WARC

Western Applied Research Corporation

Tristan Coelho – Research Assistant

Anne Kirk – Research Manager

WARC

- The Western Applied Research Corporation was incorporated in 2003 and is comprised of 7 board members
- **WARC's Mandate**
  - Identify and evaluate research and technology for Saskatchewan producers
  - Transfer technology from research to Saskatchewan producers

WARC's Recent Activities

- **Scott Field Day** – August 1st, 2012
  - Research and demonstration projects including saline tolerant forages, herbicide resistance in wild oat and canola seeding seeds trial
- **Crop Production Show** – January 7-10, 2013
  - Coordinate with the 7 other Agri-ARM sites
- **Crop Production Week** – January 11th, 2013
  - Agri-ARM Research Update
- **Crop Opportunity and Scott Research Update** – March 7th, 2013

2012 Research Activities

- **ADOPT**
- Managing herbicide resistance in wild oat
- Managing herbicide resistance in kochia
- Fall 2,4-D preceding canola, lentil and pea
- Canola seeding speeds demo
- Proper preharvest glyphosate in wheat
- Rates of ESN and Agrotain treated urea for wheat
- Response to cereal fungicide applications in spring wheat
- Foliar fungicides on wheat and barley
- Fertilizer seed dressing effects on spring wheat
- Nitrogen fertilizer management options for winter wheat
- Inoculant product ad formulation effect on field pea
- Reclamation of saline soil using perennial forages
- N rates on canaryseed
- Chloride fertilizer on canaryseed
- Improving phosphorus efficiency
- Intercropping

Industry or other

- Toadflax timing
- Canola low plant populations
- Canola variety shatter tolerance
- Winter wheat production practices
- Pulse desiccant trial
- Corn grazing study
- Mustard demonstration

Contracted from AAFC

- Evaluating varieties for straight cutting
- Nitrogen management in canola and malt barley
- Predicting Nitrogen dynamics in Canadian cropping systems

