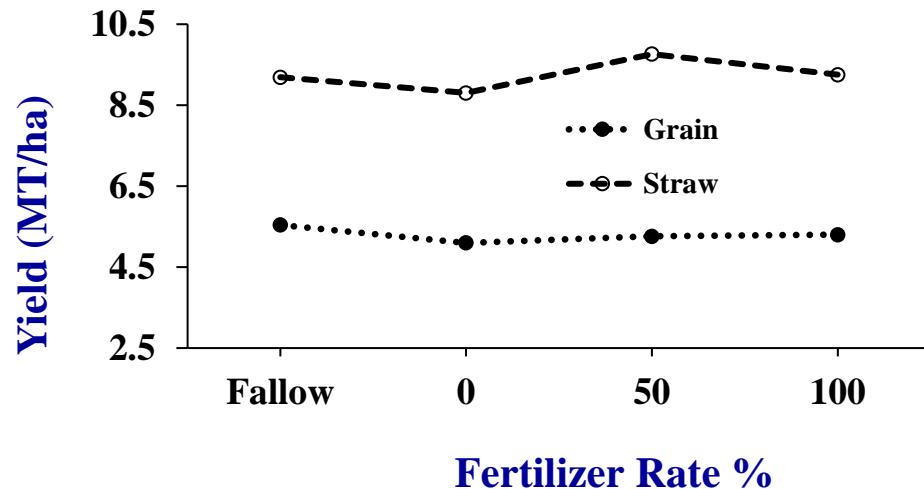
# Residual Effect of Winter Rye Cover Crop on Canola

