

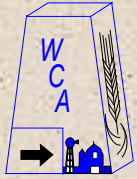
Wheatland Conservation Area Inc Southwest Agri-ARM Site

Agri-ARM Research Update
Jan. 17, 2014



ADOPT Project

“Cropping Systems Response to Seed Size, Seed Rate, and Seed Treatments”



Presentation Outline

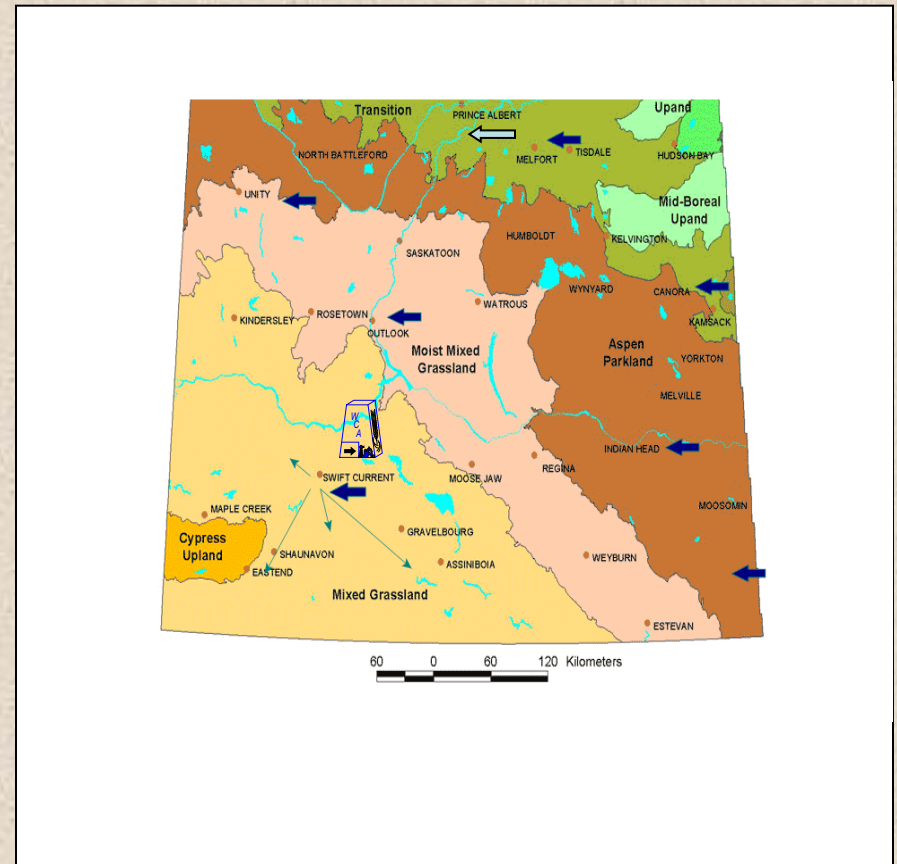
- Wheatland Conservation Area / Agri-ARM background
- ADOPT program
- Project Introduction
- AAFC Winter Wheat
- Cropping Systems Response to Seed Treatments, Seed Size and Sowing Density
- 2013 Project findings
- Acknowledgements





Wheatland Brief History

- Non-profit / producer run since 1982.
- Applied research
- Agri-ARM (8 sites)
- Trials
 - large and small plots
 - Commodity Groups
 - Governments
 - Industry and Universities
 - extension
- ADOPT projects



ADOPT Program Background

Agricultural Demonstration of Practices and Technologies

- The purpose of the ADOPT program is to accelerate the transfer of knowledge to Saskatchewan producers and ranchers.
- The ADOPT program will provide funding to help producer groups evaluate and demonstrate new agricultural practices and technologies at the local level.
- The results of successful trials can then be adopted by farming operations in the region.

Project Introduction and Rationale

- Why do this project? What is the concern?

The end of the 2012 growing season was very hot and dry resulting in harvest samples with low 1000 kernel weights. In the spring of 2013, there was some concern regarding the vigour of this smaller seed and whether it should be used. Could we compensate by adjusting seeding rates or by using seed treatments?

