

**MN Canola Council Research
Reporting Conference - Roseau, MN
12/11/2012**

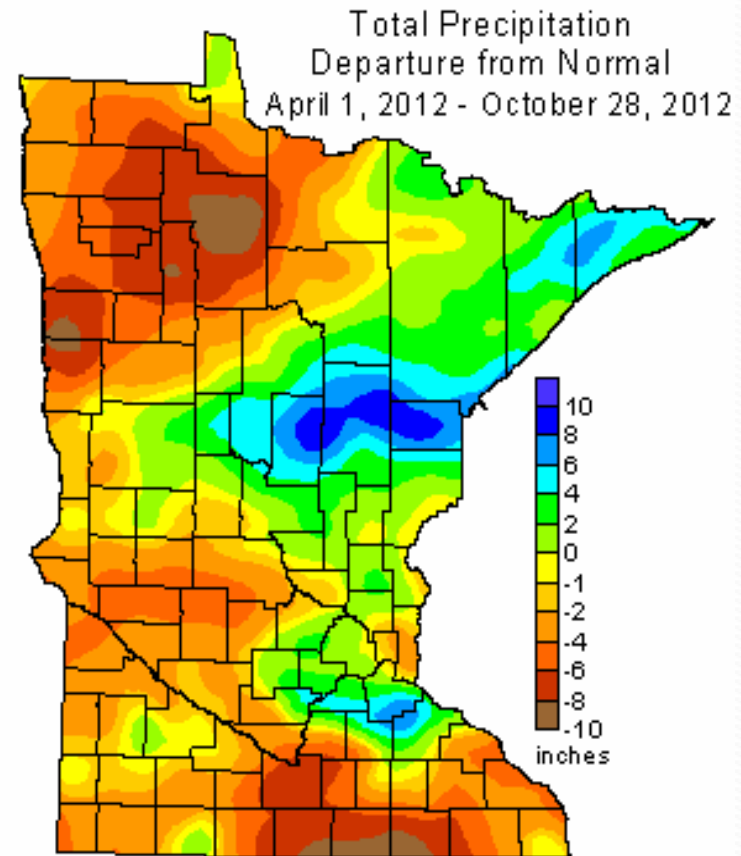
MN Canola Council CPC
Research Summary
Dave Grafstrom

2012 Canola Council - CPC

- Late start in field planning (Feb)
- Project lead Dr. Nancy Ehlke, U of MN St. Paul
- Site Agronomist - Dave Grafstrom and Donn Vellekson, with assistance from Kristen Mlodzik
- Great cooperation between:
 - MN Canola Council
 - U of MN
 - NDSU
 - Canola Industry Partners
 - Rice Farms Incorporated

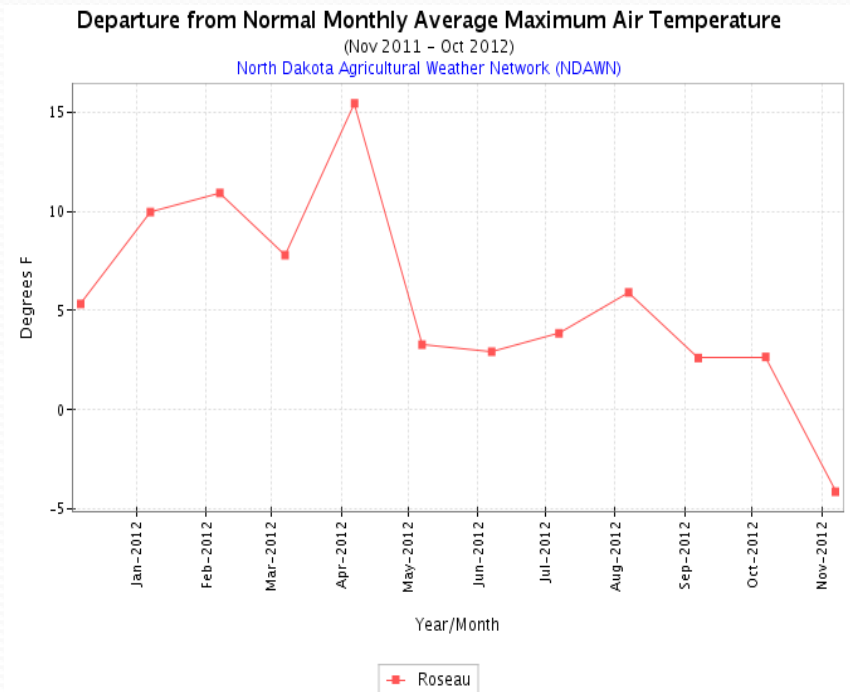
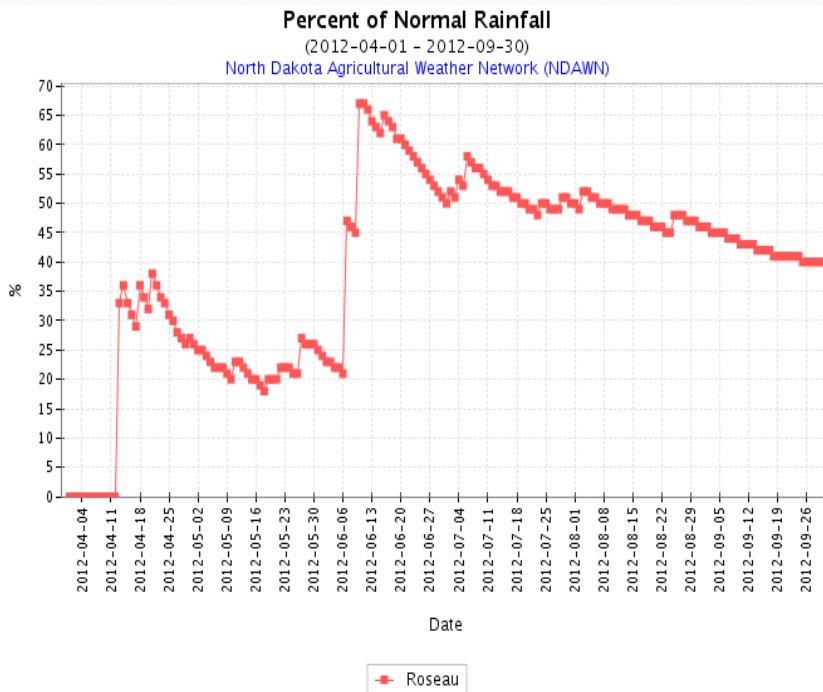
The Growing Season in 2012 was Warm & Dry