**Averaged over 2019-2020**

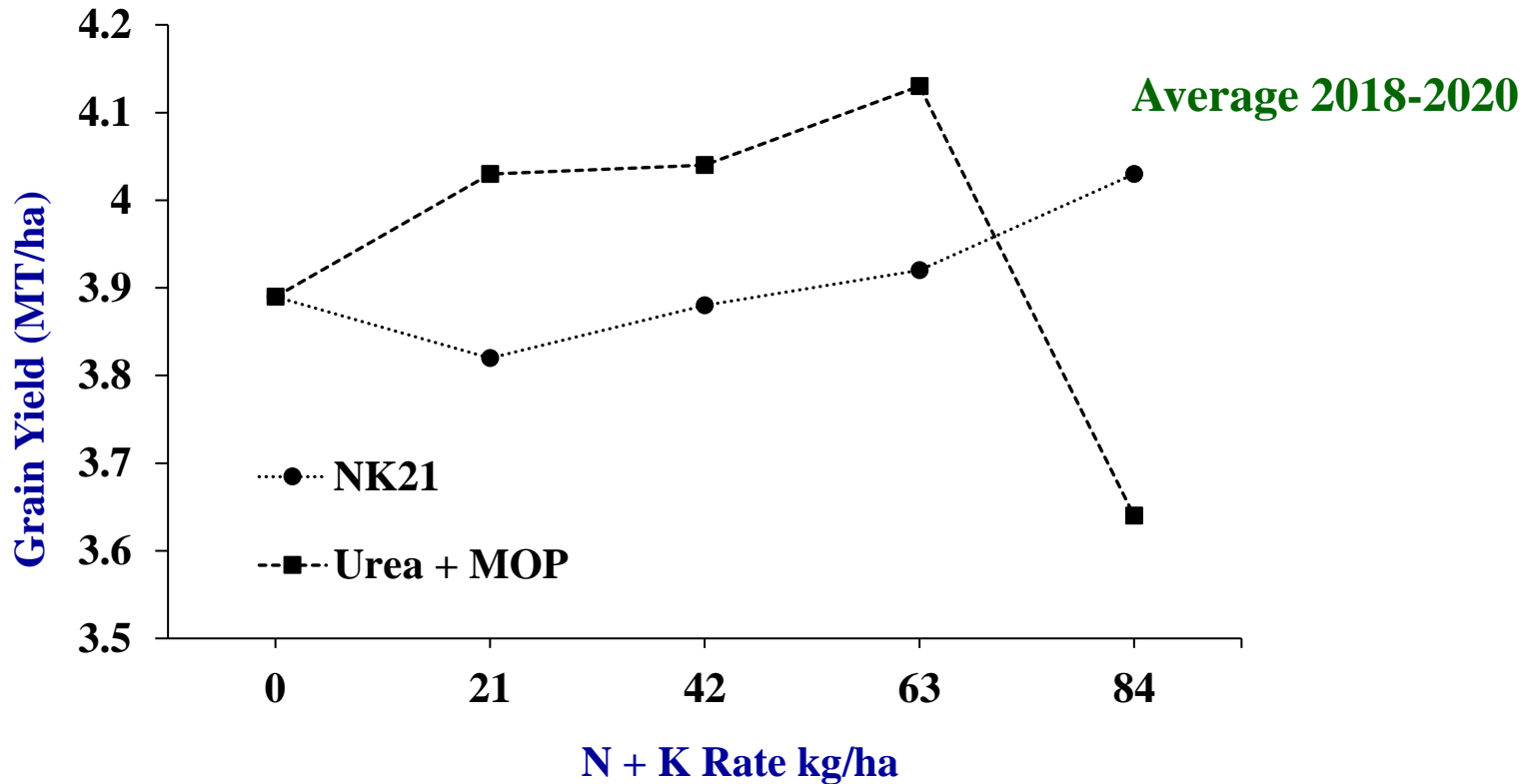


**There was no effect of Winter Rye cover crop (at different seed and fertilizer rates) on canola seed yield in the subsequent year!**

**Seed yields for canola in 2020 were about half of yields in 2019 due to the hot and dry June and July 2020!**

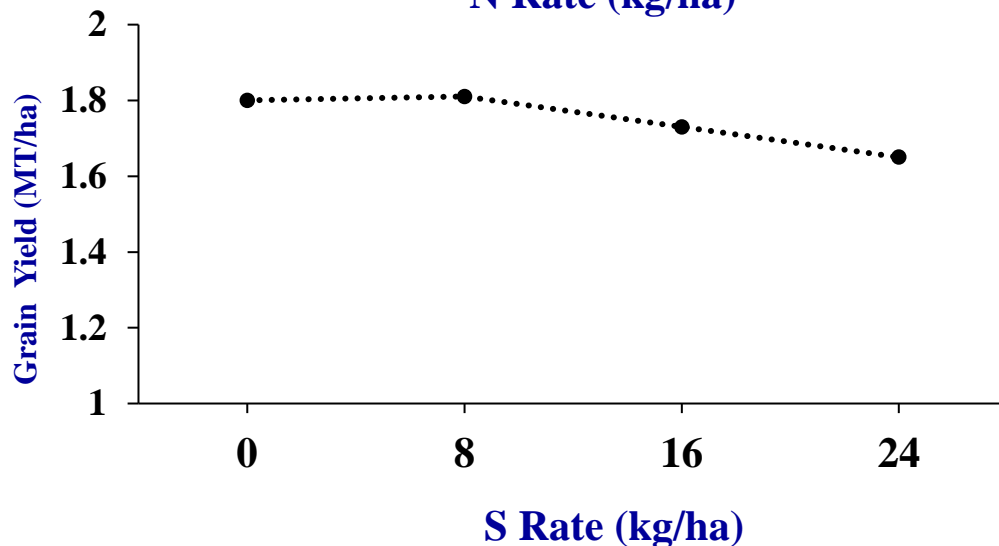
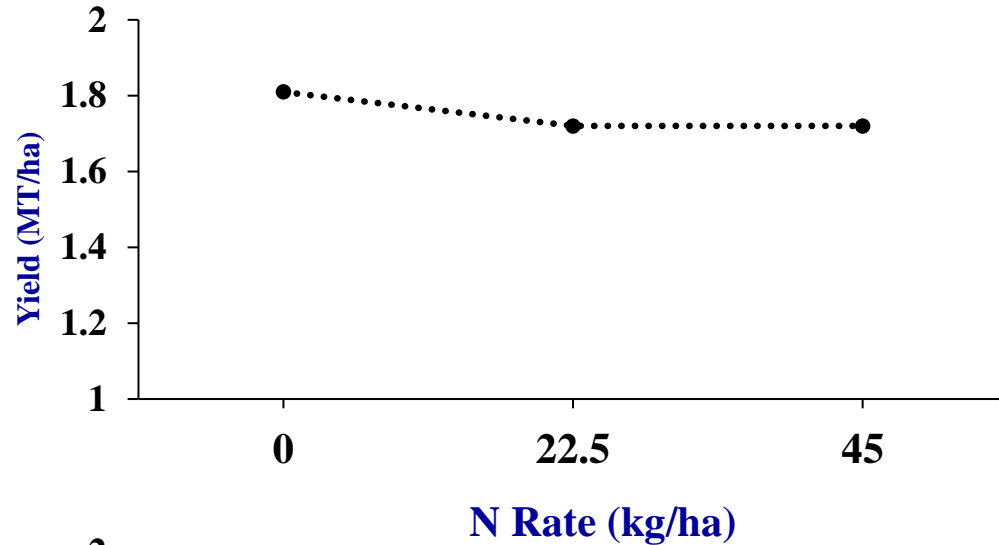


