Winter Wheat 2013

What worked & what didn't in a challenging year?

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Winter Cereal Challenges in 2013

- Extremely dry soil and weather from prior to planting until just before freeze-up
  - No significant (>1/10") rain from Aug. 2- Oct. 17
  - Poor seeding conditions, hard soil, large cracks
  - No germination or emergence observed in the fall
- Unusually late arrival of spring
  - Record breaking snow cover did not fully recede from most fields until late in the first week of May
- Dry and warm weather in May
  - What was good for spring seeding was not necessarily good for emerging winter wheat
  - Crop generally emerged poorly and developed slowly early in the season

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2013 Winter Wheat Trials

1) Seed Treatments & Seeding Rates (DU)

2) Foliar Fungicide Applications (DU)

3) N Form, Placement & Timing (ADOPT)

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Seed Treatments and Rates

Treatments:

1) Unt – 200* seeds m^{-2}
2) Unt – 400 seeds m^{-2}
3) Trt** – 200 seeds m^{-2}
4) Trt – 400 seeds m^{-2}

* 60-120 lb/ac seeding rates

**Raxil Pro (325 ml/100kg)

- Tebuconazole (1 gai/100kg), prothioconazole (5 gai/100kg) and metalaxyl (4 gai/100kg)

Methods / Site Information

- Moats WW seeded into canola stubble on Sept. 14 2012 using a SeedMaster drill on 12” row spacing
- All fertilizer applied at seeding with NKS side-banded & P seed-placed to supply 102-27-36-12 lb/ac of N-P_2O_5-K_2O-S
- No pre-seed burnoff, weeds controlled using in-crop MCPA, flurasulam and pyroxsulam (Simplicity) and disease controlled using a single application of Prosaro at early heading stage
- Pre-harvest glyphosate (356 g/ac) applied on August 23
- Straight-combined plots on September 2

June 12, 2013

Raxil Pro Treated (left) vs Untreated (right)
200 seeds/m^2

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June 12, 2013

Untreated (left) vs Raxil Pro Treated (right)
400 seeds/m^2

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June 12, 2013

Raxil Pro Treated
200 seeds/m^2

Untreated
400 seeds/m^2

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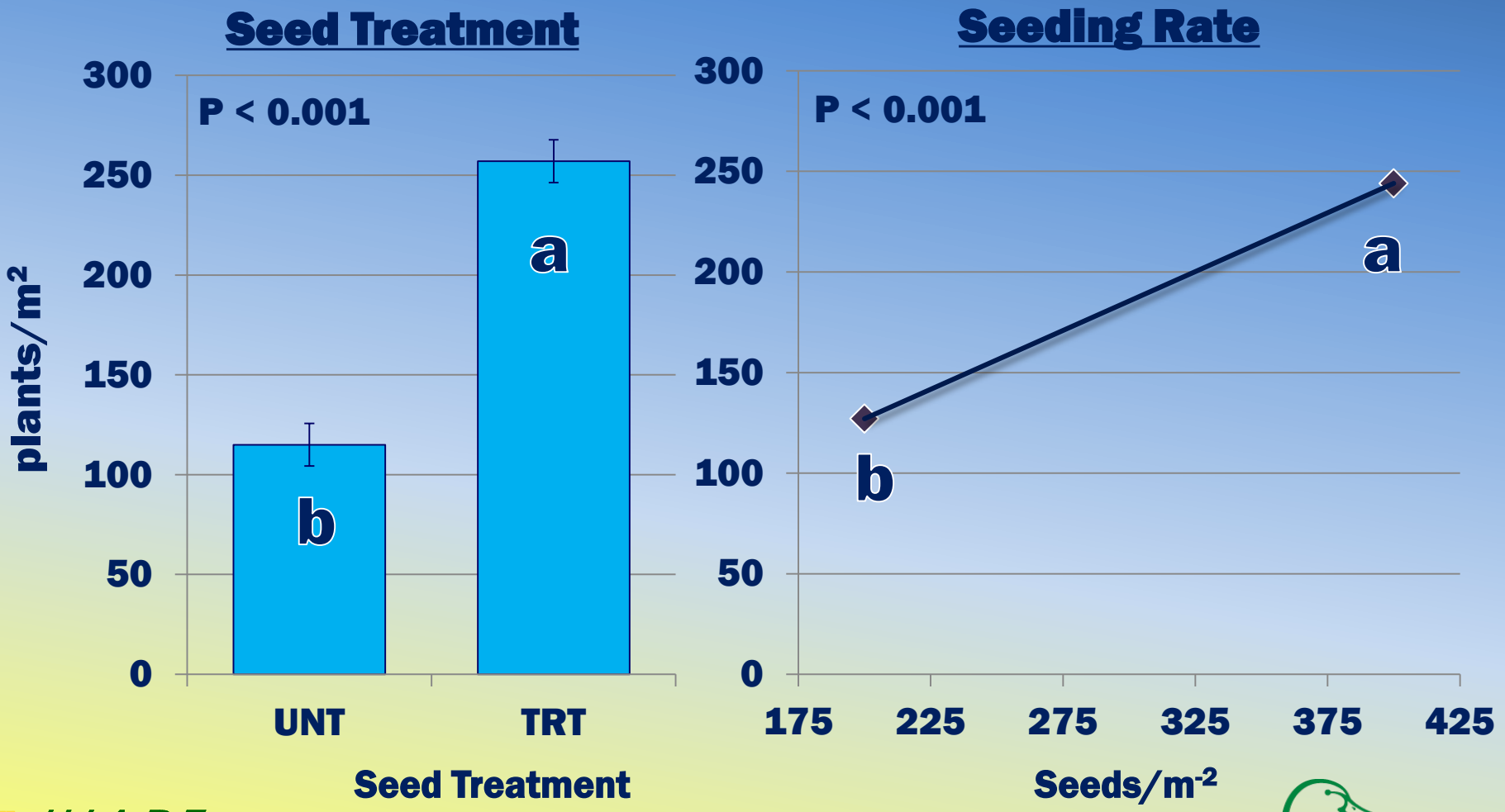
Seed Treatment & Rates

Main Effects – Emergence



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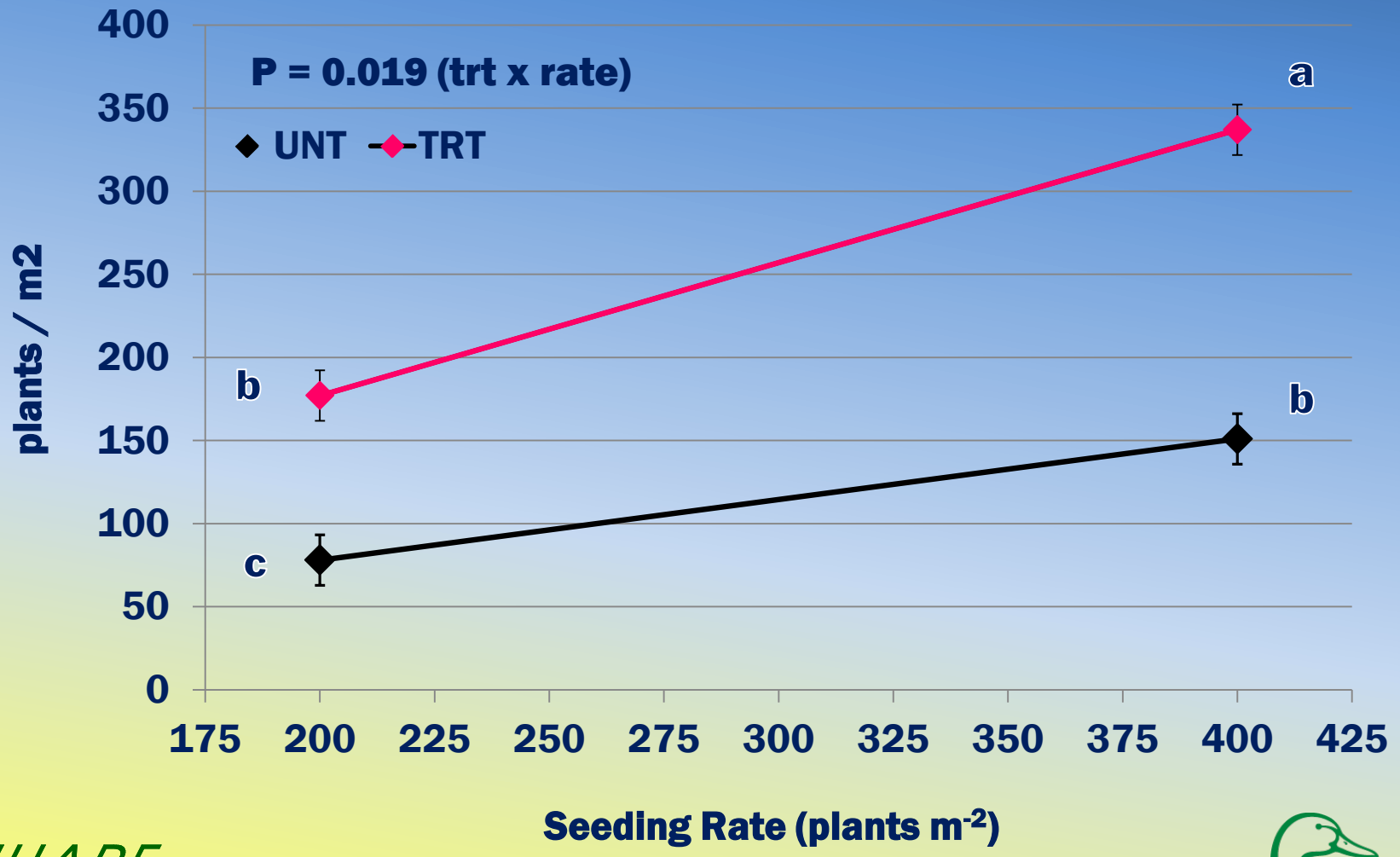
Seed Treatment & Rates

