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Crown Rust in Oats



IHARF

INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION

Canada 

Will Foliar Fungicides Increase the Quality and Yield of Oats?

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Crown Rust in Oats

Why look at it?

1. Antidotal evidence of response in Red River Valley
2. Single site experiments that have shown a response to fungicides even when crown rust is present
3. Growing belief than fungicides will provide a benefit even if crown rust is not present
4. Image of oats



Crown Rust in Oats

Objectives

To determine if a fungicide application can improving yield or quality in the absence of crown rust, across western Canada.

To determine the level of crown rust infection that would make the application of a fungicide a prudent decision. Does this level change as you move across western Canada?



Crown Rust in Oats

Seeding Date

I) May 15

II) June 5

Fungicide

I) No Fungicide

II) Fungicide (Headline)

Cultivars

Four cultivars with a range of resistance to
Crown rust



Crown Rust in Oats

Cultivars

- I) very Susceptible to crown rust (AC Morgan)
- II) Susceptible to crown rust (CDC Orrin)
- II) Partially resistant to crown rust (CDC Boyer)
- III) Cultivar with best possible resistance at time of trial (Leggett)



Crown Rust in Oats

Locations

- Indian Head
- Canora
- Melfort (Rust Free)
- Saskatoon (inoculated)
- Brandon
- Portage la Prairie



Crown Rust in Oats

Financial Support

- Saskatchewan Oat Development Commission**
- Cargill Ltd**
- Can-Oat Milling**
- Grain Millers**
- Saskatchewan Ministry of Agriculture (ADF)**

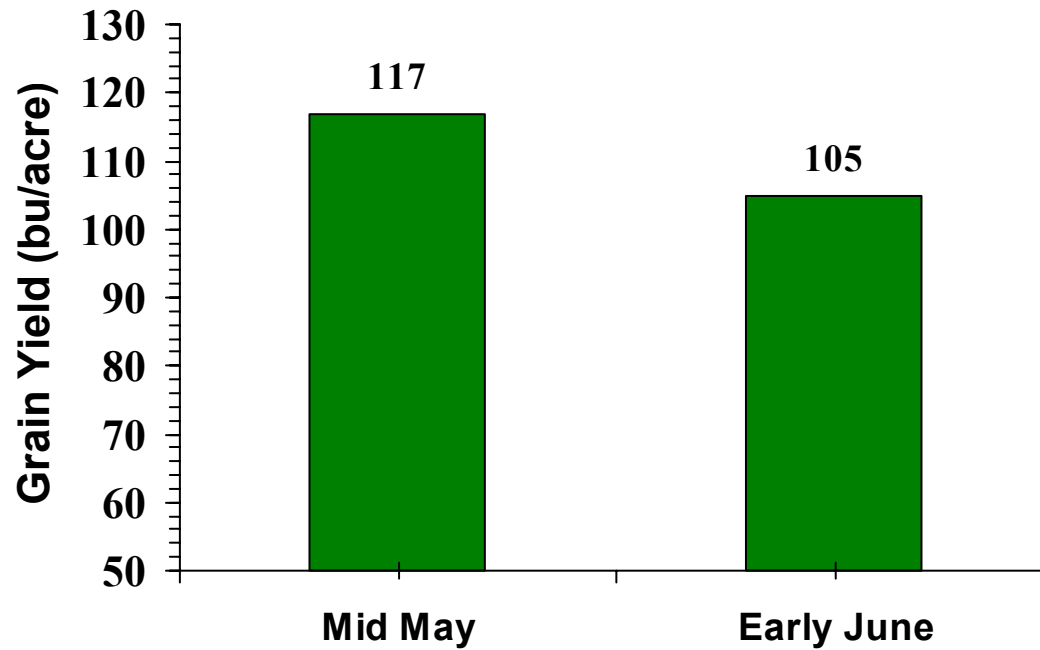




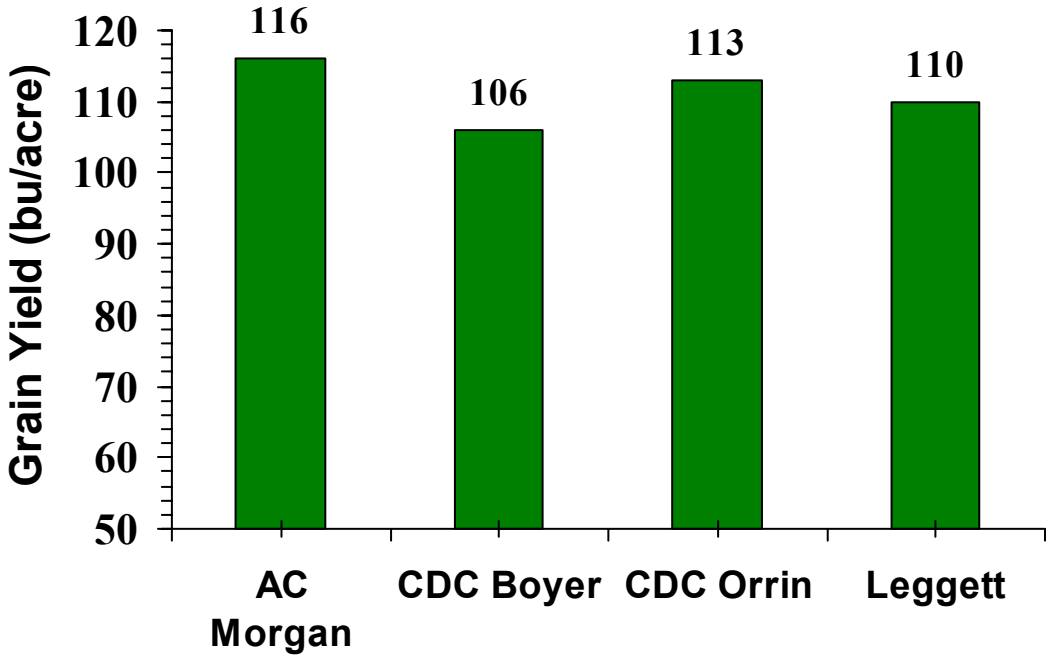




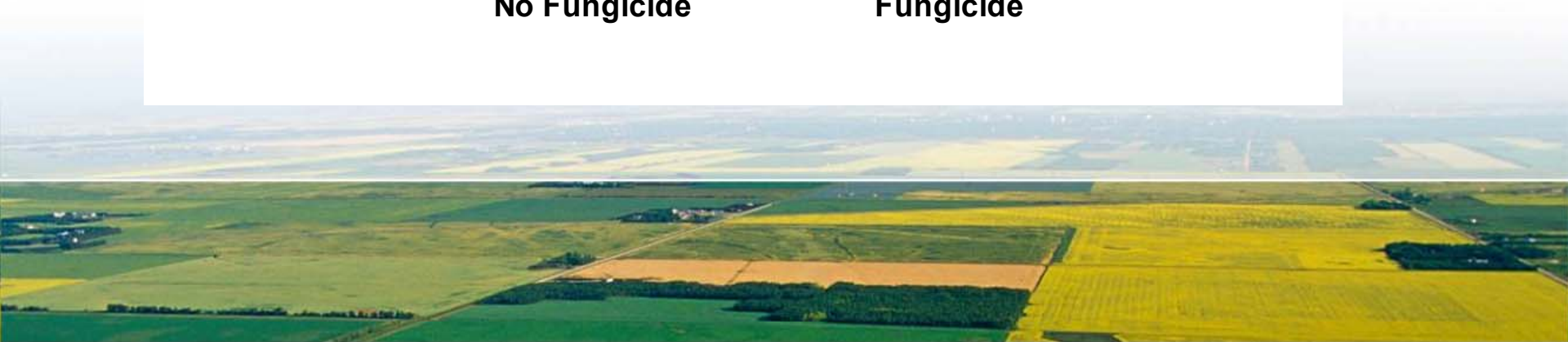
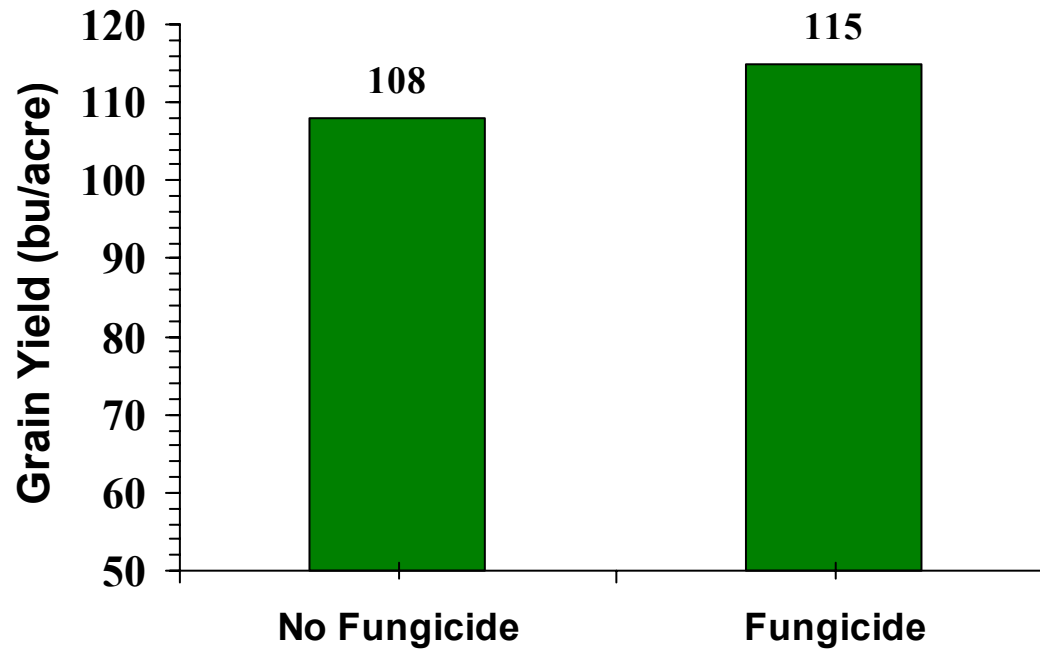
Seeding Date