- Where did we look for answers?

Winter Wheat Cropping System Response to Seed Treatments, Seed Size and Sowing Density.

Dr. Brian Beres, AAFC, Lethbridge, AB.

- A study was designed and conducted at 7 sites across the Canadian prairies to determine the influence of seed treatments, sowing density and seed size on fall stand establishment and over winter survival of winter wheat.
- The three factor experiment consisted of:
 - Seed treatments 1) Check – no seed treatment
 - 2) Raxil WW dual fungicide/insecticidal
 - Sowing density: 1) 200 seed m⁻²
 - 2) 400 seeds m⁻²
 - Seed size (small, medium, and large) as a proxy for seed vigour.

The combined factors create a range of agronomic systems from weak (low seed rate, small/thin seed, no seed protection) to superior (high seed rate, heavy/plump seed, dual seed treatment).

Dr. Brian Beres Summarized Findings

- The overall gains observed to grain yield by using seed treatments or larger seeds were significant but relatively modest.
- However, we must take into consideration the economic implications for each system to properly evaluate the risks and benefits each agronomic system can offer.



Yield responses were greatest in the weak agronomic system and tended to diminish with a stronger agronomic system. Economic benefits of using seed treatments are more likely realized in the weaker systems.

Observations from Winter Wheat Study



Superior agronomic system (400 seeds m⁻² + heavy seed weight) without seed treatment

Observations from Winter Wheat Study



Superior agronomic system (400 seeds m^{-2} + heavy seed weight) with seed treatment Raxil WW.

Observations from Winter Wheat Study



Weak agronomic system without seed treatment (200 seeds m⁻² + light/thin seed weight).

Observations from Winter Wheat Study



Weak agronomic system (200 seeds m⁻² + light/thin seed weight)
with seed treatment Raxil WW.

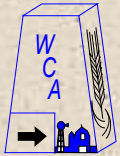
Dr. Brian Beres Initial Summary

- The results suggest seed treatments could enhance productivity, particularly if the agronomic system is compromised with less than desirable seed lots, lower plant populations, or perhaps other components not assessed in this study.
- It is important for producers to carefully assess seed lot quality, seeding rates, stubble quality, planting date in fall, and soil moisture conditions.
- If flaws to the system or less than desirable conditions exist, the use of seed treatments could reduce risk in winter wheat production systems.

Question

- Could these results be duplicated in spring seeded cereal crops like spring wheat and durum?





Project Introduction (ADOPT #20120390)