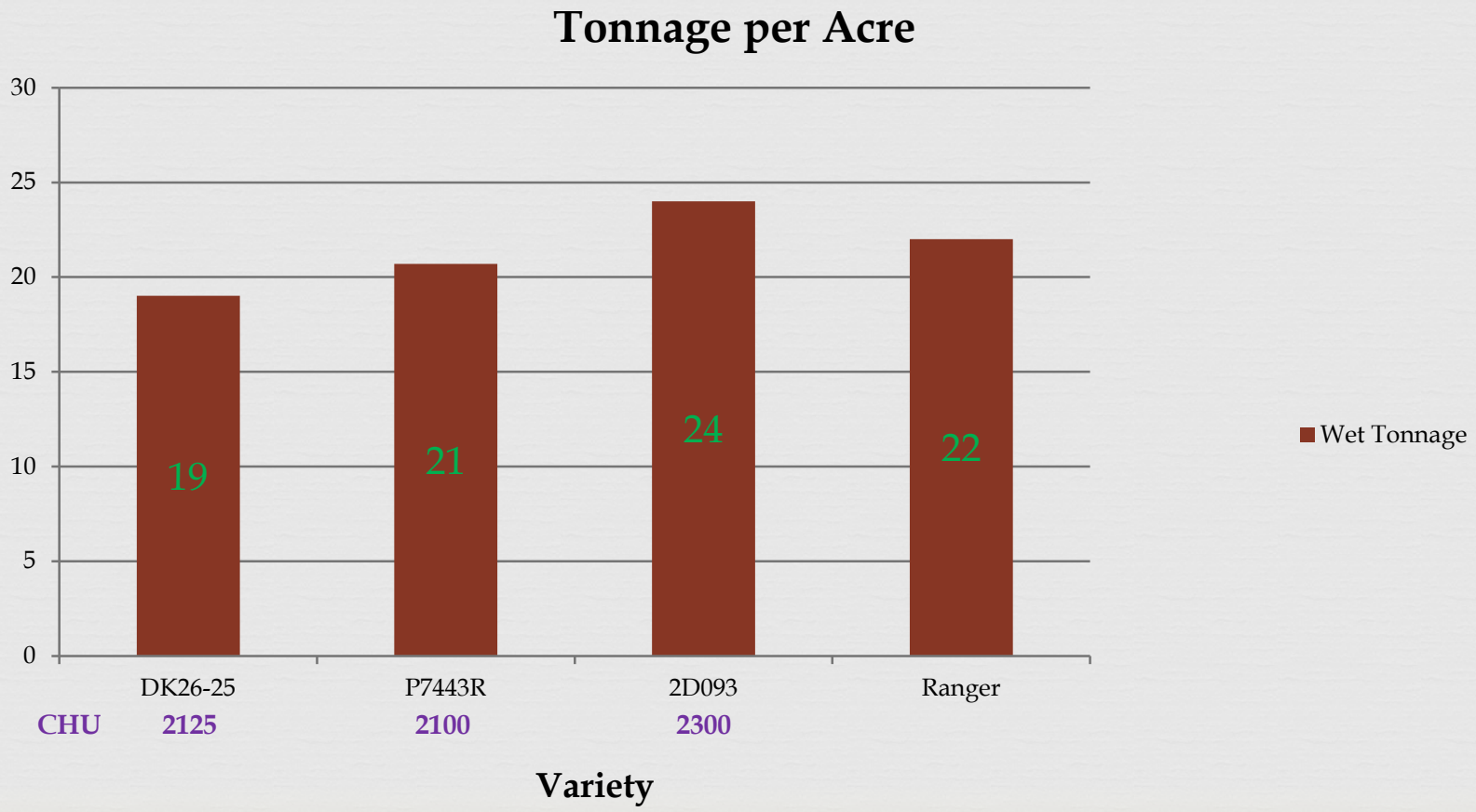
2012 Weather at Scott

	Apr	May	Jun	Jul	Aug	Sep	Oct	Season Avg./Total
Air Temperature (°C)								
2012 mean	3.7	9.8	15.2	18.7	17.1	12.4	0.9	11.1
100 year mean	3.2	10.2	14.5	17.3	16.2	10.5	3.8	10.8
Growing Degree Days								
2012 mean	47	187	307	377	349	169	49	1485
100 year mean	42	169	285	381	346	174	48	1445
Precipitation (mm)								
2012 mean	37	53	**185**	56	51	24	12	418
100 year mean	23	37	62	62	45	31	16	276

Corn and Barley for Grazing

- Evaluate 3 corn varieties and on barley for quality and yield
  - Monsanto – DKC26-25
  - Pioneer P7443R
  - Hyland 2D093
  - Ranger Barley
- Corn was seeded on 30" rows, May 18th
  - 30,000 seeds per acre
- Barley was seeded on 10" rows, June 15th
  - 2 bushels per acre

