

Best management practices for stripe rust of wheat in Saskatchewan

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Outline

- ▶ Background
- ▶ Methodology
- ▶ Results
 - ▶ Stripe rust
 - ▶ Yield
- ▶ Conclusions



Stripe rust

- ▶ *Puccinia striiformis* Westend. f. sp. *tritici* Eriks
- ▶ Host wheat, *Berberis* spp. and Oregon grape (*Mahonia aquifolium*)
- ▶ Overwinter → early infections
- ▶ Pustules called uredia growth parallel to the leaf veins on adult wheat plants.



Stripe rust

- ▶ The optimum growth temperature is between 7 to 20°C.
- ▶ > 50% relative humidity.
- ▶ Dispersed by wind.
- ▶ Impacts:
 - ▶ Yield
 - ▶ Grain quality



Disease control

Resistant cultivars (R) → yield loss <10%

Intermediate in resistance cultivars (MR) → yield loss 5-20%

No resistance or susceptible (S) → yield loss up to 35%

- ▶ Foliar Fungicides
 - Group 3: triazoles.



Objective

Assess the effectiveness of tebuconazole fungicide (Folicur 250 EW) to control stripe rust when applied at three crop growth stage on three bread wheat cultivars representing a range of resistance to stripe rust in field plot experiments at two seeding dates, at two locations.

Methodology.

► Locations:

2012-2015 Saskatoon (East Sutherland)

2013-2015 Pike Lake (Bayer Farm)

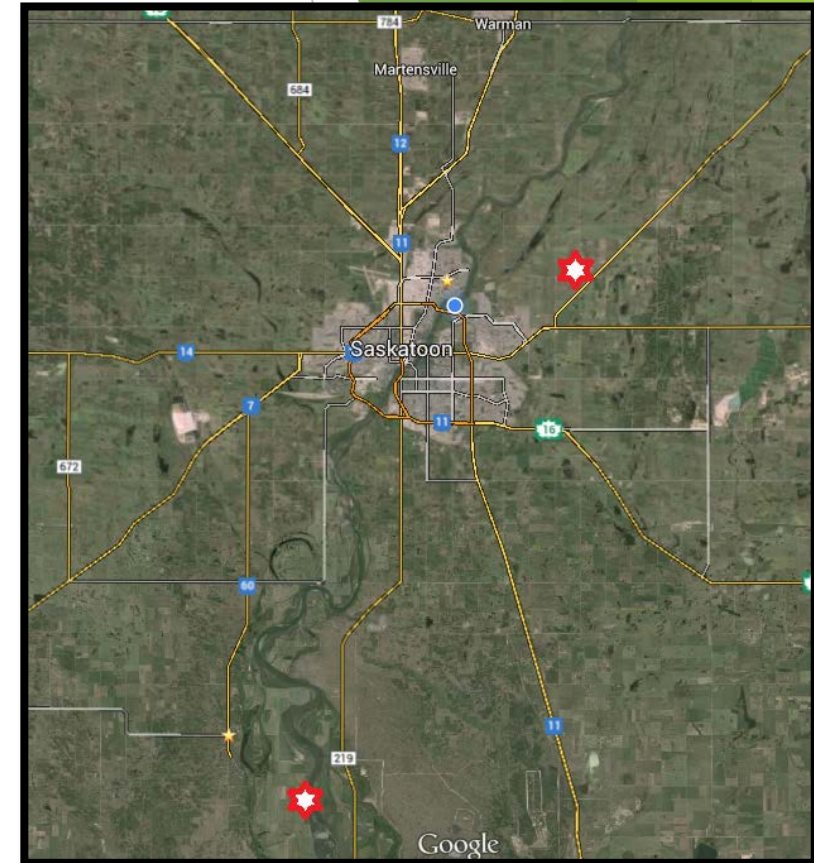
► Cultivars:

AC Barrie (S), CDC Imagine (MR) and Lillian (R)

► Seeding dates:

Early: Mid-May

Late: Beginning of June



Methodology.

▶ Fungicide:

Folicur® 250EW tebuconazole 250 g/L \approx 125 g a.i./ha.