- Total precipitation 6 to 8 inches below normal
- Growing season rainfall; June 10", July 13" & Aug 12" below normal
- April-September only 2 rainfall events over 1 inch
- Daily max temps were 5 degrees & min were 2 degrees higher than 5 year average



MNDNR State Climatology Office, 10-28-2012

Growing Season Rainfall & Temps Roseau, MN (source: NDAWN)

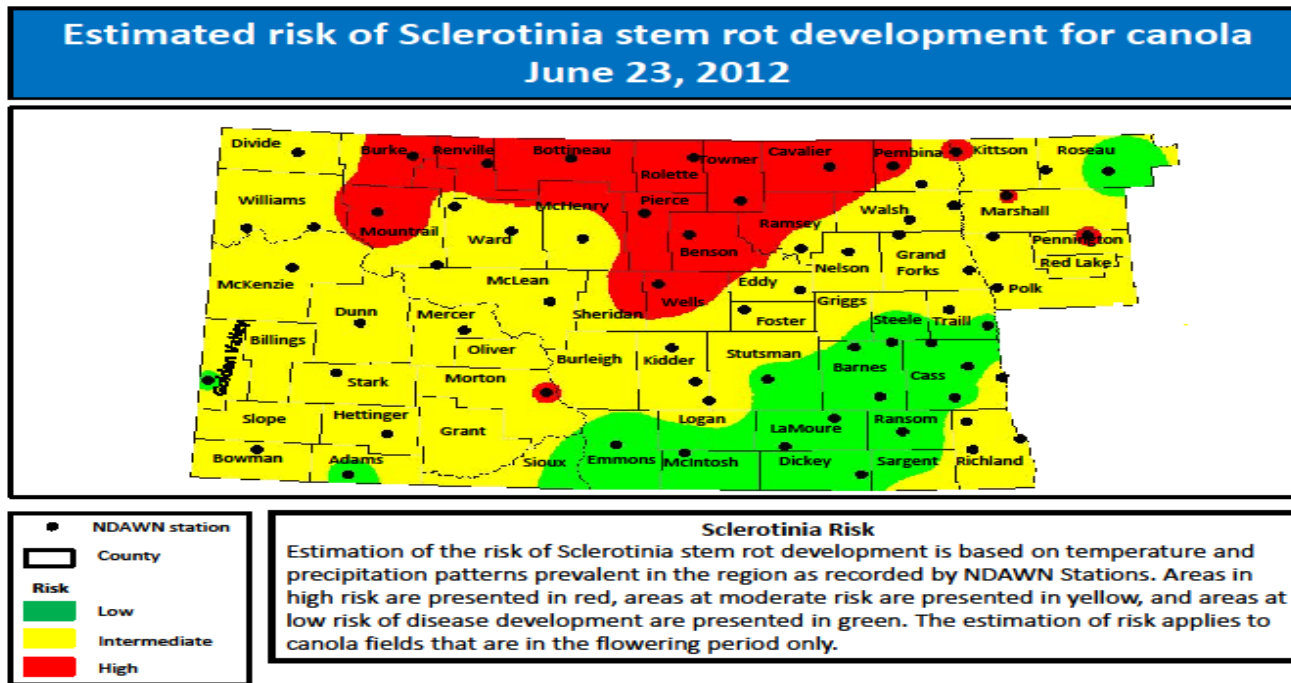


Growing Season of 2012 - Recap

- warmest & driest in recent memory
- 70 degrees in March
- Early planting for all crops in northern MN
- Aster leafhoppers
- Hail
- Heat
- Canola pod shatter
- Rapid dry-down & wind

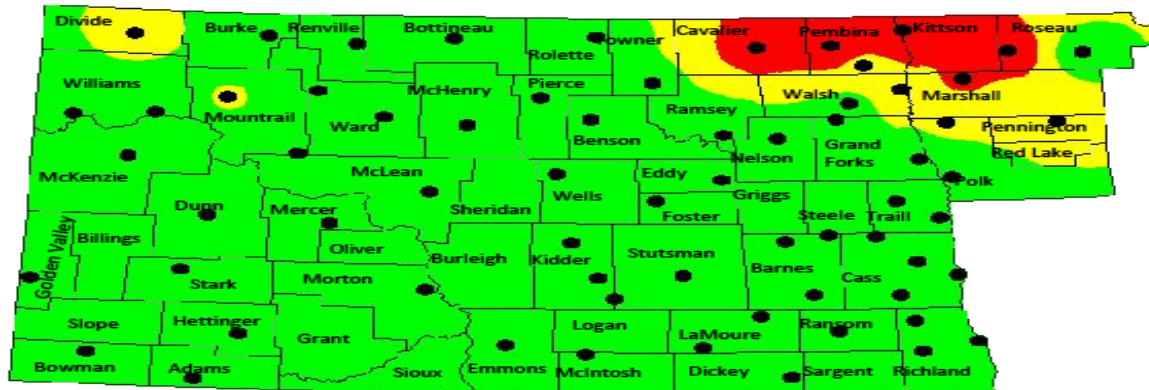


Sclerotinia Risk Map 6/23/12



Sclerotinia Risk Map 7/5/12

Estimated risk of Sclerotinia stem rot development for canola
July 5, 2012



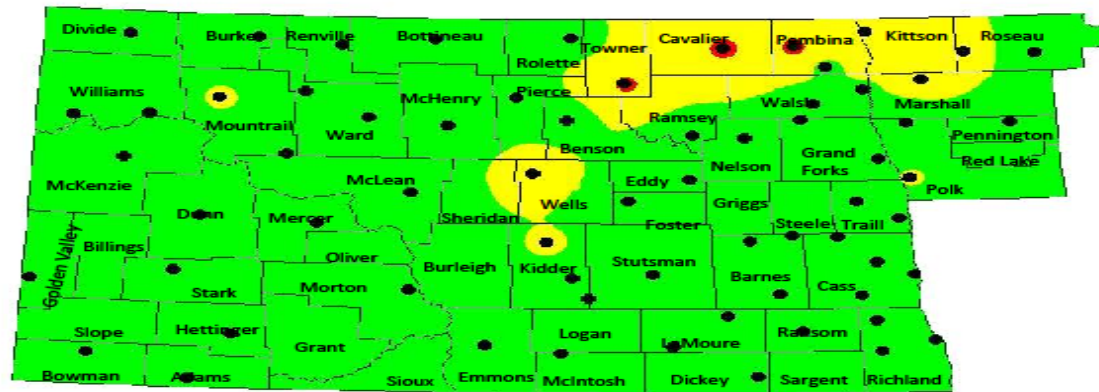
- NDAWN station
- ▭ County
- Risk**
- Low
- Intermediate
- High

Sclerotinia Risk

Estimation of the risk of Sclerotinia stem rot development is based on temperature and precipitation patterns prevalent in the region as recorded by NDAWN Stations. Areas in high risk are presented in red, areas at moderate risk are presented in yellow, and areas at low risk of disease development are presented in green. The estimation of risk applies to canola fields that are in the flowering period only.