Silage Yield Estimate



Pea Input Study

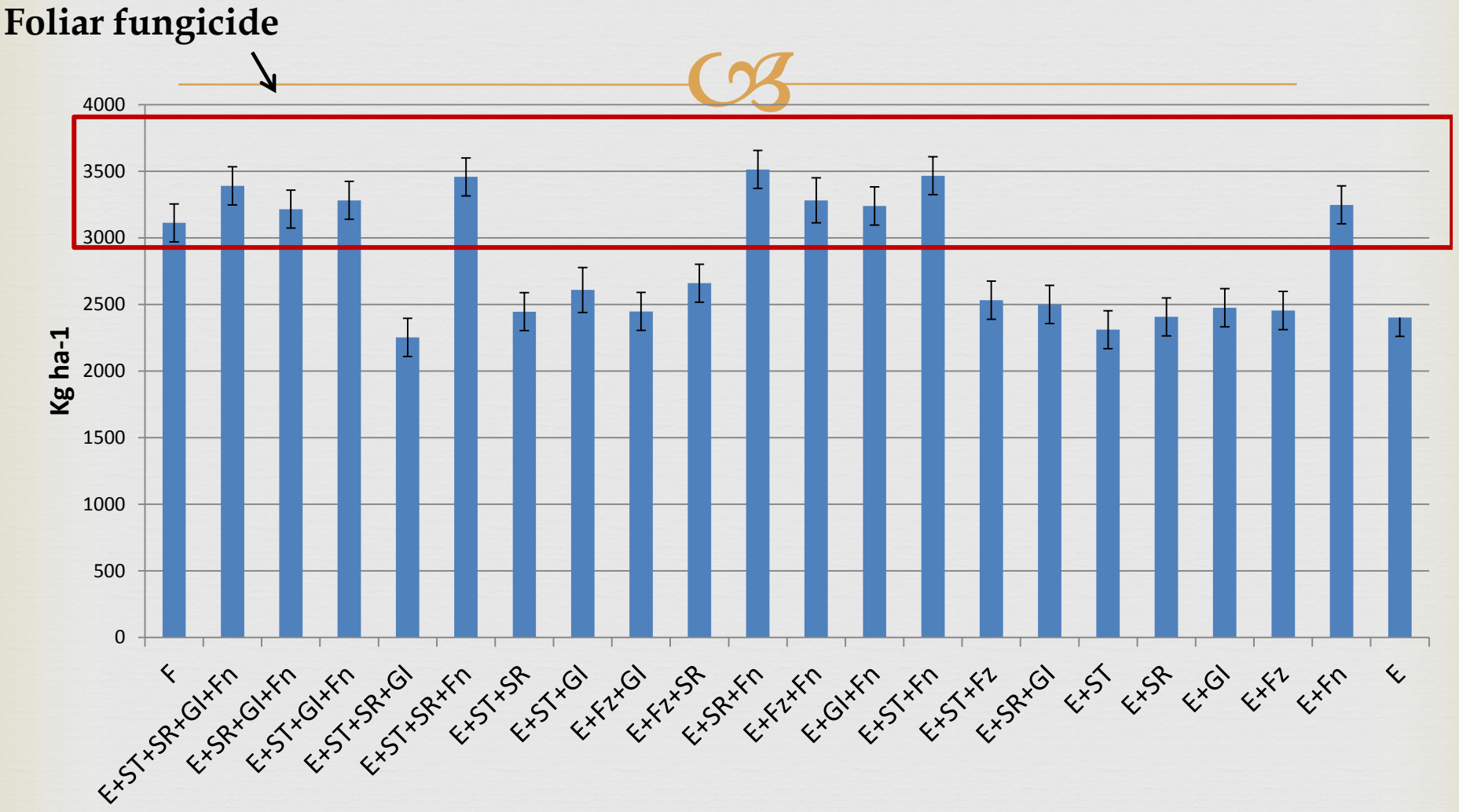
- The effects on yield when many agronomic factors are combined in relatively unknown
- 22 treatments starting with an empty and a full package, removing or adding specific agronomic inputs
- Empty Package – low seeding rate, no seed treatment, liquid inoculant, no started fertilizer, no fungicide
- Full Package - high seeding rate, seed treatment, granular inoculant, starter fertilizer, two fungicide applications
- Conducted at four locations:
  - Scott, Indian Head, Melfort and Swift Current

Previous Research

- Seeding Rate - optimum seeding rate for maximum yield in SK was 108 plants/m2, economic seeding rate in weed-free conditions (50-75 seeds/m2)
- Inoculants – granular inoculant has shown to increase biomass, yield and protein concentration over a liquid inoculant
- Starter Fertilizer - greater benefit to starter N when spring soil test N was less than 18 lb/ac (average yield increase of 11%)
- Foliar Fungicide – recommended when conditions favour disease development