**Although there was no effect from Winter Rye cover crops on canola growth in subsequent year, there could be soil health and weed control benefits from cover cropping in the long run!**



- **Highest grain yield (4.13 MT/ha) was obtained with urea + MOP @ 63 kg N+K<sub>2</sub>O/ha.**
- **There was no significant difference between the check and any treatments; Soybeans could be grown without the addition of N and K!**
- **An advantage of NK21 is the application of two nutrients from one source in one go!**

**Averaged over 2019-2020**



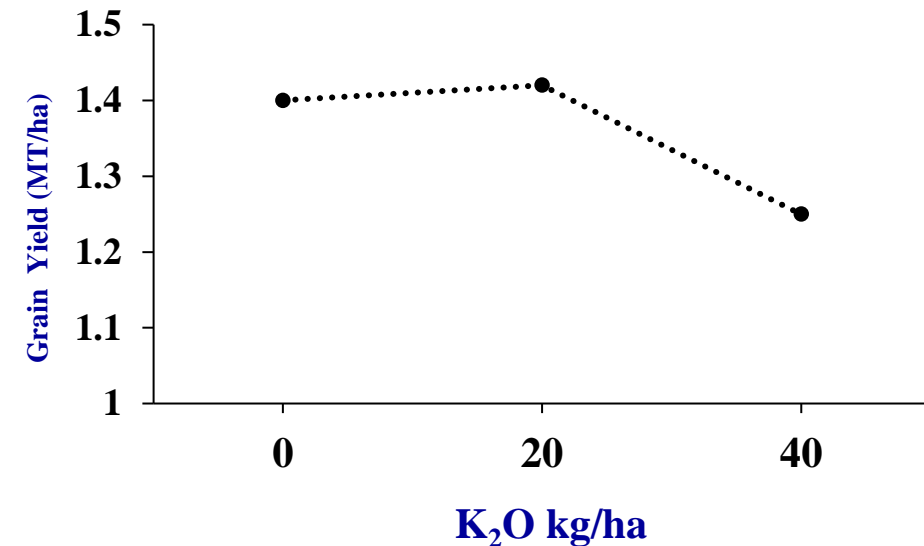
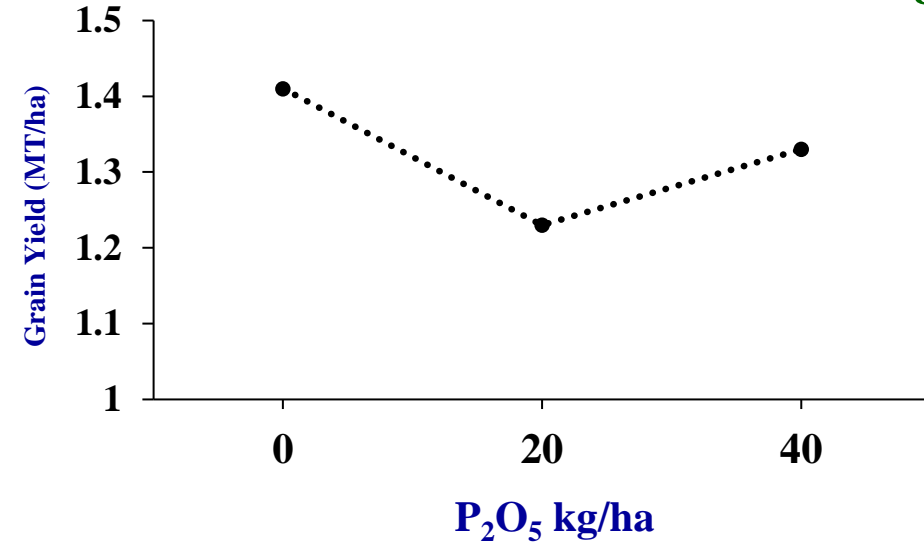
**Grain yields in 2020 were extremely poor due to hot and dry summer! Trial mean grain yield of 0.78 MT/ha; compared to 2.80 MT/ha in 2019!**