Sclerotinia Risk Map 7/14/12

Estimated risk of Sclerotinia stem rot development for canola
July 14, 2012



- NDAWN station
- ▭ County
- Risk**
- Low
- Intermediate
- High

Sclerotinia Risk

Estimation of the risk of Sclerotinia stem rot development is based on temperature and precipitation patterns prevalent in the region as recorded by NDAWN Stations. Areas in high risk are presented in red, areas at moderate risk are presented in yellow, and areas at low risk of disease development are presented in green. The estimation of risk applies to canola fields that are in the flowering period only.

2012 Canola CPC Timeline & Activities

- First planting 5/3/12
- Last planting date 6/13/12
- Flea Beetle Project May & June (Knodel NDSU)
- CPC Field Day 7/18/12
- First swathing 8/2/12
- Final harvest date 9/9/12



U of MN Magnusson Research Farm 6 Miles NW of Roseau, MN



2012 CPC Research Trials

- Small plot canola fertility trial
- Small plot date of planting trial
- Small plot variety trial
- Large on-farm swath vs. direct harvest

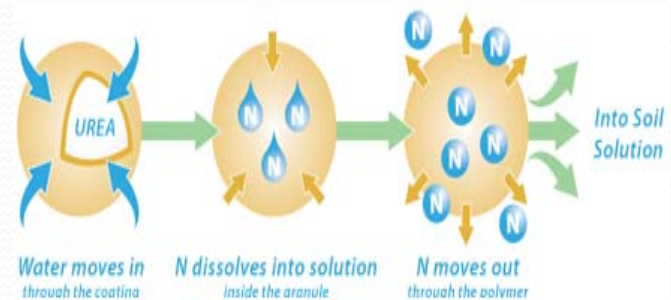
Nitrogen Use Efficiency

- 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)



Fertility Treatments

- Urea PPI - 0, 45, 90, 135, 180
- Urea + ESN - 0, 45, 90, 135, 180
- Post - 0, 45, 90, 135
- PPI + Post - 0, 45 + 45, 45 + 90, 45 + 135
- PPI - May 1, post - June 6 (4-1f canola)



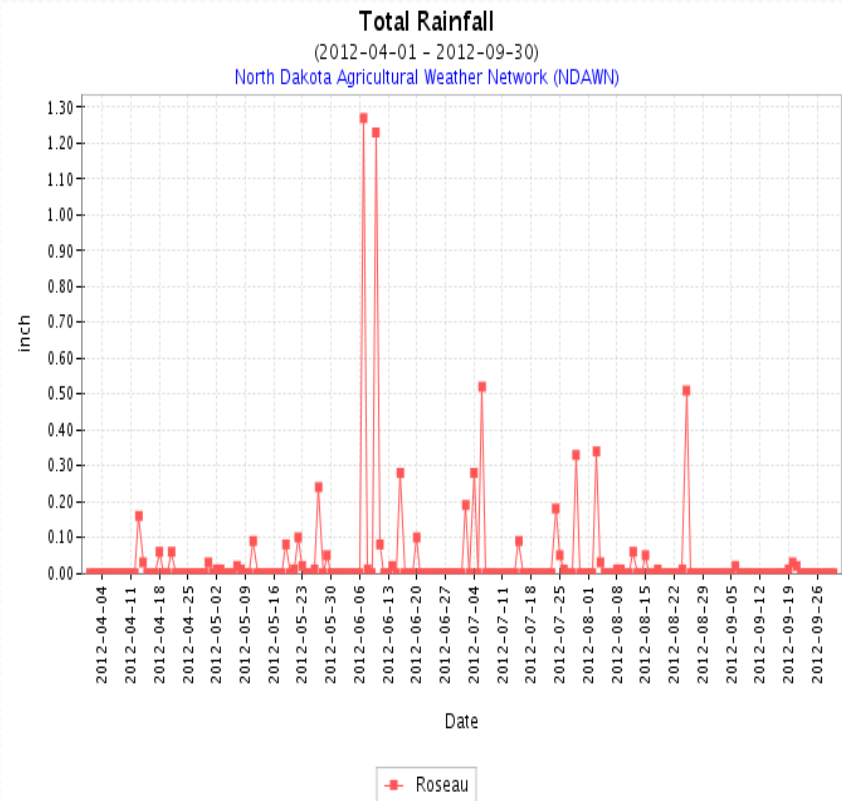
Small Plot Fertility Trial

- Previous crop ryegrass
- Planting date 5/3/12
- PPI treatments incorporated with s-tine harrow with rolling basket
- Dry conditions at incorporation and at planting
- Nitrogen loss???



Canola Fertility Trial

- Canola variety DK 72-40
- Limited rain for 4 weeks after planting
- Two rain events after post emergence fertility applications
- Significant nitrogen loss in PPI treatments
- Canola yields ranged from 696 to 1,603 #/A