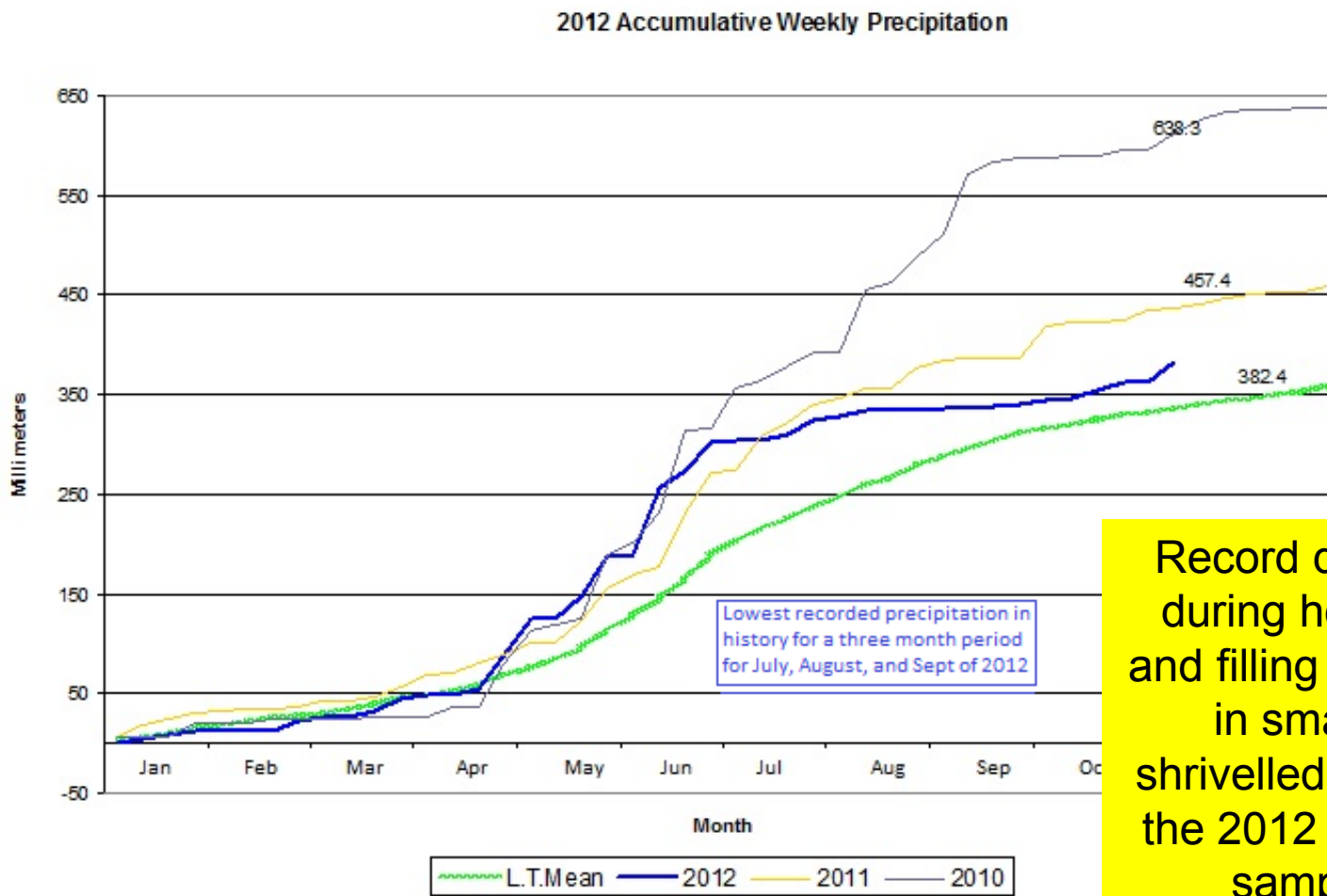
“Cropping Systems Response to Seed Treatments, Seed Size and Sowing Density”

- In 2012, producers saw reduced yields and grades in cereal crops due to late season drought, frost, and wheat midge damage.
- These factors also affected seed size in the harvest sample with higher variability and higher than normal shrivelled seeds (potential weak agronomic system).





2012 Accumulative Precipitation

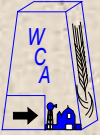


Record drought during heading and filling resulted in smaller shrivelled seed in the 2012 harvest sample.

“Cropping Systems Response to Seed Treatments, Seed Size and Sowing Density”

- Producers using “bin run” seed for spring seeding in 2013 may have ran into problems with poor emergence, poor plant vigour, and improper seeding rates, making the crop susceptible to disease and reduced yields (as suggested by Dr. Brian Beres in his Winter Wheat Study).
- This project is aimed at demonstrating the effects of seed treatments on various seed sizes and seeding rates of spring wheat and durum.

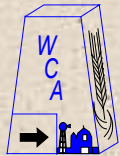




Seed Size

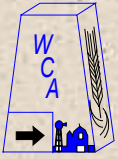
- The 1,000 kernel (1,000 K) weight is a measure of seed size. It is the weight in grams of 1,000 seeds.
- Seed size and the 1,000 K weight can vary from one crop to another, between varieties of the same crop and even within the same variety from year to year or from field to field.