Empty vs Full

Yield – Indian Head



Comparing Individual Inputs

	Yield Increase (decrease) in kg/ha				
	Scott	Indian Head	Melfort	Swift Current	All Sites
Seed treatment	(-34)	(-92)	68	(-117)	42
Seeding rate	1268	4	598	506	604
Granular inoculant	902	73	357	33	364
Starter fertilizer	573	52	191	-70	195
Fungicide	392	845	1134	-8	1004

Evaluating the Response of Hybrid Canola to Low Plant Populations

- Three year study completed in 2012 at: Scott, Swift Current, Indian Head, Melfort and Saskatoon
- Objectives:
  - Determine the minimum plant density where hybrid canola yields 90% of the maximum
  - Evaluate the effects of plant population on maturity, seed size and green seed
  - Determine the minimum plant density at which reseeding would be recommended
- Two varieties – 5440LL and 5770LL
- Seeding Rates – 5, 10, 20, 40, 80, 150 and 300 seeds/m2
  - Typical seeding rate of 5lbs/ac, using seed with a TKW of 5 grams, estimating 60% survival would give us an actual seeding rate of 70 plants/m2

20 seeds/m^2

40 seeds/m^2

80 seeds/m^2

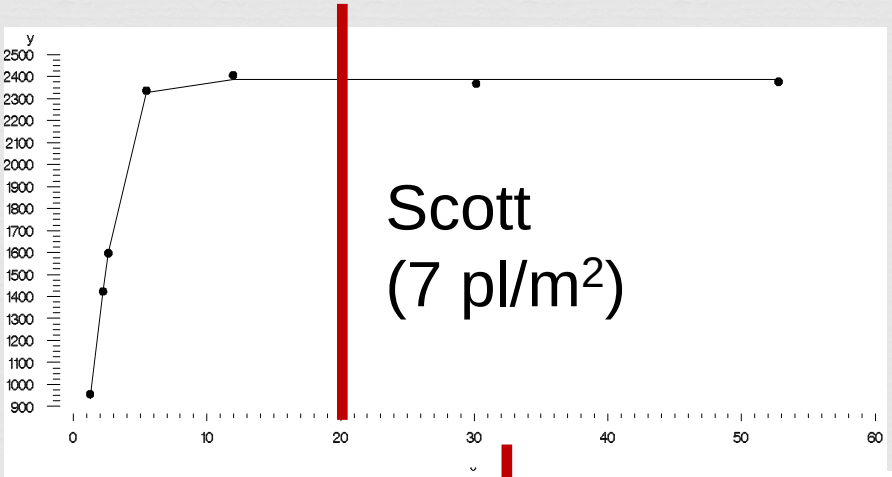
150 seeds/m^2

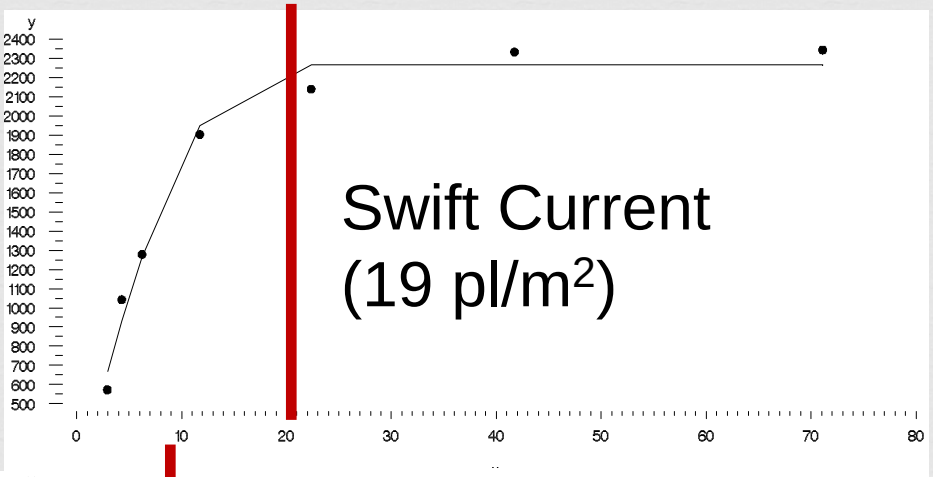
Actual Plant Densities – increased podding and branching delayed harvest