Post Emergence Fertilizer Timing

2-leaf canola



4-5 leaf canola

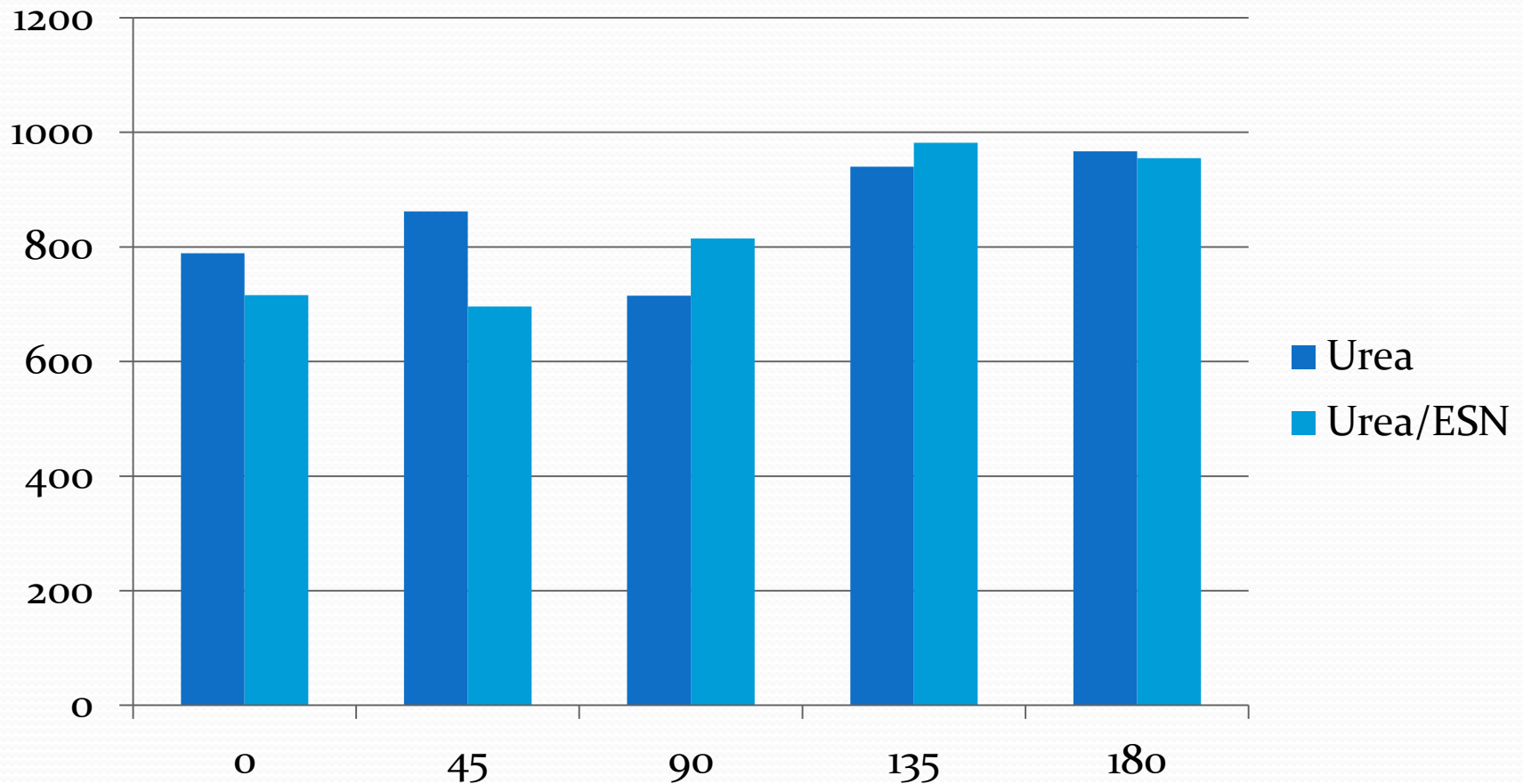


CPC-Fertility Trial - 2012

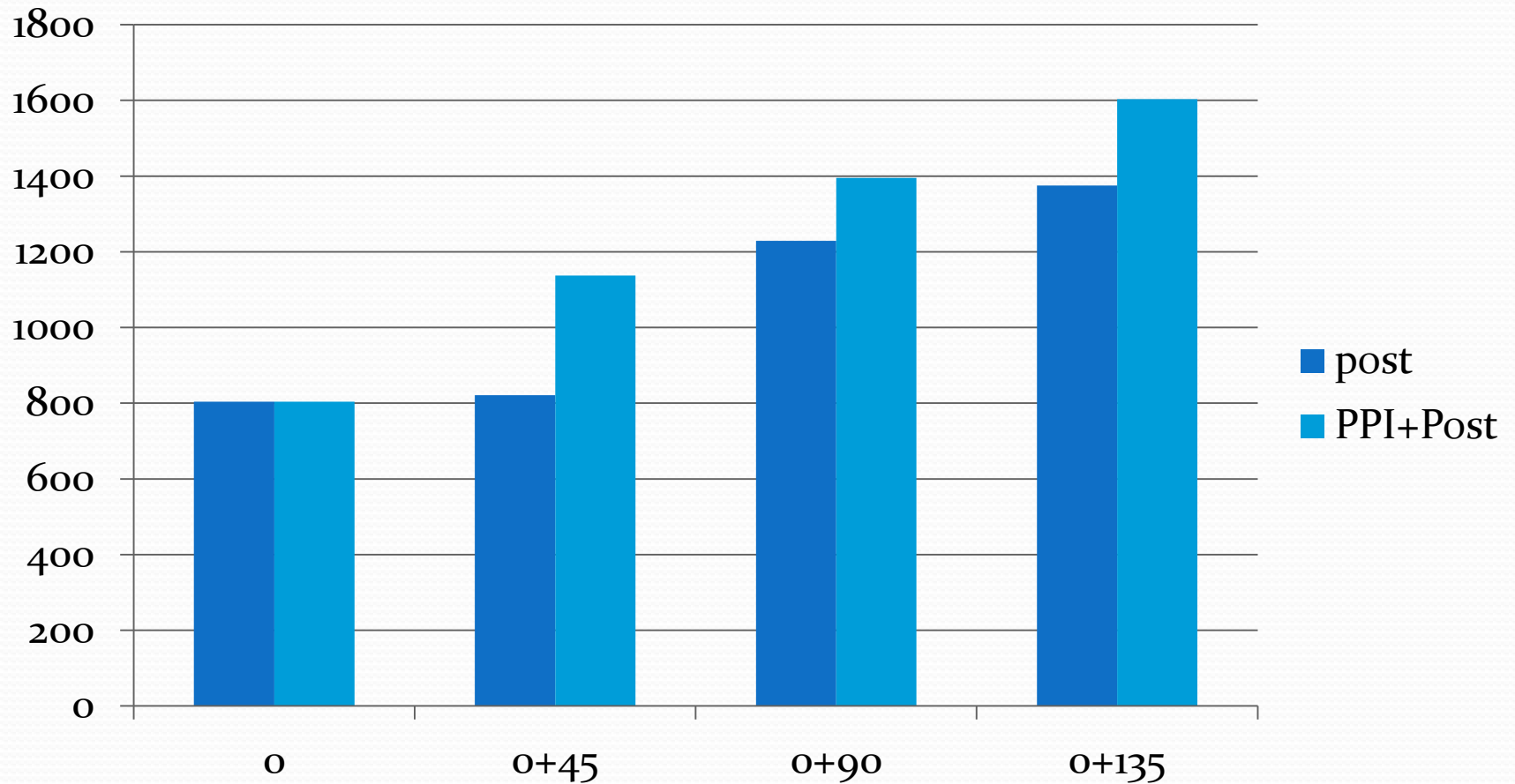
2012 Canola Fertility Trial- University of Minnesota												
Location- Rice Farms northwest of Roseau,Mn												
Trt#	N' Rate PPI Urea ¹	Yield ² #/acre	Yield as ² % of mean	% Oil	Test ³ Weight Lb/Bu.	Early ⁴ Season Vigor	Begin Bloom Date	End Bloom Date	Maturity ⁵	Harvest Height (inches)	Lodging ⁶	% Green Seed ⁷
1	0	789	80	50.4	51.7	6	18-Jun	1-Jul	25-Jul	39	1	0.4
2	45	862	87	50.3	51.8	7.3	19-Jun	2-Jul	27-Jul	42	1	0.1
3	90	715	72	49.7	51.8	6.5	19-Jun	2-Jul	27-Jul	43	1	0.4
4	135	940	95	49.8	52.0	7.3	20-Jun	3-Jul	28-Jul	42	1	0.3
5	180	967	98	48.9	51.9	5	21-Jun	4-Jul	30-Jul	43	1	0.4
PPI												
Urea/ESN ¹												
6	0	716	72	50.5	51.8	6.5	18-Jun	1-Jul	25-Jul	40	1	0
7	45	696	70	50.0	51.7	5	18-Jun	1-Jul	26-Jul	42	1	0.3
8	90	815	82	50.3	51.4	6.8	19-Jun	2-Jul	26-Jul	42	1	0.3
9	135	982	99	49.6	52.0	6.8	19-Jun	2-Jul	28-Jul	42	1	0.5
10	180	955	97	49.5	51.9	7	20-Jun	3-Jul	29-Jul	44	1	0.3
PPI/Post												
Urea ¹												
11	0	804	81	50.7	51.6	5.5	18-Jun	1-Jul	25-Jul	39	1	0.4
12	0/45	821	83	50.3	51.7	6.8	20-Jun	3-Jul	28-Jul	42	1	0.1
13	0/90	1229	124	49.3	51.9	5.8	21-Jun	5-Jul	30-Jul	44	1	0.3
14	0/135	1375	139	47.8	52.0	5	21-Jun	5-Jul	30-Jul	44	1	0.3
15	45/45	1137	115	49.6	51.8	8.5	20-Jun	3-Jul	29-Jul	45	1	0.1
16	45/90	1395	141	48.2	52.2	7.8	20-Jun	3-Jul	29-Jul	44	1	0.3
17	45/135	1603	162	47.2	52.4	8	21-Jun	5-Jul	30-Jul	43	1	0.1
LSD @5% Level	159	16	0.6	0.2	1.6	1.1	1.5	1.7	2.8	0	0.5	
LSD @10% Level	133	13	0.5	0.2	1.3	0.9	1.2	1.5	2.3	0	0.4	
CV(%)	11.3	11.3	0.9	0.3	17.4	4	42.6	4.4	4.6	0	129	