▶ Treatments:

1. Unsprayed check
2. Stem elongation (BBCH 31)
3. Early flowering (BBCH 61)
4. Early milk (BBCH 73)
5. Sprayed check - all three previous growth stages

Methodology.

▶ Inoculation:

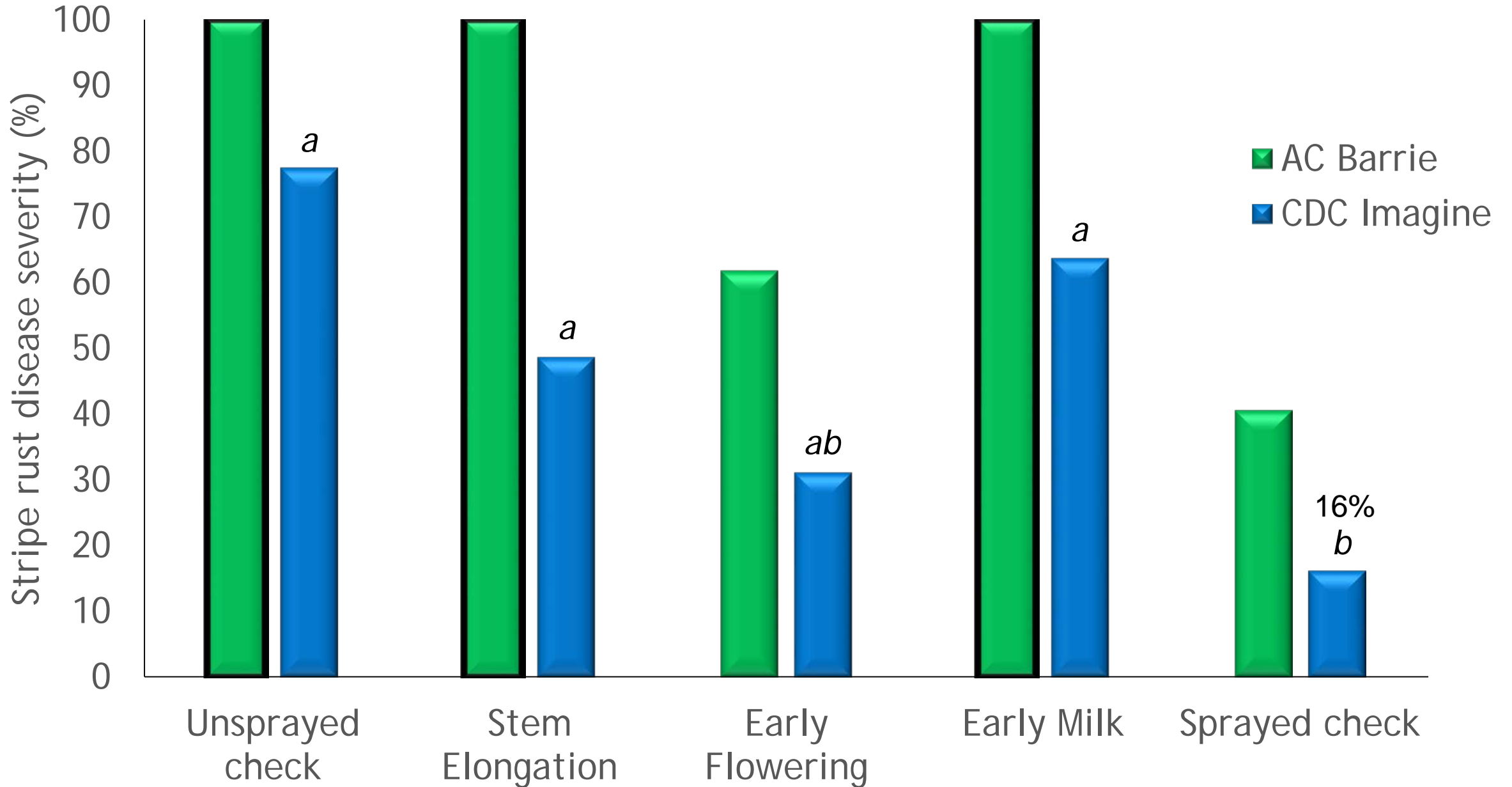
Two inoculations at three to four leaf stage of a Saskatchewan stripe rust mix.