**There was no significant difference between the check and any treatments.**

**The application of N and S didn't improve lentils grain yield!**

# P and K Management for Lentils

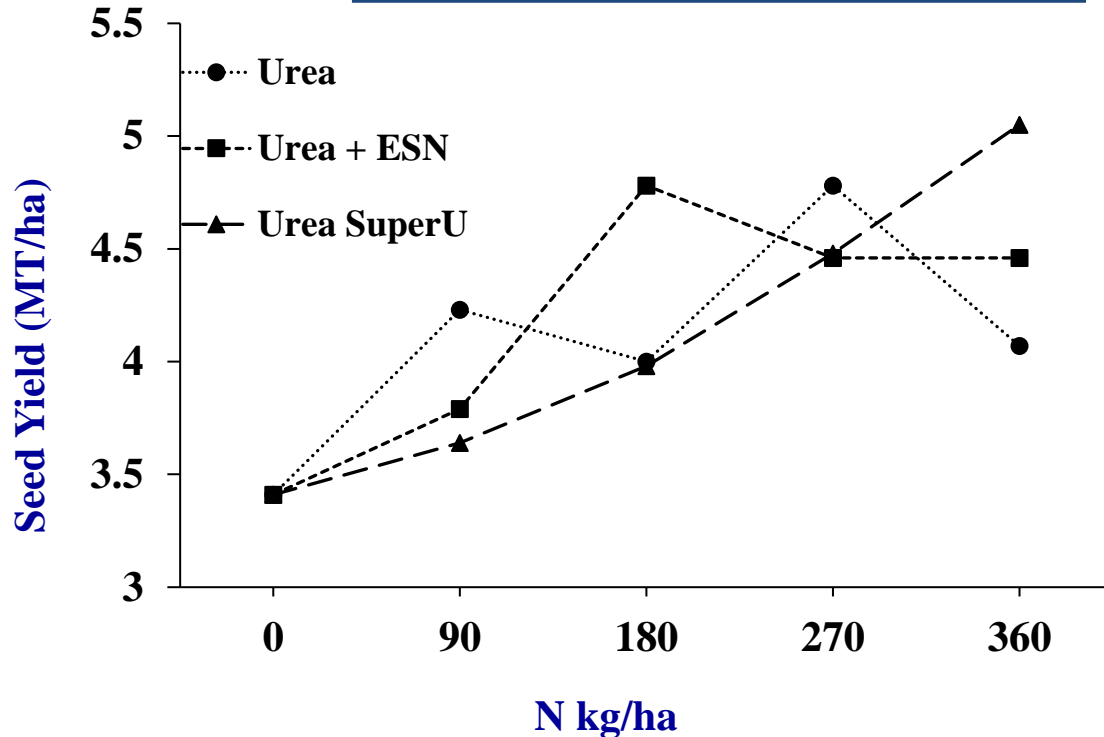
Averaged over 2019-2020



- Grain yields were extremely poor due to hot and dry summer! Trial mean grain yield of **0.60 MT/ha**, compared to **2.11 MT/ha** in 2019!
- There was no significant difference between the check and any treatments.
- **The application of P and K didn't improve lentils grain yield!**
- **Lentils could be grown without application of N, P, K, and S!**

# Canola Response to High Rates of N from Different Sources

Averaged over  
2019-2020



- Highest seed yield (5.05 MT/ha) was obtained with Urea SuperU at 360 kg N/ha.
- Seed yields at 180 kg N/ha from Urea + ESN (4.78 MT/ha) was the same as seed yield from Urea alone @ 270 kg N/ha!
- Promising seed yield (4.53 MT/ha) was obtained in a new treatment this year with 180 kg N/ha from a blend of Urea + ESN + Urea SuperU!