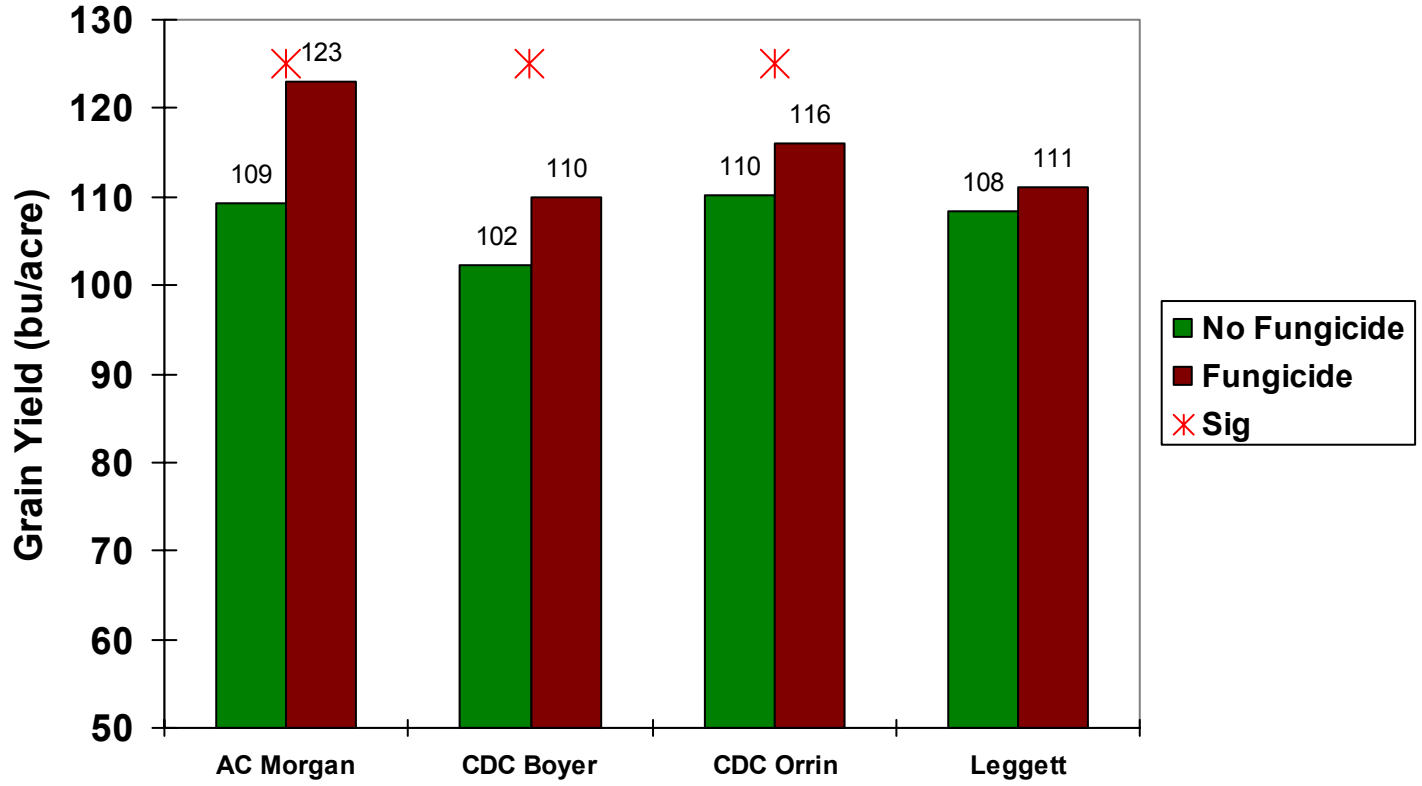
Cultivar



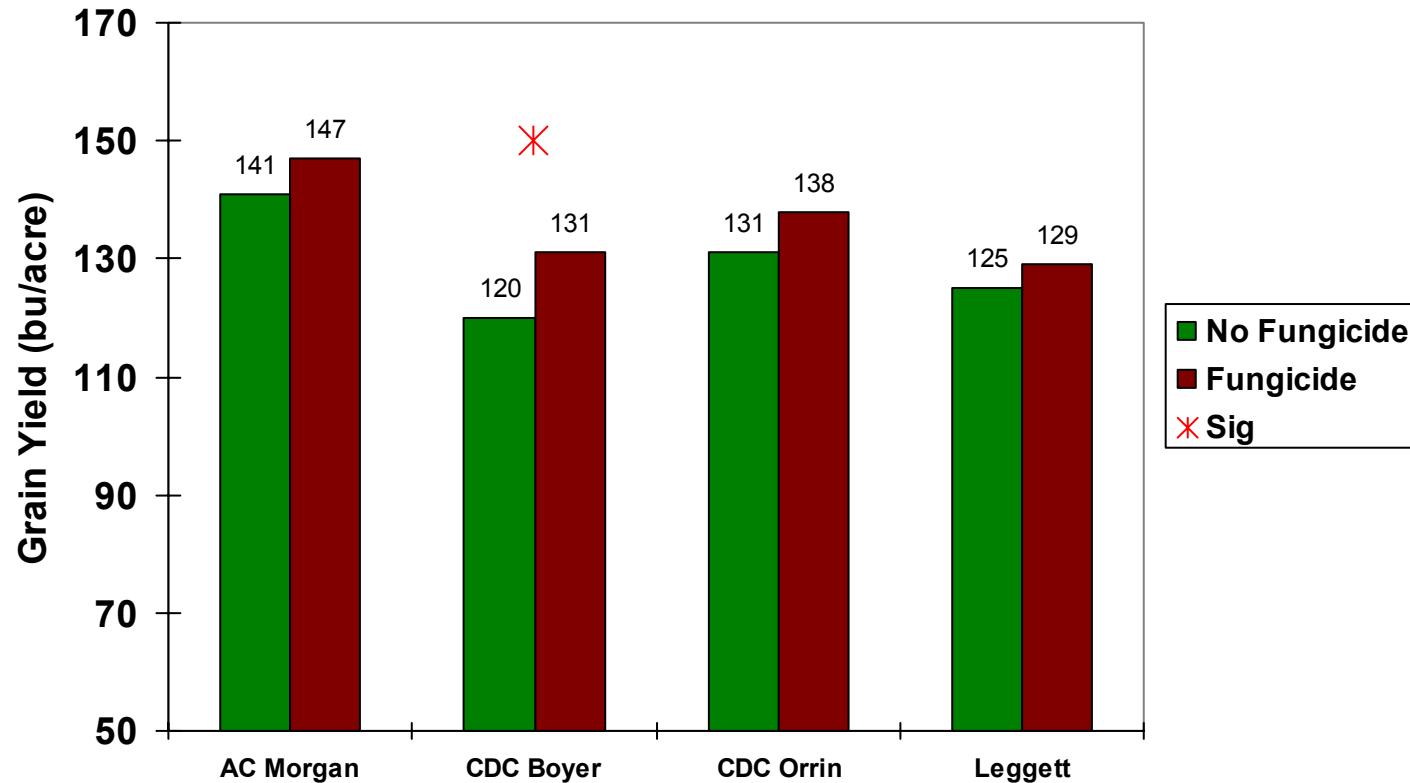
Fungicide



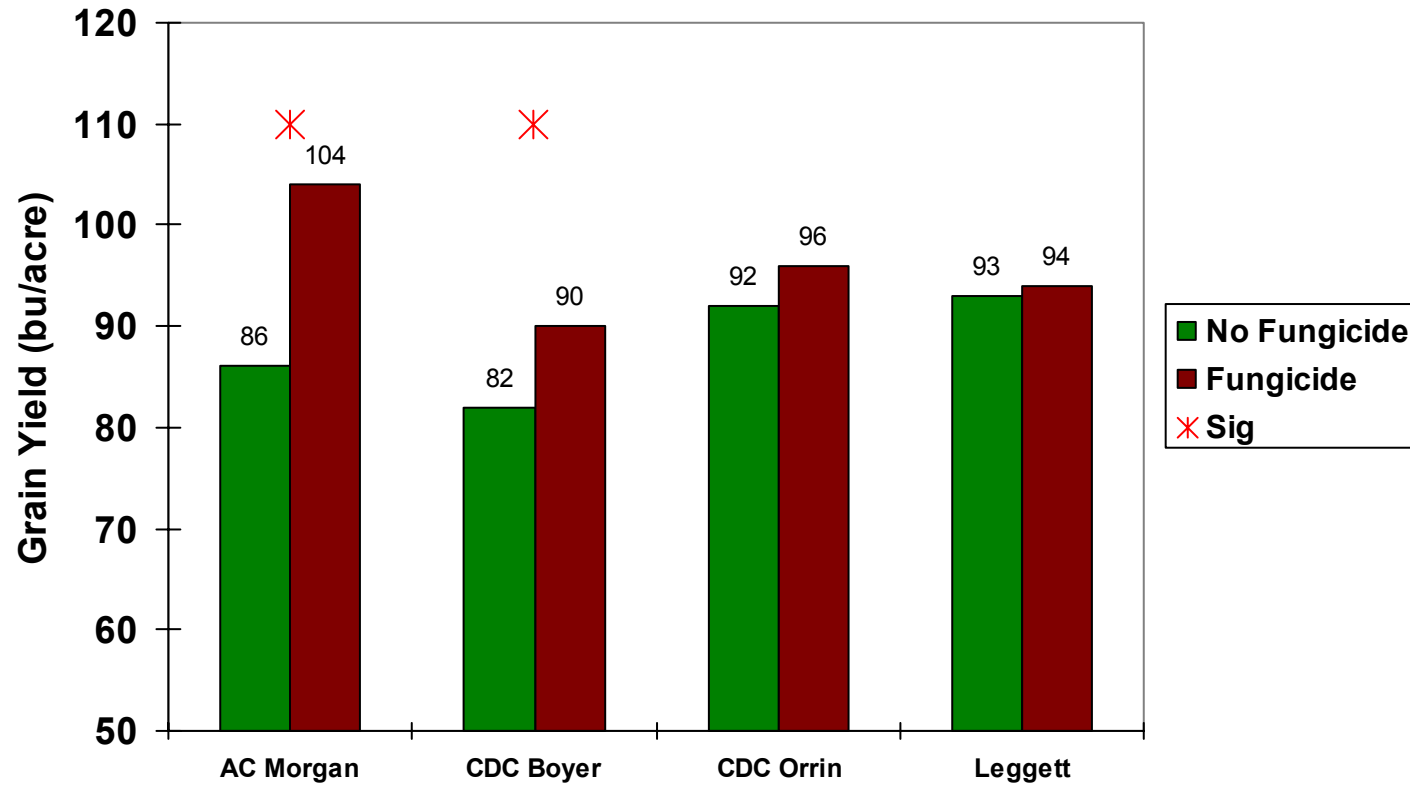
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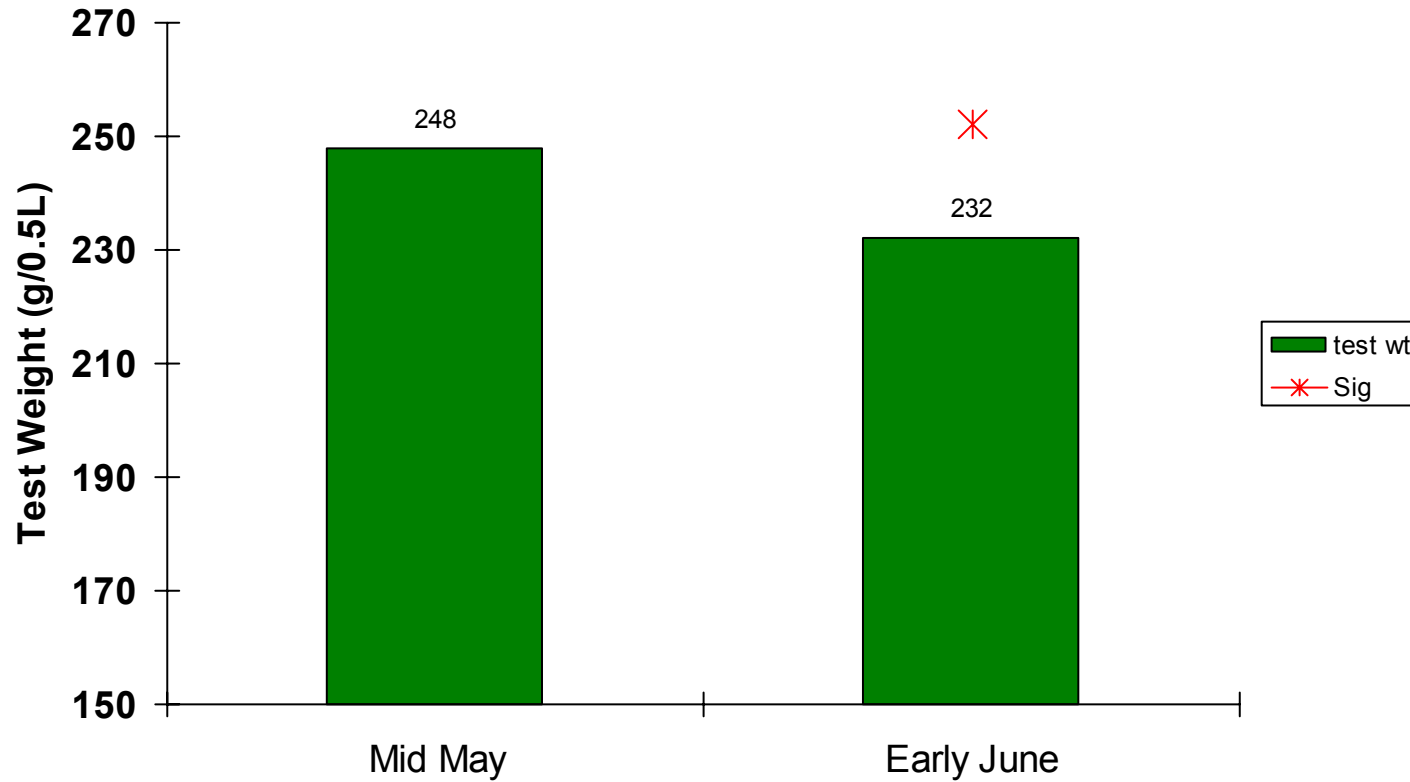