Interactions – Emergence



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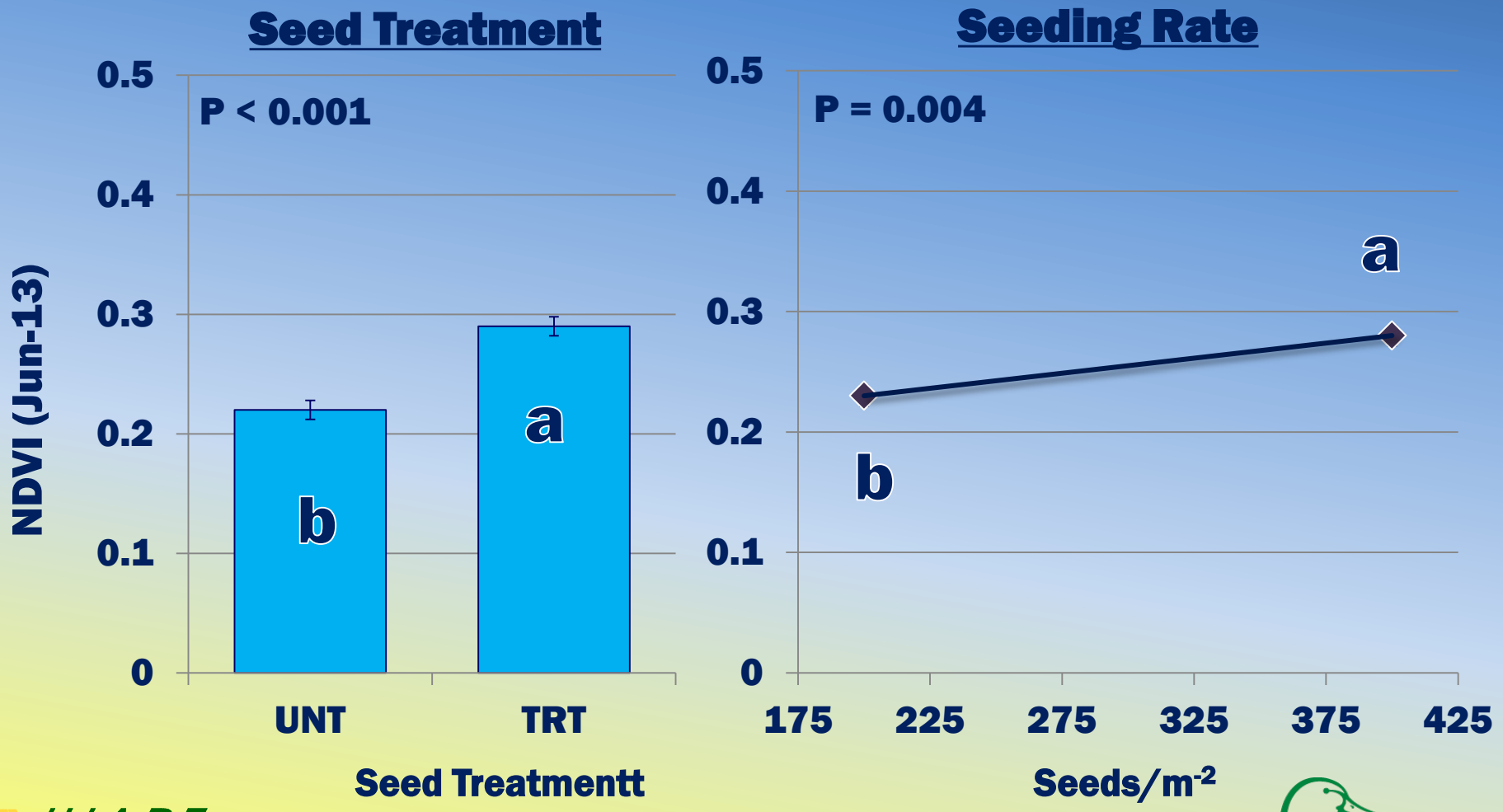
Seed Treatment & Rates

Main Effects – Spring NDVI



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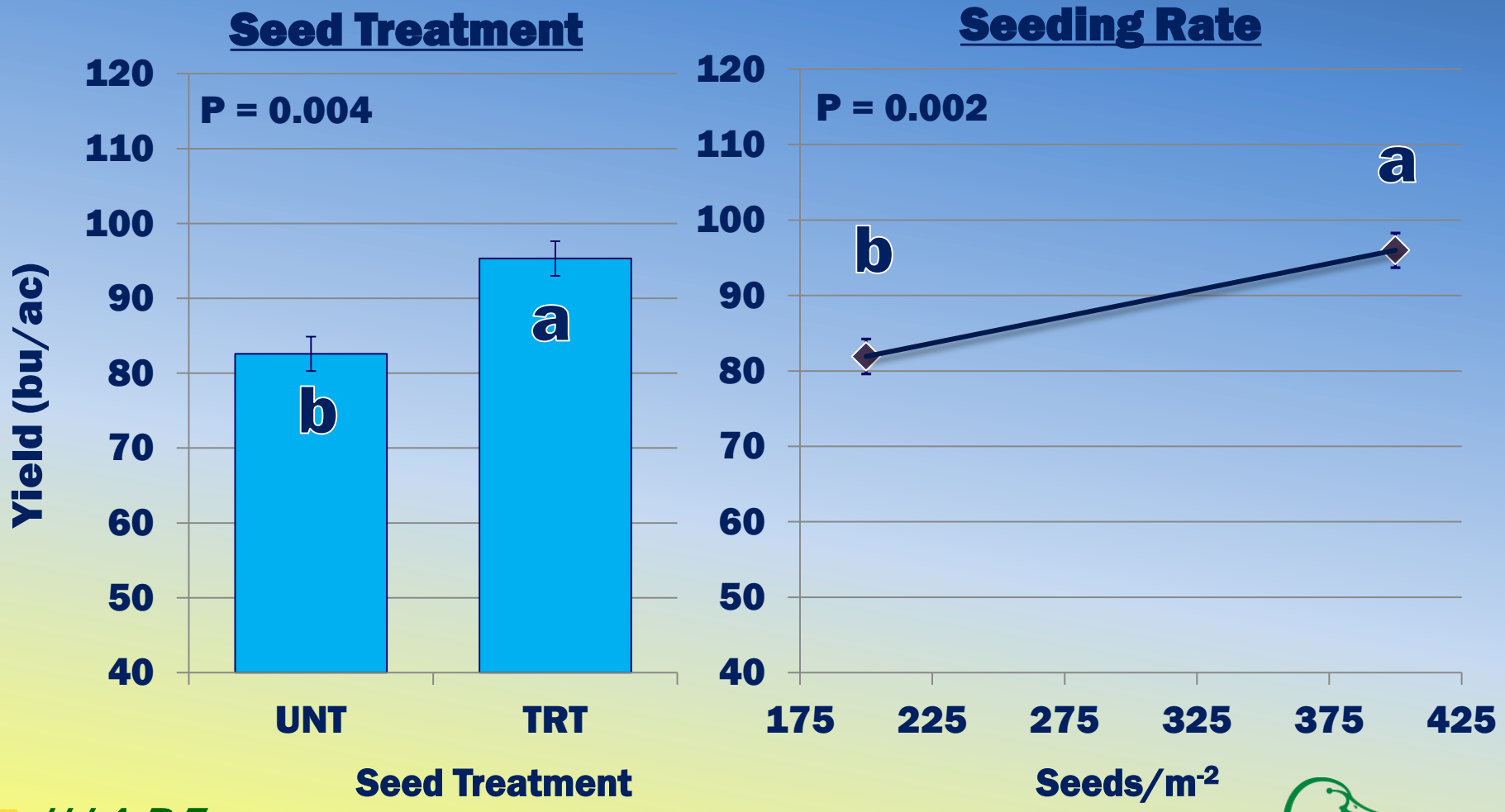
Seed Treatment & Rates

Main Effects – Yield



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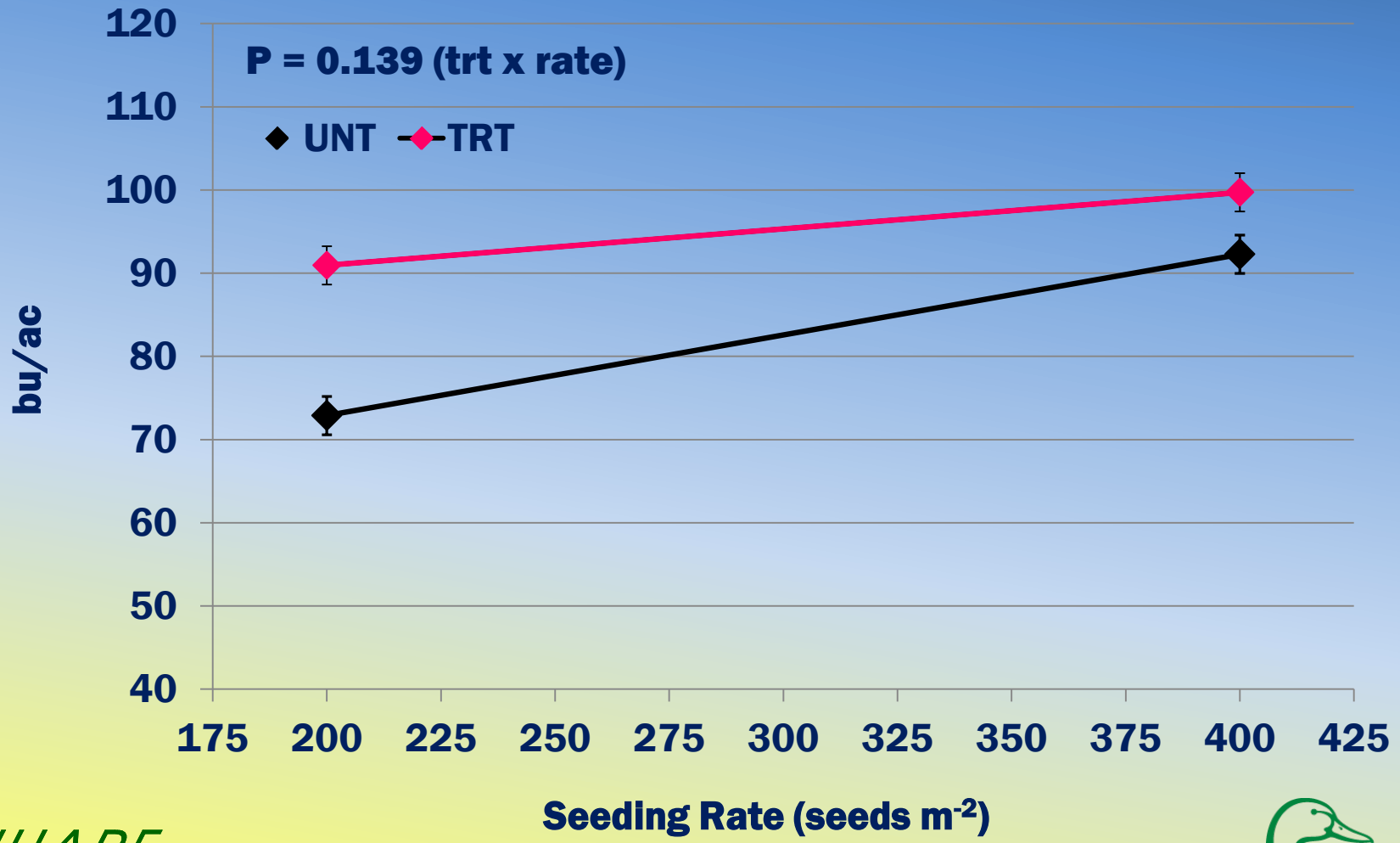
Seed Treatment & Rates