▶ Data collection:

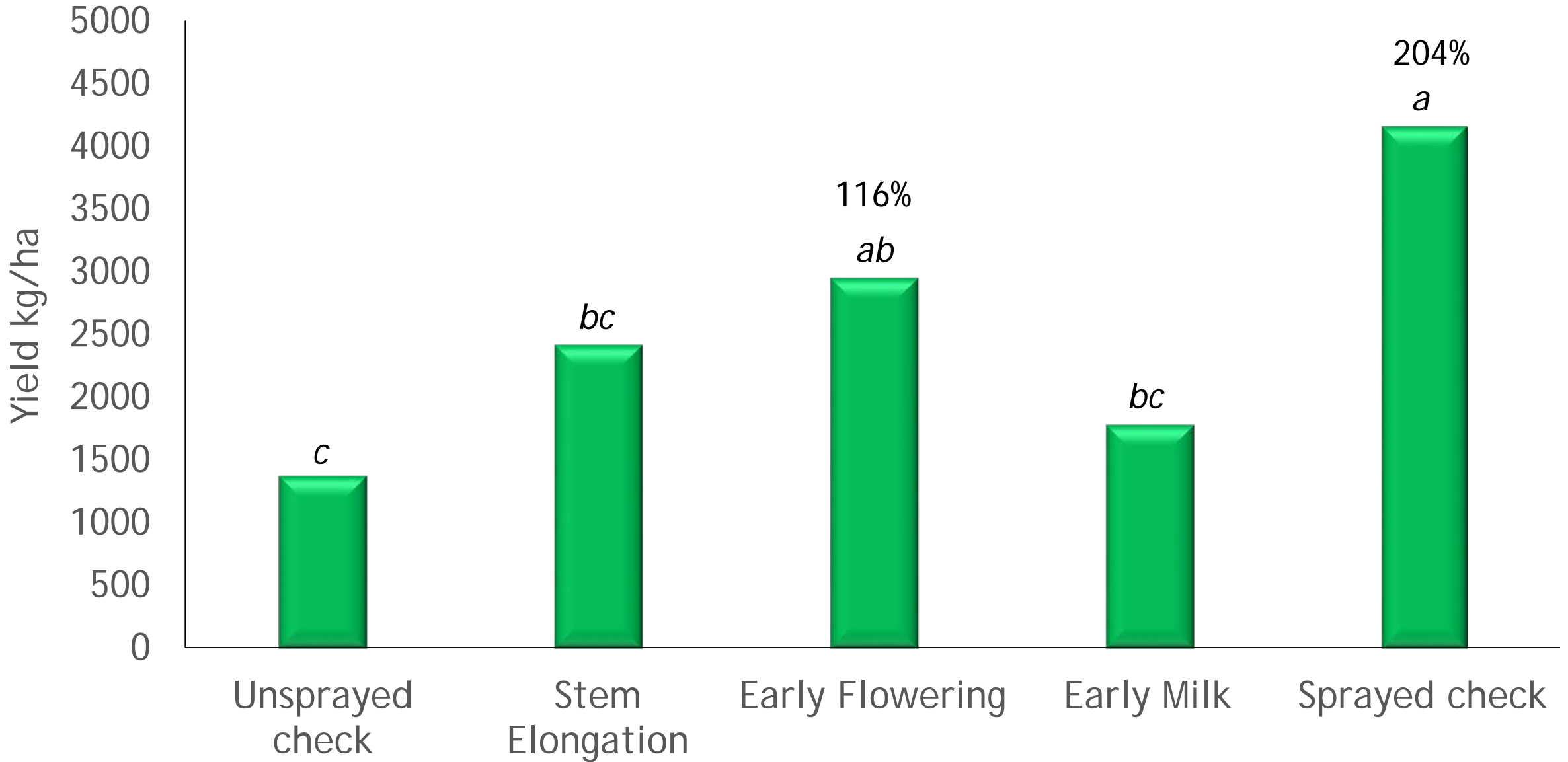
- ▶ Stripe rust disease severity (Modified Cobb scale) Leaf spot disease severity (Horsfall - Barratt scale)
- ▶ Emergence counts, thousand kernel weight, test weight and protein content.
- ▶ Yield (kg/ha)