Sites with Low Crown Rust



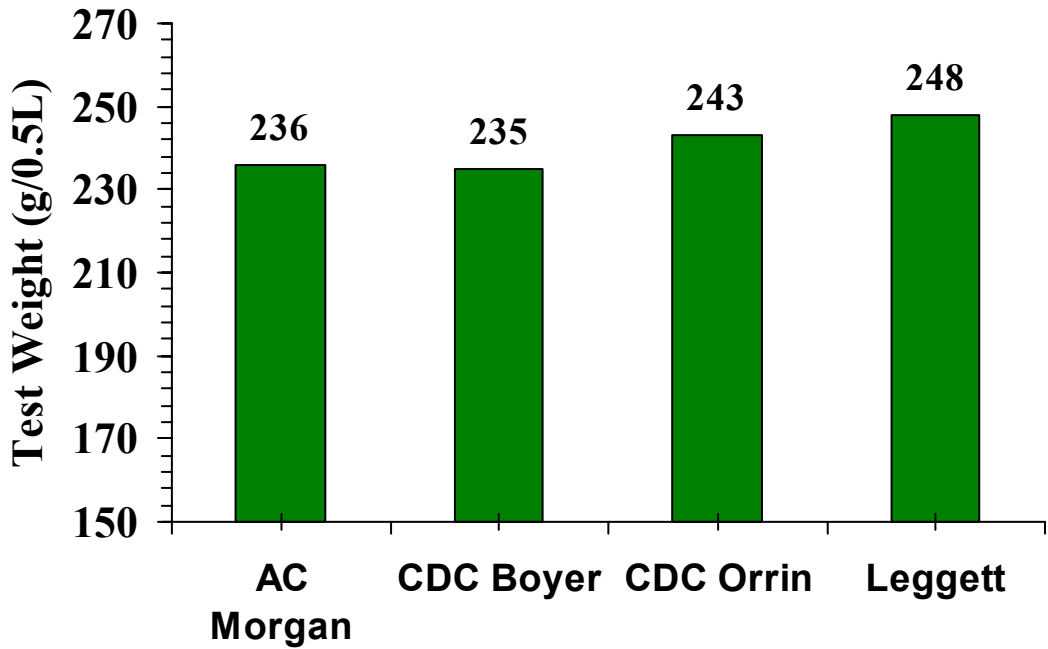
Sites with High Crown Rust



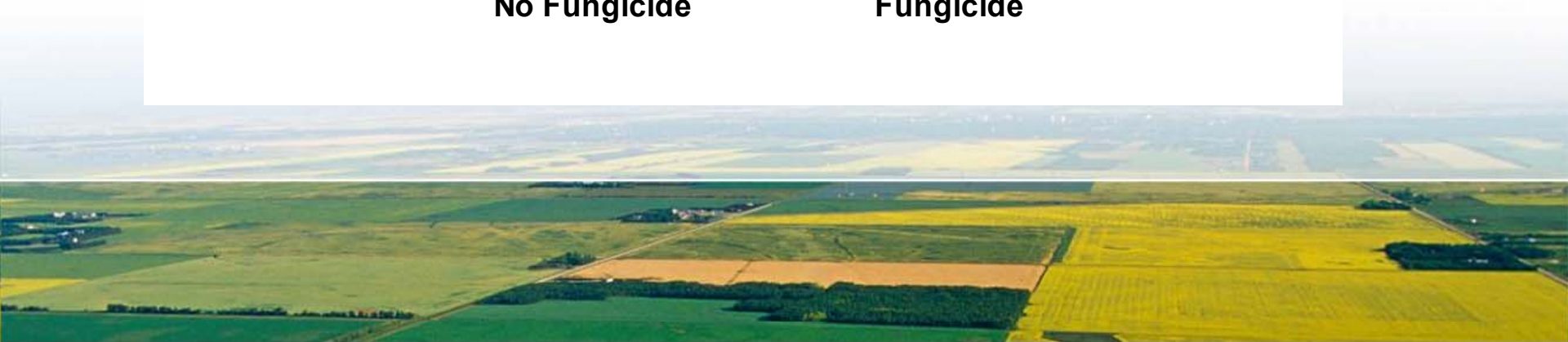
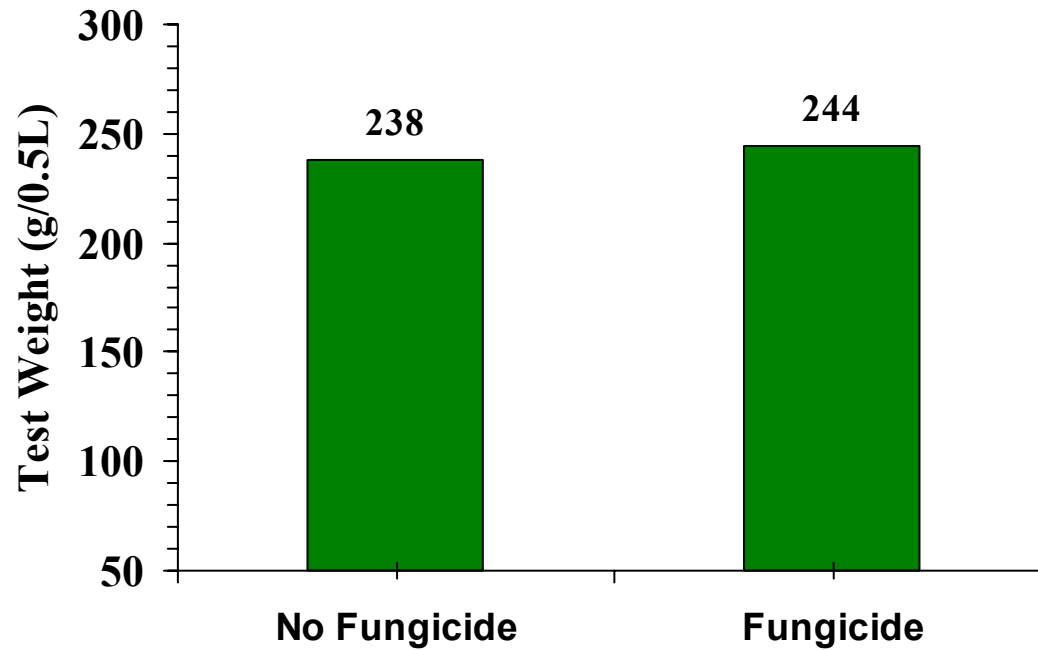
Seeding Date