Interactions – Yield



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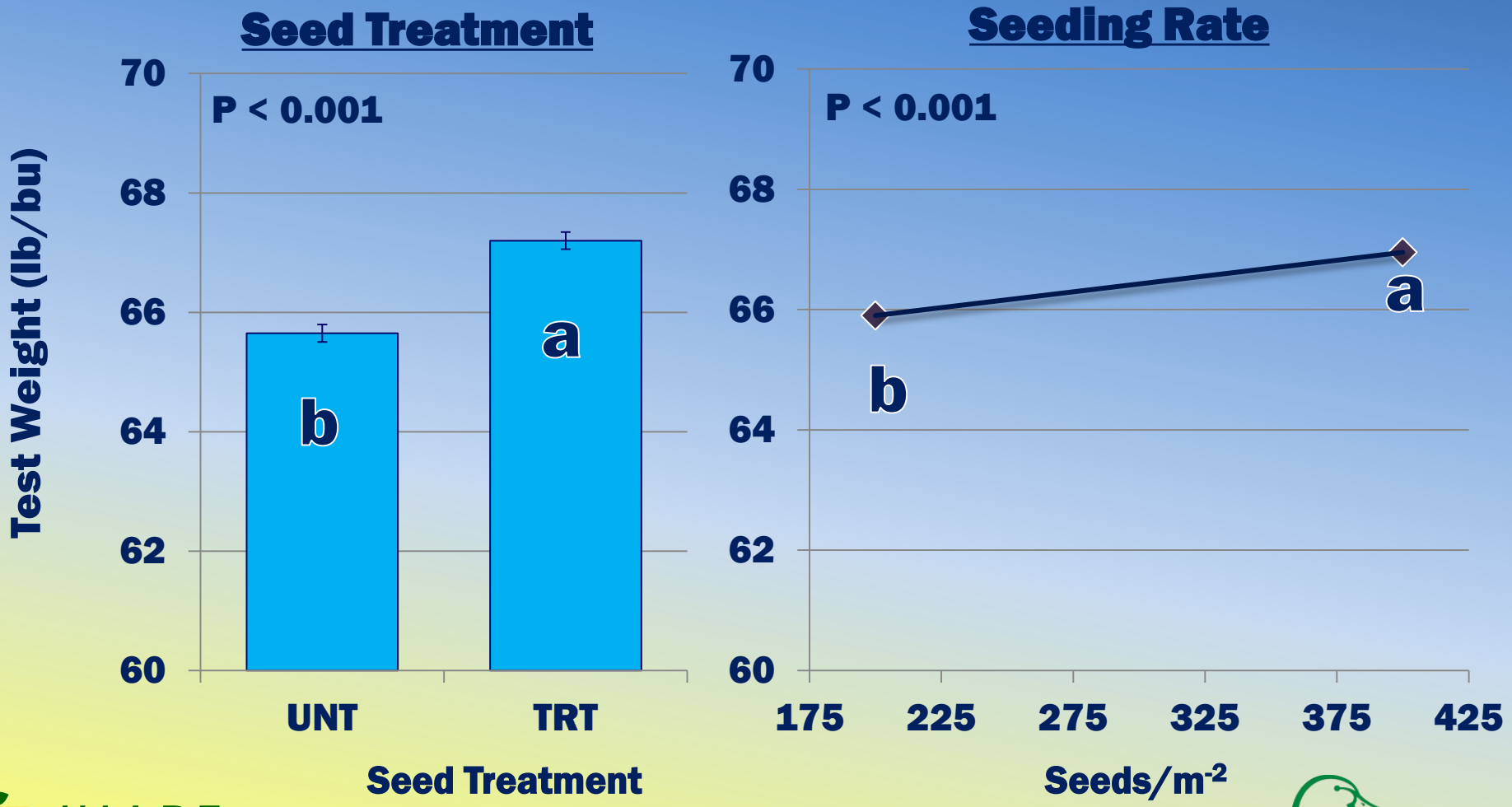
Seed Treatment & Rates

Main Effects – Test Weight



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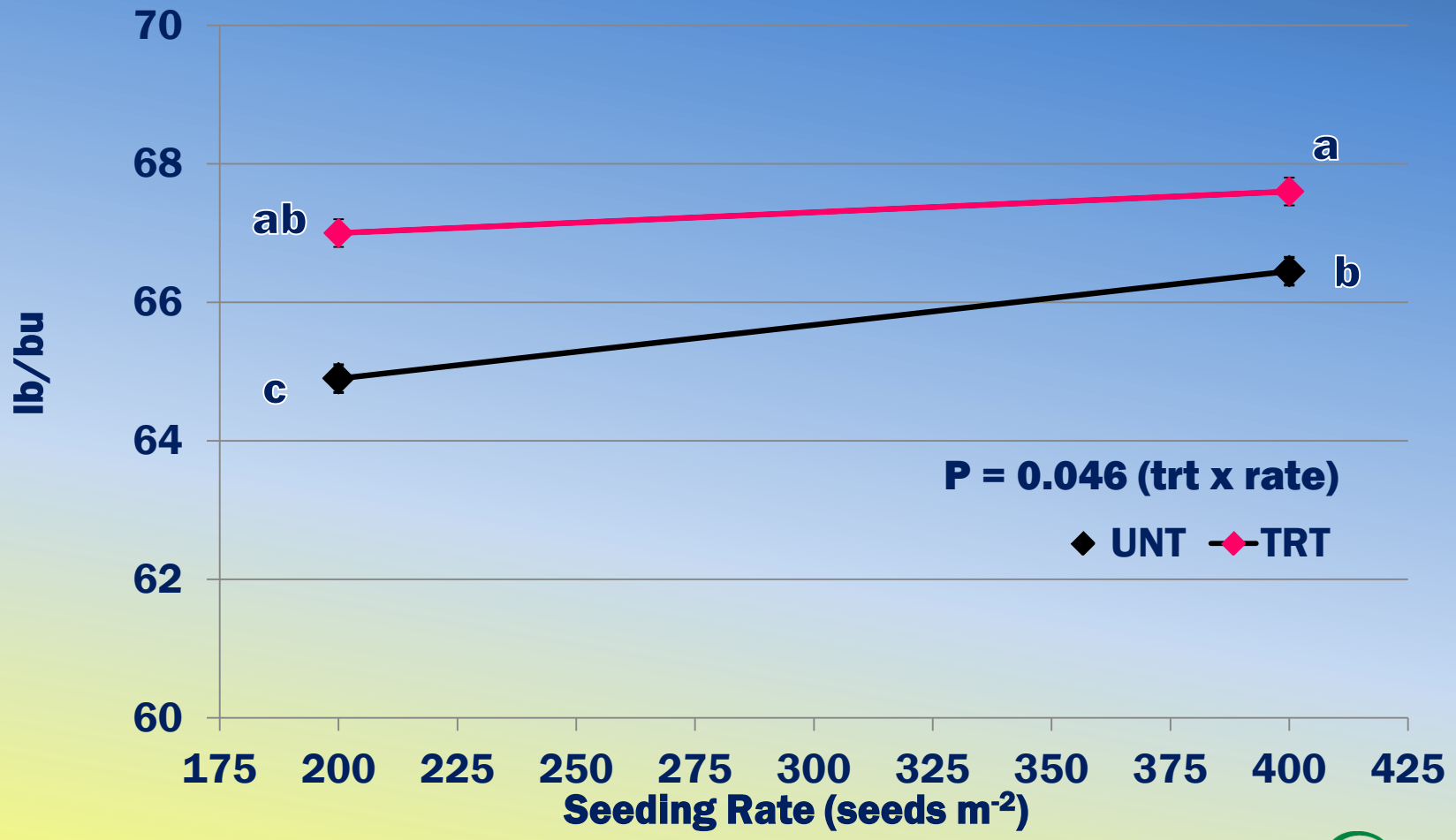
Seed Treatment & Rates

Interactions – Test Weight



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Seed Treatment & Rates

Indian Head 2013 Conclusions

- Seed treatment dramatically improved winter wheat establishment (123% overall increase in plant populations)
- Similar plant densities achieved with 200 seeds m^{-2} of treated seed versus 400 seeds m^{-2} of untreated seed
- Seed treatments increased yield by 15.4% while doubling the seeding rate from 200 to 400 seeds m^{-2} increased yields by 17.2%; yields maximized with high rate of treated seed (137% of low rate/untreated)
- Test weight increased with seed treatment & seeding rate; rate effect on test weight was smaller with treated (0.9%) versus untreated seed (2.4%)
- Seed treatment response of this magnitude not typical but results show the potential benefits under highly stressful conditions. Best results when emergence does not occur in the fall? Potential for dry seed decay?
- Trials expanded upon in 2014 with sites at Indian Head and Scott

Foliar Fungicide Demo

Indian Head, 2013

Treatments:

1) Check (no fungicide)
2) Twinline* (T1–flag)
3) Prosaro** (T2–head)
4) Dual (T1 + T2)

* Pyraclostrobin (65 gia/ha) + metconazole (40 gai/ha)

**Prothioconazole (100 gia/ha) + tebuconazole (100 gai/ha)

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Methods / Site Information

- Treated Moats WW seeded at 300 seeds/m^2 into canola stubble on Sept. 14 2012 using a SeedMaster drill on 12” row spacing
- All fertilizer applied at seeding with NKS side-banded and P seed-placed to supply 102-27-36-12 lb/ac of N-P_2O_5-K_2O-S
- No pre-seed burnoff, weeds controlled using in-crop MCPA, flurasulam and pyroxsulam (Simplicity)
- Foliar fungicides applied as per protocol on June 26 (flag-leaf stage) and July 4 (early heading stage)
- Leaf disease and FHB rated on July 29
- Pre-harvest glyphosate (356 g/ac) applied on August 18
- Straight-combined plots on August 27

June 26 – immediately prior to T1 fungicide application

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June 26 – immediately prior to T1 fungicide application

Foliar Fungicide Demo

Leaf Disease Ratings

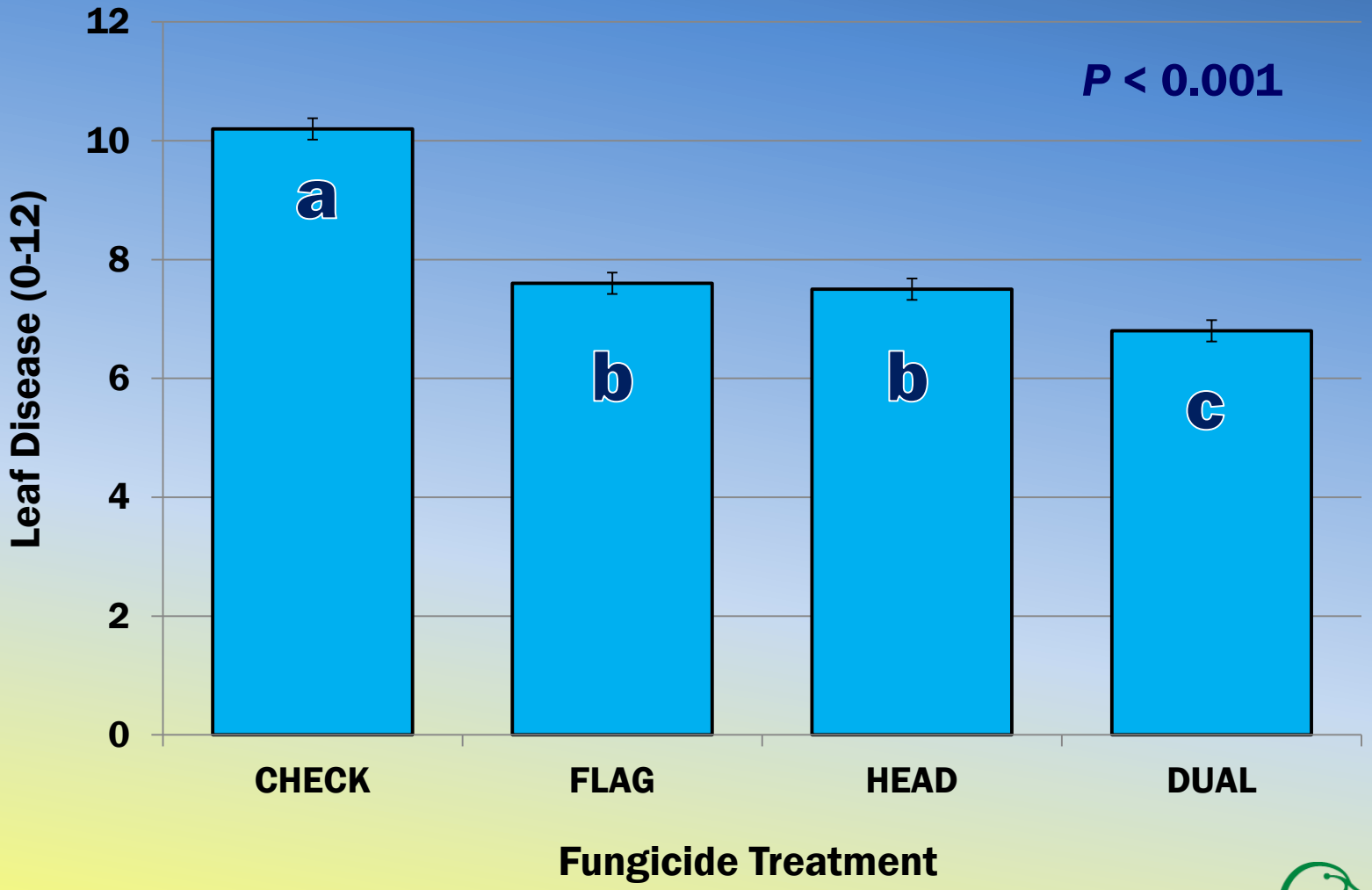
McFadden, W. 1991. Etiology and epidemiology of leaf spotting diseases in winter wheat in Saskatchewan. Ph.D. thesis, University of Saskatchewan, Saskatoon, 151 pp.