¹Nitrogen rate: PPI treatments, all applied at planting time and shallow tilled into soil. PPI Urea= all urea source nitrogen
PPI urea/ESN: = 50%coated urea(ESN)+ 50% urea nitrogen source and shallow tilled into soil.
PPI/Post= First number urea applied before plant and shallow tilled in; second number- urea applied June 12.
0 Rates= 25# N(AMS and MAP fertilizer source) other N rates as stated.
²Harvested seed cleaned and corrected to 8.5% moisture. Trial mean=988#/acre.
³Test weight corrected to 8.5% moisture.
⁴Early Plant Vigor 6/2/2012-1 = poorest;9 = best.
⁵Maturity date = majority of pods are brown.
⁶Lodging: 1 = upright, no lodging noted on any plots.
⁷%Green Seed: = Average of 2x100 seed samples per plot.

Canola Seed Yield (#/A)



Canola Seed Yield (#/A)



How to Detect the Amount of Nitrogen Availability to Plants?

- Estimate based on moisture and temperature
- Soil tests
- Tissue tests
- Visual observation
- Guess??
- Crop sensors (chlorophyll, proteins, AA)
- All have advantages and disadvantages

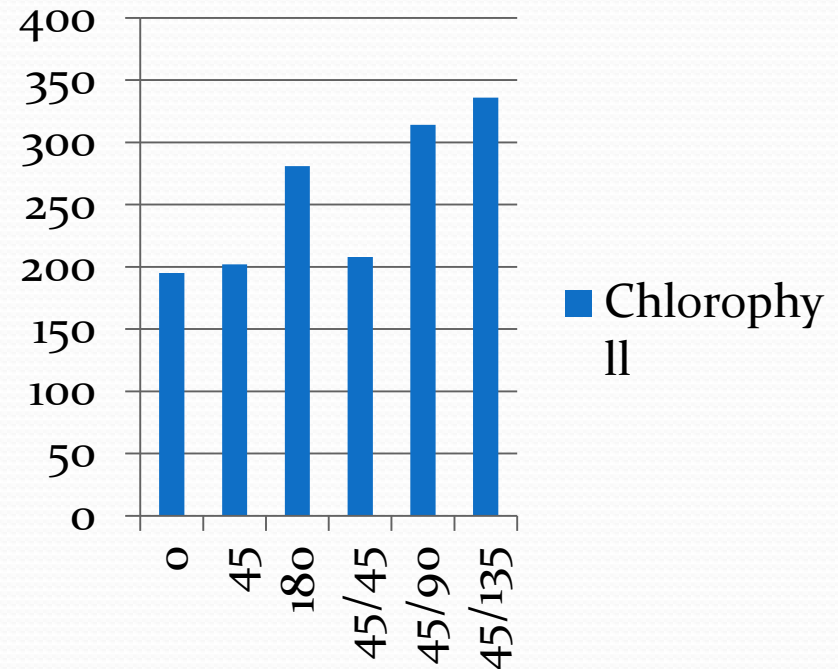
Photosynthetically Active Radiation (PAR)