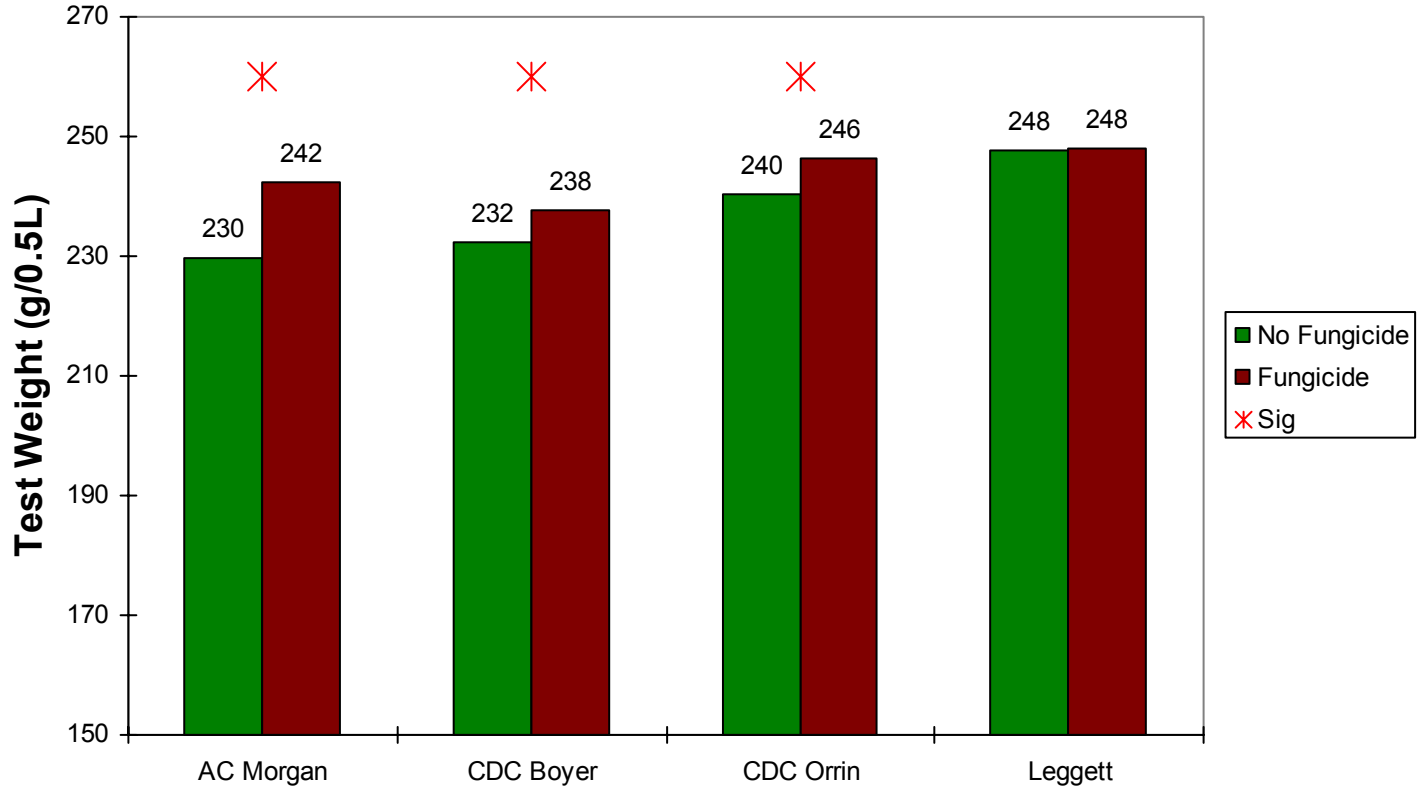
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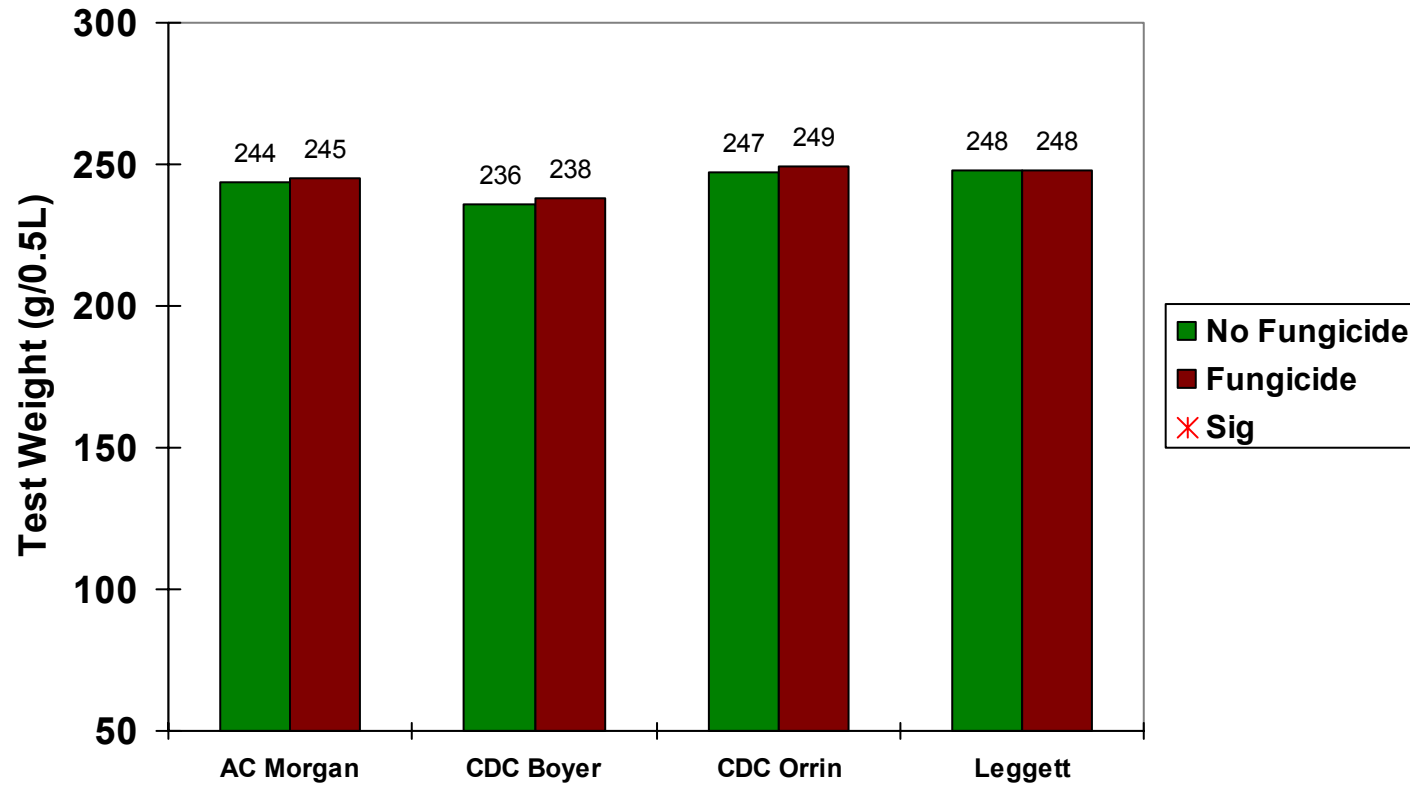
Fungicide