Leaf Level	0	1	2	3	4	5	6	7	8	9	10	12
Upper (flag)	0 [Z]	0	0	0	0	0	0	0-1	2-5	6-10	11-25	26-50
Mid	0	0	0	0	0-1	2-5	6-10	6-10	11-25	26-50	>50	>50
Lower	0	0-1	2-5	6-10	11-25	26-50	>50	>50	>50	>50	>50	>50

[Z] Percentage of leaf area with lesions in the upper, middle and lower leaf canopies

Foliar Fungicide Demo

Effects on Leaf Disease



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July 29, 2013

UNTREATED CHECK

FUNGICIDE APPLIED

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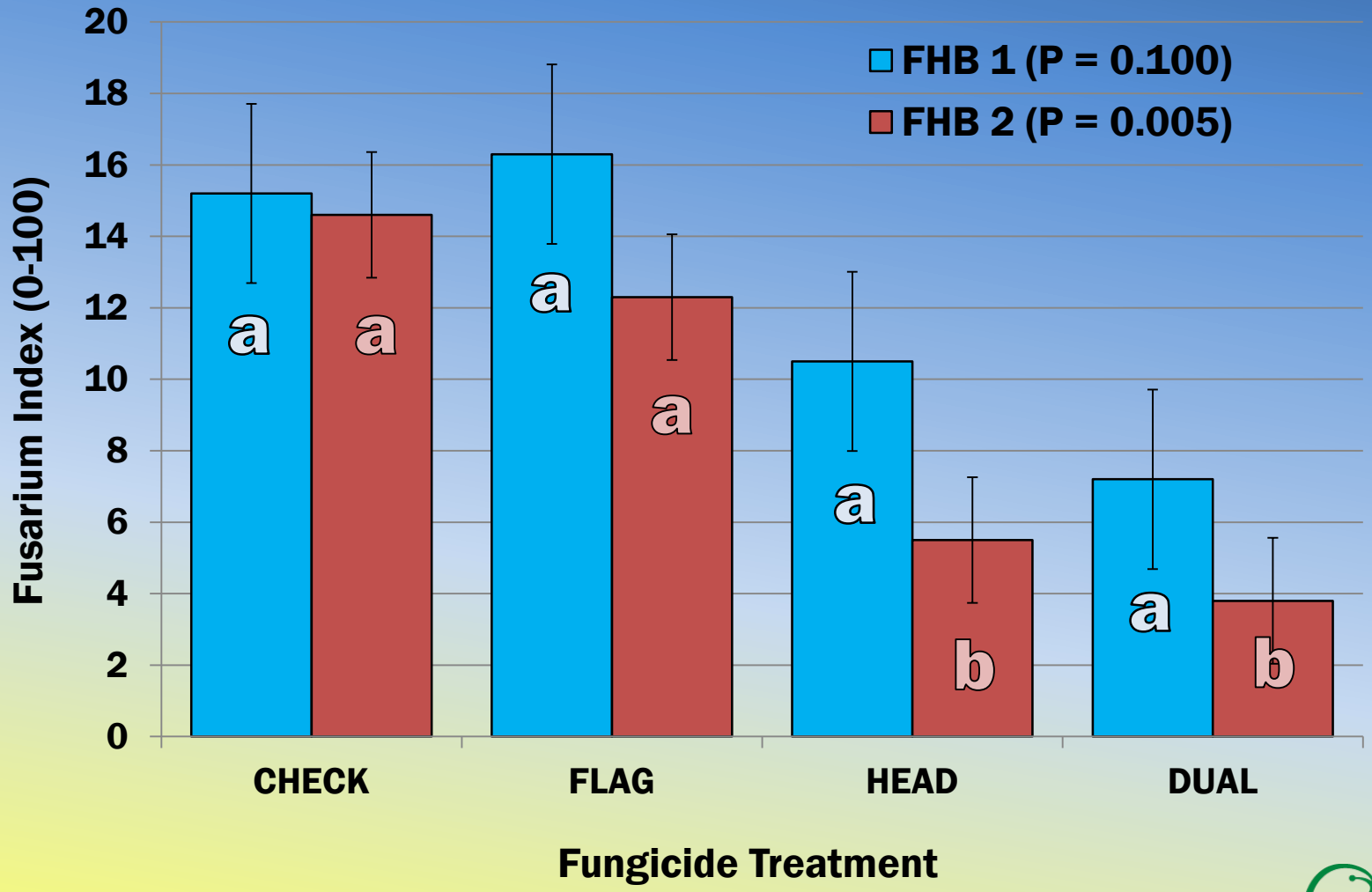
Foliar Fungicide Demo

Effects on Fusarium Head Blight



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July 29, 2013 (untreated)

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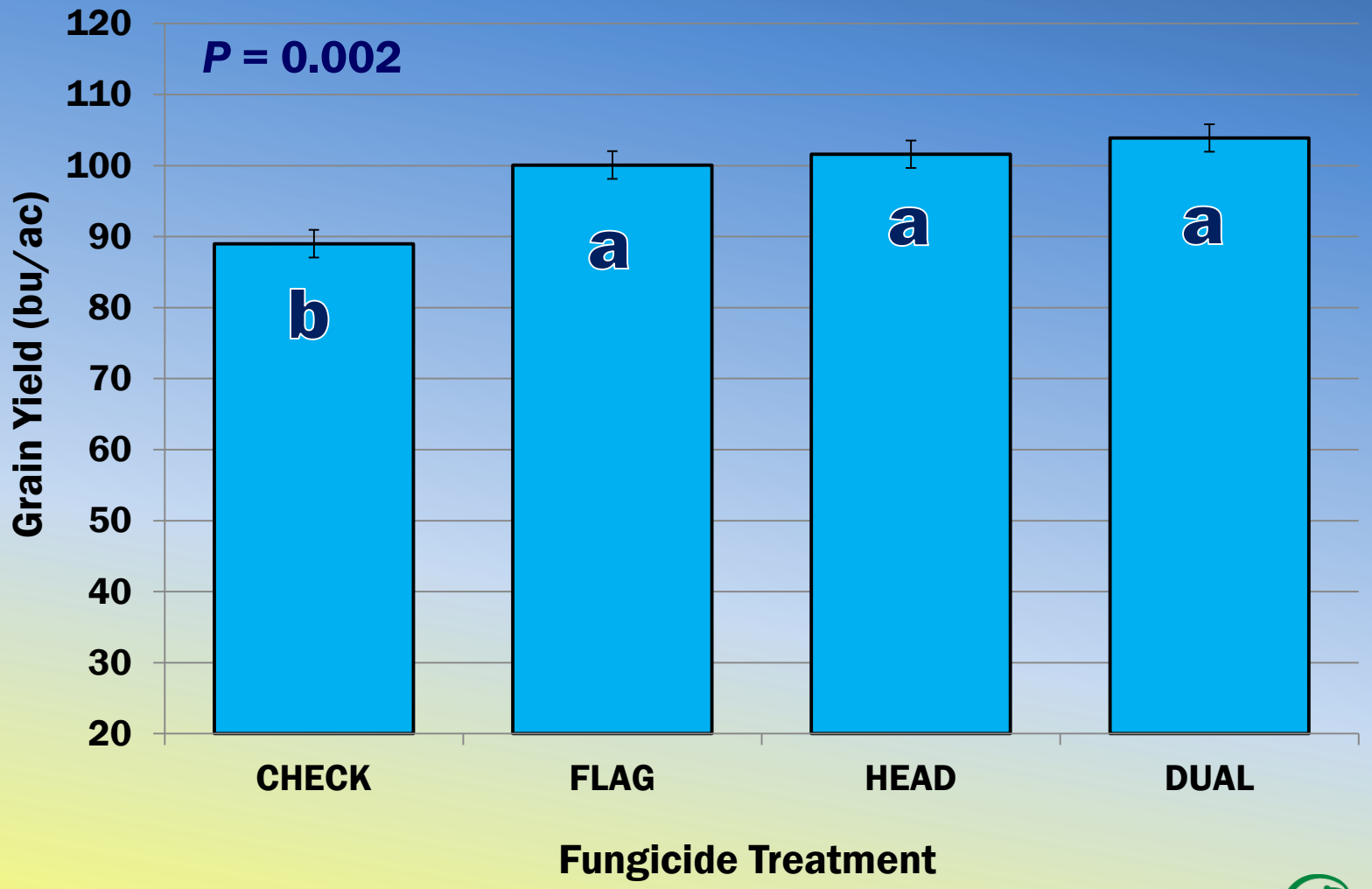
Foliar Fungicide Demo