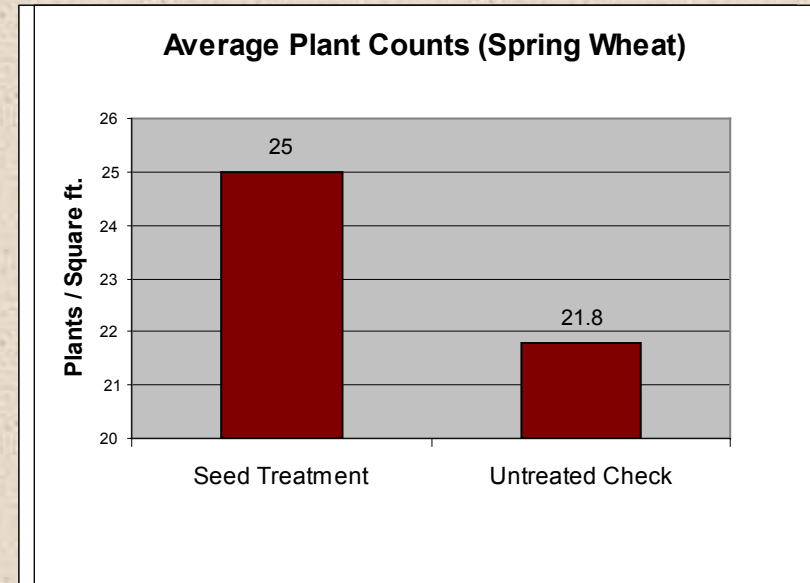
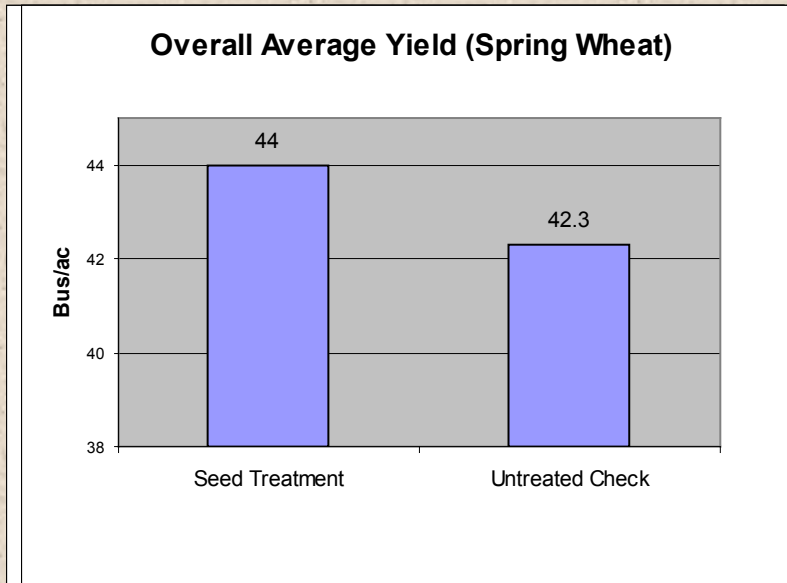


“Cropping Systems Response to Seed Treatments, Seed Size and Sowing Density”

- Bin run seed from 2012 harvest samples was sieved into 3 seed sizes:
Seed size:
 - Small (spring wheat 24 g/1000, durum 30 g/1000)
 - Medium (spring wheat 33 g/1000, durum 41 g/1000)
 - Large (spring wheat 42 g/1000, durum 52 g/1000)Seed treatment:
 - Dual action Raxil WW (fungicide/insecticide)
 - Untreated (no seed Treatment).Seeding Rate:
 - Low seeding rate (spring wheat 25 sds/ft², durum 28 sds/ft²)
 - Higher seeding rate (spring wheat 33 sds/ft², durum 37 sds/ft²).
- We set up a range of agronomic combinations to see if seed treatments can benefit a weaker agronomic system vs. a strong agronomic system.