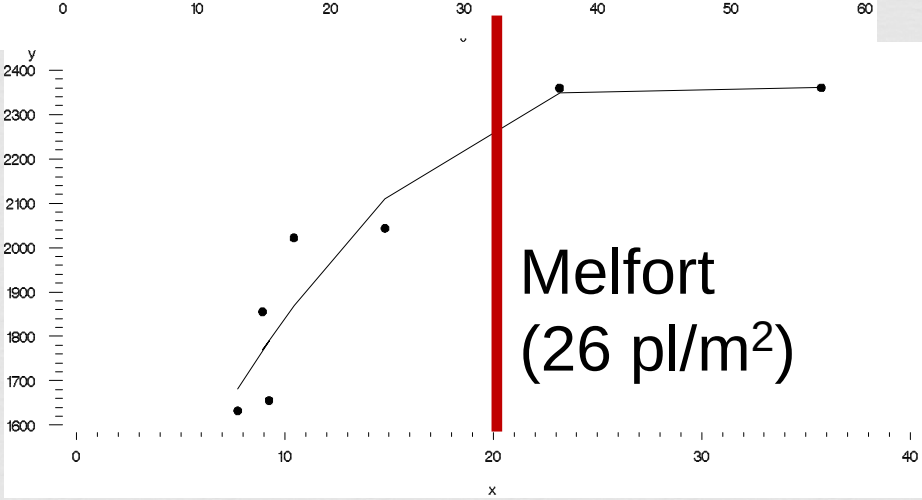
1 plant/m^2

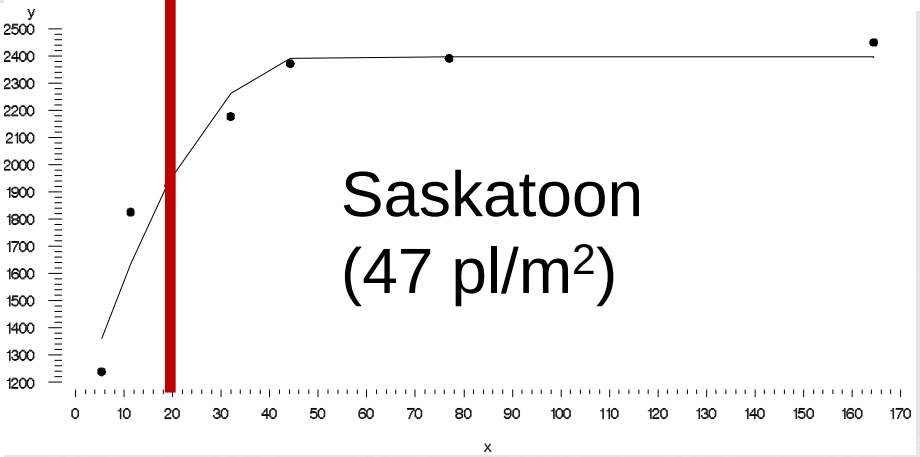
52 plants/m^2

Yield Response to Plant Density in 2011









Optimal Seeding Rate For Spring Wheat

- Objective – provide information on the yield benefits associated with increasing seeding rate in spring wheat
- Unity VB - was seeded at rates ranging from 60 to 480 seeds square meter
- Plant Density – the trial averaged 57% emergence and this decreased slightly with higher seeding rates
- Weed biomass with herbicides - ranged from 20% at the lowest seeding rate to 6% at the highest seeding rate
- Weed biomass without herbicides - ranged from 188% at the lowest seeding rate to 23% at the highest seeding rate

Fertilizer Seed Dressings On Spring Wheat

- Objective - demonstrate the effects of commercially available seed-applied micronutrient fertilizer products and granular Zinc on spring wheat emergence, early development and yield

Table 2. Description of treatments in seed applied fertilizer demonstration.