Effects on Grain Yield



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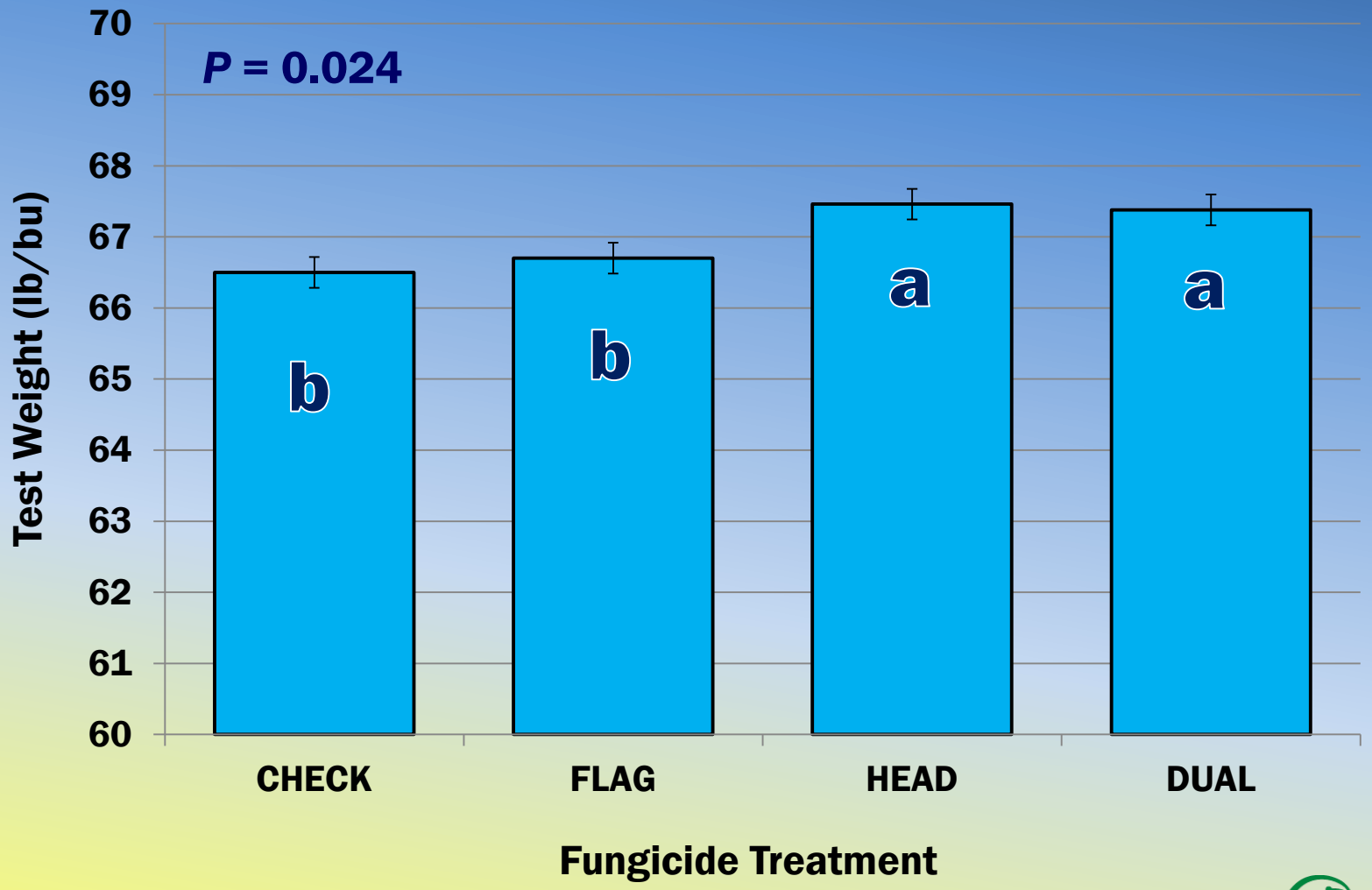
Foliar Fungicide Demo

Effects on Test Weight



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Foliar Fungicide Demo

Indian Head 2013 Conclusions

- Relatively high pressure for both leaf disease and fusarium head blight observed in 2013 winter wheat at Indian Head
- Similar reduction in leaf disease achieved with both foliar fungicide application times – relatively low levels observed at flag-leaf timing
- Yields for all three treatments where fungicide was applied were similar (13-15% above check) but flag-leaf application did not provide the FHB control achieved with the later application
- Test weight increased with fungicide applied at early heading; flag-leaf application did not increase test weights over the check
- Unless disease pressure is high early in the season (prior to flag-leaf emergence), a single fungicide at the early heading stage will likely provide acceptable control of both leaf and head disease
- Field trials continuing in 2014 with sites at Indian Head and Scott

Nitrogen Fertility Options

Indian Head 2013

23 N fertilizer treatments where:

- 0, 75 or 150 kg N ha^{-1} applied
  - Soil test N recommendation was 99 kg N ha^{-1}
- Untreated urea, ESN®, Nutrisphere-N® or liquid UAN use as primary N fertilizer source
- N fertilizer either side-banded (at seeding), surface broadcast (early spring) or applied in a split-application (40/60)

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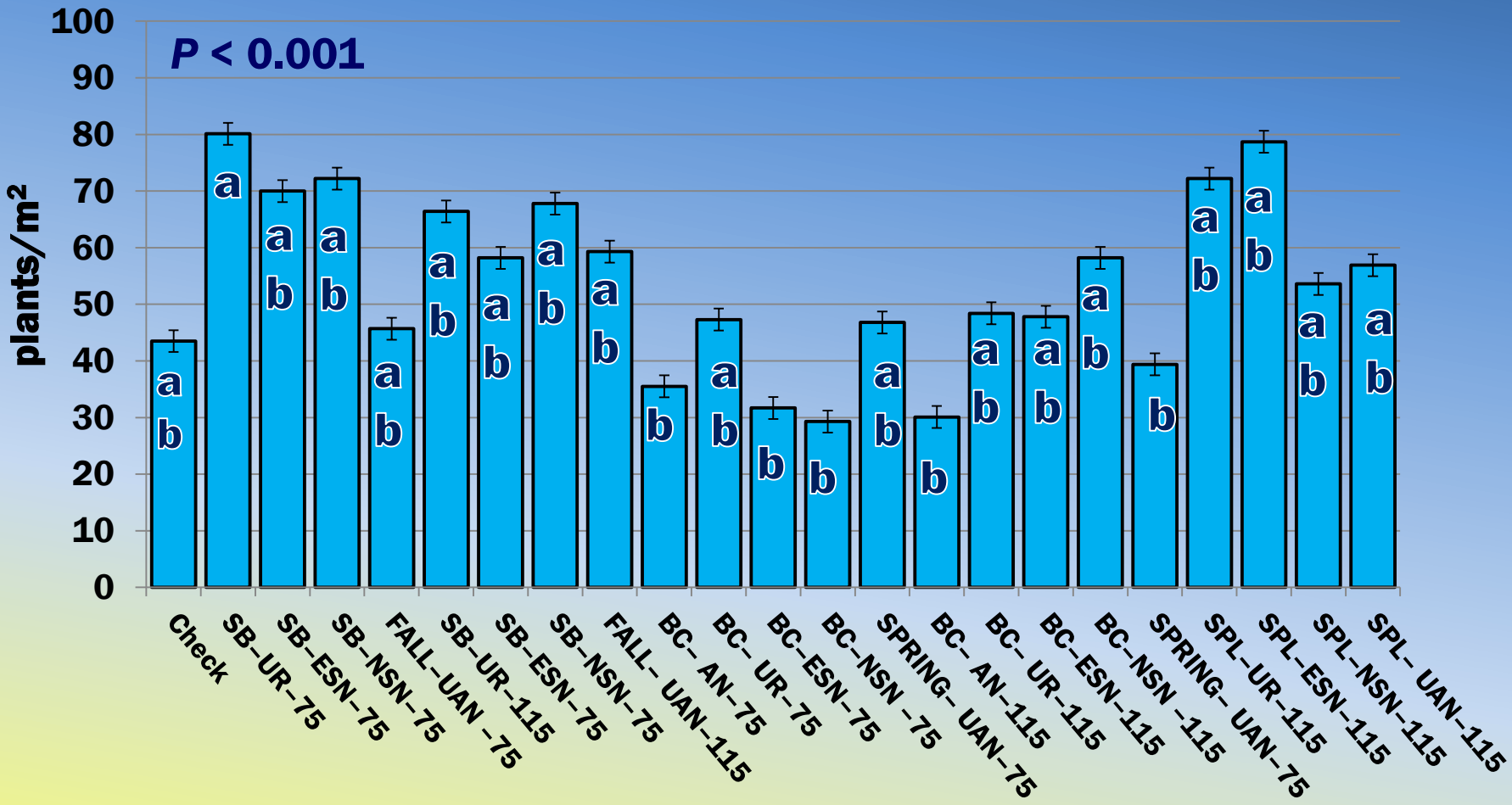
Methods / Site Information

- Untreated Buteo WW seeded at 300 seeds/m^2 into canola stubble on Sept. 14 2012 using a SeedMaster drill on 12" row spacing
- All PKS fertilizer applied at seeding 27-36-12 lb/ac of P_2O_5-K_2O-S
- Where applicable liquid UAN was surface dribble banded either in late fall or early spring
- No burnoff, weeds controlled w/in-crop MCPA, flurasulam & pyroxsulam
- No foliar fungicide applied
- Pre-harvest glyphosate (356 g/ac) applied August 23
- Straight-combined plots on September 2

Nitrogen Fertility Options

Effects on Winter Wheat Establishment



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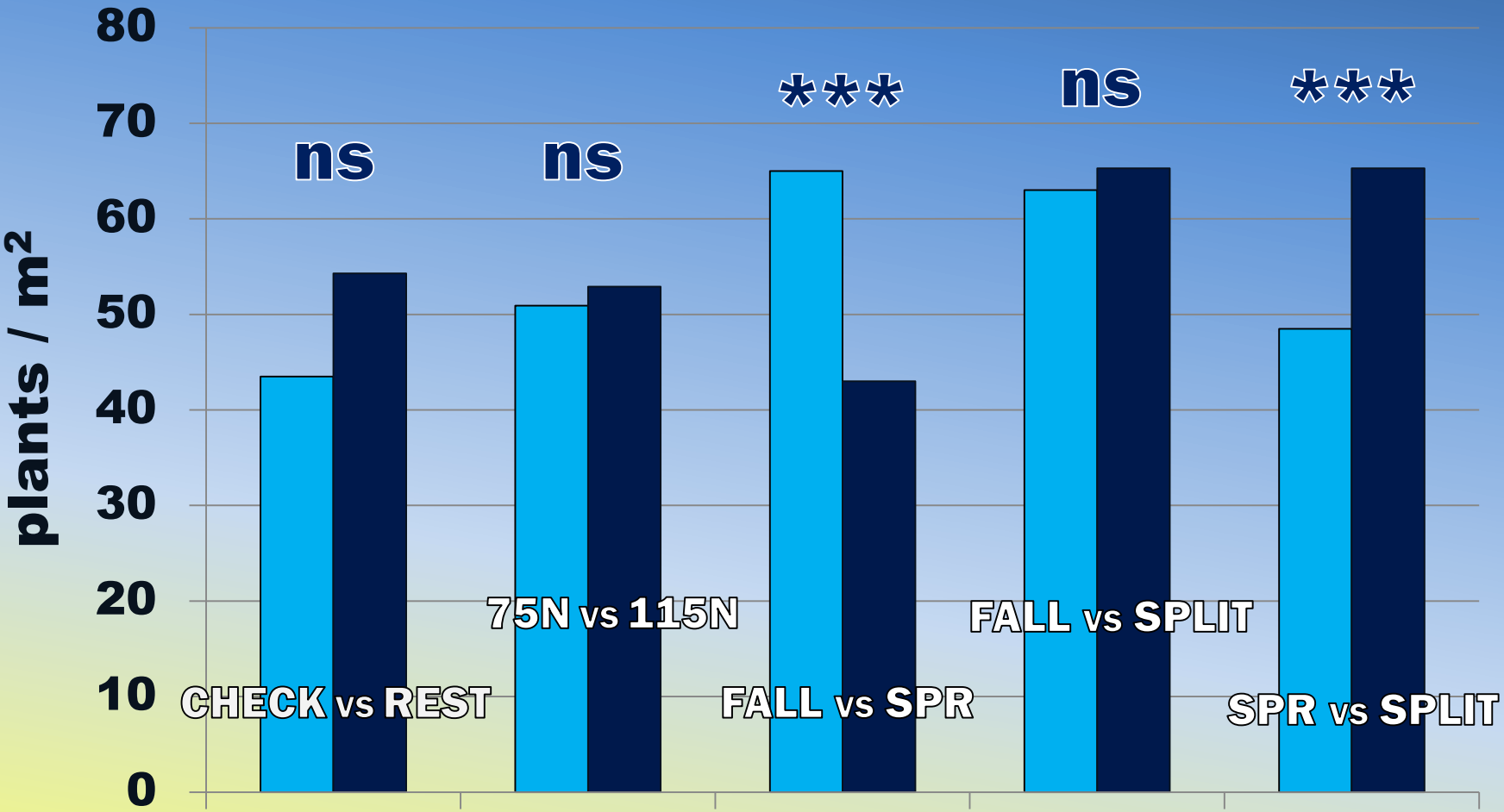
Contrasts – Rate & Timing