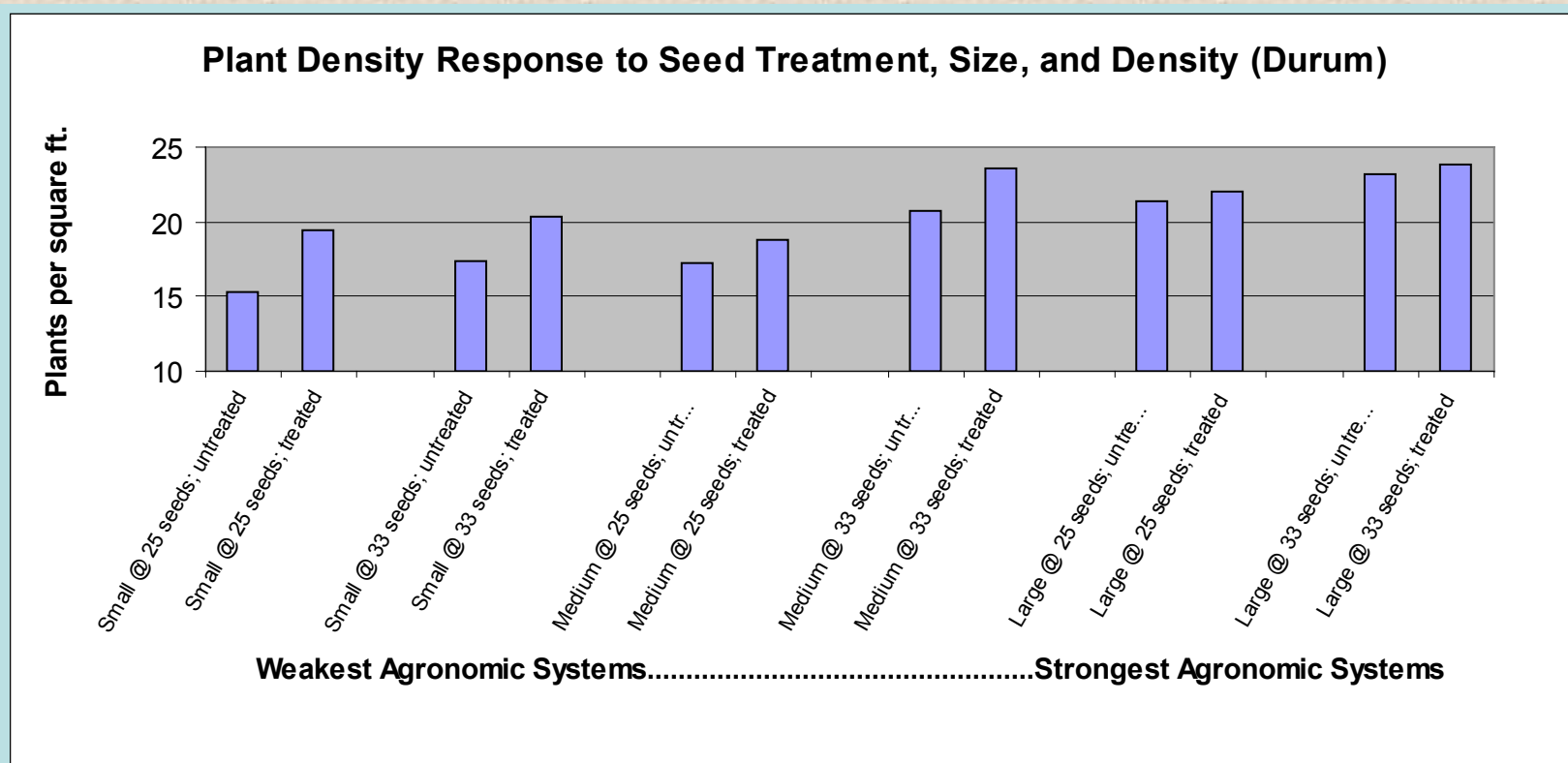


“Cropping Systems Response to Seed Treatments, Seed Size and Sowing Density”