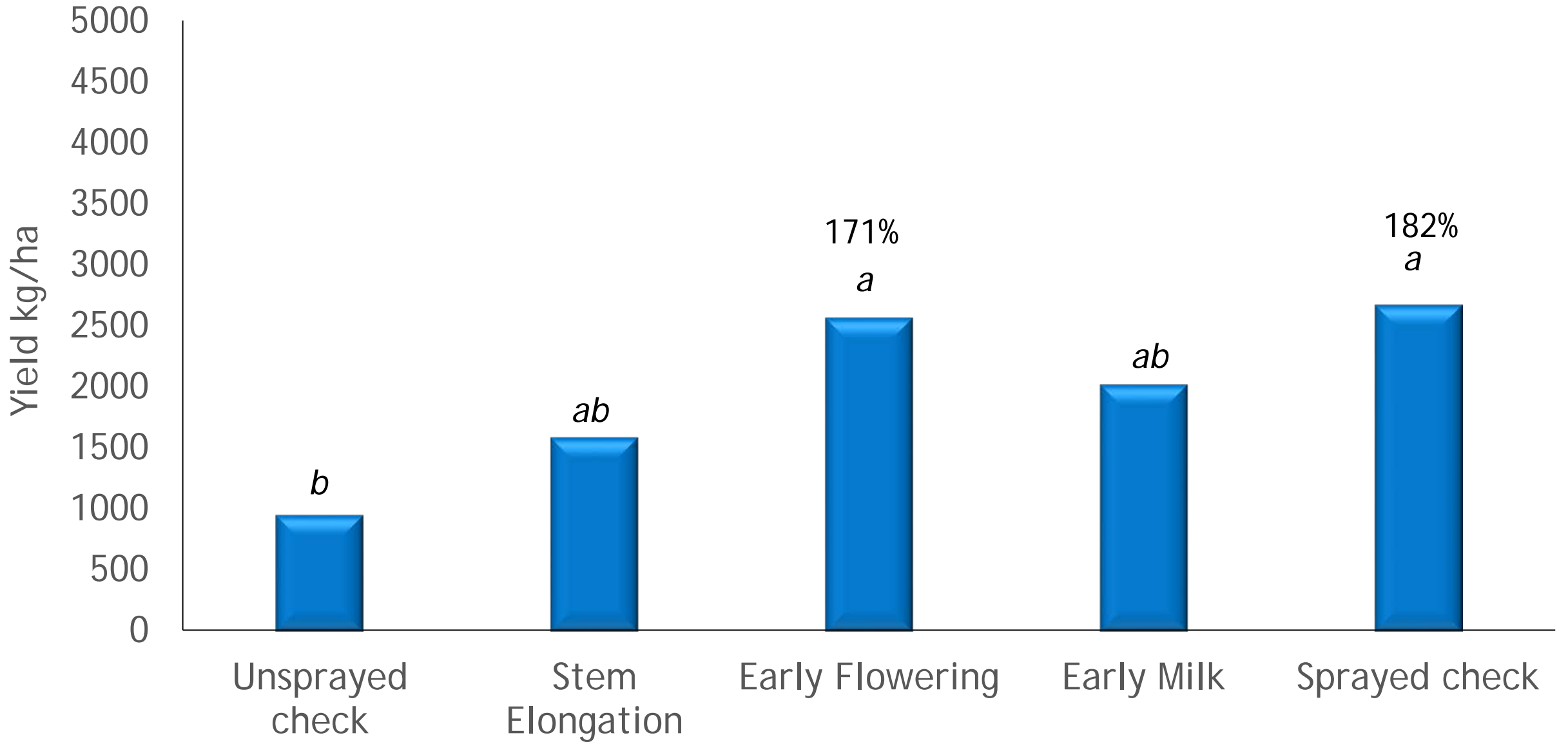
2014 Pike Lake - Early Seeding