Effects on Winter Wheat Establishment



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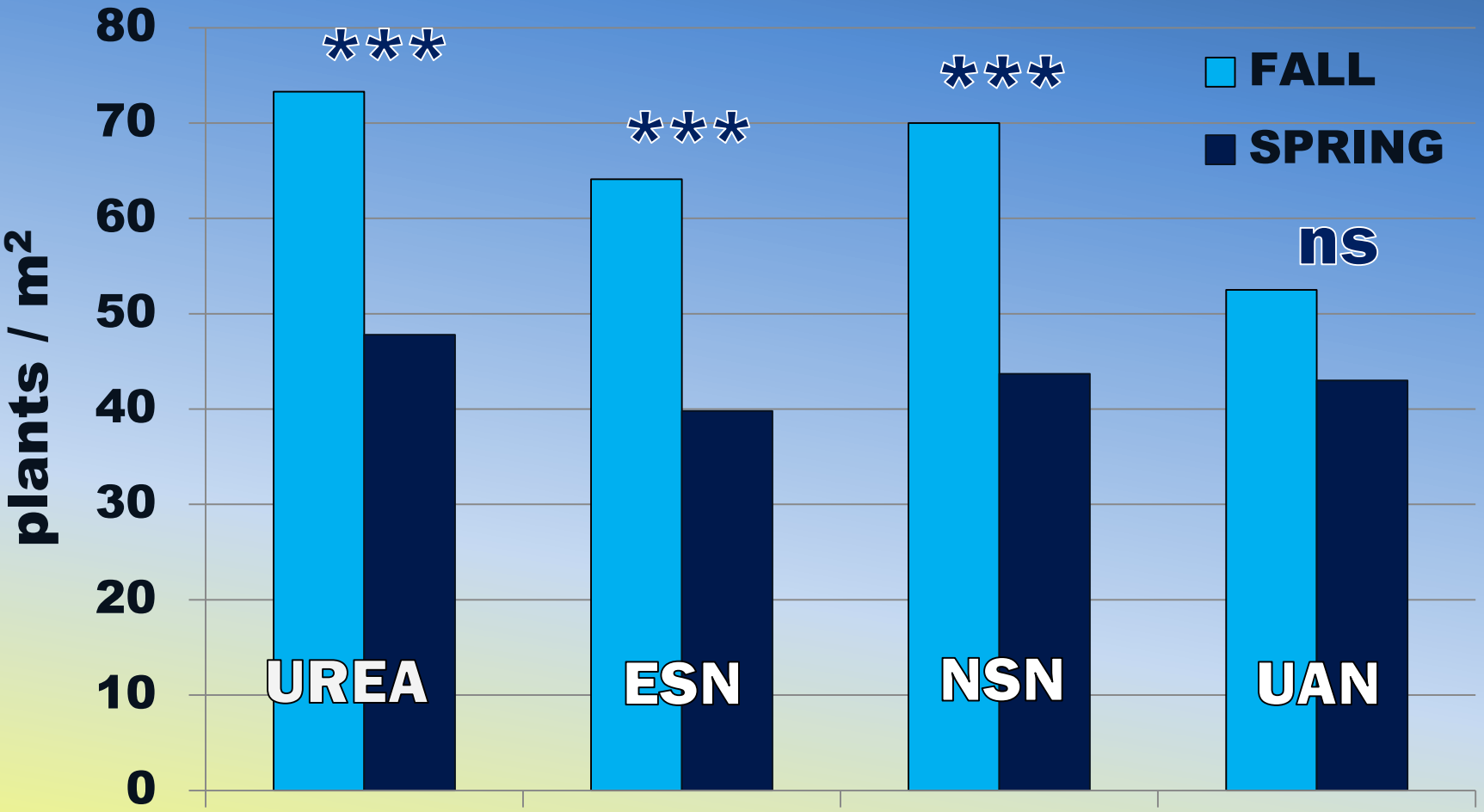
Contrasts – Form x Timing

Effects on Winter Wheat Establishment



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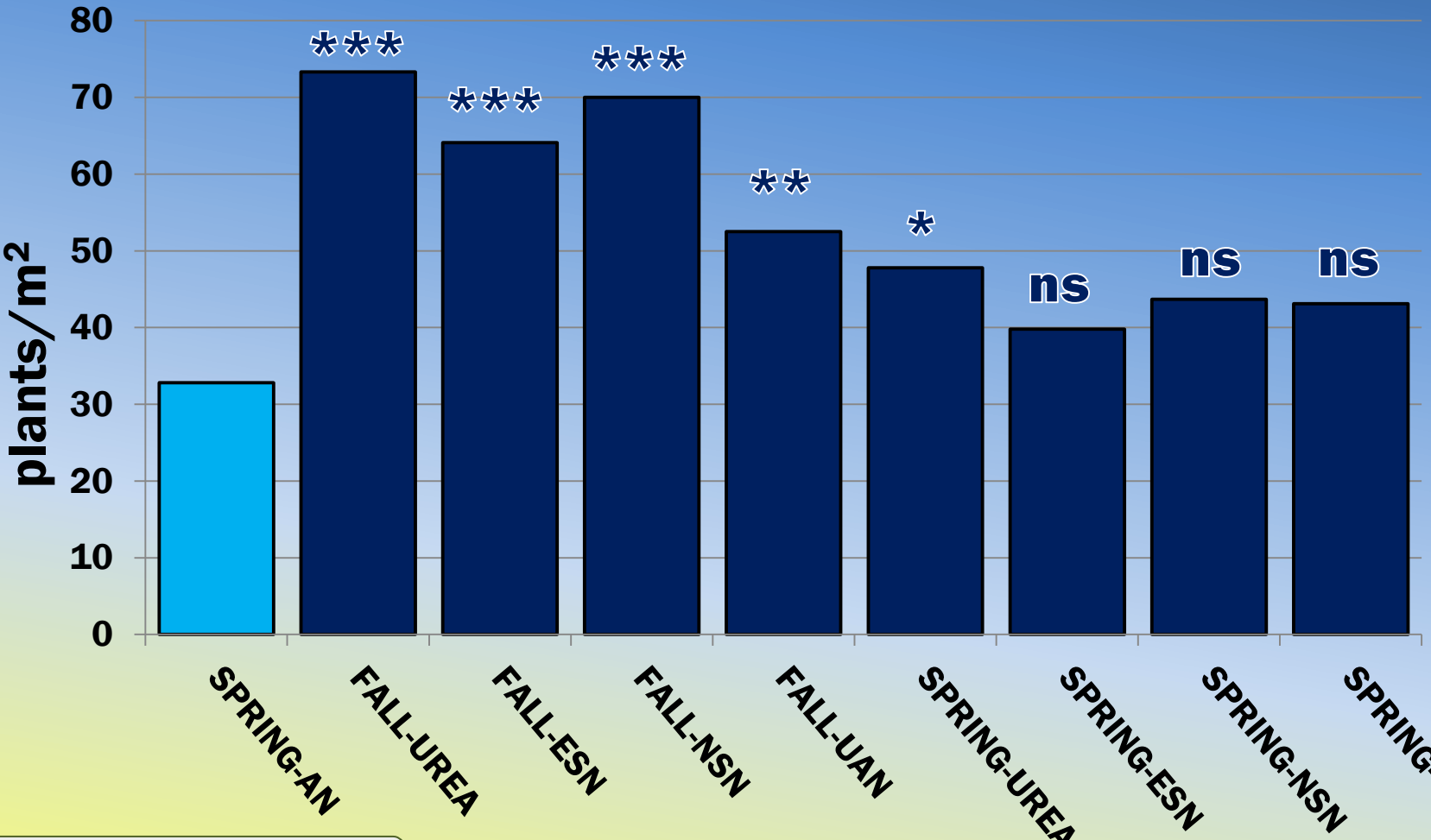
Nitrogen Fertility Options

Versus Spring Broadcast 34-0-0



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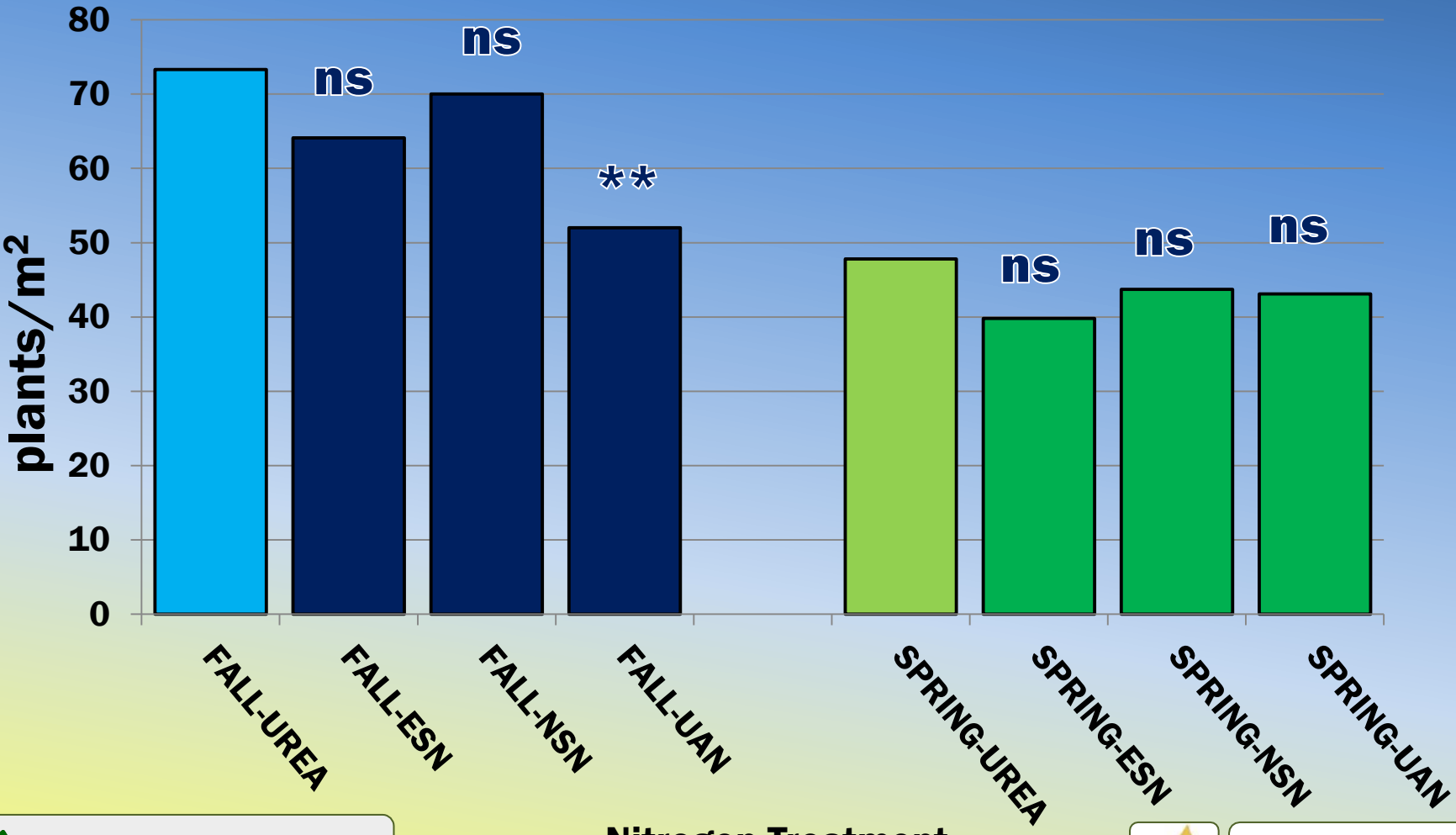
Nitrogen Fertility Options