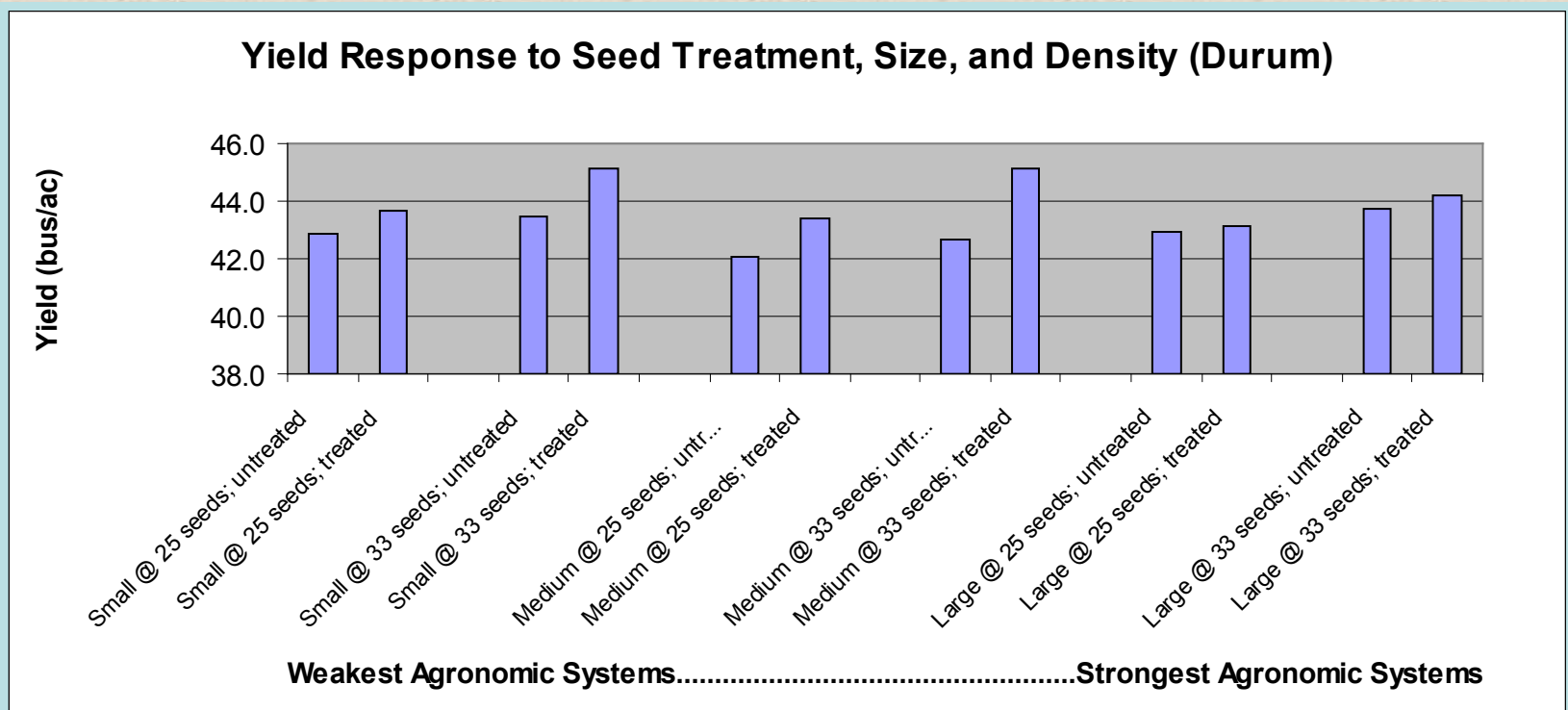
Overall yield increases are modest, therefore, we must look at each agronomic system to determine where the economic benefits are realized.

Durum Plant Densities



Seed treatments had a greater impact on plant density in the weaker agronomic system (small seed / lower rate) and the impact is diminished with the stronger agronomic system (large seed / higher seeding rate)