Trt	Trade Name[Z]	Description / Rate / Nutrient Analyses[Y]
1	Untreated check	N/A
2	EZ20 Essential Zn®	$ZnSO_4$ (2-0-0-14 + 20% Zn) applied in-furrow at 12 kg/ha
3	Awaken ST®	Seed-applied at 325 mL 100 kg seed^{-1}; 6-0-1-0 + 5% Zn + 0.8% B, Cu, Fe, Mn & Mo
4	Alpine Seed Nutrition®	Seed applied at 510 ml 100 kg seed^{-1}; 6-22-2-0 + Zn
5	Protinus®	Seed applied at 323 g 100 kg seed^{-1}; 40% Zn, 10% Mn + Fe
6	Undisclosed - Zn[X]	Seed-applied; commercial Zn-based product
7	Undisclosed - Cu	Seed-applied; commercial Cu-based product

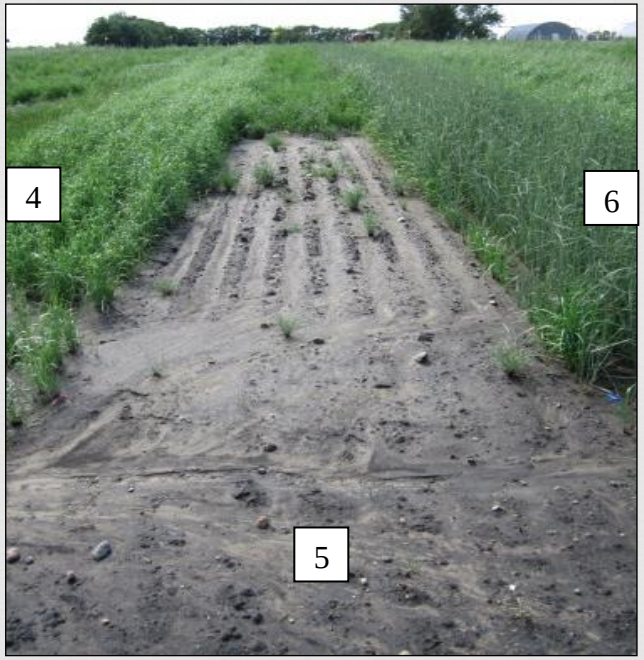
Data Collection

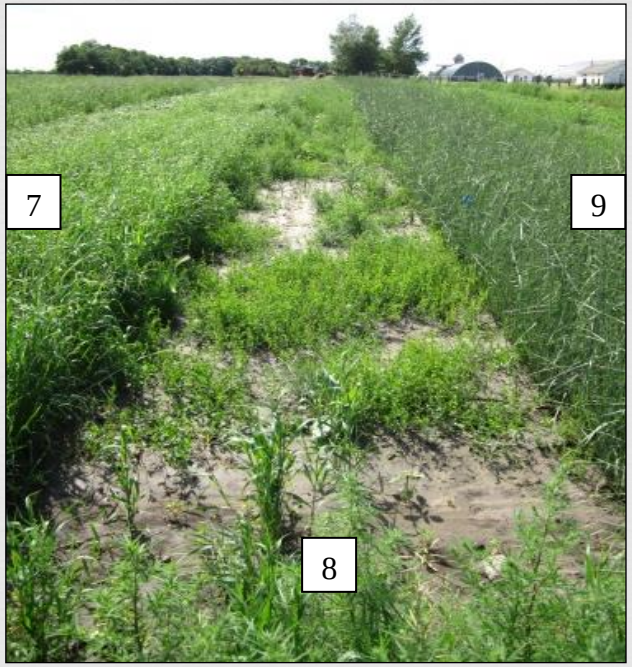
- Emergence counts – plant counts at 5 dates
  - Subtle treatment effects on emergence were observed at Melfort
- Biomass sampling - 3 weeks after first emergence
- Vigor rating - 1-10 scale of plant vigor
- Growth stage – Haun scale
- Yield and Quality – test weight, seed size and protein
  - Slight yield increase at Indian Head with the application of granular $ZnSO_4$ fertilizer