Versus Untreated Urea (by placement/timing)



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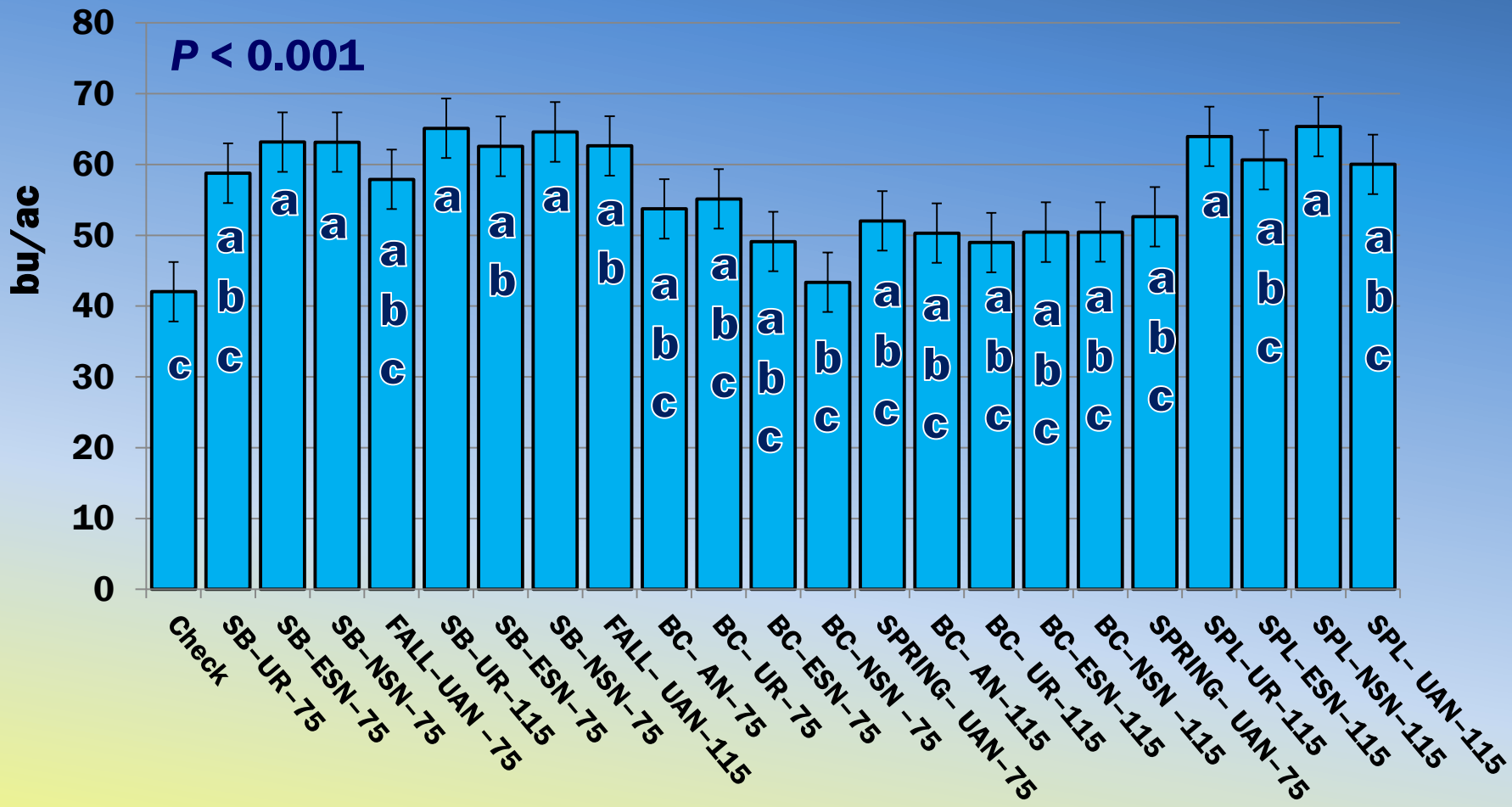
Nitrogen Fertility Options

Effects on Winter Wheat Yield



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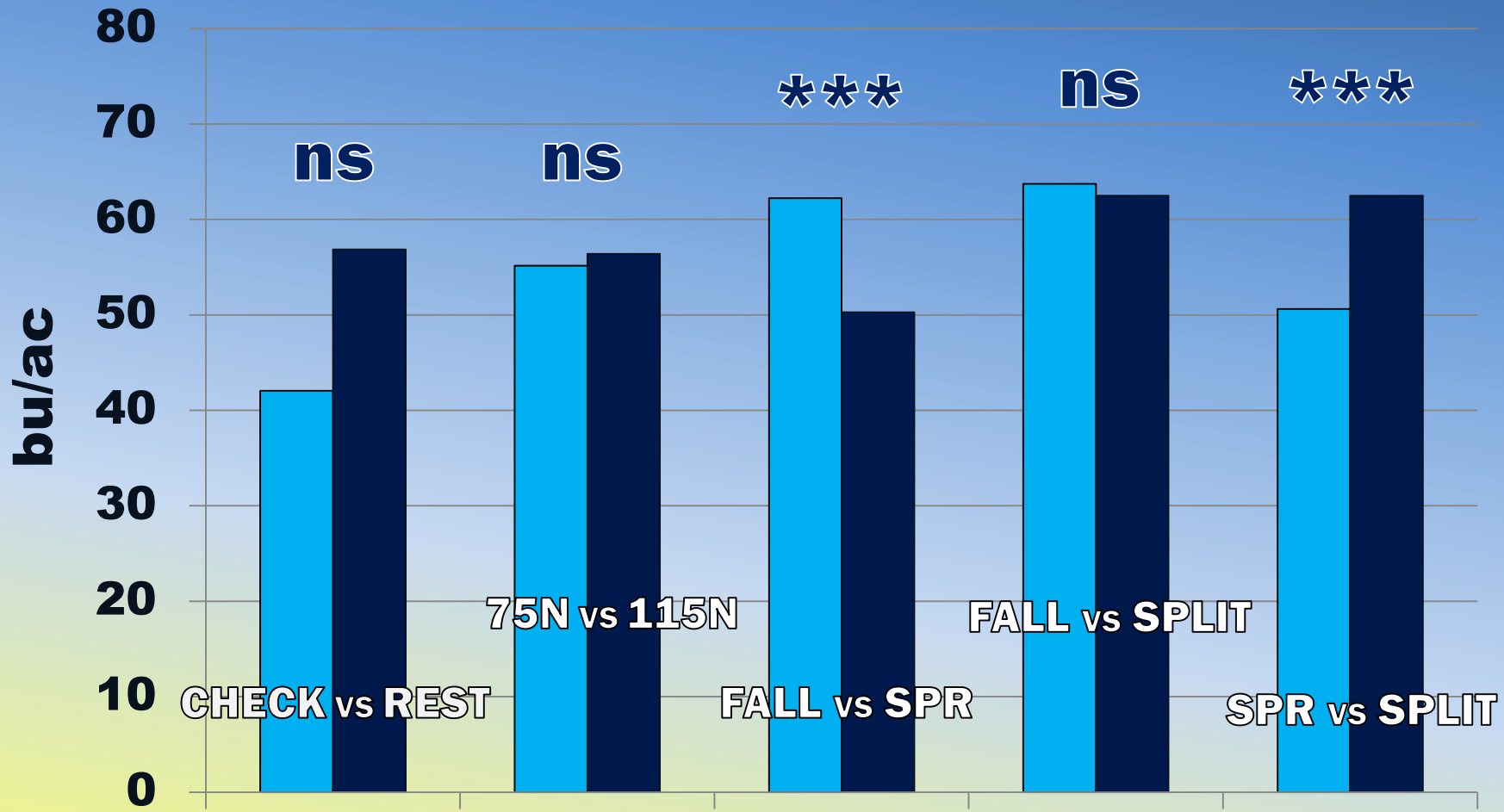
Contrasts – Rate & Timing