## Apex, Top Phos, EXCELIS MAXX and Bio-Stimulants on Canola

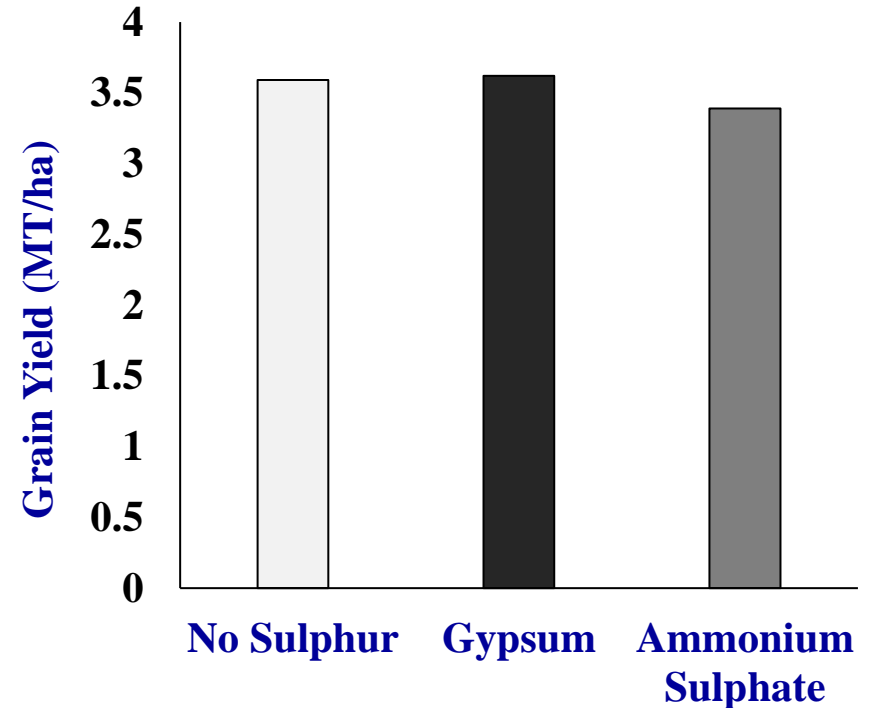
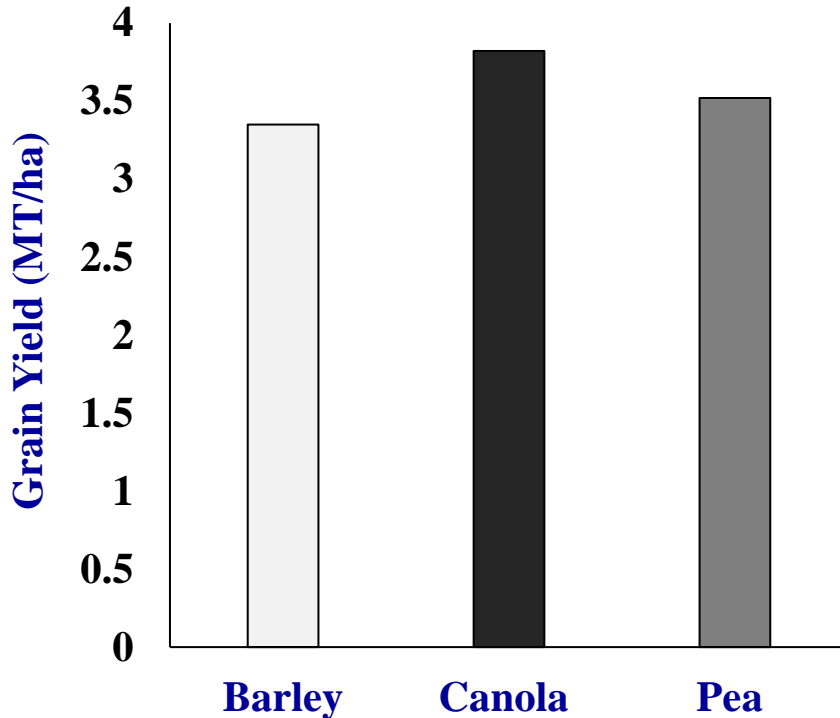
- **Neither Apex (new N fertilizer) nor Top Phos (new P fertilizer) improved the seed yield of canola as compared to the farmers' practices!**
- **Bio-stimulants namely FA Starter and IRYS showed some positive effect on the canola seed yield.**
- **The use of EXCELIS MAXX treated urea equaled the yield with farmers' practice (blend of urea, and ESN)!**
- **This was the first year of the experiment and needs to be repeated for two more years!**



# Gypsum and Ammonium Sulphate as Sources of Sulphur for Barley, Canola, and Pea

**Averaged over 2018-2020**

**– Residual Effect on Wheat**



- **Grain yield of Wheat after Canola was  $\geq$  than that after Pea  $\geq$  than that after Barley.**
- **There was no residual effect of Gypsum or Ammonium Sulphate applied to previous crops on Wheat grain or straw yield!**

## Comparative Performance of Gypsum and Lime on Galega

<b>Treatment</b>	<b>DMY (kg/ha) 2020</b>	<b>DMY (kg/ha) 2019-2020</b>	<b>% Protein 1<sup>st</sup> Cut 2019-2020</b>
<b>Check (No Lime or Gypsum)</b>	<b>1105</b>	<b><u>3637</u></b>	<b>14.2</b>
<b>Gypsum @1.25 MT/ha</b>	<b>1255</b>	<b>3659</b>	<b>16.2</b>
<b>Gypsum @2.5 MT/ha</b>	<b>1294</b>	<b><u>4336</u></b>	<b>16.6</b>
<b>Gypsum @3.75 MT/ha</b>	<b>1055</b>	<b>3473</b>	<b>15.5</b>
<b>Lime @1.07 MT/ha</b>	<b>1185</b>	<b>4159</b>	<b>16.3</b>
<b>Lime @2.14 MT/ha</b>	<b>1510</b>	<b><u>4594</u></b>	<b>15.5</b>
<b>Lime @3.21 MT/ha</b>	<b>1202</b>	<b>3787</b>	<b>16.3</b>