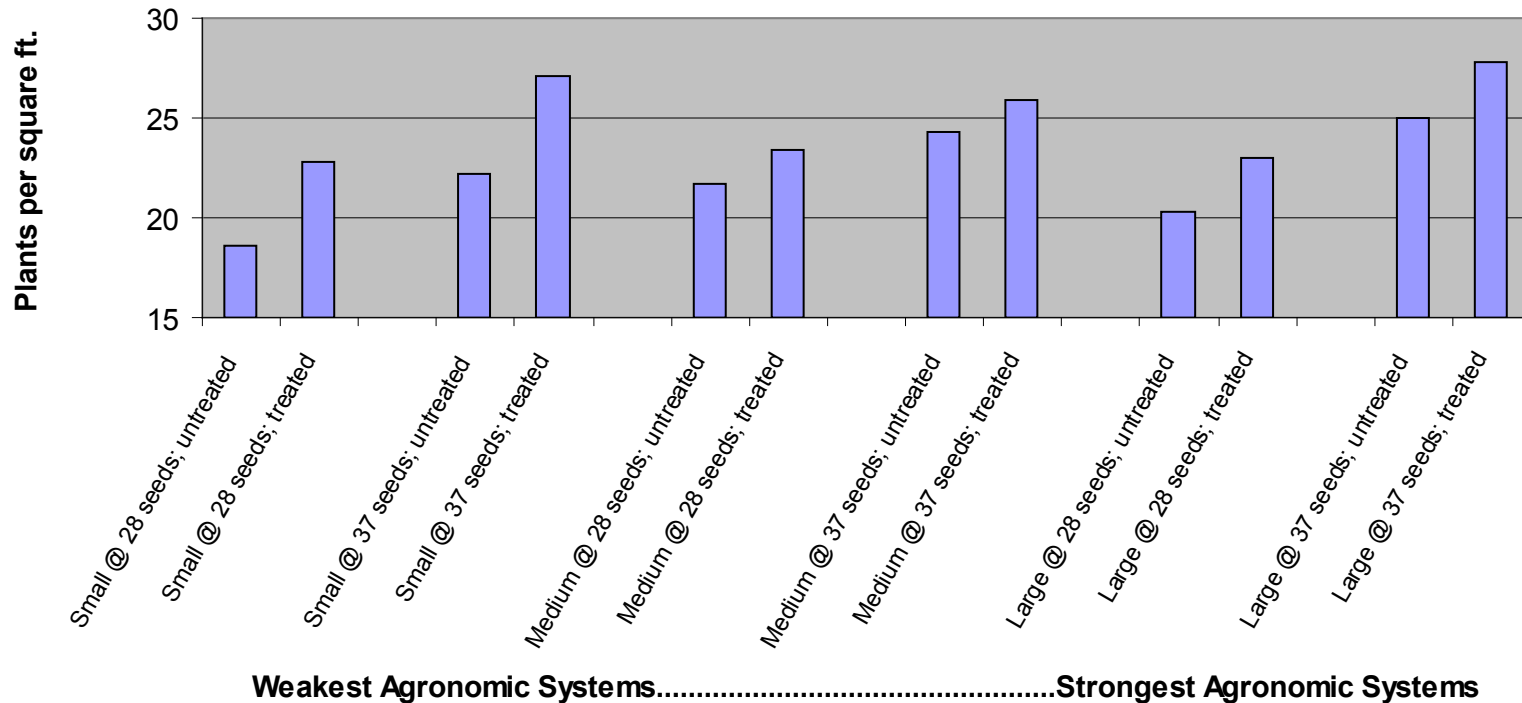
Durum Yields



Seed treatments had a greater impact on durum yield in the weaker agronomic system (small seed / lower rate) and tended to diminish with the stronger agronomic system (large seed / higher seeding rate)