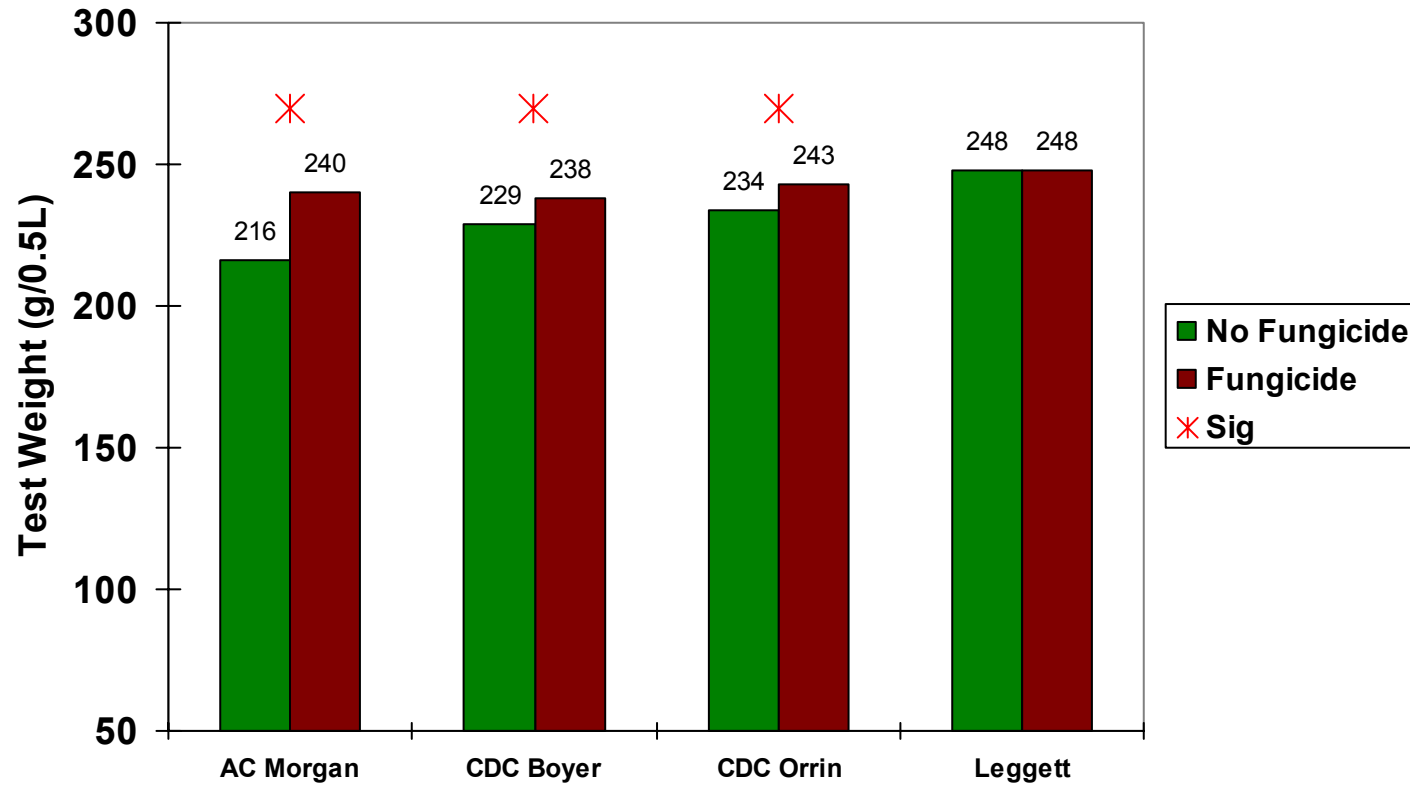
Cultivar



Sites with Low Crown Rust



Sites with High Crown Rust



Preliminary Conclusions

Seeding Date

Large effect on yield and test weight

-12 bu/acre

- 15 g/0.5L



Preliminary Conclusions

Cultivars x Fungicide

Largest benefit from fungicide occurred in cultivars most susceptible to crown rust under high levels of crown rust

AC Morgan – 18 bu/acre

Leggett – no effect



Preliminary Conclusions

Cultivars x Fungicide

Under low levels of crown rust only CDC Boyer had a significant response

CDC Boyer – 11 bu/acre

other three cultivars – no statistical effect

Under all conditions the yield of Leggett was not affected by fungicides



Preliminary Conclusions

Cultivars x Fungicide

A fungicide improved test weight only in rust susceptible cultivars at high levels of crown rust

A fungicide application did not lower test weight

Under all conditions the test weight of Leggett was not affected by fungicides



Nitrogen Rates

- **54 lbs/acre of Nitrogen Fertilizer**
 - 13 lbs/acre at 3 sites
 - 27 to 54 lbs/acre at 10 sites
 - 107 lbs/acre at 1 site
- **Increasing Nitrogen decreased test weight**
 - 13 out of 17 site years
- **High rates of Nitrogen Fertilizer reduced the profitability of Oats.**



Seeding Rate and Nitrogen in 1998

bushels acre⁻¹

Nitrogen Rate (lbs/acre)	Canora	Melfort	Brandon
13	105.1 <i>b</i>	121.6 <i>c</i>	58.5 <i>d</i>
27	122.5 <i>a</i>	128.7 <i>b</i>	63.4 <i>d</i>
54	126.9 <i>a</i>	133.5 <i>ab</i>	73.0 <i>c</i>
80	126.5 <i>a</i>	135.8 <i>a</i>	84.5 <i>b</i>
107	123.3 <i>a</i>	136.9 <i>a</i>	95.8 <i>a</i>
CV	13	7.4	15

Seeding Rate and Nitrogen in 1999

bushels acre⁻¹

Nitrogen Rate (lbs/acre)	Weyburn	Ituna	Indian Head	Brandon	
				City	Lowes
13	84 <i>a</i>	100 <i>b</i>	126 <i>b</i>	95 <i>a</i>	111 <i>ab</i>
27	87 <i>a</i>	111 <i>a</i>	133 <i>a</i>	94 <i>ab</i>	117 <i>a</i>
54	81 <i>b</i>	119 <i>a</i>	137 <i>a</i>	88 <i>bc</i>	116 <i>a</i>
80	83 <i>ab</i>	112 <i>a</i>	134 <i>a</i>	90 <i>abc</i>	107 <i>bc</i>
107	80 <i>b</i>	114 <i>a</i>	133 <i>a</i>	87 <i>c</i>	101 <i>c</i>
CV	9	11	5.4	10	11

Nitrogen and Seeding Rate in 2000

Nitrogen Rate **Indian Head** **Melfort** **Canora** **Ituna** **Brandon**

bushels/acre

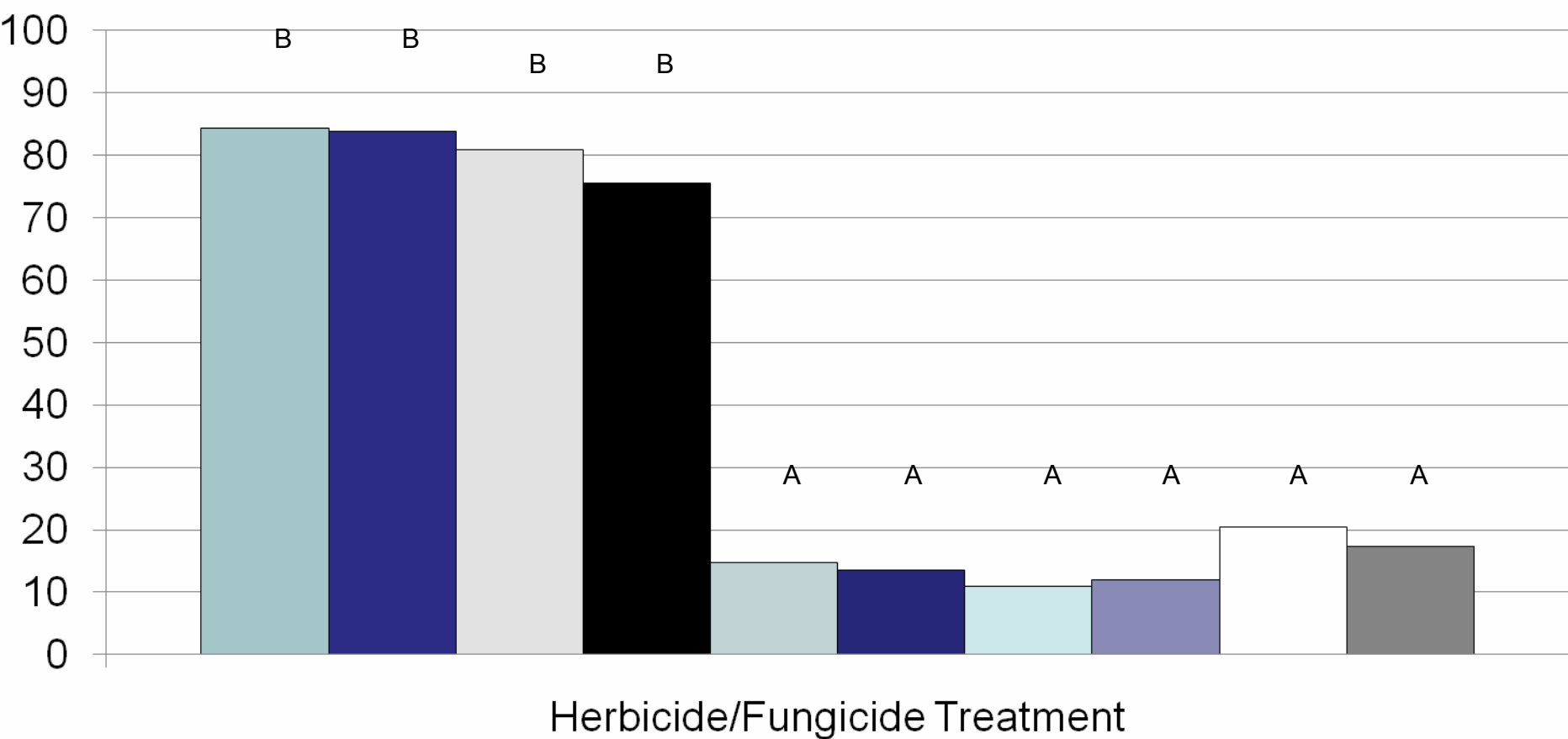
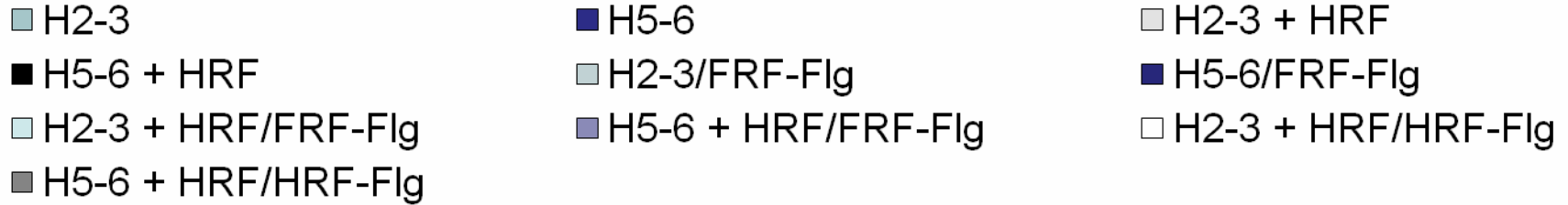
13	89_b	151_b	133_c	78_c	65_c
27	97_b	151_b	144_b	91_b	87_b
54	110_a	165_a	154_a	104_a	101_a
80	117_a	168_a	155_a	102_a	105_a
107	117_a	167_a	155_a	102_a	104_a

