

MN Canola Production Center

Research Results - 2015



UNIVERSITY OF MINNESOTA

Research Team

- **Dr. Nancy Ehlke - Overall project lead, trial design and data analysis**
- **Donn Vellekson - U of MN Mag Farm manager, field layout and data collection**
- **Dave Grafstrom - Coordinate day-to-day activities in small plot and large on-farm trials**
- **Summer intern/s assist in data collection**



MN Canola Council - CPC

- **The 2015 CPC was located 5 miles northwest of Roseau in cooperation with Magnusson Farms Inc**
- **CPC Partners:**
 - ❖ **MN Canola Council**
 - ❖ **U of MN**
 - ❖ **NDSU**
 - ❖ **Canola seed companies and industry**
- **Large on-farm trial - Hugh Hunt, Hallock, MN**
- **Canola rotation trial - Peter Grafstrom, 5 miles east of Roseau, MN**



Magnusson Research Farm



CPC Research Trials in 2015

- **Small plot variety trial**
- **Small plot fertility trial**
- **Small plot fungicide trial**
- **Three year canola rotation trial**
 - **Canola, wheat, soybeans**
- **Large on-farm**
 - **Swath vs. direct harvest**



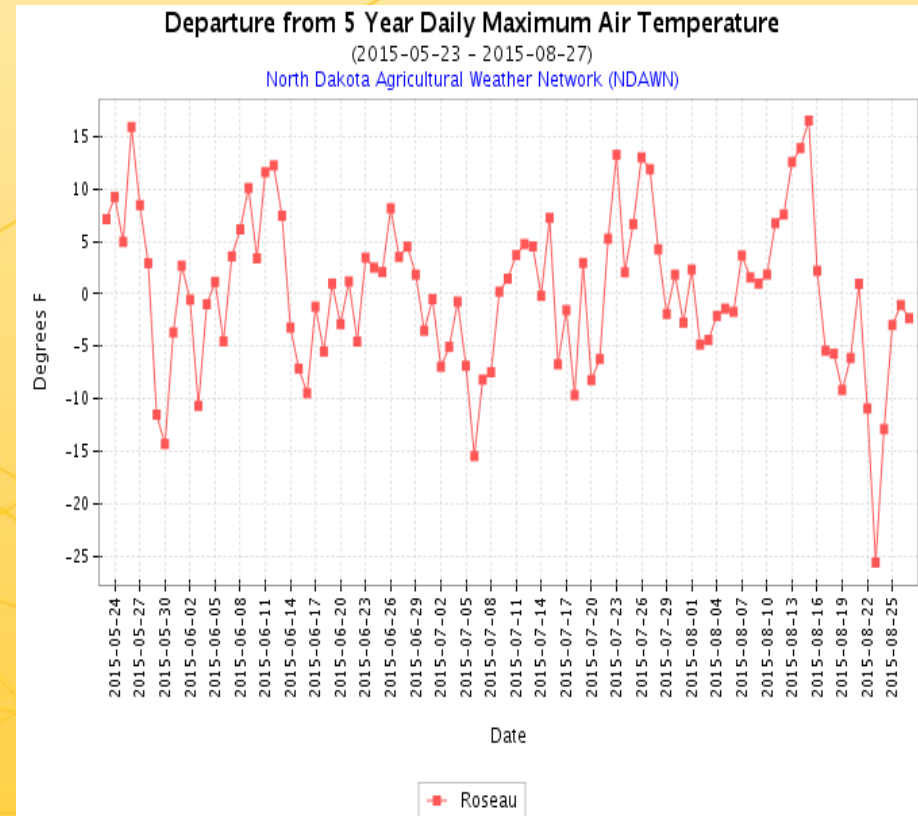
Canola CPC: Activities in 2015

- **Small plot trials planted May 23**
- **On-farm trials planted late April**
- **CPC Field Day - July 15**
- **First canola swathed August 21**
- **Final harvest date September 16**



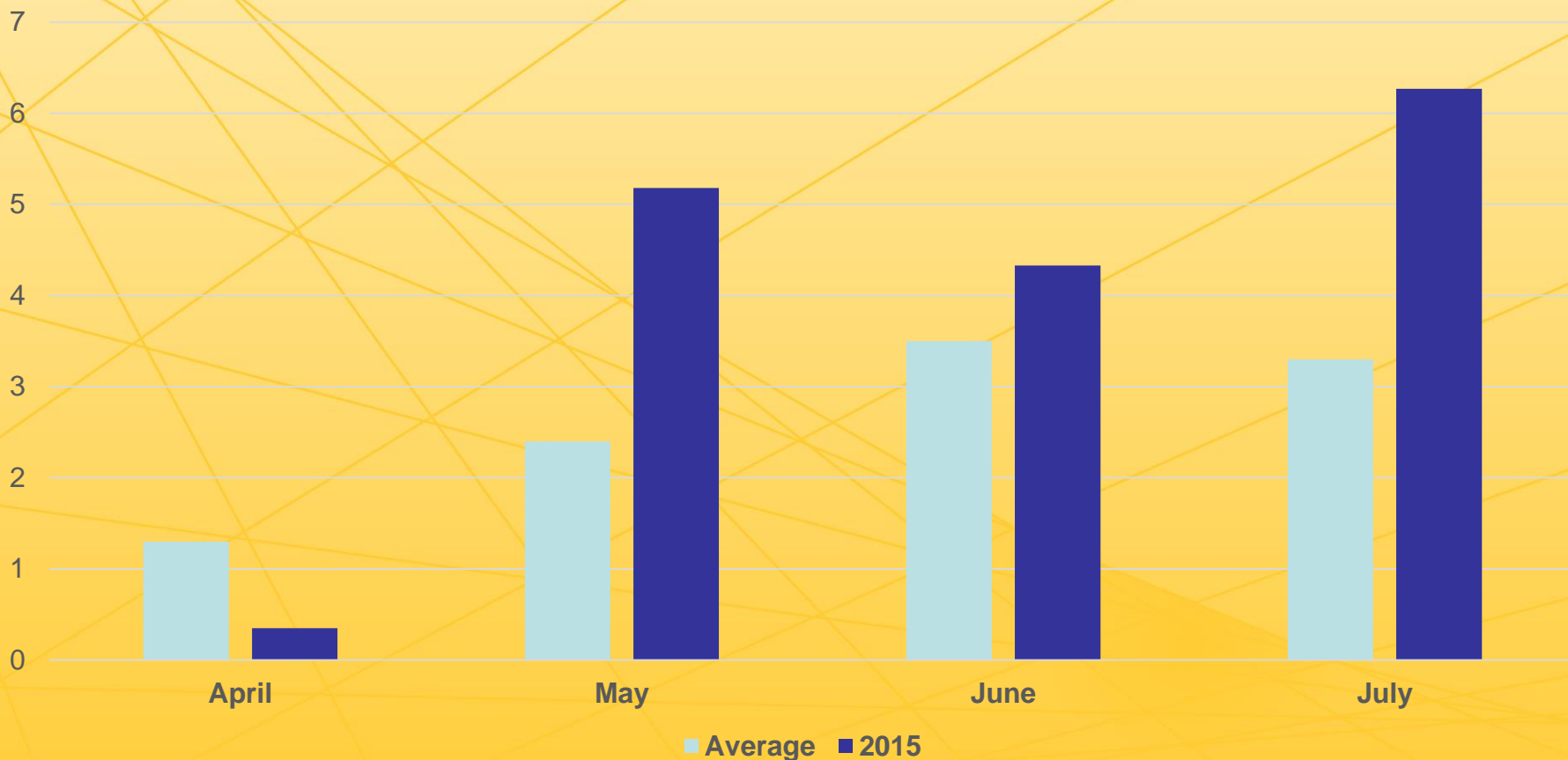
2015 Growing Season - Recap

- **Dry winter**
- **Dry early spring**
- **Cool and wet summer**
- **White mold**
- **CPC canola yields above average**
- **Production fields, dry early, wet conditions in June and July**