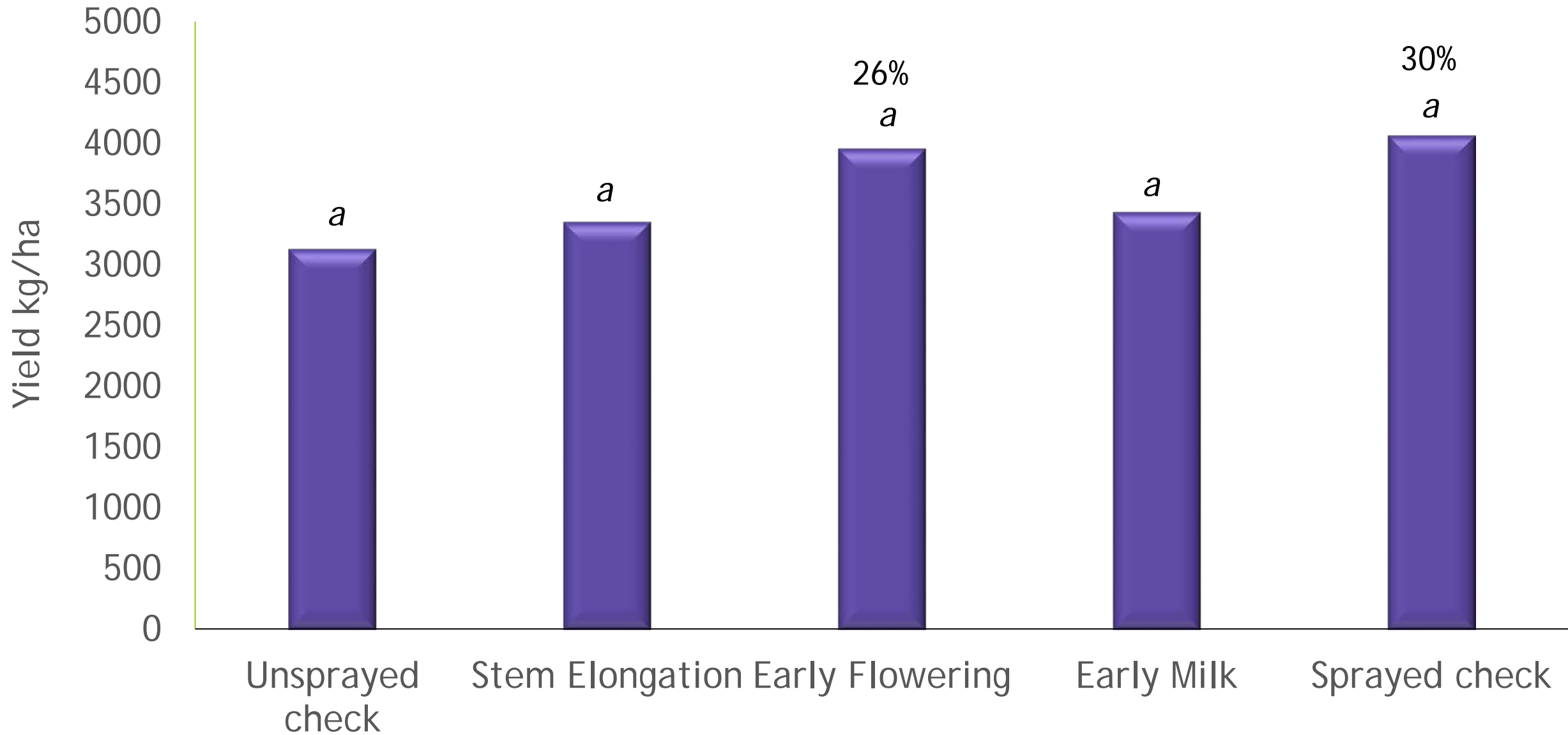
2014 Pike Lake - Early Seeding AC Barrie