Herbicide and Fungicide Experiment

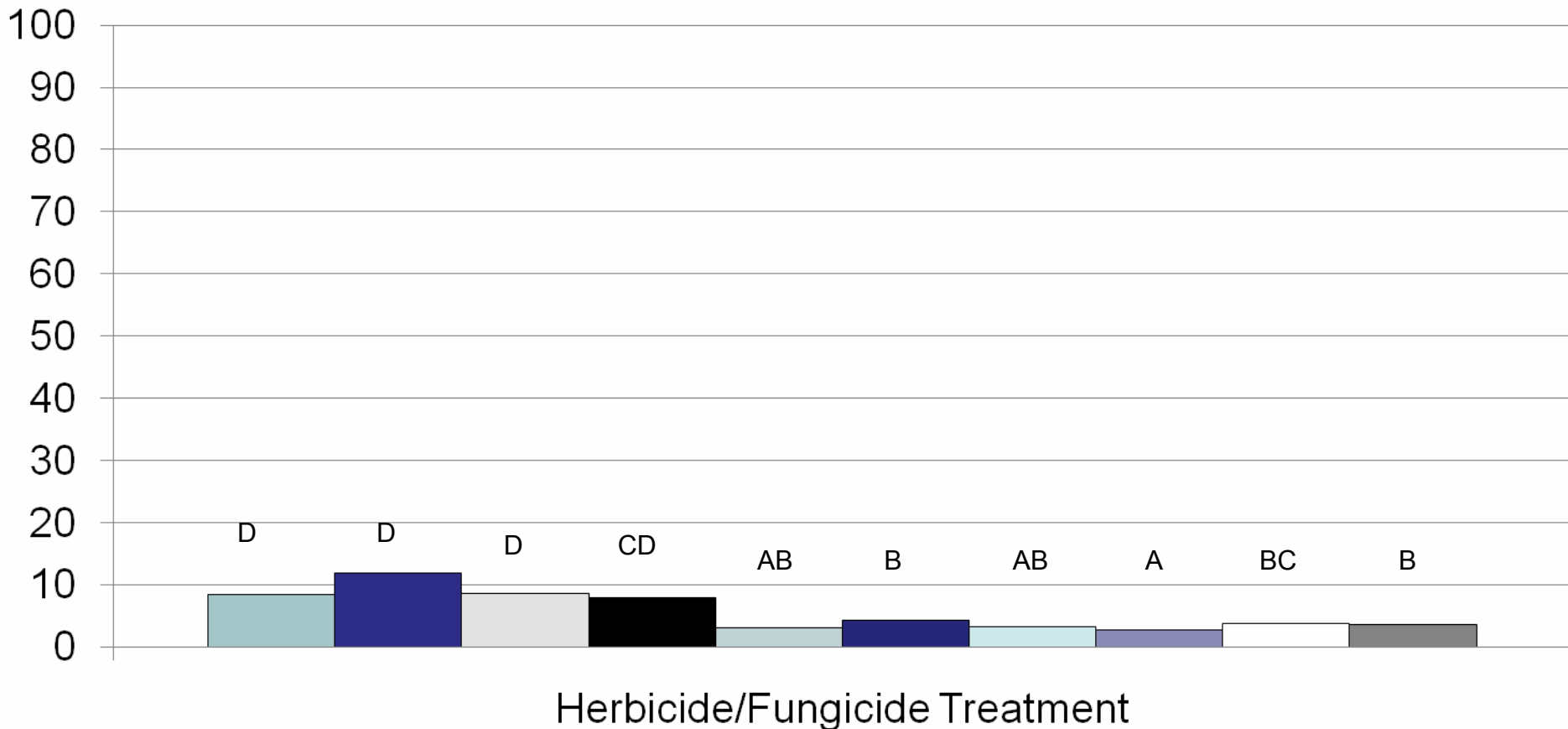
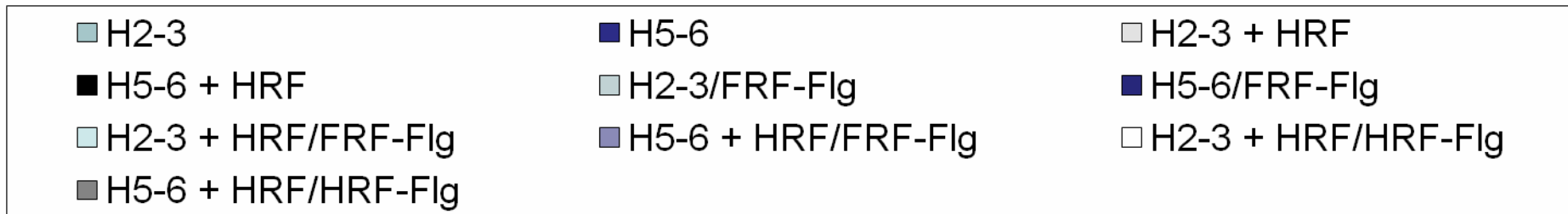
- **Treatments consisted of herbicides applied alone and in tank-mixtures with Tilt at 3 crop growth stages (2-3, 5-6, Flag (split or only at flag leaf stage))**
- **Lead by Dr. Turkington at Lacombe, AB
– 403-782-8138**



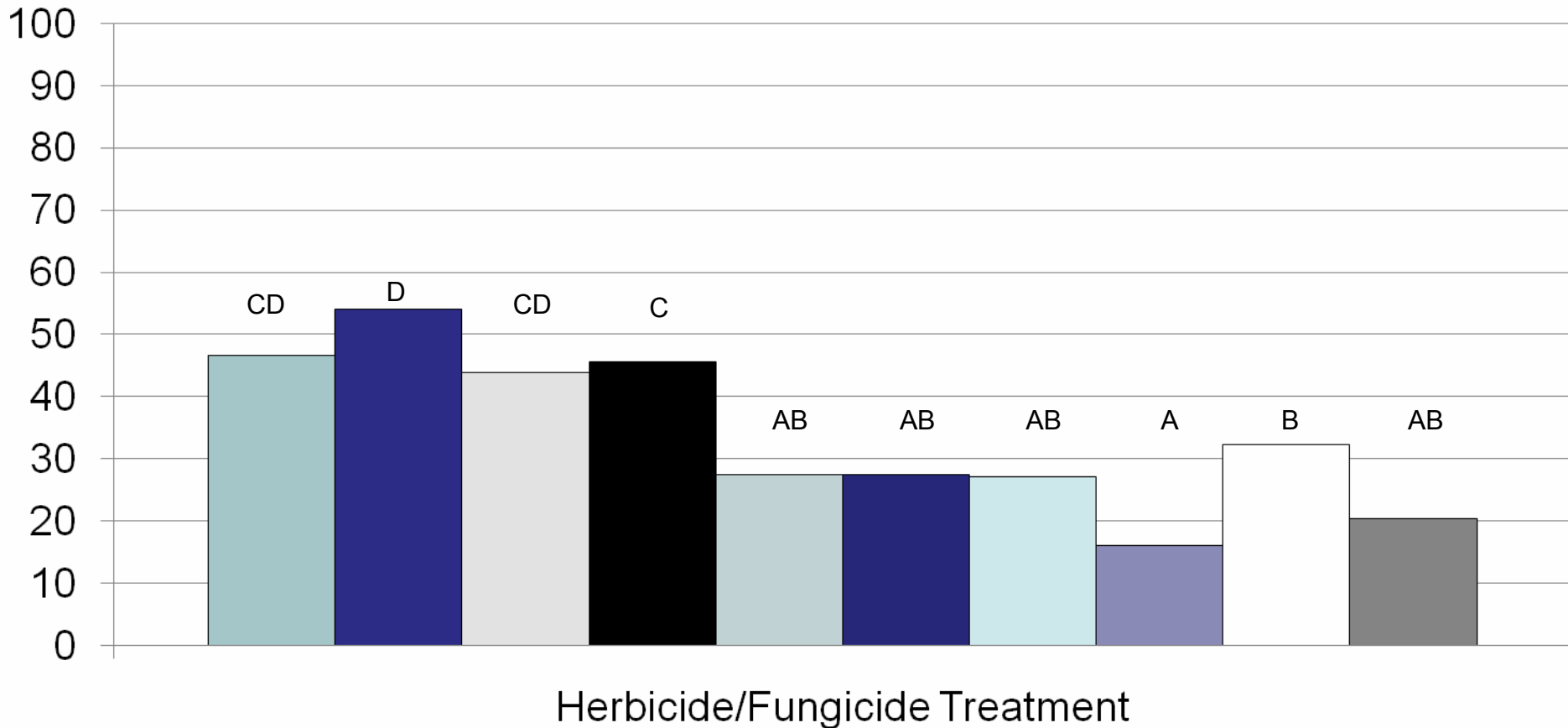
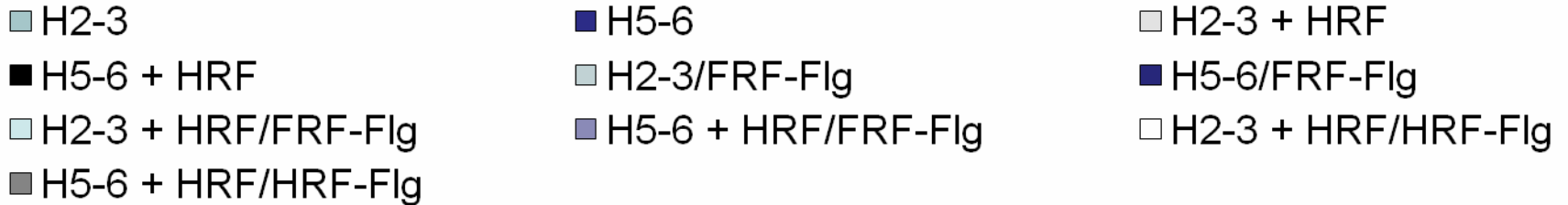
Percentage leaf area diseased Lacombe 2010