Effects on Winter Wheat Yield



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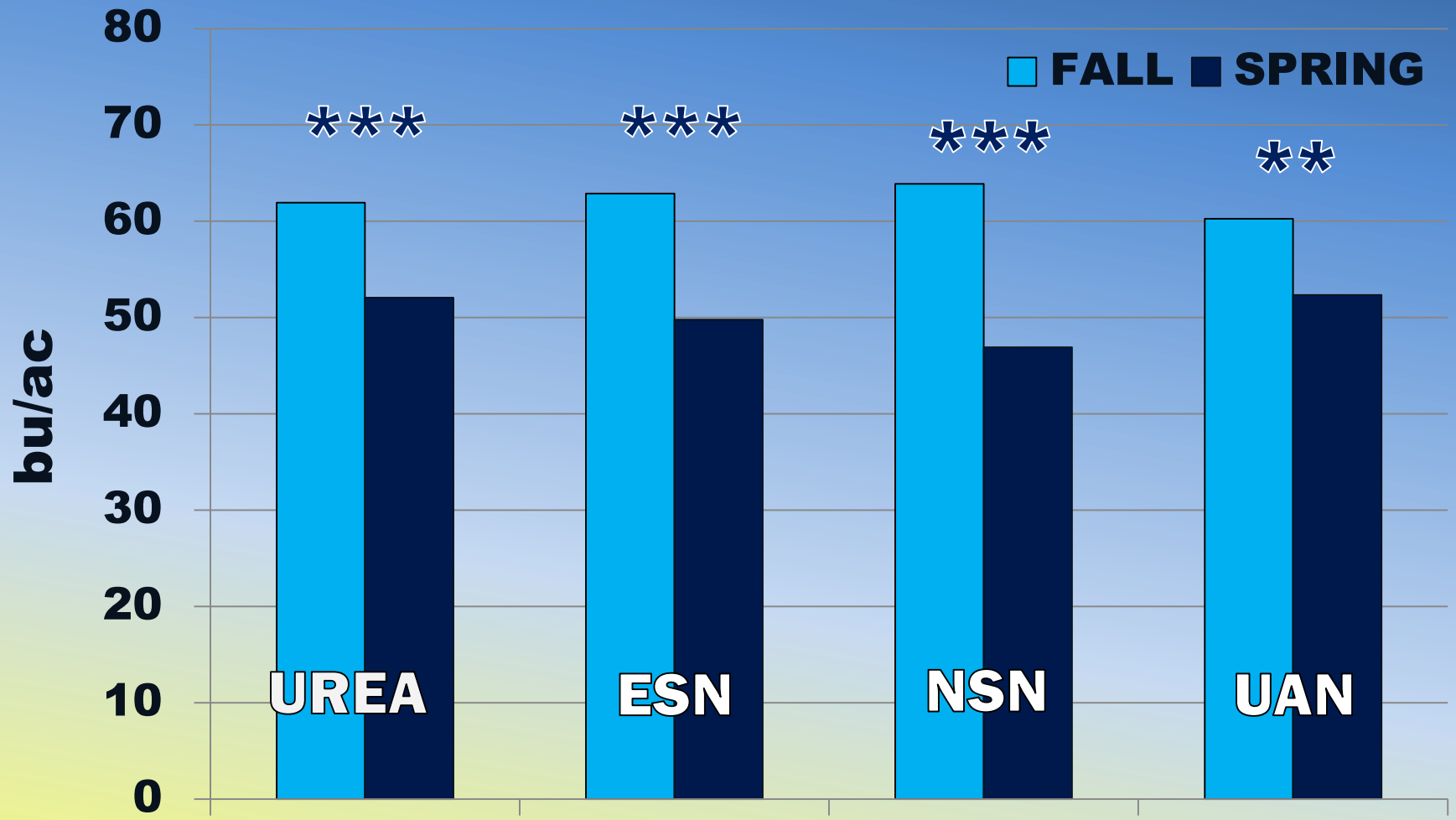
Contrasts – Form x Timing

Effects on Winter Wheat Yield



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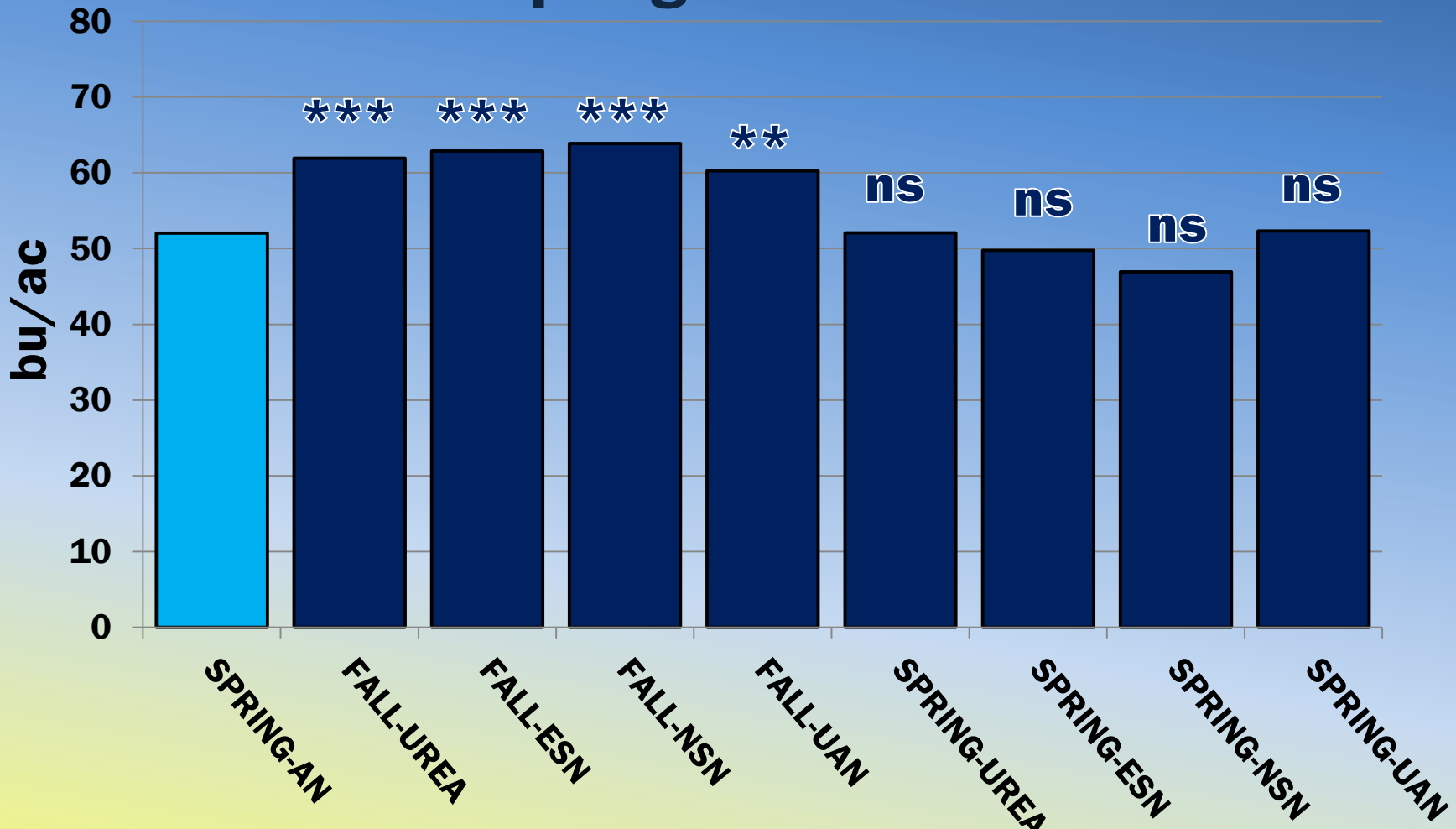
Nitrogen Fertility Options

Versus Spring Broadcast 34-0-0



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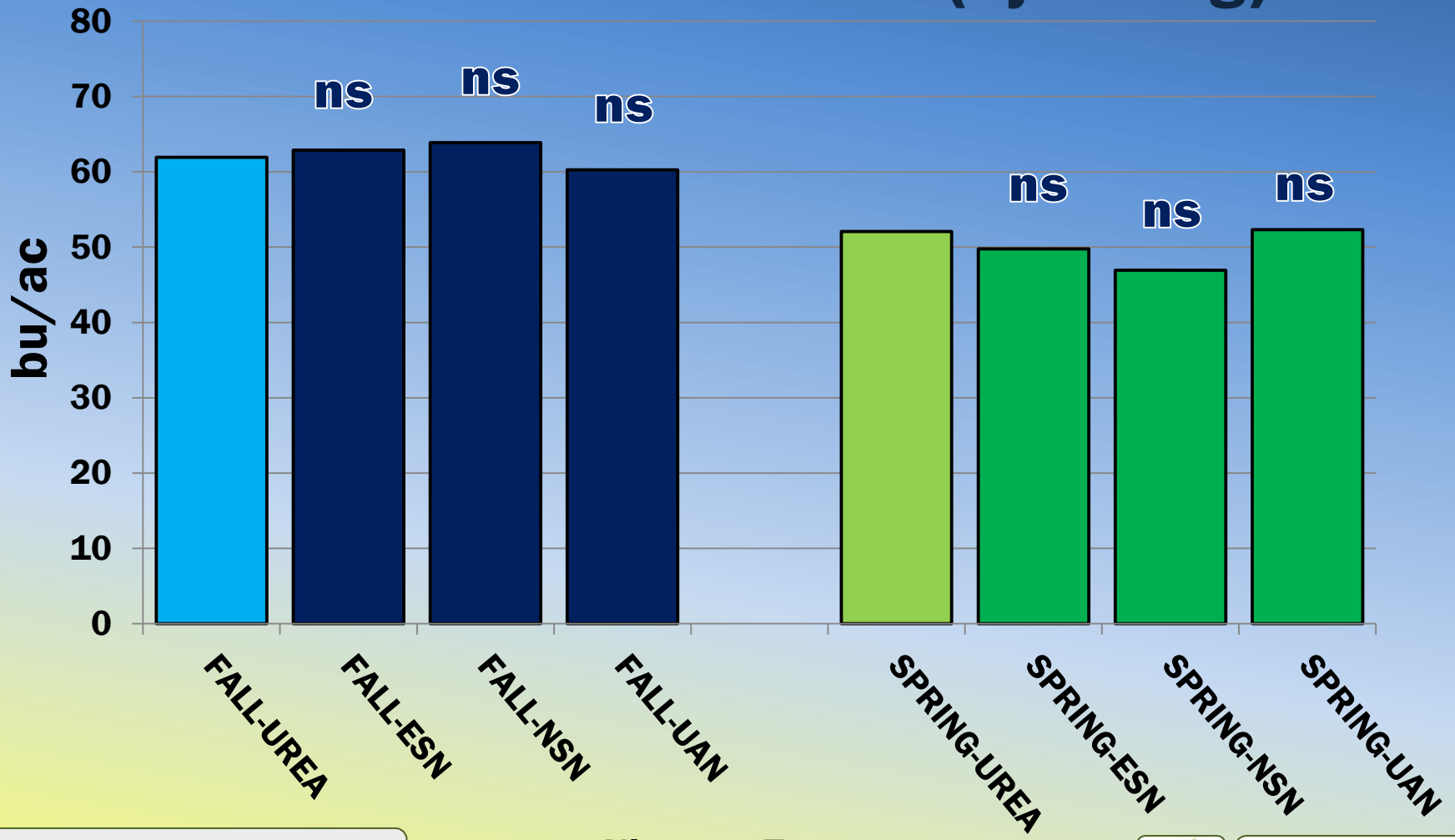
Nitrogen Fertility Options

Versus Untreated Urea (by timing)



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FALL SB UREA

SPRING BC UREA

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Nitrogen Fertilizer Options

Indian Head 2013 Conclusions

- Reasonably strong overall N response observed but no difference between 75 and 115 kg N ha^{-1} fertilizer treatments for any variables
- Nitrogen fertilizer crop establishment provided that it was applied in the fall – best results with side-banding regardless of form
- Similar results for grain yield where fall-applied N resulted in higher yields than spring broadcast applications & best yields were achieved with side-banding
- Urea ammonium-nitrate (UAN) not typically recommended for fall application due to susceptibility of NO_3-N to leaching and denitrification; however it is a good choice for spring, surface applications and easy to apply with a sprayer
- No significant benefits to slow release forms of N observed but such products may be advantageous when used properly and can be a good fit for winter wheat
- Split-application performed equal to fall application but with the potential advantage of allowing N rates to be adjusted depending on stand establishment and economics
- Trials continuing at Indian Head, Scott and Melfort in 2014

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