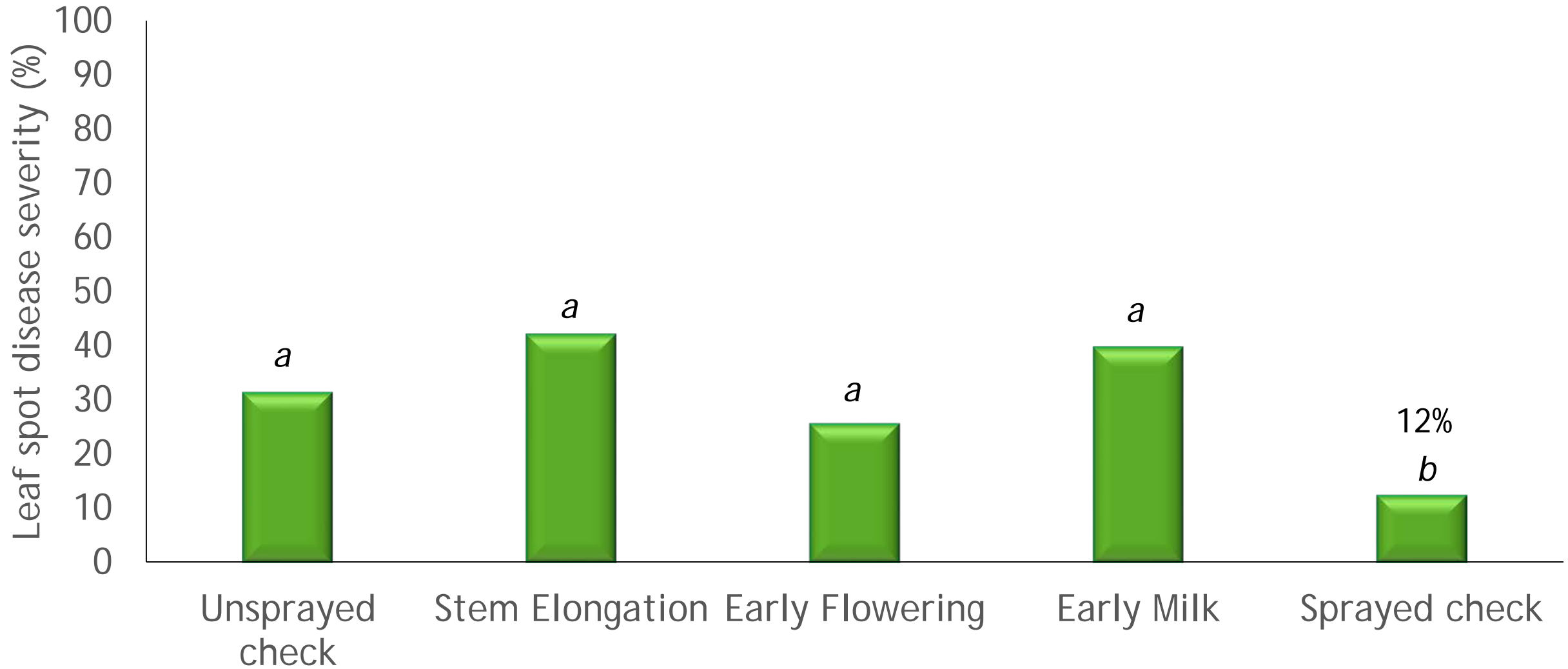
2014 Pike Lake - Early Seeding CDC Imagine