Percentage leaf area diseased, Melfort 2010

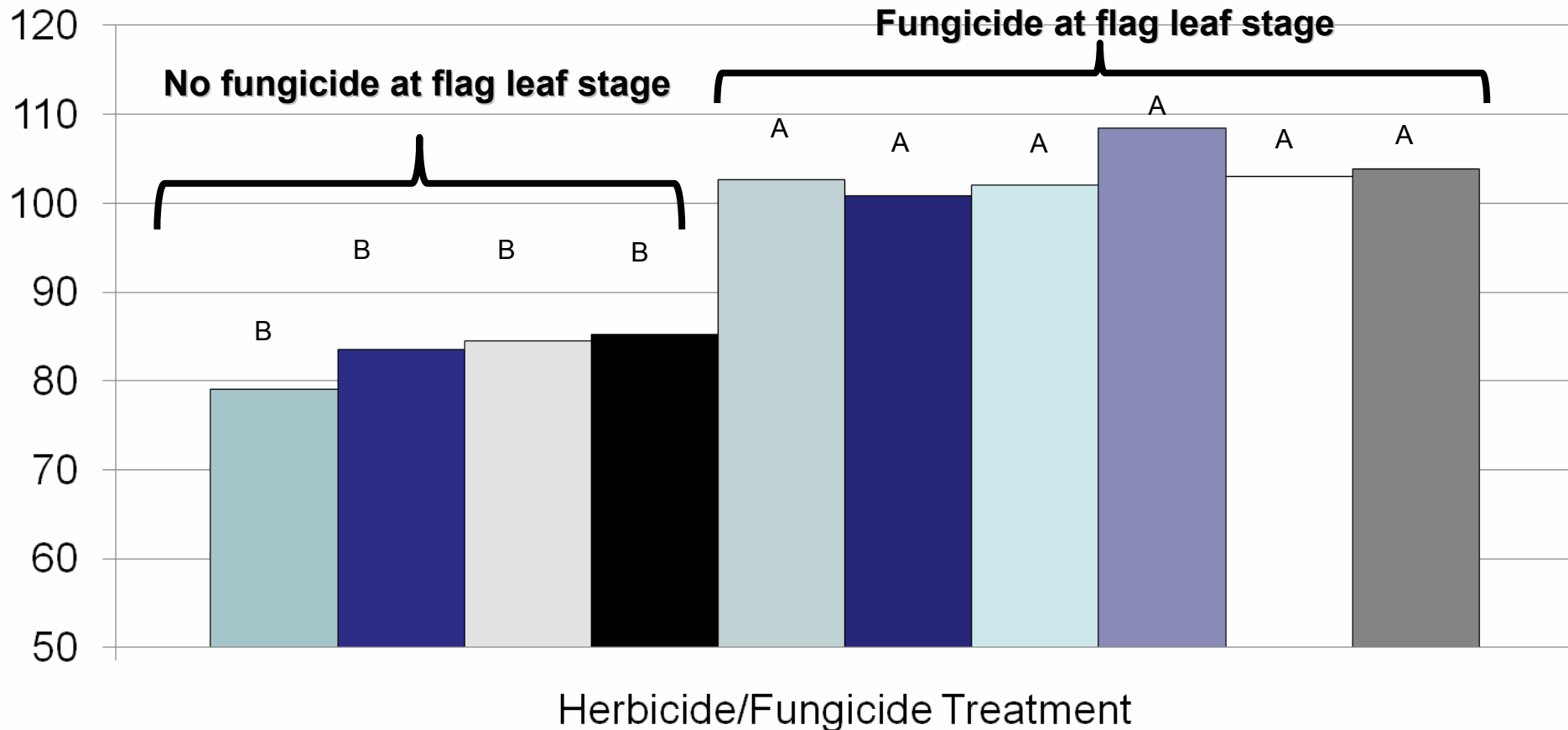
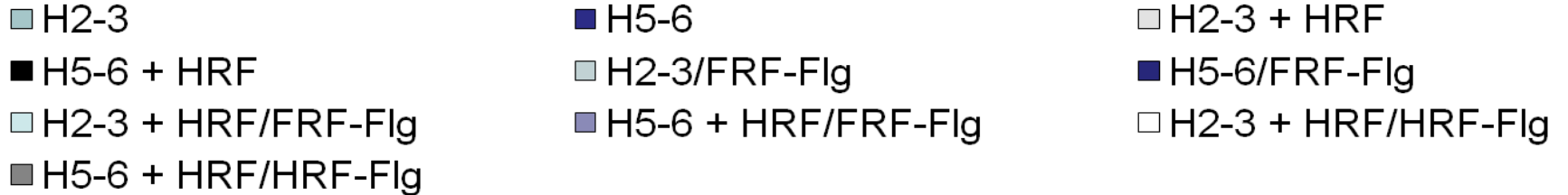


Percentage leaf area Scott 2010



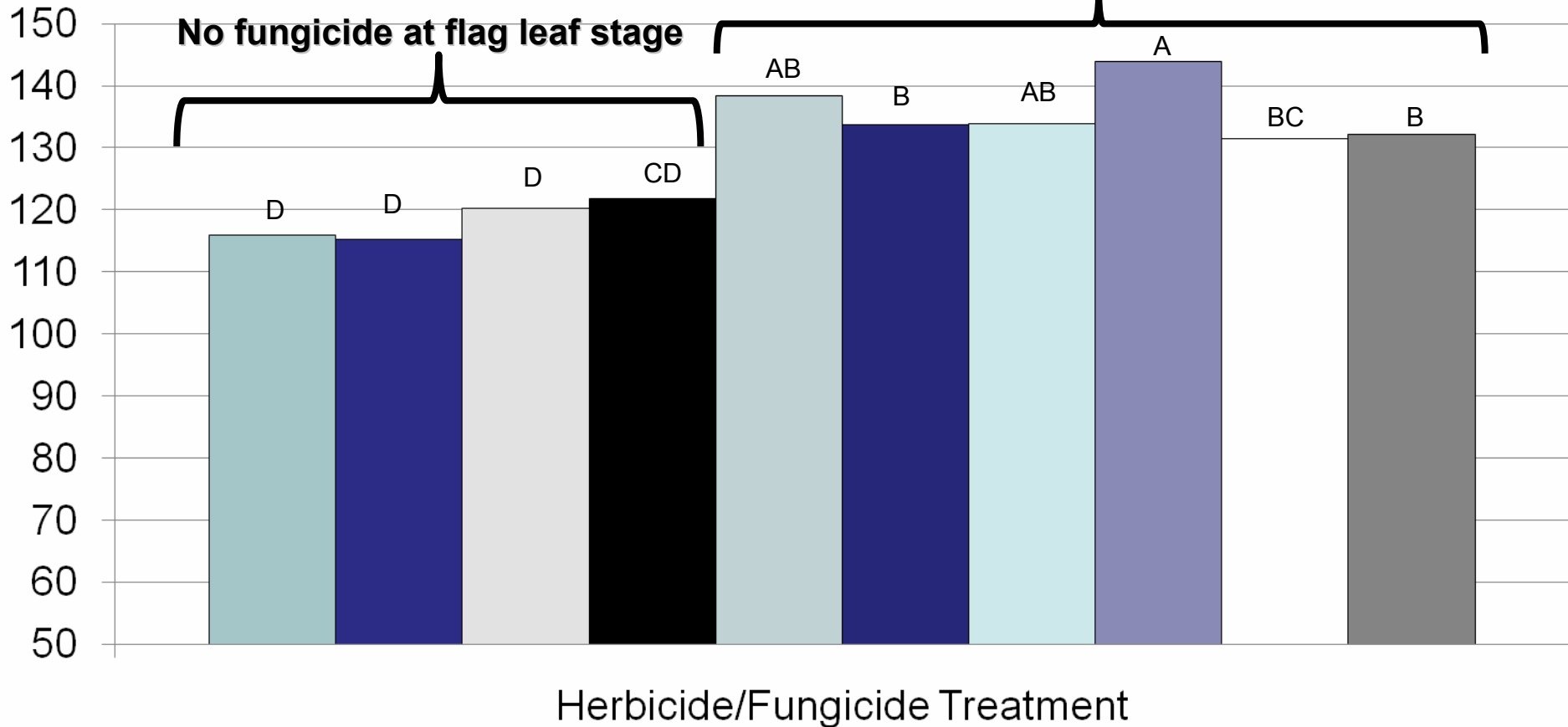
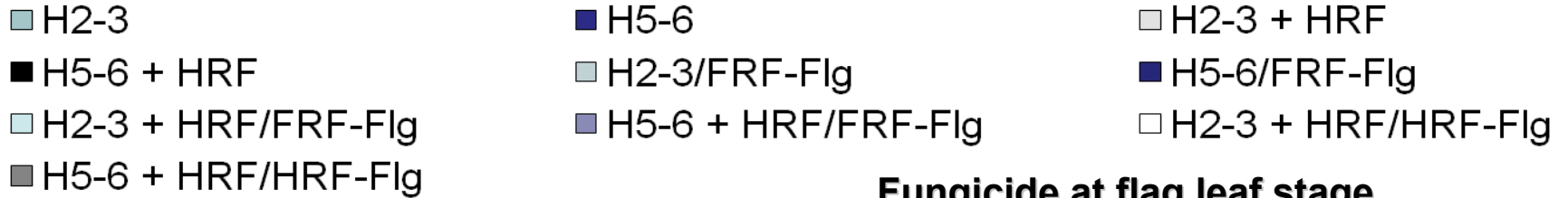
Grain yield (bu/ac)