Roseau Rainfall in April - July Average Compared to 2015

Rainfall in Inches



Small Plot Canola Variety Trial

- Planted May 23, 2015
- RCB w/4 replications
- 27 canola varieties
- 20 RR, 4 LL & 3 CL
- Harvested 8/25 & 9/16
- Yields ranged from 2,025 to 3,212 #/A
- Trial average yield was 2620 #/A



Small-Plot Variety Trial - 2015

- **27 entries**
 - 20 Roundup Ready®
 - 4 Liberty Link®
 - 3 Clearfield®
- **8 companies**
 - Bayer
 - Brett Young
 - DuPont Pioneer
 - Mycogen
 - Monsanto
 - Proseed
 - Star Specialty Seeds
 - Winfield Solutions



Top Three Canola Varieties @ 2015 MN CPC

Yield (#/acre)

- InVigor L252 3,212
- HyClass 970 3,068
- CL2562966H 2,997

- Trial Mean 2,620

Oil (%)

- Star 402 52.5
- HyClass 930 51.4
- G28101 50.8

- Trial Mean 48.3



Summary Small-Plot Canola Variety Trial

- Trial average yield = 2,620 #/acre
- Trial range in yield: 2,085 - 3,212 #/acre
- Above average yields @ CPC in 2015
- Moderate white mold pressure, Proline 5.7oz/A applied to entire trial
- Limited flea beetle pressure in 2015
- Canola growers have excellent LL, CI and RR canola varieties adapted to this area





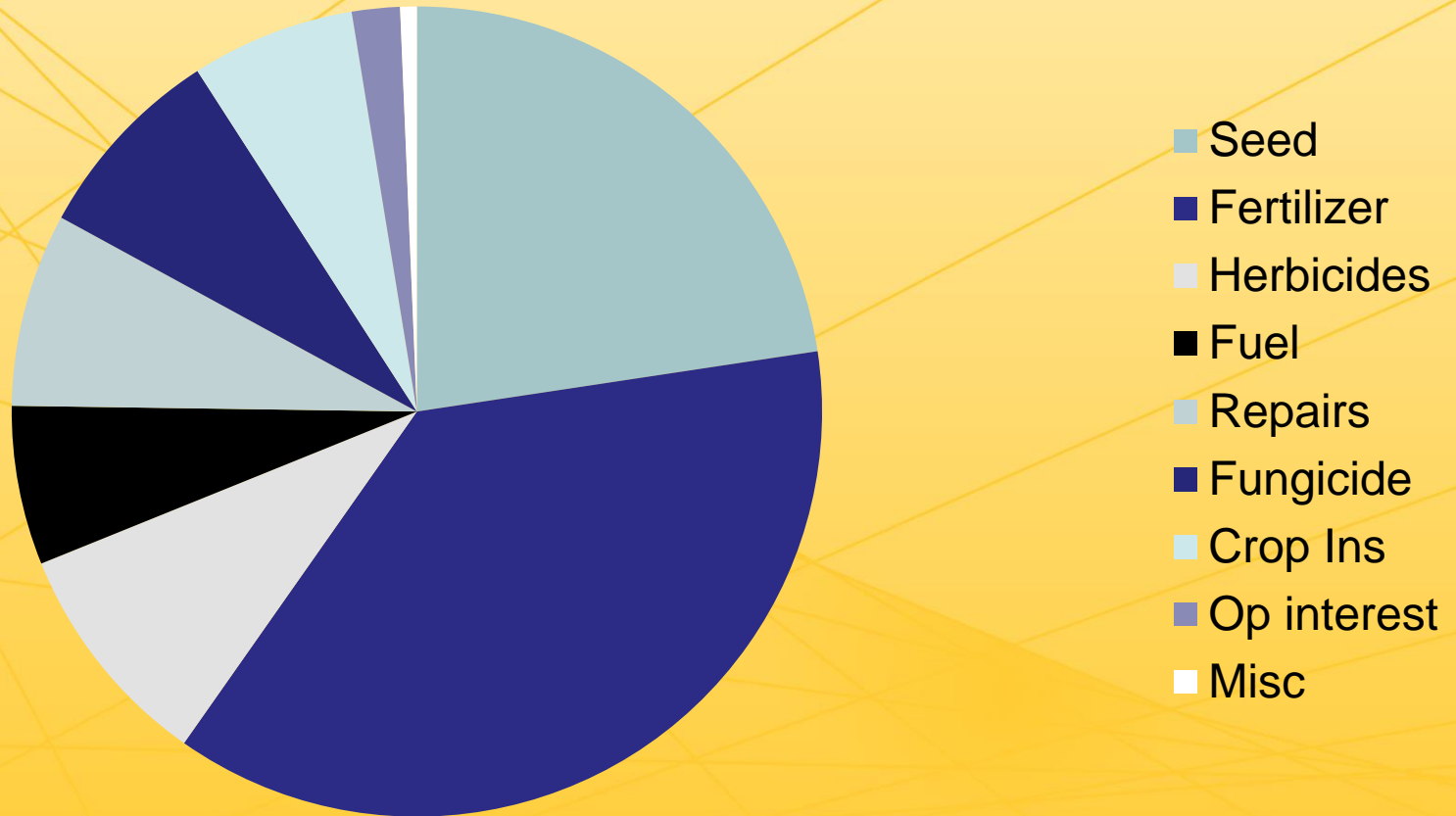
Canola Fertility

What do we know?