Chlorophyll Meter



Light Meter Readings 7/18

Chlorophyll





Questions

Small Plot Date of Planting Trial

- Two varieties DK 72-40RR & In vigor LL-120
- Five planting dates
- May 3, 12, 21, 31 and June 13
- RR canola yields ranged from 1,430 to 1,726#/acre
- LL canola yields ranged from 1,142 to 1,574#/acre



Canola DAP Trial

- Aster yellows more symptoms on first three planting dates
- Hail damage on first three dates (10%)
- Pod shatter most evident on early planting dates
- Last date highest canola yields



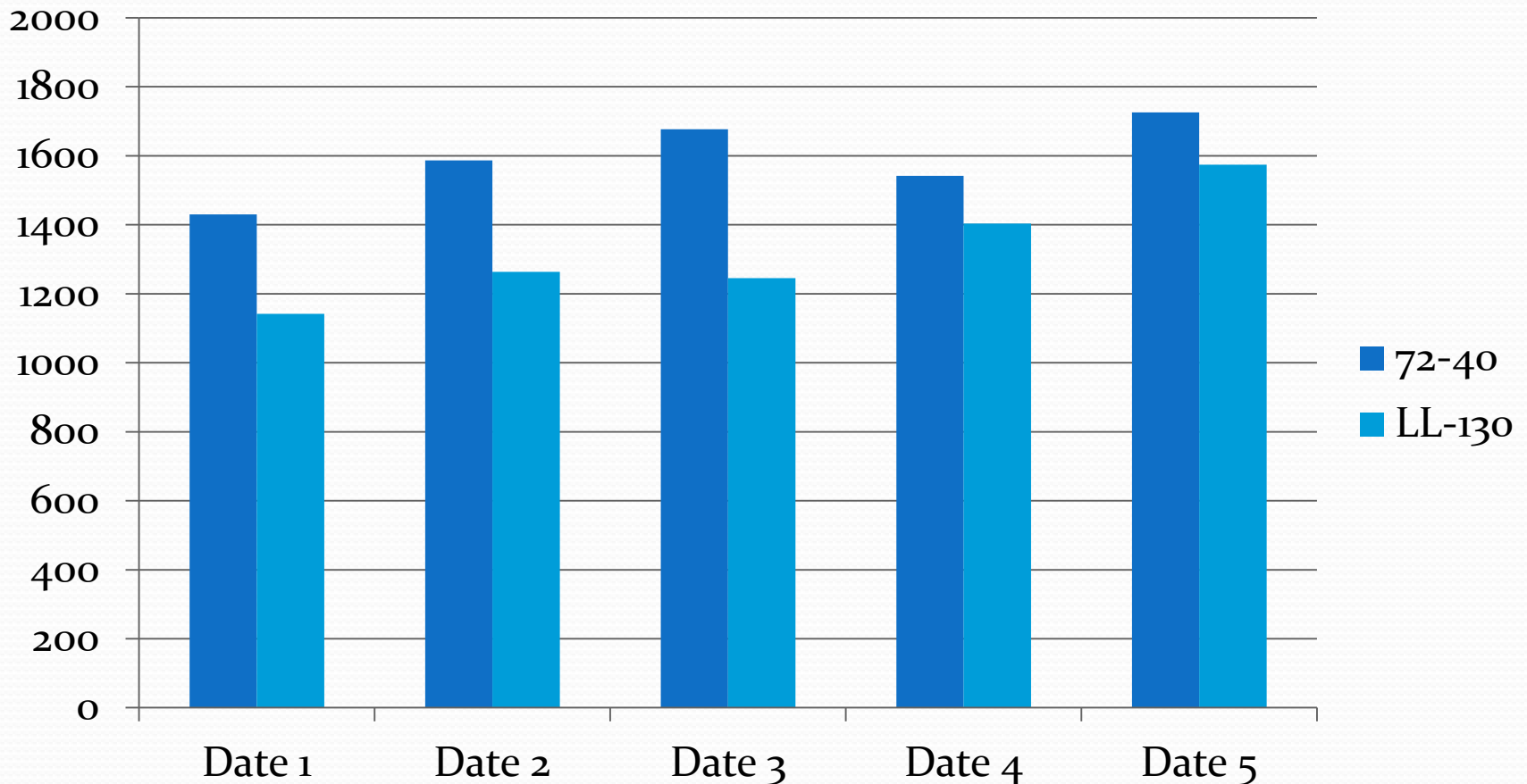
CPC – Date of Planting - 2012

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Location- Rice Farms northwest of Roseau, Mn												
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³Test weight corrected to 8.5% moisture
⁴Early Plant Vigor 6/2/2012: 1 = poorest; 9 = best
⁵Maturity date when the majority of pods are brown
⁶Lodging: 1 =upright no lodging noted on any plots
⁷%Green Seed is based on the average of 2x100 seed samples per plot

2012 Canola Yields in Pounds/A

Canola Date of Planting Trial



Aster Yellows in Canola

Date of Planting Trial

- Leafhoppers observed in all crops in April & May 2012
- No difference in RR or LL Leafhopper equal opportunity?
- More symptoms in early vs. late planted canola
- >5% expression in May, 3, 12 & 21 planting date s(up to 15%)
- < 1% expression June 13

Aster Yellows





Questions

Small Plot Canola Variety Trial

- Planted 5/17/2012
- 33 varieties
- 24 Roundup Ready
- 6 Liberty Link
- 2 Clearfield
- Harvested 8/30/12
- Yields ranged from 1,092 to 1,943 #/A