**S was balanced in gypsum and lime treatments!**

<b>Treatment (kg/ha)</b>	<b>DMY (kg/ha) 2020</b>	<b>DMY (kg/ha) 2019-2020</b>	<b>1<sup>st</sup> Cut Protein Content (%) 2019-2020</b>
<b>Check (0 N, S, B, Zn, &amp; Mn)</b>	<b>1104</b>	<b>3854</b>	<b>17.5</b>
<b>45 N, 0 S, 0 B, 0 Zn, &amp; 0 Mn</b>	<b>1576</b>	<b><u>5231</u></b>	<b>17.1</b>
<b>45 N, 24 S, 0 B, 0 Zn, &amp; 0 Mn</b>	<b>1422</b>	<b>5254</b>	<b>17.5</b>
<b>45 N, 24 S, 1 B, 0 Zn, &amp; 0 Mn</b>	<b>1369</b>	<b>4089</b>	<b>17.3</b>
<b>45 N, 24 S, 1 B, 7 Zn, &amp; 0 Mn</b>	<b>1567</b>	<b>5185</b>	<b>17.8</b>
<b>45 N, 24 S, 1 B, 7 Zn, &amp; 2 Mn</b>	<b>1690</b>	<b>5305</b>	<b>16.3</b>
<b>45 N, 36 S, 2 B, 7 Zn, &amp; 2 Mn</b>	<b>1531</b>	<b>4454</b>	<b>17.3</b>
<b>45 N, 36 S, 3 B, 7 Zn, &amp; 2 Mn</b>	<b>1625</b>	<b>5406</b>	<b>17.7</b>
<b>45 N, 36 S, 4 B, 7 Zn, &amp; 2 Mn</b>	<b>1387</b>	<b>4726</b>	<b>16.9</b>
<b>60 N, 36 S, 2 B, 7 Zn, &amp; 2 Mn</b>	<b>1853</b>	<b>5330</b>	<b>18.6</b>

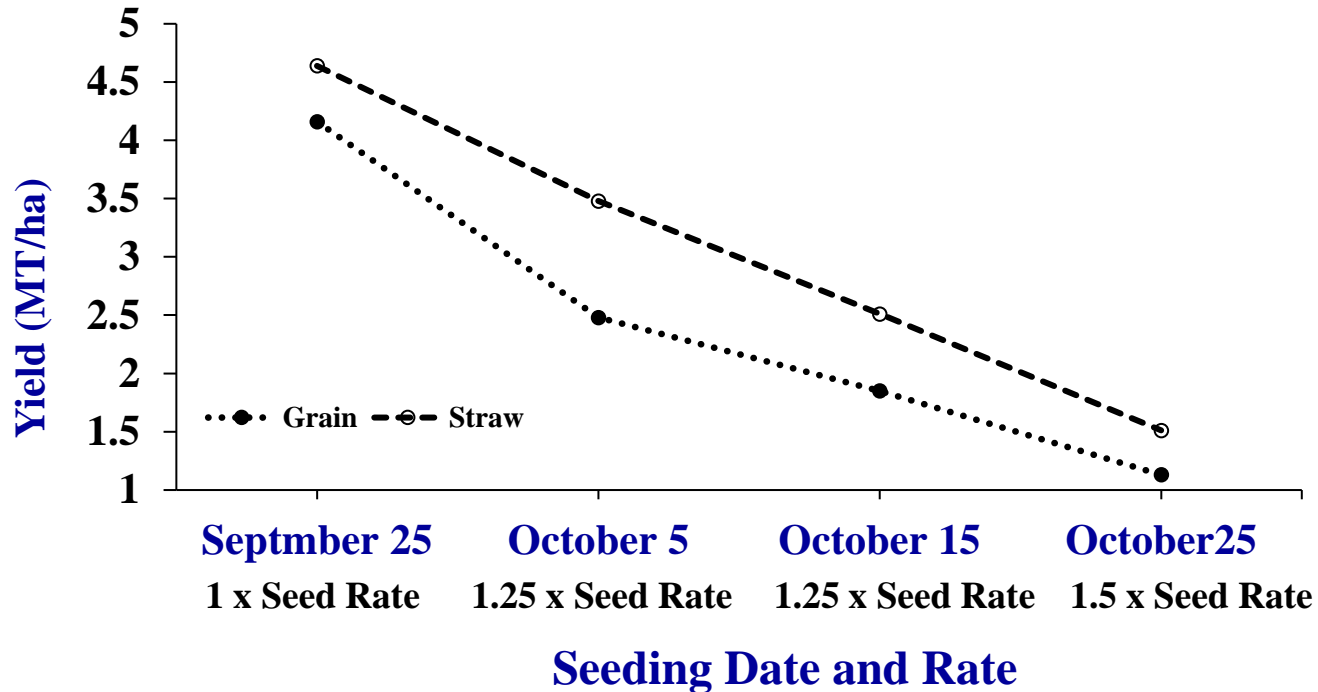
# Effect of Fungicides on Diseases and Grain Yields in Spring Cereals

- **Due to the hot and dry weather during June and July there were very low diseases; FHB score was ZERO!**
- **None of the fungicide treatments gave higher grain yield than the check (no fungicide) in any of the spring cereals!**
- **Septoria score went from 3 with no fungicides to 0 with all three fungicides (Stratego, Prosaro and Caramba)!**
- **Higher disease pressure is required to know the economic benefit from the fungicides application!**

<b>Seeding Date</b>	<b>Grain</b>	<b>Straw</b>
<b>August 25</b>	<b>5.62</b>	<b>6.99</b>
<b>September 5</b>	<b>6.36</b>	<b>7.42</b>
<b>September 15</b>	<b>7.25</b>	<b>7.82</b>
<b>September 25</b>	<b>5.40</b>	<b>6.23</b>
<b>October 5</b>	<b>4.23</b>	<b>4.81</b>
<b>October 15</b>	<b>2.97</b>	<b>4.01</b>

**Winter Rye Seeded on Sep 15 gave the maximum grain and straw yields!**  
**Delay in seeding up to Sep 15 increased yields, and the yields declined thereafter!**

# Winter Rye Date and Rate of Seeding



**Increasing seeding rates by 25-50% in seedings after Sep 25 did not help curtailing the consistent decline in yield with each successive delay in seeding date!**

# Effect of Winter Rye Cover Cropping on Spring Crops

**Spring Crops were planted on June 6, were caught in hot and dry weather in June/July and did not reach full maturity; therefore only biomass yields were recorded!**

**Winter Rye cover crop with or without fertilizers did not produce higher biomass yields for any of the spring crops as compared to the fallow (no cover cropping)!**

**Although there was no difference between cover crop and fallow, cover crop may provide some soil health and weed control benefits in the long run!**

## Alternate Forage Legumes

<b>Treatment</b>	<b>DMY (kg/ha) 2020</b>	<b>DMY (kg/ha) Mean 2019-'20</b>	<b>Protein (%)* 2020</b>	<b>RFV* 2020</b>
<b>Alfalfa</b>	<b>3444<sup>a</sup></b>	<b>2952<sup>a</sup></b>	<b>18.8</b>	<b>130</b>
<b>Galega</b>	<b>1854<sup>ab</sup></b>	<b>1248<sup>b</sup></b>	<b>13.4</b>	<b>117</b>
<b>Red Clover</b>	<b>2939<sup>ab</sup></b>	<b>3037<sup>a</sup></b>	<b>19.1</b>	<b>122</b>
<b>Birdfoot Trefoil</b>	<b>2385<sup>ab</sup></b>	<b>1956<sup>b</sup></b>	<b>19.6</b>	<b>128</b>
<b>Sainfoin (20 kg/ha)</b>	<b>1467<sup>b</sup></b>	<b>1215<sup>b</sup></b>	<b>19.6</b>	<b>128</b>
<b>Sainfoin (30 kg/ha)</b>	<b>1893<sup>ab</sup></b>	<b>1660<sup>b</sup></b>	<b>14.7</b>	<b>118</b>
<b>Sainfoin (40 kg/ha)</b>	<b>1881<sup>ab</sup></b>	<b>1631<sup>b</sup></b>	<b>12.7</b>	<b>121</b>
<b>Sainfoin (50 kg/ha)</b>	<b>1540<sup>b</sup></b>	<b>1739<sup>b</sup></b>	<b>13.2</b>	<b>120</b>

**\*First Cut!**

**The addition of alternate forage legumes could be beneficial?**



<b>Treatment</b>	<b>DMY (kg/ha) 2020</b>	<b>DMY (kg/ha) Av. 2019-2020</b>	<b>Protein (%) 2020</b>	<b>RFV 2020</b>
<b>Alfalfa seeded at 15kg/ha (Check)</b>	<b>2570<sup>a</sup></b>	<b>2217</b>	<b>20.4</b>	<b>141</b>
<b>Galega seeded in spring as early as possible</b>	<b>2052<sup>ab</sup></b>	<b>1858</b>	<b>20.4</b>	<b>110</b>
<b>Allow weeds to come out, kill weeds then seed Galega</b>	<b>1424<sup>b</sup></b>	<b>1899</b>	<b>20.1</b>	<b>121</b>
<b>Galega seeded after barley harvested at boot stage</b>	<b>1489<sup>b</sup></b>	<b>1689</b>	<b>20.3</b>	<b>127</b>
<b>Galega seeded mid-July after killing weeds</b>	<b>1426<sup>b</sup></b>	<b>1767</b>	<b>19.6</b>	<b>114</b>
<b>Galega seeded after pre-plant incorporation of Rival @ 3L/ha</b>	<b>2008<sup>ab</sup></b>	<b>2369</b>	<b>19.4</b>	<b>126</b>
<b>Galega seeded after pre-plant incorporation of Sencor @ 475g/ha</b>	<b>1458<sup>b</sup></b>	<b>1472</b>	<b>17.3</b>	<b>118</b>
<b>Galega sprayed with Sencor @ 275 g/ha post emergent</b>	<b>1849<sup>ab</sup></b>	<b>1525</b>	<b>17.8</b>	<b>119</b>
<b>Galega sprayed with Basagran Forte @ 1.75 L/ha post emergent</b>	<b>1849<sup>ab</sup></b>	<b>1952</b>	<b>20.2</b>	<b>122</b>
<b>Galega sprayed with Pursuit @ 210 ml/ha + Ag-Surf @ 0.25% v/v post emergent</b>	<b>1849<sup>ab</sup></b>	<b>2272</b>	<b>20.3</b>	<b>116</b>

# Conclusions

- **We had a very hot and dry June and July in 2020 which impacted the crops' growth and yield; except that of soybean and edible beans!**
- **AAC Wheatland and AAC Starbuck (Spring Wheat) could be recommended for cultivation in 2021!**
- **Synasolis/Boroe (Spring Barley) gave the highest grain yields!**
- **AB Brewnet is a new promising Malting Barley variety!**
- **CDC Bow's (best over 2017-'20) grain and straw yields declined over the years!**
- **CDC Arborg and AAC Rigodon were high yielding Oat varieties!**
- **Even though Keldin and Gallus (Winter Wheat) gave better grain yields than AAC Gateway, these can't be recommended because they are often prone to winter kill!**

- **Late (mid Sep) seeded Winter Wheat could be a promising addition to cropping systems!**
- **Edible Beans (AAC Scotty) could be added to the crop rotations!**
- **Bourke R2X which has some disease resistance was the top yielding Soybean variety!**
- **Field Peas were eaten by deer and geese!**
- **Lentils and Linseed Flax had very poor yields (hot and dry weather)!**
- **L252, L241C and L230 were the top yielding Liberty Canola varieties!**
- **5545CL was the other top yielding Canola variety in 2020!**

# Conclusions

- **Winter Canola has failed to winter survive (past two years)!**
- **AC200 was the highest yielding Mustard variety!**
- **Galega had higher yield and protein content than Alfalfa (2012-'20)!**
- **Urea + ESN at 105 kg N/ha produced the best yield for Malting Barley! Sulphur had no effect on Malting Barley yield!**
- **Urea + ESN @ 80 kg N/ha produced the best grain yield in Wheat!**
- **Hazlet and Guttino were the best Winter Rye varieties; use 100% recommended seed and fertilizer rates!**
- **NK21 and Urea + MOP gave similar grain yields of soybeans!**

# Conclusions

- **Lentils could be grown without addition of N, P, K and S!**
- **It pays to use multiple sources of N (urea, ammonium sulphate and ESN) as compared to urea alone!**
- **Seed yield in canola with urea + ESN @ 180 kg N/ha equaled that from urea alone @ 270 kg N/ha!**
- **Gypsum or Amm. Sulphate applied to barley, canola and peas had no residual effect on grain or straw yield of wheat in the next year!**
- **September 15 is the optimum time to seed Winter Rye!**
- **There was no residual effect of Winter Rye (at different seed/or fertilizer rates) cover cropping on Canola!**
- **Kernza could be grown in mixture with alfalfa!**

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*Thank You!*

Any Questions?