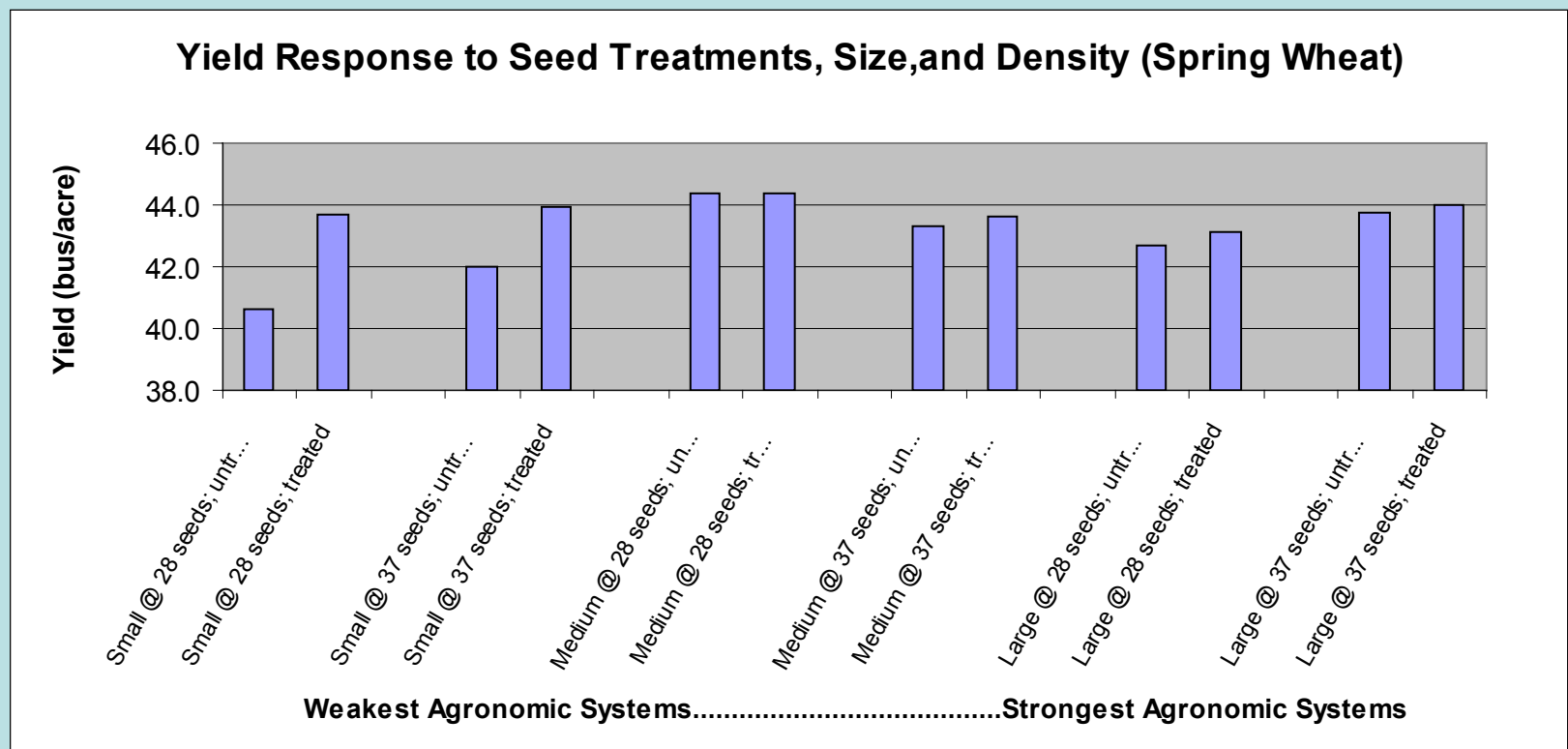
Spring Wheat Plant Densities

Plant Density Response to Seed Trmt, Size, Density (Spring Wheat)



Seed treatments had the greatest impact on plant density in the weaker agronomic system (small seed / lower rate) and the impact somewhat diminished with the stronger agronomic system.

Spring Wheat Yields



Seed treatments had an impact on spring wheat yield in the weaker agronomic system only and benefits were not realized in the moderate and strong agronomic systems.

Other Factors to Note

- We are using seed size as the only parameter for seed vigour.
- Other considerations can be made for diseased or midge damaged seed, potential wire worm and other pest infestations, or weather related factors that can contribute to a weak agronomic scenario that may further warrant the use of seed treatments.



Conclusion

- Our results were very similar to those found by Dr. Beres with winter wheat.
- The overall gains observed to grain yield by using seed treatments were significant but relatively modest.
- Yield responses were greatest in the weak agronomic system and tended to diminish with a stronger agronomic system.
- Must look at the strength of your agronomic system in order to determine the economic benefits of using a seed treatment.



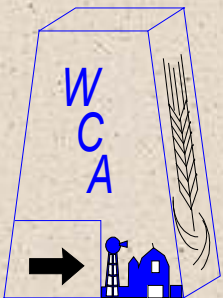
Acknowledgement



- ADOPT & Sask. Ministry of Agriculture
- Dr. Brian Beres, AAFC
- WCA Staff.



2014 Croportunities Conference , March 18
2014 Wheatland Annual Tour July 17, 2014
www.wheatlandconservation.ca



Thank-you!



2014 Cropportunities Conference , March 18
2014 Wheatland Annual Tour July 17, 2014

www.wheatlandconservation.ca