Canola Variety Trial – CPC - 2012

Small-plot canola variety trial at Roseau, 2012. Location- Rice Farms northwest of Roseau,Mn													
Brand	Entry	Herbicide ¹ System	Yield as ² % of mean % Oil		Test ³ Weight LB/Bu.	Early ⁴ Season Vigor	Begin Bloom Date	End Bloom Date	Maturity ⁵ 8/10/2012	Harvest Height (inches)	Lodging ⁶	% Green Seed ⁷	
Bayer CropScience	InVigor L150	LL	76	46.8	52.8	6.5	7/3	7/19	6.3	48	5.3	0.5	
Bayer CropScience	Exp.159	LL	89	44.5	52.9	6.5	7/3	7/20	6.3	50	2.0	1.4	
Bayer CropScience	InVigor L130	LL	94	45.8	53.0	8.5	6/30	7/17	5.5	49	2.3	0.6	
Bayer CropScience	Exp.154	LL	88	46.1	52.7	9.0	7/2	7/18	4.8	47	4.0	0.9	
Bayer CropScience	Exp.526	LL	69	45.0	52.0	7.0	7/2	7/20	5.8	47	2.3	1.1	
Bayer CropScience	InVigor L120	LL	83	46.5	52.1	8.0	7/1	7/17	4.8	44	2.3	0.6	
Cropland Genetics	HyClass 930	RR	112	49.0	51.9	8.5	6/28	7/13	3.3	44	2.8	0.4	
Cropland Genetics	HyClass 947	RR	112	49.2	51.9	9.0	6/29	7/16	4.8	43	3.3	0.5	
Cropland Genetics	HyClass 988	RR	98	47.2	51.3	9.0	7/1	7/20	7.0	47	2.0	0.8	
Cropland Genetics	HyClass 955	RR	104	48.0	52.0	9.0	6/28	7/14	3.3	39	2.8	0.5	
Dow AgroScience	Nexera 2012	CL	92	46.3	52.2	7.0	7/1	7/19	7.5	43	2.5	0.5	
Dow AgroScience	Nexera 2016	CL	97	48.0	52.4	9.0	7/1	7/19	7.3	43	2.3	1.1	
Dow AgroScience	Nexera 1016	RR	92	46.8	52.8	8.5	7/2	7/16	6.8	44	2.8	0.3	
Dow AgroScience	Nexera 1012	RR	103	44.7	52.9	8.5	7/4	7/20	7.3	51	2.0	0.3	
Monsanto	DKL30-42	RR	90	46.5	52.2	9.0	6/28	7/14	3.0	38	2.3	1.1	
Monsanto	G13109	RR	122	47.9	51.9	8.5	6/30	7/16	4.8	43	4.3	0.5	
Monsanto	DKL55-55	RR	110	48.8	51.9	9.0	6/29	7/15	3.8	45	2.8	0.8	
Monsanto	G84737	RR	115	48.2	52.3	8.5	7/1	7/16	5.5	41	2.0	0.6	
Monsanto	G93765	RR	105	48.6	51.8	8.0	6/30	7/15	5.3	44	2.3	0.6	
Monsanto	G08486	RR	100	47.5	52.5	8.5	7/1	7/17	5.5	41	2.5	0.3	
Monsanto	DKL30-03	RR	109	48.3	52.0	7.5	6/27	7/13	3.0	40	3.0	0.3	
Monsanto	DKL70-07	RR	114	49.4	52.0	9.0	6/30	7/16	4.5	44	2.5	0.9	
Monsanto	G08652	RR	117	49.9	51.7	9.0	6/30	7/16	5.0	43	5.0	0.4	
Monsanto	G08648	RR	120	49.1	52.3	8.5	6/30	7/15	3.5	43	4.5	0.3	
Monsanto	DKL72-55	RR	96	47.8	52.4	7.0	6/29	7/16	5.3	45	3.0	0.4	
Monsanto	G95585	RR	109	49.9	51.9	9.0	6/28	7/14	4.0	43	5.0	0.5	
Monsanto	G95483	RR	89	48.3	52.2	8.5	6/28	7/14	3.5	41	4.3	0.4	
Monsanto	G09149	RR	102	48.1	52.2	8.0	6/29	7/14	4.3	44	2.8	0.3	
Pioneer	45 Caliber	RR	93	46.0	51.8	8.5	7/1	7/20	6.5	44	3.0	1	
Pioneer	45H31	RR	107	46.9	52.7	8.5	7/2	7/19	7.0	49	1.8	0.4	
Pioneer	46S53	RR	97	48.6	52.5	8.5	7/3	7/19	6.5	53	3.8	0.8	
Star Specialty Seeds	Star 402	RR	96	49.1	51.9	8.5	6/28	7/16	5.0	46	2.3	1	
LSD @ 10% Level			11	0.9	0.2	1.5	1	1	0.9	4	1.1	0.7	
CV (%)			9	1.6	0.4	15.7	2	5	14.7	7	32.6	97	

¹RR = Roundup Ready; LL = Liberty Link; CL = Clearfield.
²Trial canola seed yields are expressed as a percentage of the trial mean (1591/acre) and corrected to 8.5%moisture
³Test weight corrected to 8.5% moisture
⁴Early Plant Vigor 6/9/12: 1 = poorest; 9 = best
⁵Maturity at harvest: 1 = green; 9 = brown
⁶Lodging: 1 = upright; 9 = flat
⁷%Green Seed = Average of 2x100 seed samples per plot



Questions

Large On-Farm Trial



Large On-Farm Swath vs. Direct Harvest Trial

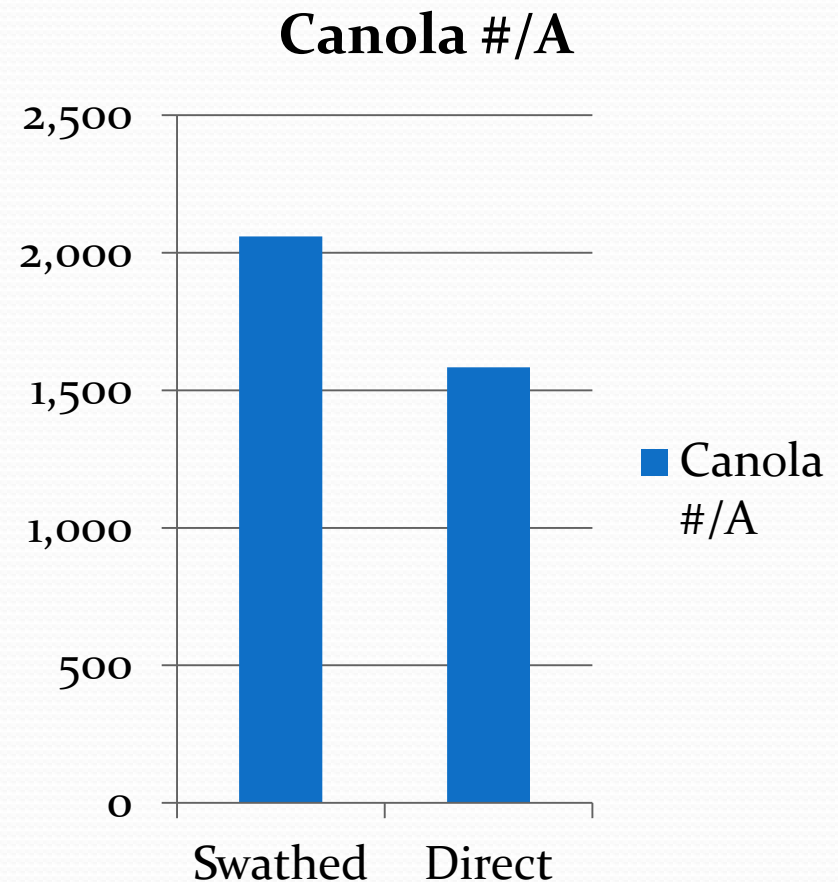
- Cooperators Brian and Sheldon Rice
- Field operations conducted with commercial scale equipment
- Significant canola pod shatter due to hot windy weather