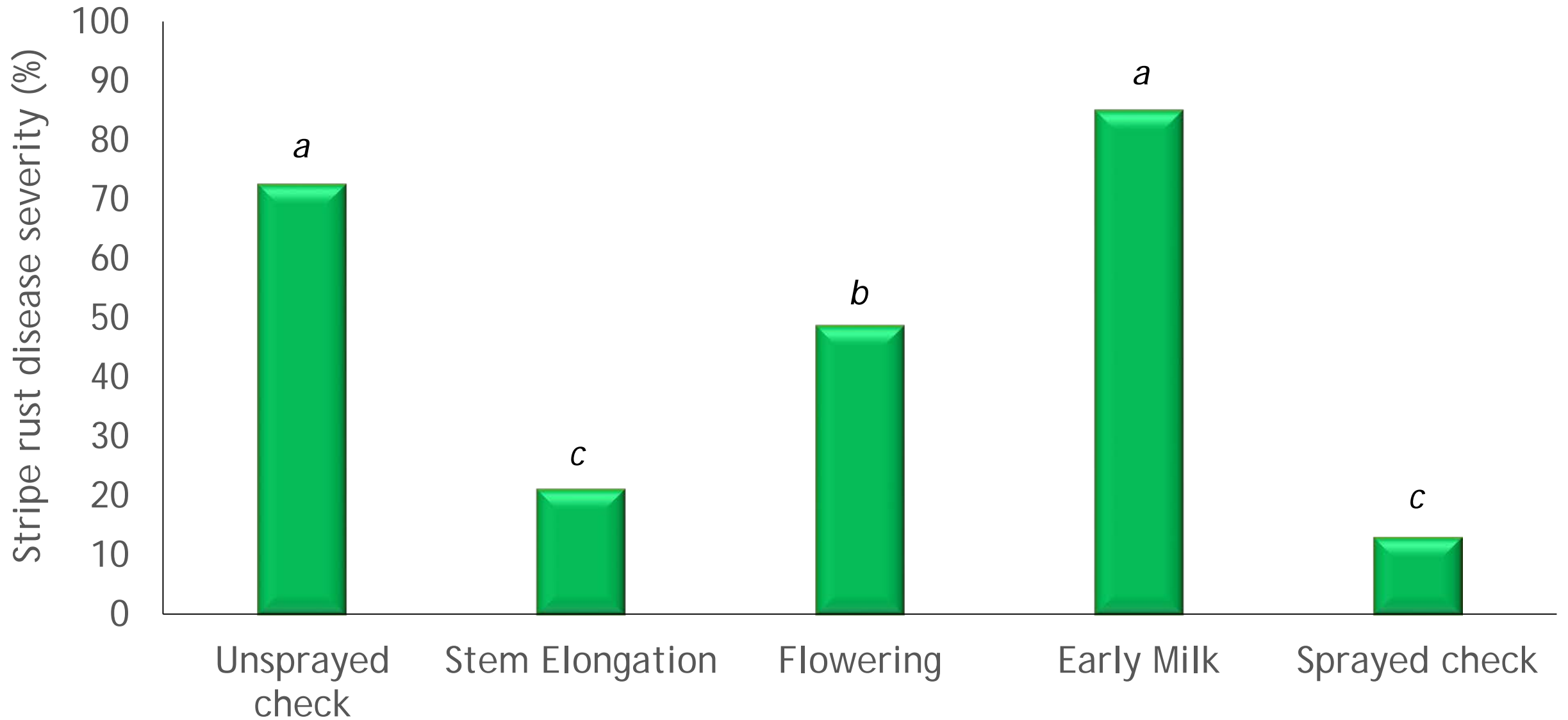
2014 Pike Lake - Early Seeding Lillian



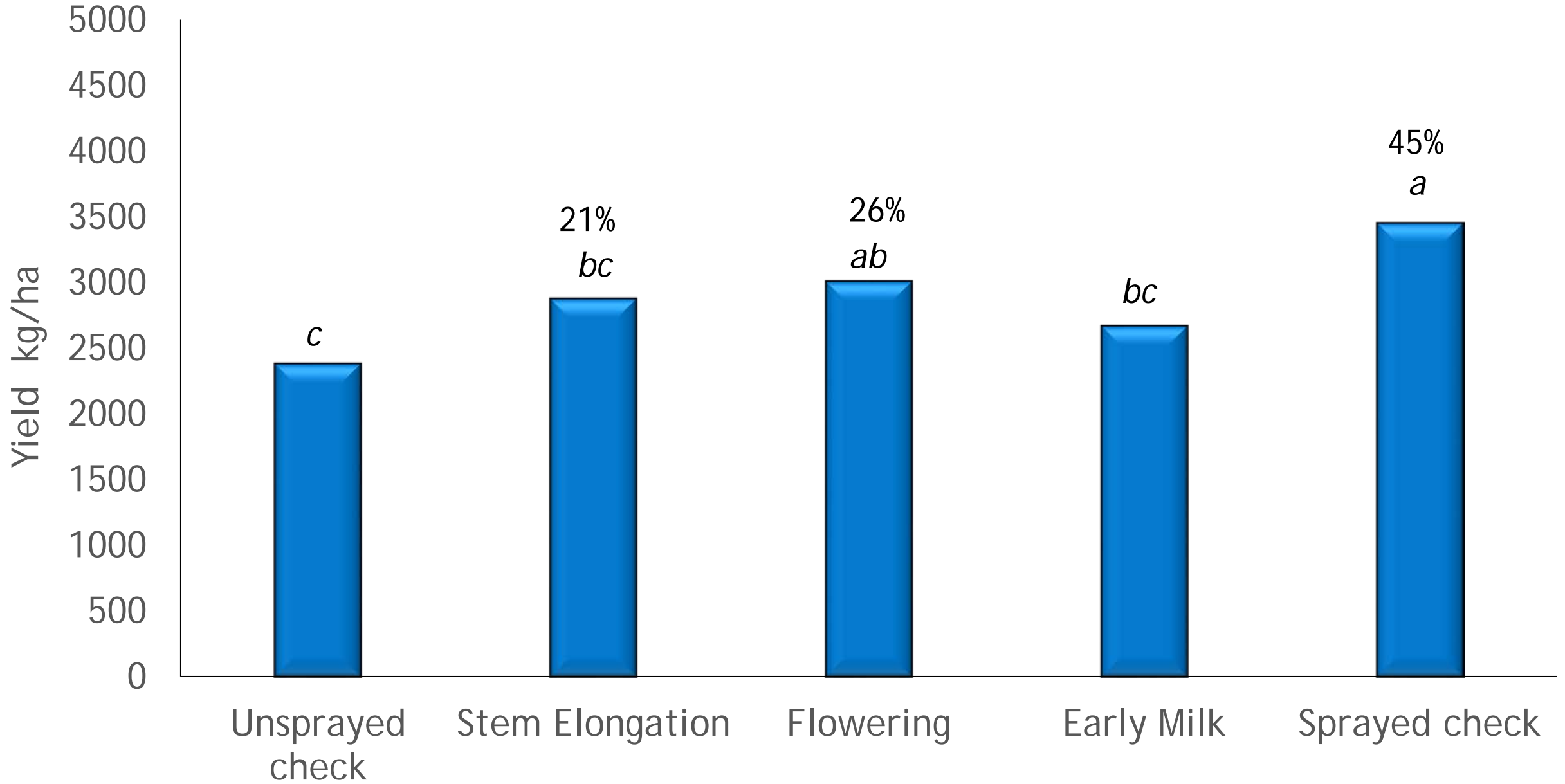
Leaf spot disease severity
2014 Pike Lake - Early Seeding
Lillian



2014 Pike Lake-Late seeding AC Barrie



2014 Pike Lake-Late seeding



CONCLUSIONS

- ▶ Stripe rust of wheat can be reduced substantially by use of resistant cultivars.
- ▶ Fungicide is effective at reducing stripe rust disease symptoms of susceptible and moderately resistant cultivars.
- ▶ Stripe rust disease severity was higher at early seeding 100% - 77% compared with late seeding 77% - 8% for AC Barrie and CDC Imagine.

CONCLUSIONS

- ▶ Yield benefits of fungicide application at flowering stage were in the range of 26% to 171%, for the susceptible and moderately resistant cultivars.
- ▶ Resistant cultivar Lillian had the highest yield compared with susceptible and moderately resistant cultivars.
- ▶ Protein content was higher for resistant cultivars than for moderately resistant to susceptible cultivars.

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Thank you