Canola Direct Costs (\$226.56) \$/A

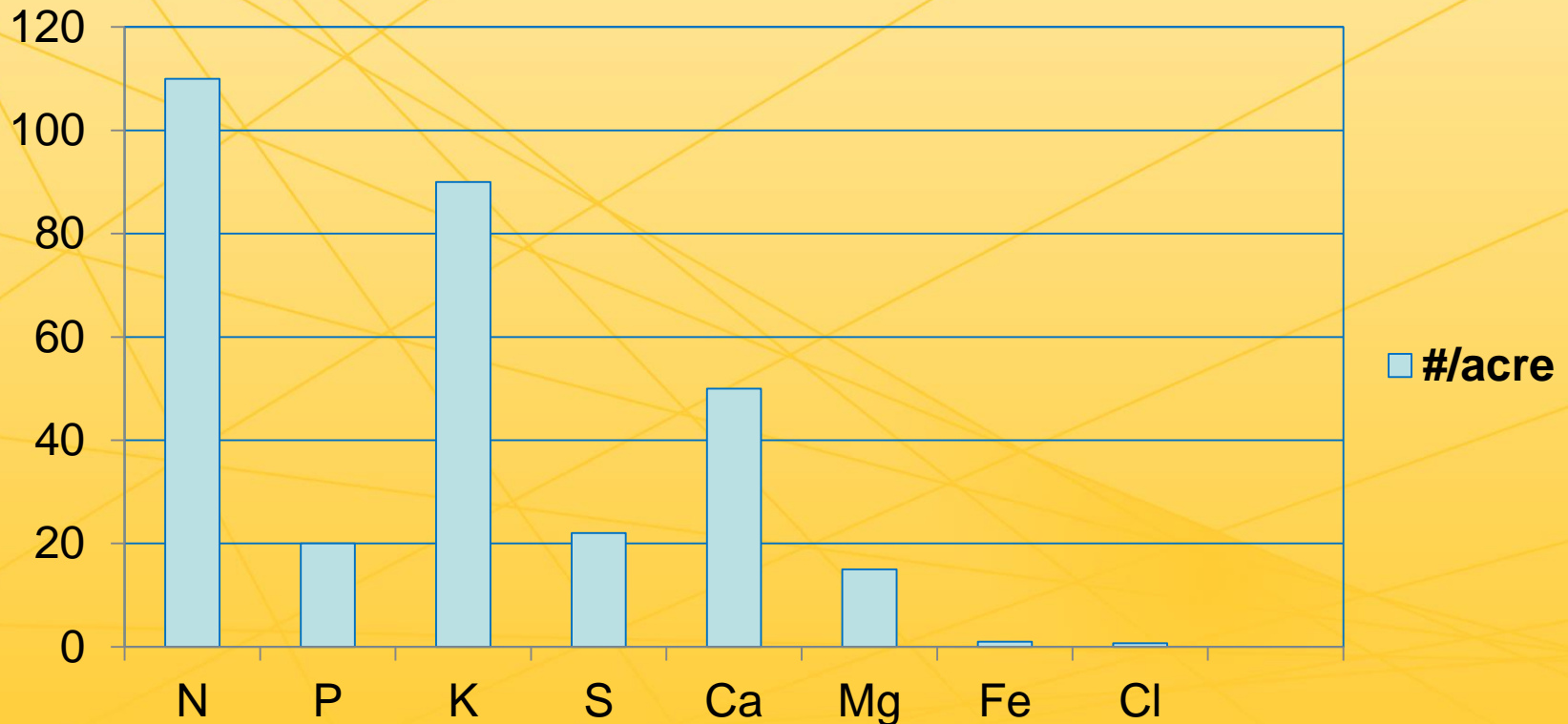
Source: NDSU Crop Budget - 2015

\$/acre



Nutrient Content (#/acre) in 35 (bu/acre) Canola Crop

Nutrient Content

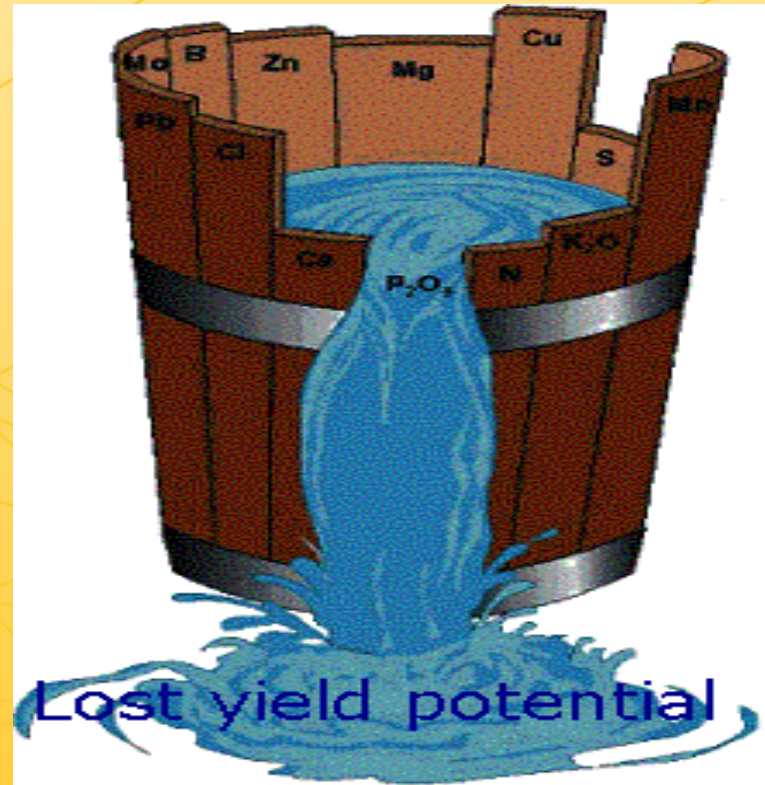


NW MN Soils

What do we know?

- Glacial Lake Agassiz is the origin of area soils
- Reduced nutrient uptake in cold soils - placement
- High pH soils limits root uptake of nutrients
- 'Mining' of soil P- 50 bu beans 40# P and 80 bu wheat 48# P
- 7-30-30 going backwards