Lacombe 2010



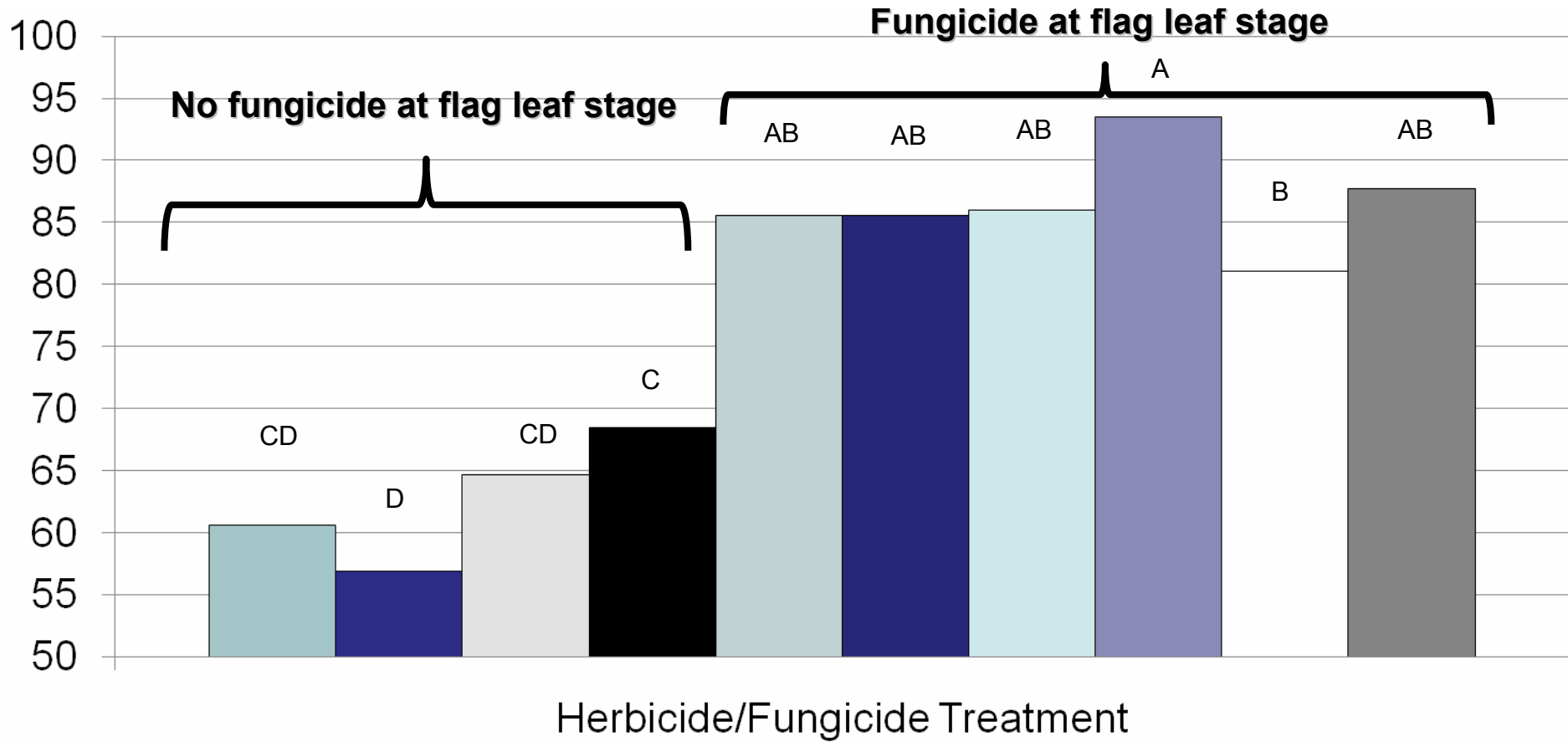
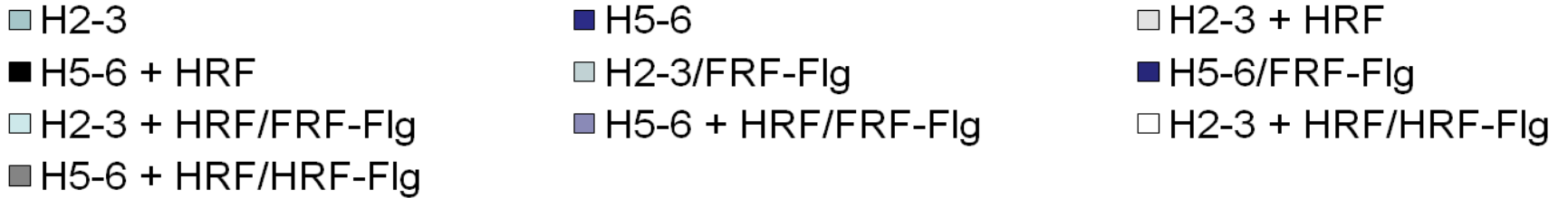
Grain yield (bu/ac)

Melfort 2010

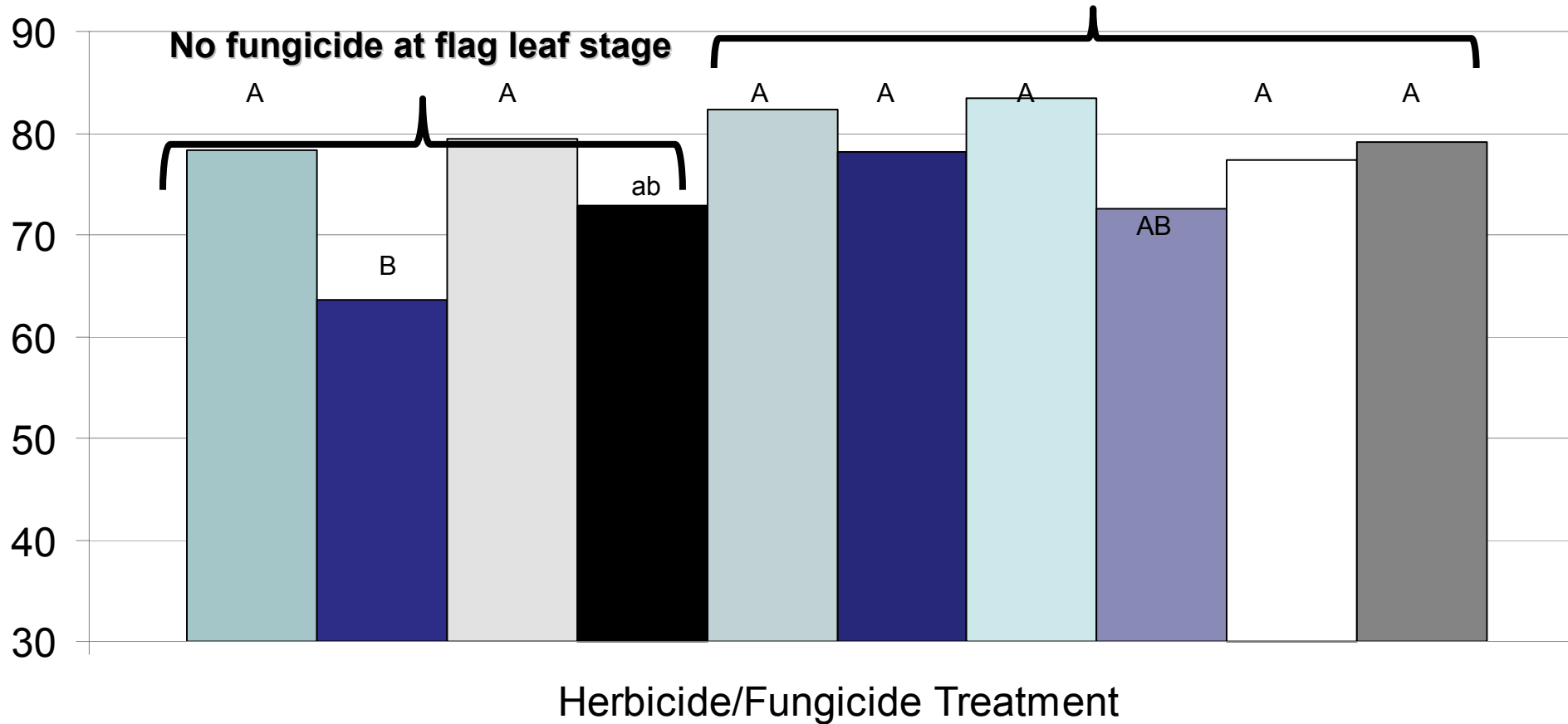
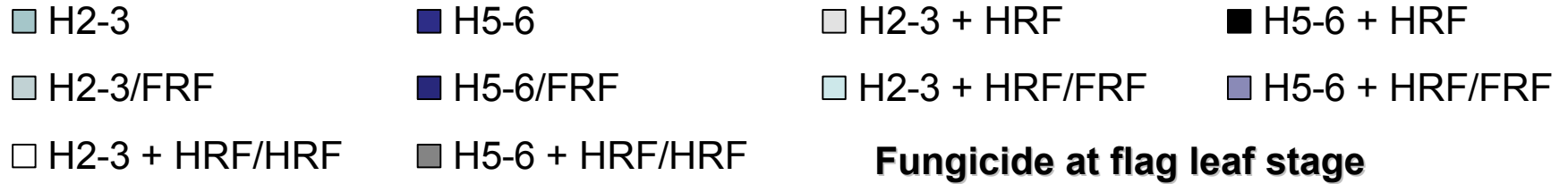


Grain yield (bu/ac)

Scott 2010



Grain yield (bu/ac) Indian Head 2011



The People Who Do The Work

- Orla Willoughby
- Randy Shiplack
- Kevin Willoughby
- Kim Reiter
- Sam Tillotson



Thank you!