Reclamation of Saline Soil with Perennial Forages

	Salinity Gradient		
Treatment	Non-Saline	Slightly Saline	Moderately Saline
Alfalfa – rambler	100	39	15
Alfalfa – halo	100	55	4
Alfalfa – rugged	100	39	19
Tall fescue – kokanee	100	78	32
Tall wheatgrass	100	101	101
Creeping foxtail	100	95	106
Saline Master	100	102	76
Green wheatgrass – AC Saltlander	100	95	106
NewHy	100	109	70

High Salinity





Forage production in moderately saline soil

1 NewHy
2 Smooth Brome
3 Tall Wheatgrass
4 Creeping Foxtail
5 Tall Fescue
6 Tall Wheatgrass
7 AC Saltlander Green Wheatgrass
8 Halo Alfalfa
9 Tall Wheatgrass

Pre-Harvest Glyphosate

- Conducted at Scott, Swift Current and Prince Albert in 2012
- Unity spring wheat - midge tolerant varietal blend

- **Objectives of this project:**
  - Demonstrate to producers the proper pre-harvest glyphosate timing in wheat
  - Illustrate methods of avoiding issues of improper applications
    - High glyphosate residue levels
    - Reduction of grain yield and quality

Proper Glyphosate Timing

- Apply at 30% grain moisture or less
- Cereal grain reaches physiological maturity at the hard dough stage
- Maximizes yield and quality potential
- Pre-harvest glyphosate can also reduce the risk of frost damage and post-harvest sprouting