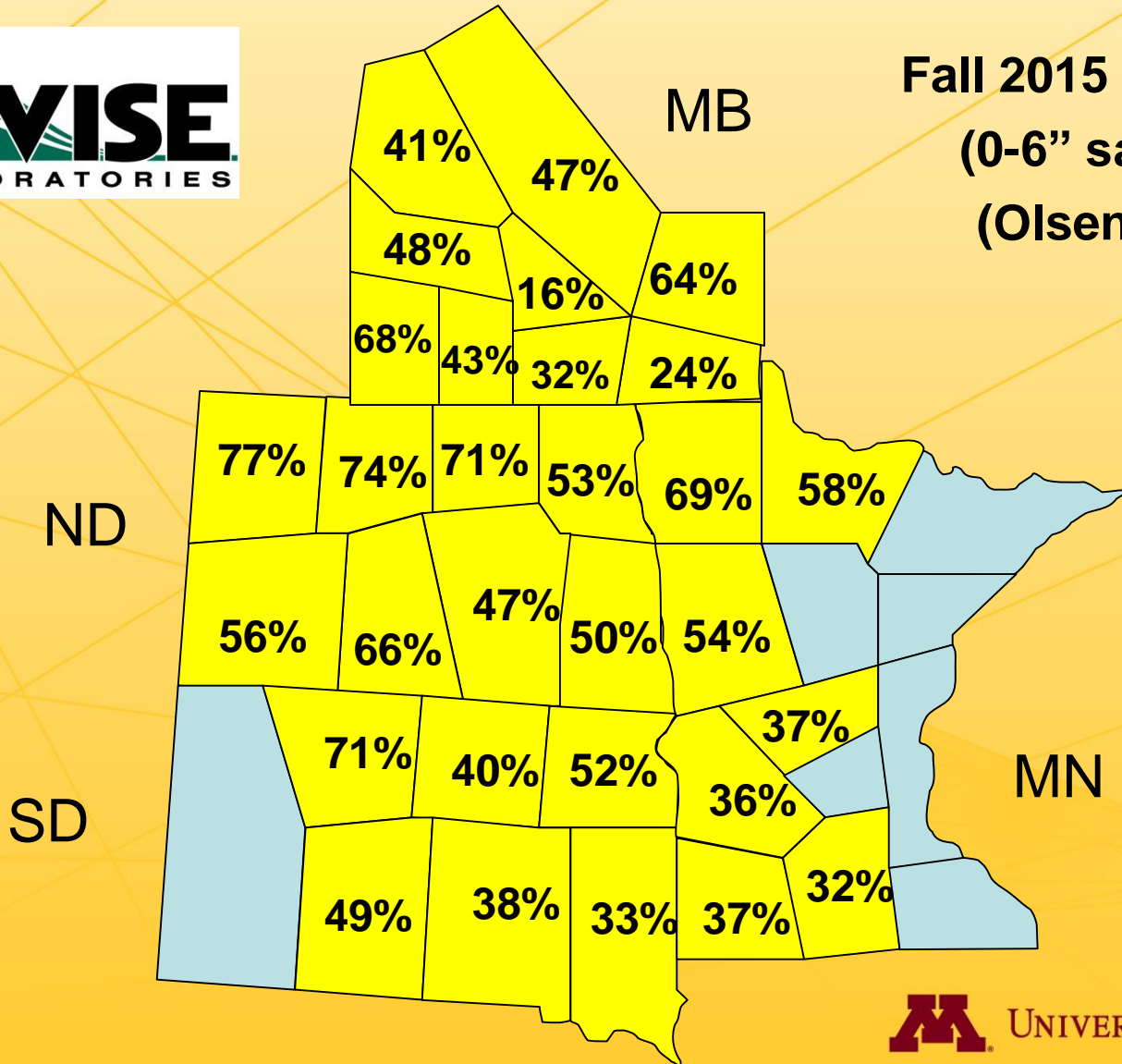
Law of the Minimum



% Soil Samples with Phosphorus less than 10 ppm



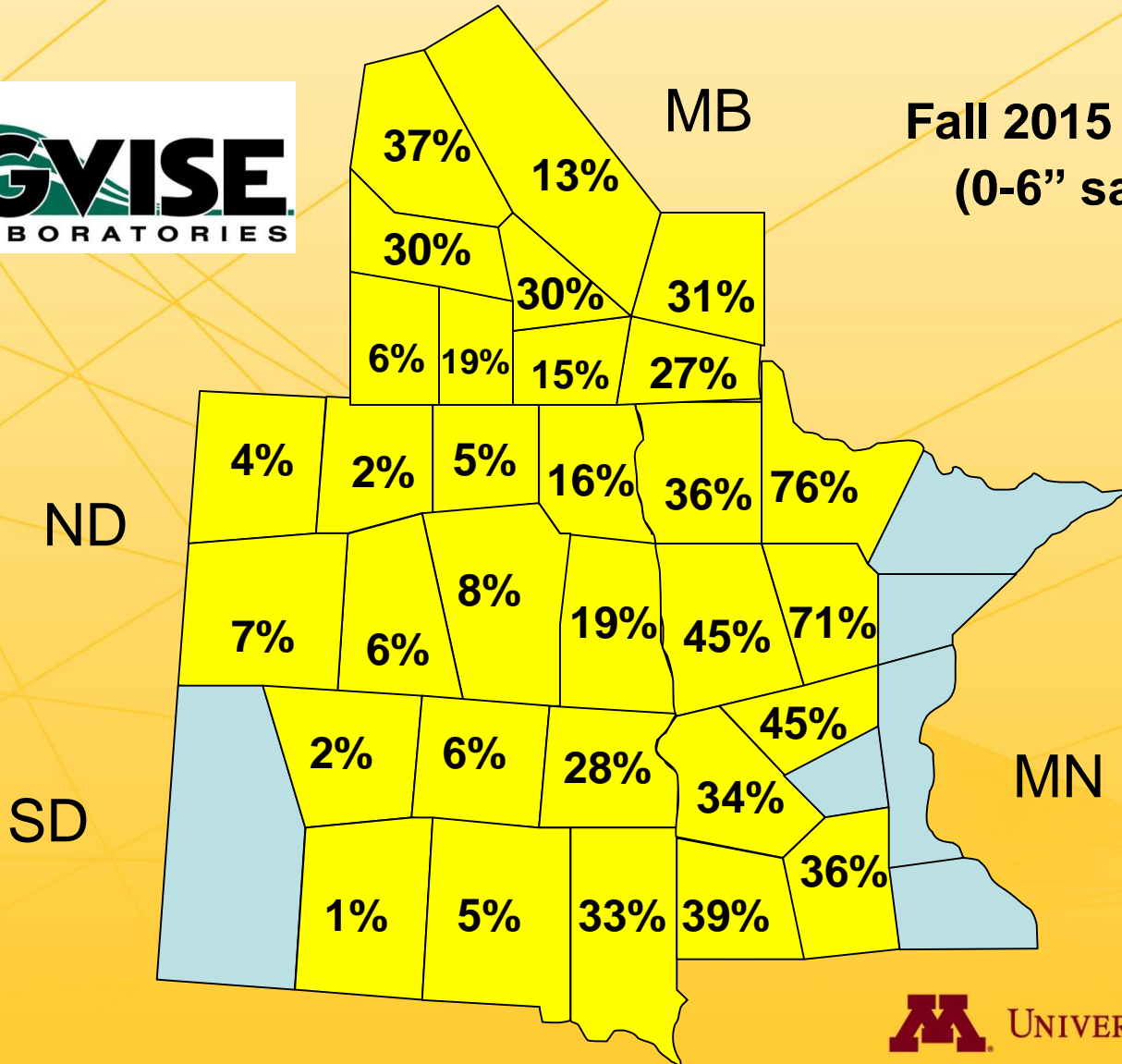
Fall 2015 samples
(0-6" samples)
(Olsen P test)



% Soil Samples with Potassium less than 150 ppm



Fall 2015 samples
(0-6" samples)



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Soil Test Calibrations*

Nutrient	Very Low	Low	Medium	High	Very High
	----- (ppm) -----				
Phosphorus	0-3	4-7	8-11	12-15	>16
Potassium	0-40	41-80	81-129	121-160	>161
	-----Probability of a Positive Response-----				
	>80 %	60-80%	40-60%	20-40%	<20%

*North Dakota Fertilizer Handbook

Nitrogen Use Efficiency

- **Strategies to reduce applied nitrogen loss**
 - Reduce waterlogged soil conditions
 - Incorporate nitrogen when possible
 - Delay N availability
 - Split applications
 - Coated urea (ESN)
 - Stabilized nitrogen (Agrotain)



Small Plot Fertility Treatments

- Urea PPI - 0, 45, 90, 135, 180
- Urea + ESN - 0, 45, 90, 135, 180
- Urea PPI + Post - 45+45, 45+90, 45+135
- Urea PPI + Post w/Agrotain Ultra
 - 45+45, 45+90, 45+135
- Urea Post - 0, 45, 90, 135
- Urea Post + Agrotain Ultra - 45, 90, 135
- Post treatments applied June, 15



Small Plot Fertility Trial

- Previous crop - wheat
- Planting date May 23
- RDB w/4 reps
- Background nitrogen
- 0-6 = 25#; 6-24 = 7#
- 26-40-40-20S - applied PPI to entire trial
- Post fertility applied June, 15 (3-5 lf canola)



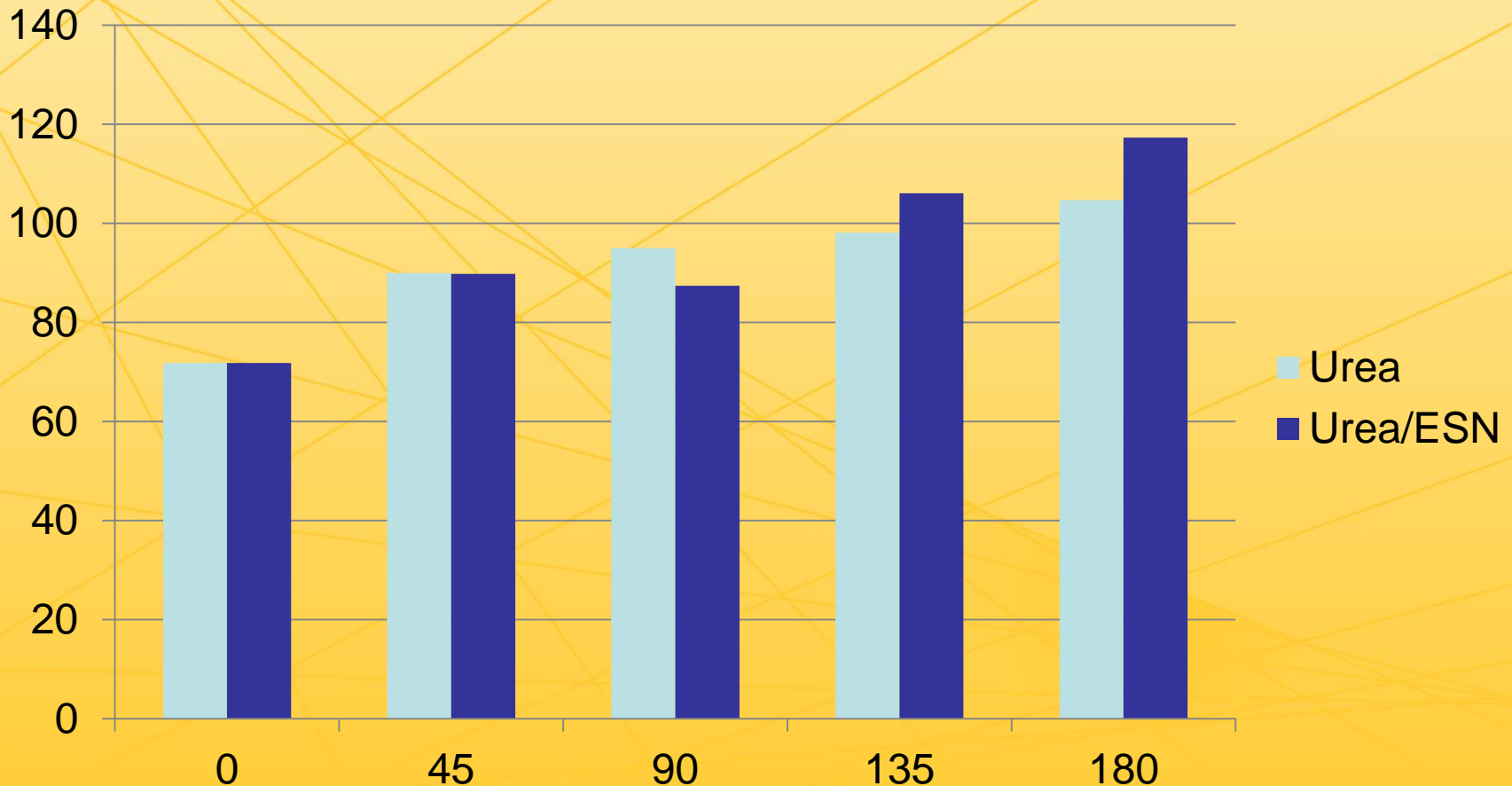
Canola Fertility Trial

- **Canola variety - InVigor LL 252**
- **Seeding date: May 23**
- **Post fertilizer applied June 15 to 3 to 5 lb canola**
- **0.5 inch rain after post fertilizer treatments applied**
- **Canola yields ranged from 2,503 to 3,361 #/A**



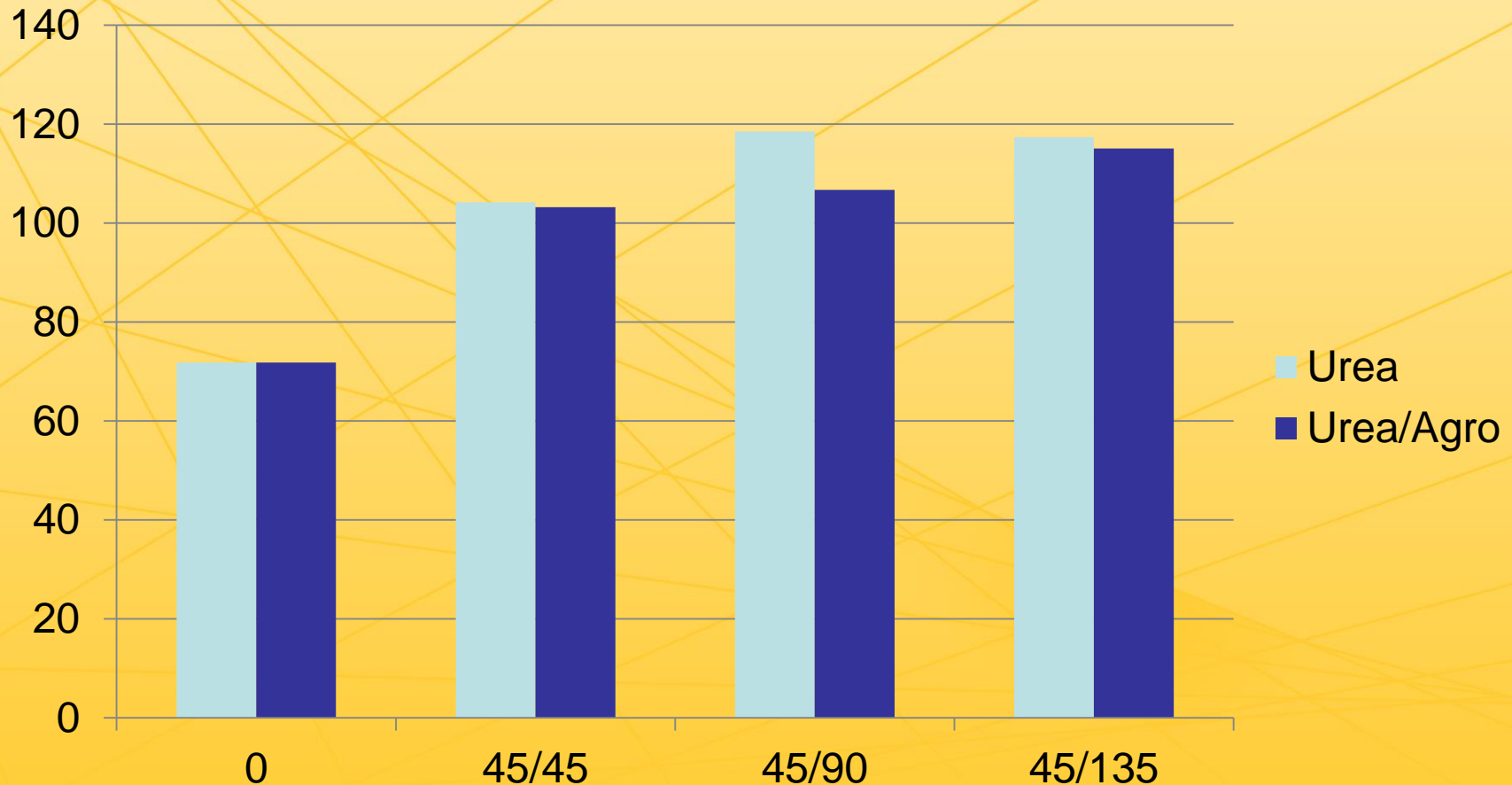
Canola Yield (% of Mean)

Mean Yield = 2,864 #/acre



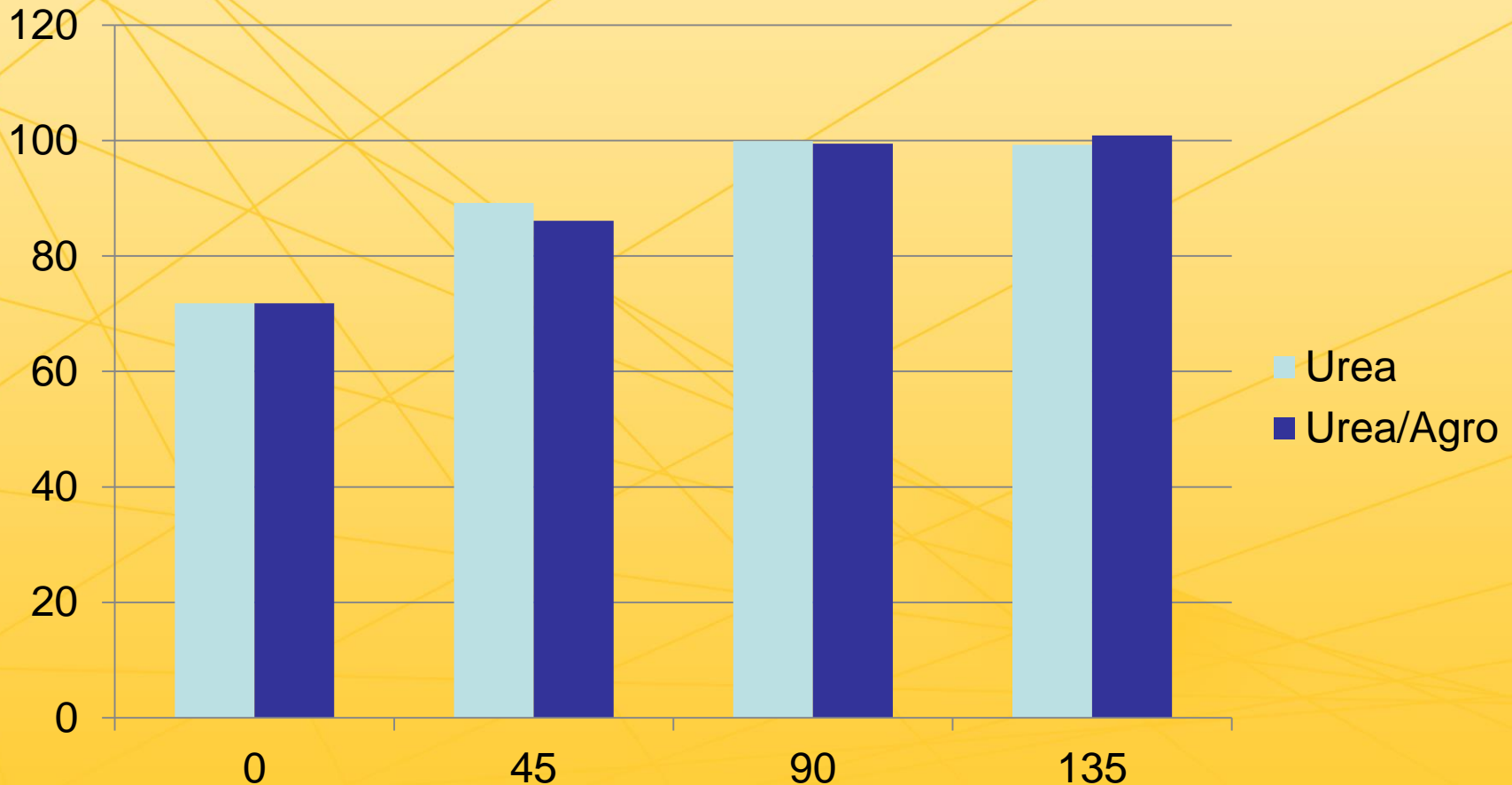
Canola Yield (% of Mean)

Mean Yield = 2,864 #/acre



Canola Yield (% of Mean)

Mean Yield = 2,864 #/acre



Canola Fertility Trial -Three Year Summary

TRT#	Nitrogen Timing/Source ²	Nitrogen Rate	2013-15 Yield 3yr.ave	Added Fertility Cost ³	Net Return ⁴
3	preplant 100% urea	90	2647	\$0.00	\$135.44
8	preplant 50% urea+50%ESN	90	2557	\$6.55	\$111.75
15	50%preplant urea+50%urea at 4leaf	90	2886	\$6.00	\$172.46
21	50%preplant urea+50%urea+Agrotain at 4leaf	90	2765	\$9.04	\$148.23
13	100% post plant urea	90	2664	\$0.00	\$138.50
19	100%post plant urea+Agrotain	90	2878	\$6.08	\$172.12
4	preplant 100% urea	135	2864	\$22.80	\$153.65
9	preplant 50% urea+50%ESN	135	2973	\$32.86	\$161.82
16	33%preplant urea+67%urea at 4leaf	135	2960	\$28.80	\$164.93
22	33%preplant urea+67%urea+Agrotain at 4leaf	135	2973	\$35.11	\$162.15
14	100% post plant urea	135	2798	\$22.80	\$141.77
20	100%post plant urea+Agrotain	135	2921	\$31.88	\$156.58
5	preplant 100% urea	180	2932	\$45.83	\$144.82
10	preplant 50% urea+50%ESN	180	3116	\$54.53	\$170.66
17	25%preplant urea+75%urea at 4leaf	180	3102	\$51.83	\$169.42
23	25%preplant urea+75%urea+Agrotain at 4leaf	180	3178	\$60.91	\$175.77
		LSD @ 5% level	264		
		CV(%)	7		



Canola Fertility Summary

- **No 'Silver Bullet'**
- **Treatments that improve N efficiency**
 - Urea PPI with ESN
 - Urea PPI followed by urea post
 - Post emergence urea with Agrotain
- **Majority of nitrogen uptake 4-lf to bloom**
- **Crop sensors and UAV as a diagnostic tools??**

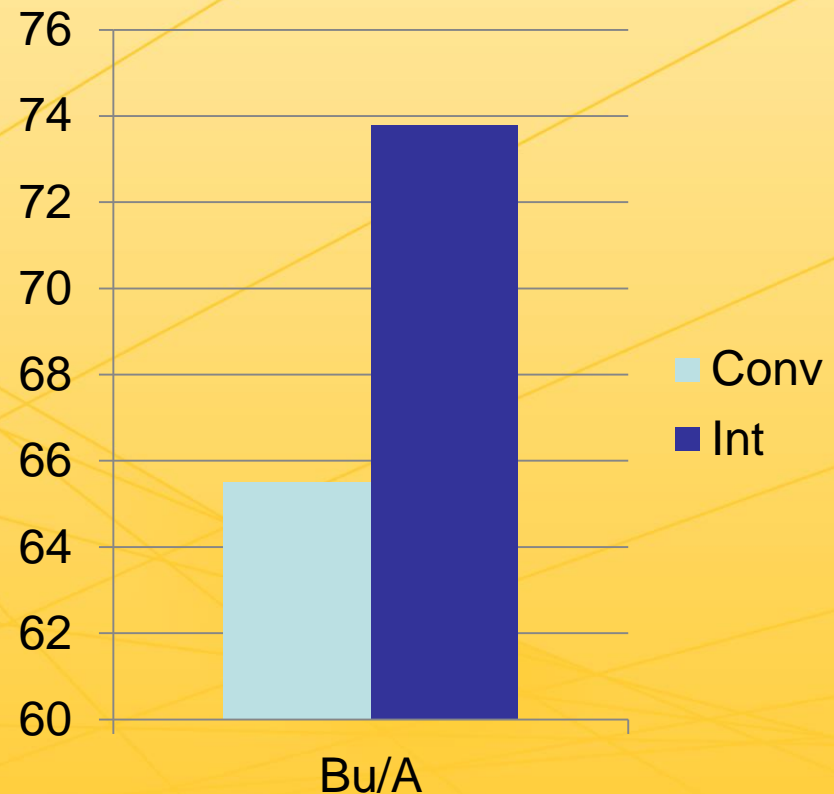


Do Crops Respond to Multiple Fungicide Applications?

Wheat and Ryegrass

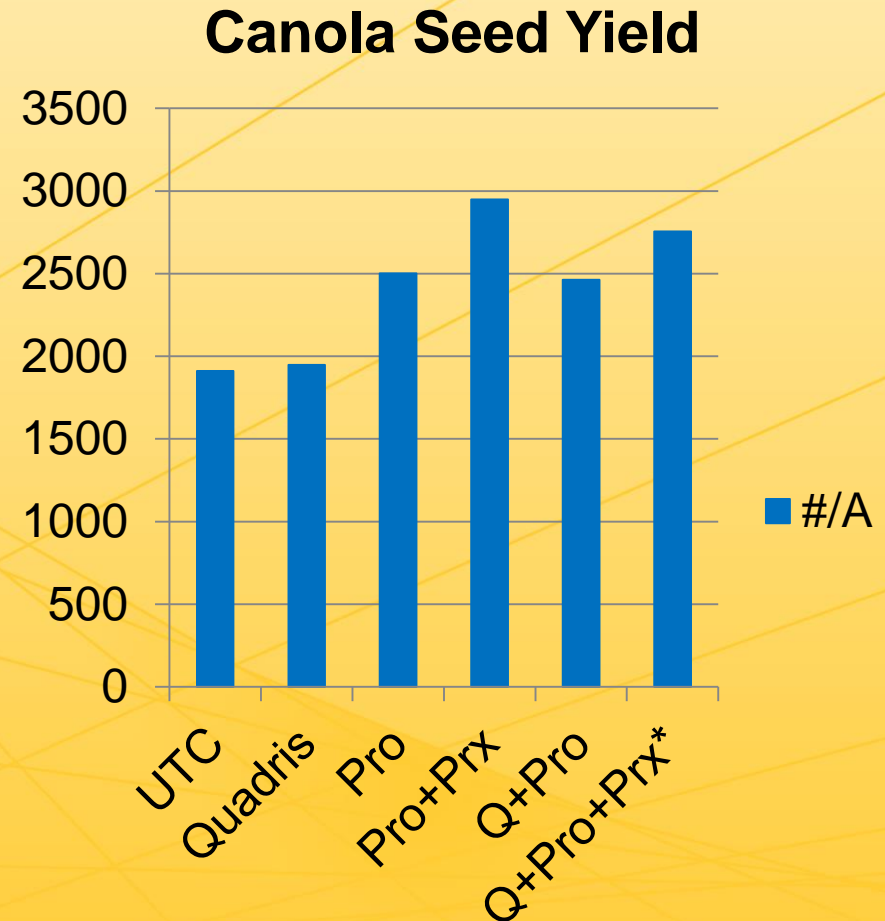
- **MN Variety Trials 2015**
- **12.2 bu/a advantage in northern trials with intensive fungicide treatments compared to conventional**
- **Mnturfseed.org: ryegrass seed yield advantage of over 200 pounds/acre**

Wheat Data – U of MN



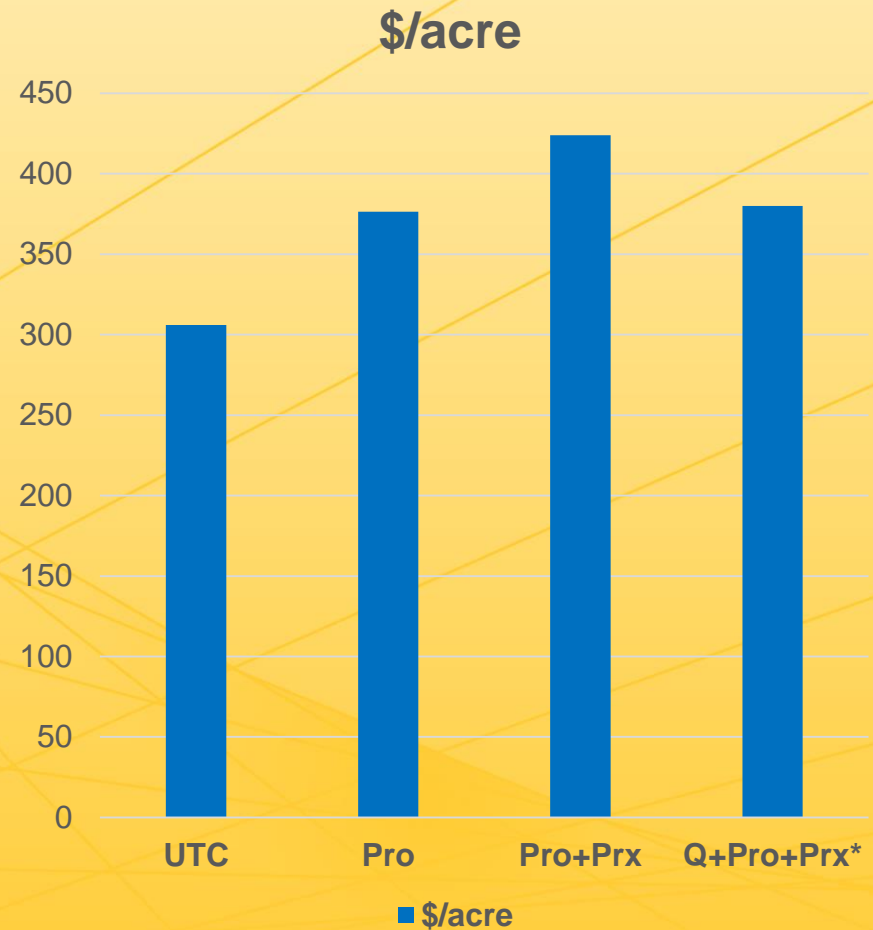
Small Plot Fungicide Trial MN CPC in 2015

- Trial located at CPC
- RCB w/4 reps
- UTC = Untreated
- Pro = Proline 5.7 oz/A @ first petal fall
- Prx = Priaxor 6.0 oz/A applied @ 80% bloom
- Q = Quadris 7 oz/A applied at 2 to 4 lf
- * Warrior with Quadris



Fungicide Economics

- **Canola price \$0.16/#**
- **Fungicides for white mold \$18.00/acre.**
Source: NDSU Crop Budgets for 2015
- **\$6.00/acre application**
- **Single timing \$24.00**
- **Sequential \$48.00/acre**



Summary Fungicide Trial

- **Moderate to severe white mold in 2015**
- **The standard treatment of Proline at first petal 590#/A more yield than untreated**
- **A sequential treatment of Proline at first petal fall/Priaxor at 75% bloom 1,037#/A more yield than untreated**
- **In wet years, sequential fungicides needed to maximize canola yield**
- **No evidence of Blackleg**



Large On-Farm Canola Trial: Swath vs Direct Harvest

- Trial location Hugh Hunt farm - Hallock
- Star 402 planted 4/27/15
- Both treatments combine on 8/19/15
- Treatments were swathing and direct harvest



Combine Harvest of Swaths and Straight Harvest Canola

Windrows



Direct Harvest



Two Factors Conducive for Direct Harvest Canola

Uniform Canola Stand



“Tabled” Canola



Direct Harvest Canola

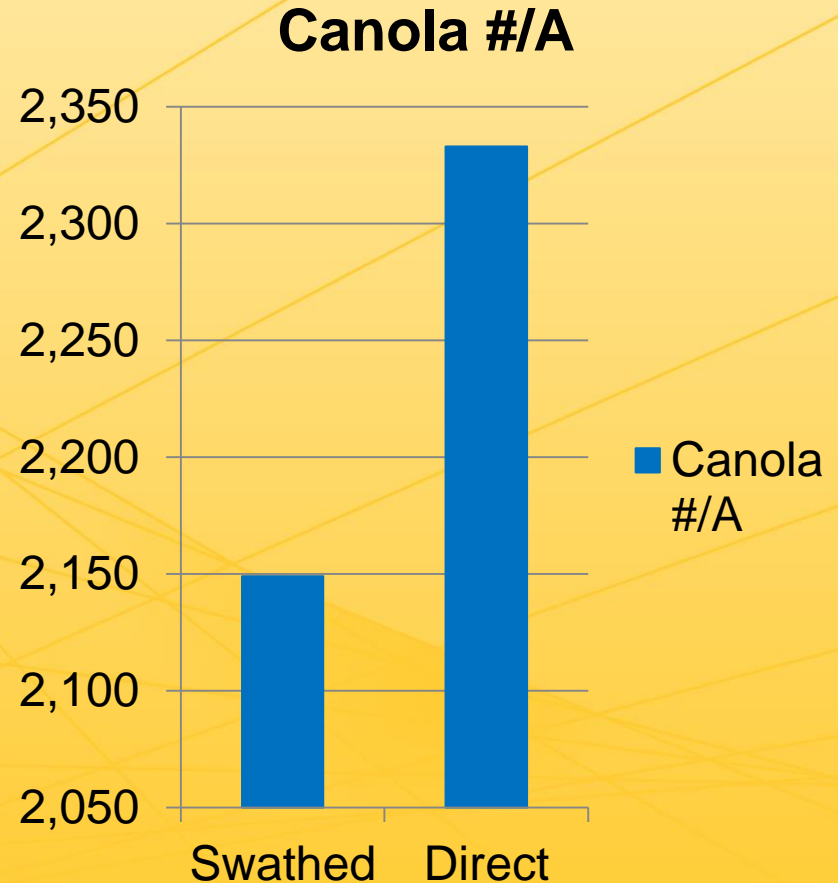
Uniform Canola Stand



Note Reel Height



On-Farm Swathed vs. Direct Harvest Data - 2015

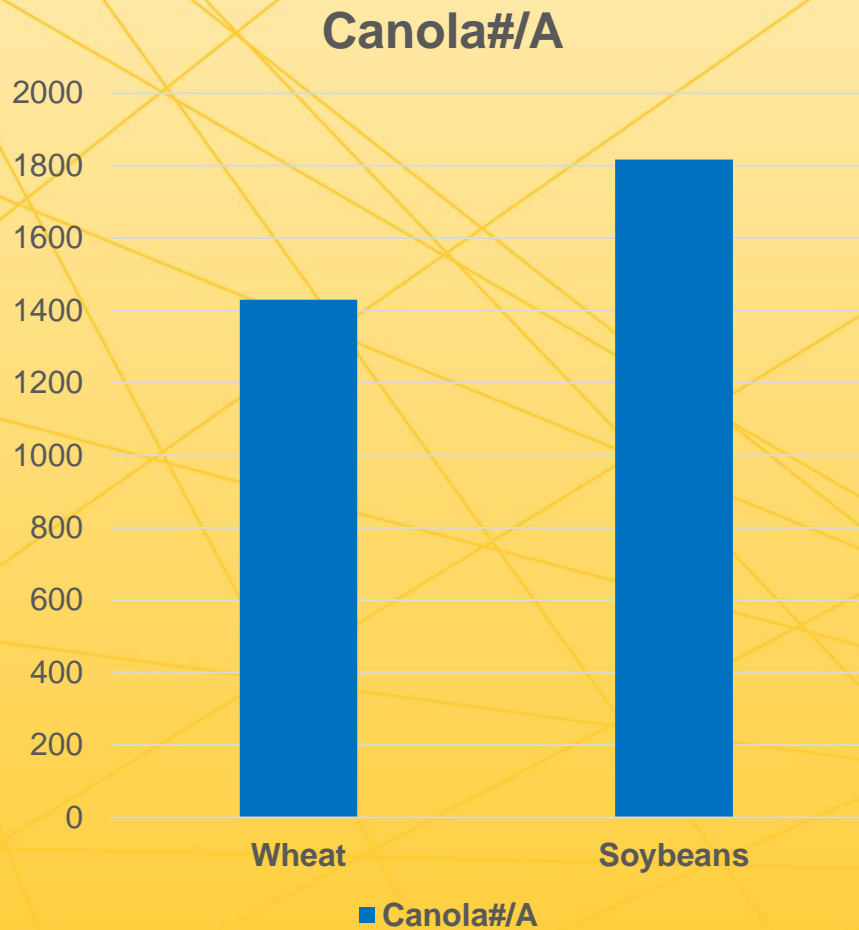


Canola Rotation Trial

- **Brian Jenks lead investigator on project**
- **Project duration three years**
- **Objective to determine canola growth development and yield in rotation with spring wheat and soybeans**
- **Trial established in 2014 with the final year after the 2016 harvest**



Canola Rotation Trial - 2015



Canola Row Spacing/Seeding Rate Trial - 2015

Trt.#	Row	Seeding Rate			Yield ¹	Stand ²	%survival ³
	Spacing	PLS/Ft.2	#/acre	pls/ac.	#/acre	6/18	6/18
1	6"	3	1.6	131000	2518	126000	96
2	6"	6	3.2	261000	2636	175000	67
3	6"	9	4.8	392000	2850	232000	59
4	6"	12	6.4	523000	3194	318000	59
5	12"	3	1.6	131000	2692	79000	60
6	12"	6	3.2	261000	2972	153000	58
7	12"	9	4.8	392000	2901	172000	44
8	12"	12	6.4	523000	3337	235000	44
9	24"	3	1.6	131000	2898	72000	55
10	24"	6	3.2	261000	2561	134000	51
11	24"	9	4.8	392000	2822	176000	45
12	24"	12	6.4	523000	3018	238000	45
	LSD @5% level				518	79	5
	CV(%)				12	16	16

Questions



Contact Information

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