On-Farm Swathed vs. Direct Harvest Trial - Rice Farms



On-Farm Swathed vs. Direct Harvest



CPC- Direct Harvest Trial - 2012

2012 Canola Conventional vs. Swath- University of Minnesota						
Location- Rice Farms Northwest of Roseau, Mn						
		Yield				% Green
Treatment		#/acre ¹	Test Wt. ¹	%Oil	%Moisture	Seed ³
Conventional Swath/Combine		2033	53.3	46.3	7.1	1.3
Straight Combine		1584	52.6	47.1	17.6	1.5
LSD @ 5% Level		221	0.4	NS	2.0	NS
LSD @ 10% Level		197	0.3	NS	1.3	NS
CV (%)		6.5	0.4	1.7	6.6	61.2
¹ Yield and test wt. corrected to 8.5% moisture						
² Seed moisture at harvest						
³ 2-100 seed samples taken to determine % of green seed						

Direct Harvest Canola - Challenges

**Green Within Canola
Canopy**

Green Stubble - Direct Harvest



On-Farm Canola Trial - Rice Farms

Swathed Canola

Direct (L) Swath (R)





Questions

Looking Forward

- Maximize canola production
- Shift grower attitude e.g. corn growers talk potential yield, canola talk expenses
- MN wheat growers evaluate intensive vs. conventional production
- Light meter, remote sensing

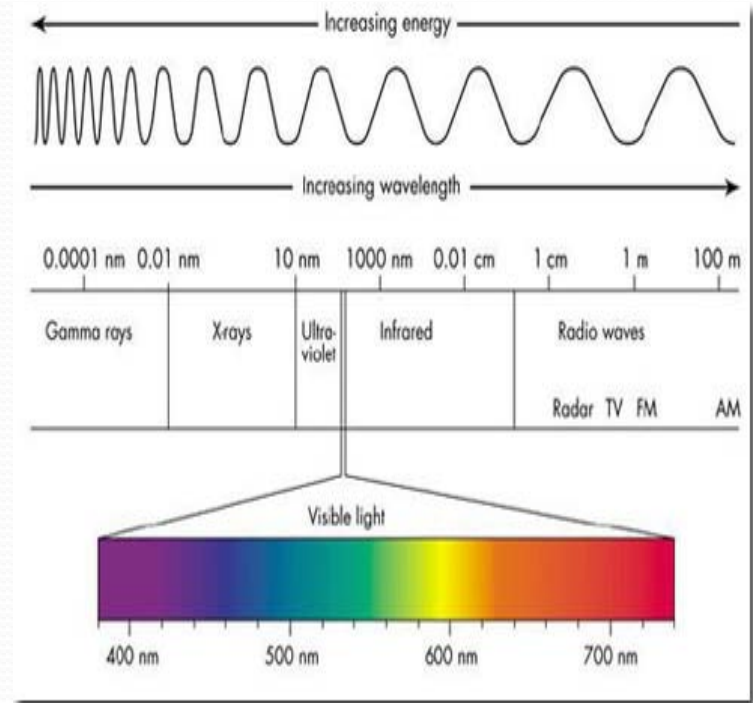
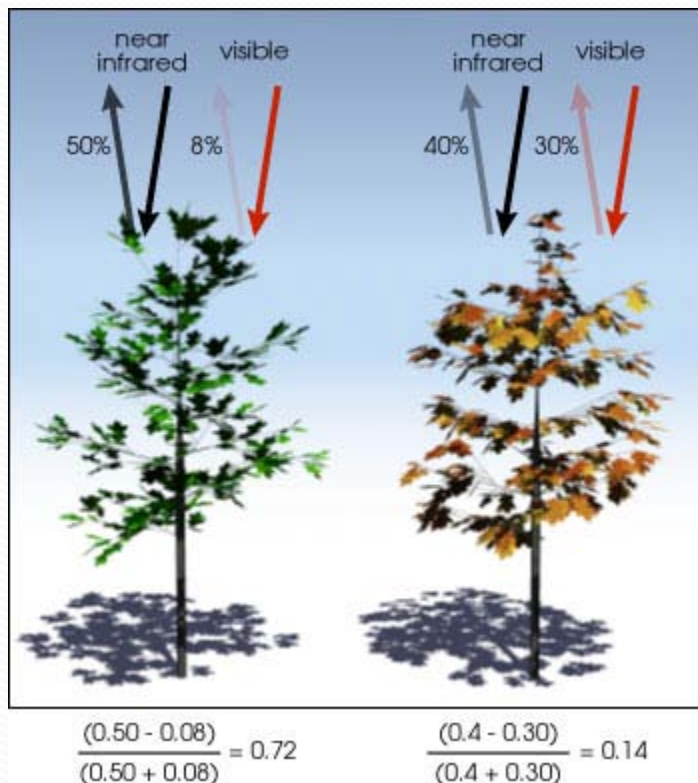


2012 MN Canola Growers Survey

Research Priorities

- Optimize canola yield, quality and profit
- Traditional and non-traditional research efforts to improve canola production
- Straight harvest with desiccants
- Reduce pod shatter – Identify variety differences
- Seeding date x location trials with improved genetics
- Sclerotinia management
- Nitrogen/sulfur fertility efficiency trials

Visible Light Spectrum and NDVI Index



Photosynthetically Active Radiation (PAR)

PAR in Perennial Ryegrass

- Reduction in PAR to ryegrass seed head decreased yields up to 16% (Trethewey et.al)
- Strong correlation for seed yield and light interception at flag leaf
- Ryegrass seed yield increased 26.7 #/A for each 1% increase in PAR

Chlorophyll meter



2012 Canola CPC Field Research

- Most northern U of MN field research facility
- Gift from the Magnusson family
- 40 acres in size
- Test and evaluate agricultural production practices that improve the profitability of crops grown in the area