Hard Dough Stage

Glyphosate Treatments

- Treatment List and Application Dates

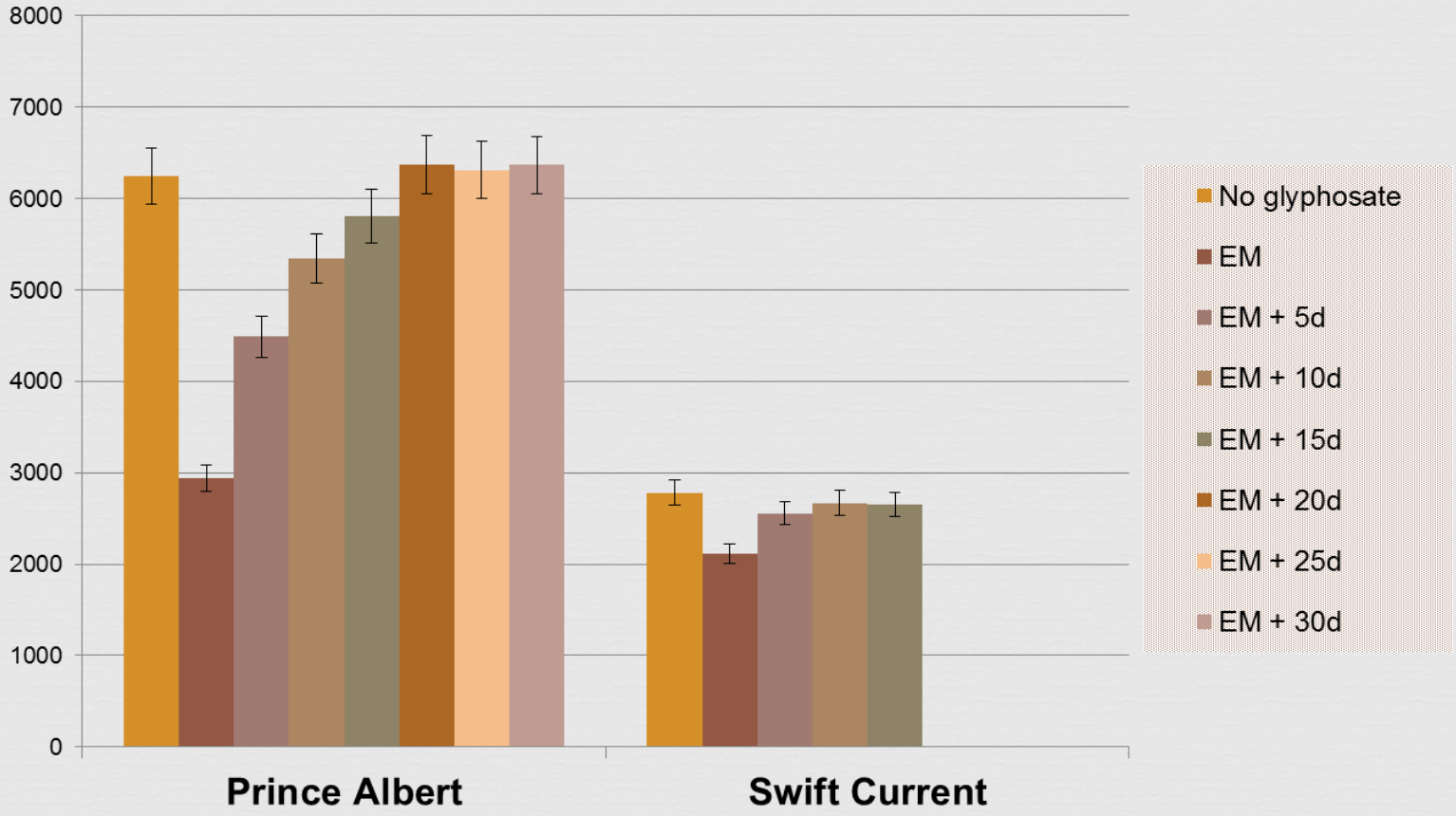
Trt	Timing	Scott	Swift Current	Prince Albert
1	Check (no glyphosate)	n/a	n/a	n/a
2	Early milk	Aug 7	Aug 1	Aug 7
3	Early milk + 5 days	Aug 12	Aug 7	Aug 12
4	Early milk + 10 days	Aug 17	Aug 10	Aug 17
5	Early milk + 15 days	Aug 23	Aug 14	Aug 22
6	Early milk + 20 days	Aug 27	N/A	Aug 27
7	Early milk + 25 days	Sep 1	N/A	Sep 3
8	Early milk + 30 days	Sep 6	N/A	Sep 8

Scott Results

Table 2: Treatment effects on wheat yield, test weight (TW), thousand kernel weight (TKW) and protein

Treatment	Yield (kg/ha)	Test Weight (g)	Thousand Kernel Weight (g)	Protein %
No glyphosate	-	-	-	-
Early milk	1331c[y]	61.9c	16.13c	14.7a
Early milk + 5 days	2542b	70.5b	18.94b	13.9b
Early milk + 10 days	3530a	76.3a	21.83a	14.1b
CV	14.54	1.65	4.62	1.49
LSD	620.81	1.99	1.52	0.37

Prince Albert and Swift Current Results



Conclusions

- Pre-harvest glyphosate on wheat gives an additional time to control **perennial weeds**
- Assists in **plant dry-down** to facilitate an earlier harvest
- May be difficult to justify as a harvest aid in a weed-free crop
- **Increasing Seeding Rates -** this is an alternative method that will allow you to reduce weed pressure and reduce secondary growth which together both contribute to easier and earlier harvest

New for 2013

- Effect of seeding rate and seed size on lentil
- Demonstrating the effect of fungicide application and seeding rate on disease levels in field peas and lentils
- Fall 2,4-D preceding canola, lentil and pea
- Optimum timing of weed control in field pea and lentil
- Straight combining canola small plot demonstration
- Nitrogen fertilizer management options for winter wheat
- Short season corn and soybean demonstration

Acknowledgements

For more information visit: www.warc.ca

- ADOPT (Agricultural Demonstration of Practices and Technologies) program

AgriARM Applied Research Management

SaskCanola

Saskatchewan Ministry of Agriculture

BAYER Bayer CropScience

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada