# *In-crop management strategies to reduce the impact of fusarium head blight in barley*

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Canadian Agricultural Partnership

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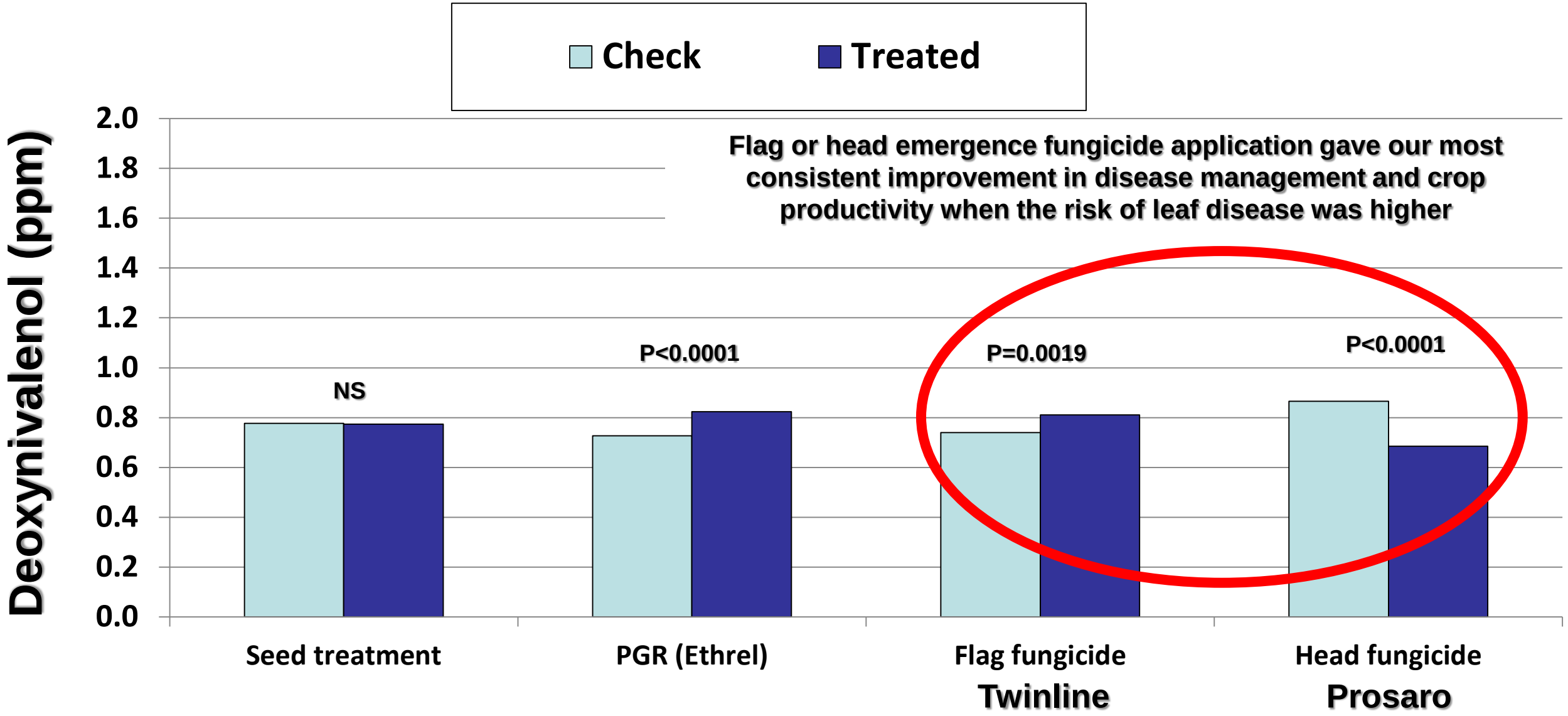
# Background

- Multiple biotic and abiotic factors
  - Influence malt barley yield and end use quality
- Fusarium head blight has had a major influence
  - *Fusarium graminearum* primarily
  - Has caused a westward shift in the malt selection areas for Canada and the USA
- FHB is now a barley production issue across the prairies
- Current management tools do not completely mitigate risk

# Deoxynivalenol (DON) content (ppm), Test 62, 2013-2016



Test 62, PGR (Ethrel) treated plot, Lacombe

Note secondary tiller development

# Objectives of the current study

- To determine if water volumes, seeding rates and fungicide timing, and their potential interactions affect
  - Leaf disease and fusarium head blight (FHB) development
  - Deoxynivalenol (DON) content in harvested grain
  - Crop productivity and kernel quality
  - Malting quality

# Materials and Methods

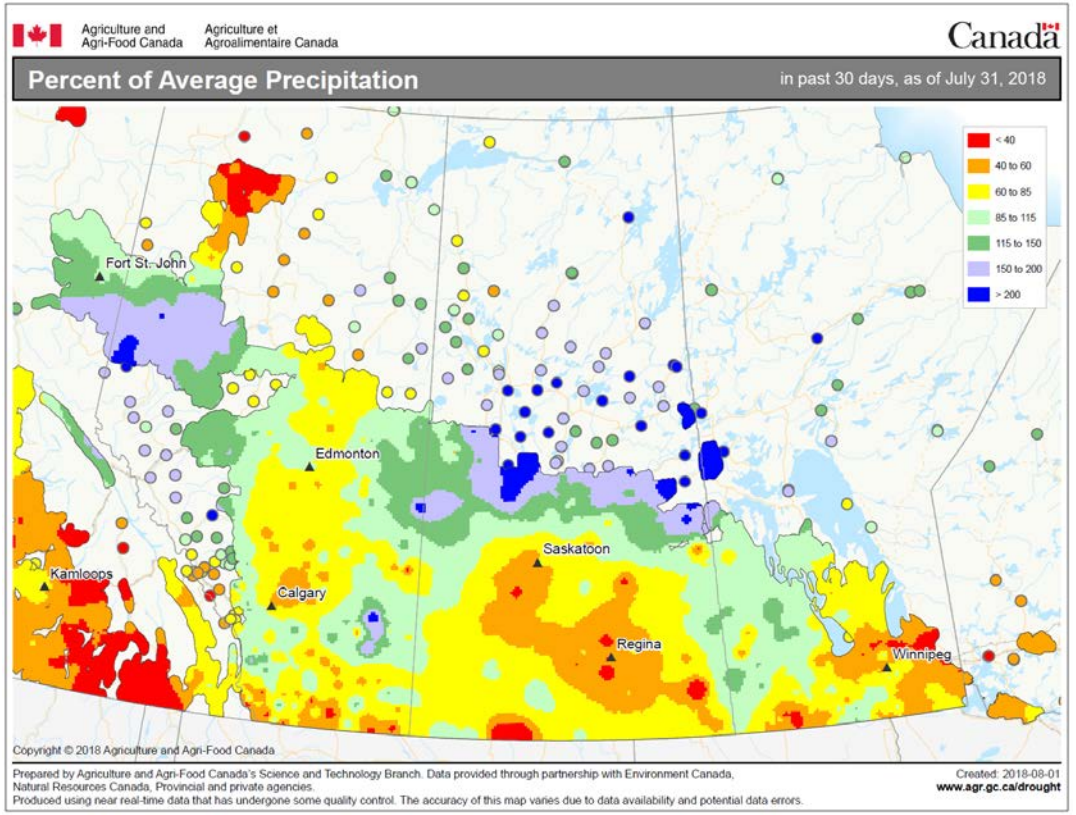
- Water volumes
  - 50, 100, and 150 L $ha^{-1}$
- Seeding rates
  - 200 and 400 seed $m^{-2}$
- Timing of Prosaro (tebuconazole and prothioconazole) application
  - ~ 800 ml $ha^{-1}$ per application
  - Check, no fungicide applied
  - 1-2 days after full head emergence (Timing 1, Zadoks 59)
  - Fungicide applied 7-10 days after the date of Timing 1 (Timing 2)
  - Timing 1 and again at Timing 2 (Timing 3)

# Materials and Methods

- Percentage leaf area diseased
  - Flag – 1
- Grain yield
- Kernel characteristics & malting quality
- Deoxynivalenol content in the harvested grain
- AAC Synergy barley
  - Moderately susceptible to FHB
- Multiple locations across Canada
  - Lacombe, Lethbridge, AB; Scott, Melfort, Indian Head, SK; Brandon, MB; Normandin, QC; and Charlottetown, PEI

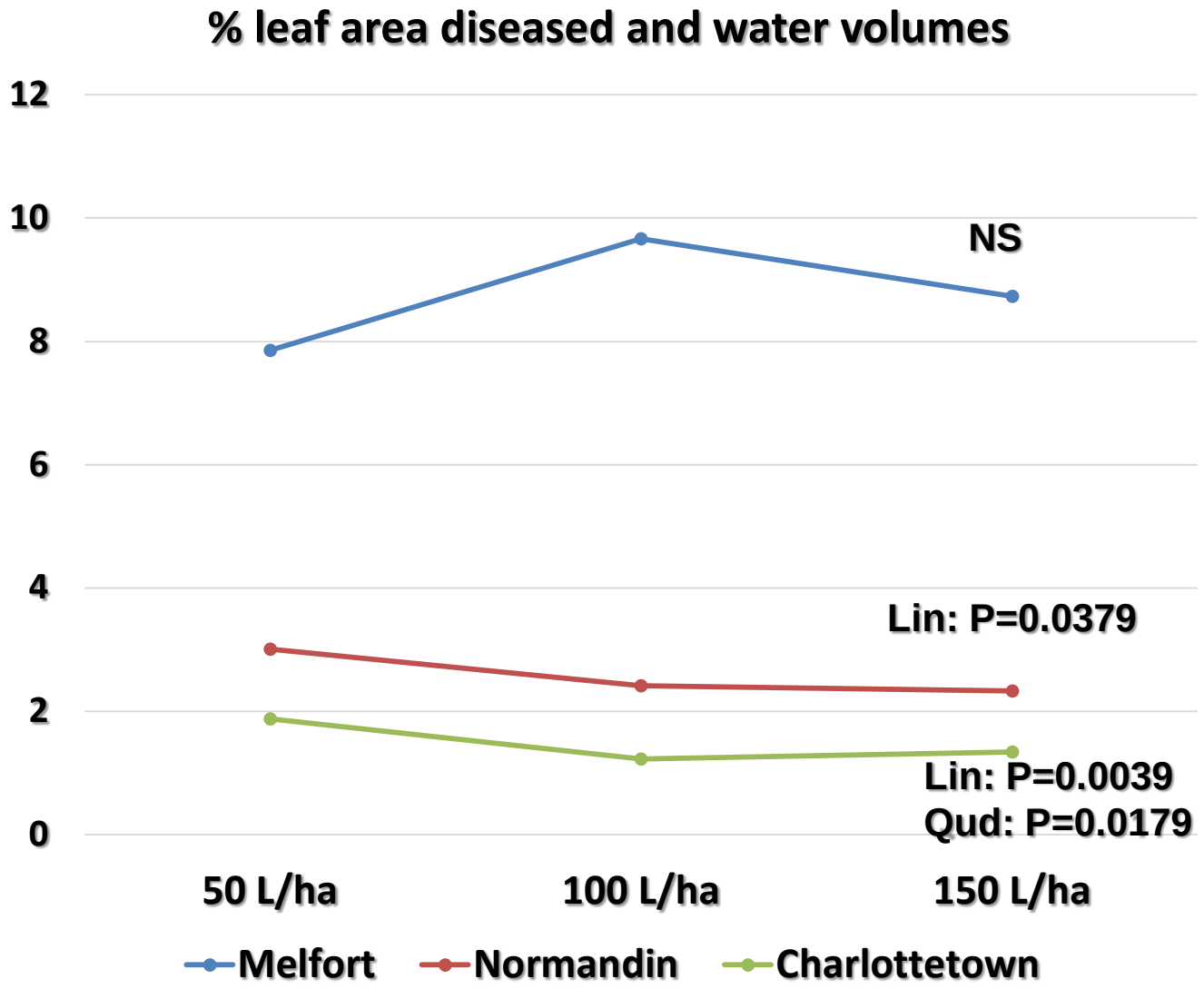
# General impressions

- 2018 was generally a dry year at most sites
- Limited leaf disease development
  - <10% leaf area affected
- Limited fusarium head blight and subsequent DON development
  - <1 ppm
- Focus of presentation is on three sites with somewhat higher disease & DON levels
  - Melfort, Normandin, and Charlottetown

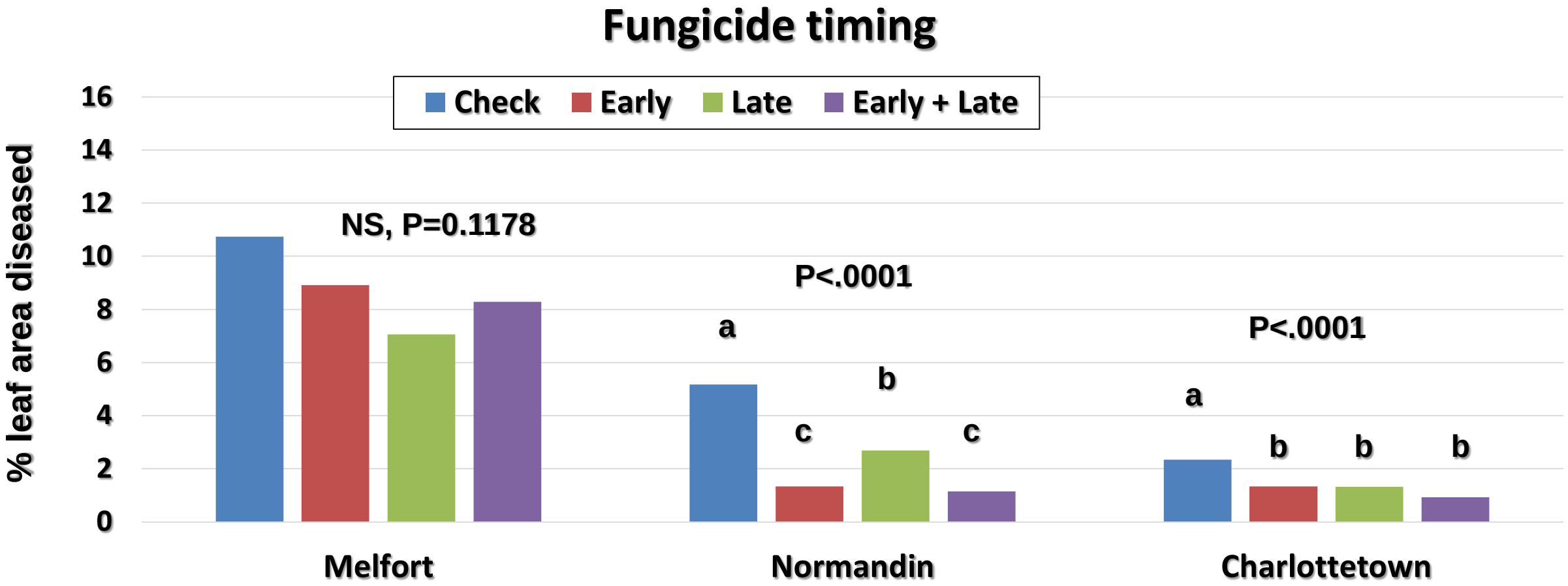


# Treatment effects and % leaf area diseased

- Water volume
  - No effect at Melfort
  - Small but significant effects at Normandin (linear effects only) and Charlottetown (linear and quadratic effects)
- Seeding rate
  - No effect at Melfort (P=0.1588)
  - Normandin (P<.0001)
    - 2.0% vs. 3.2%, 200 vs. 400 seeds $m^{-2}$
  - Charlottetown (P=0.0252)
    - 1.3% vs. 1.7%, 200 vs. 400 seeds $m^{-2}$

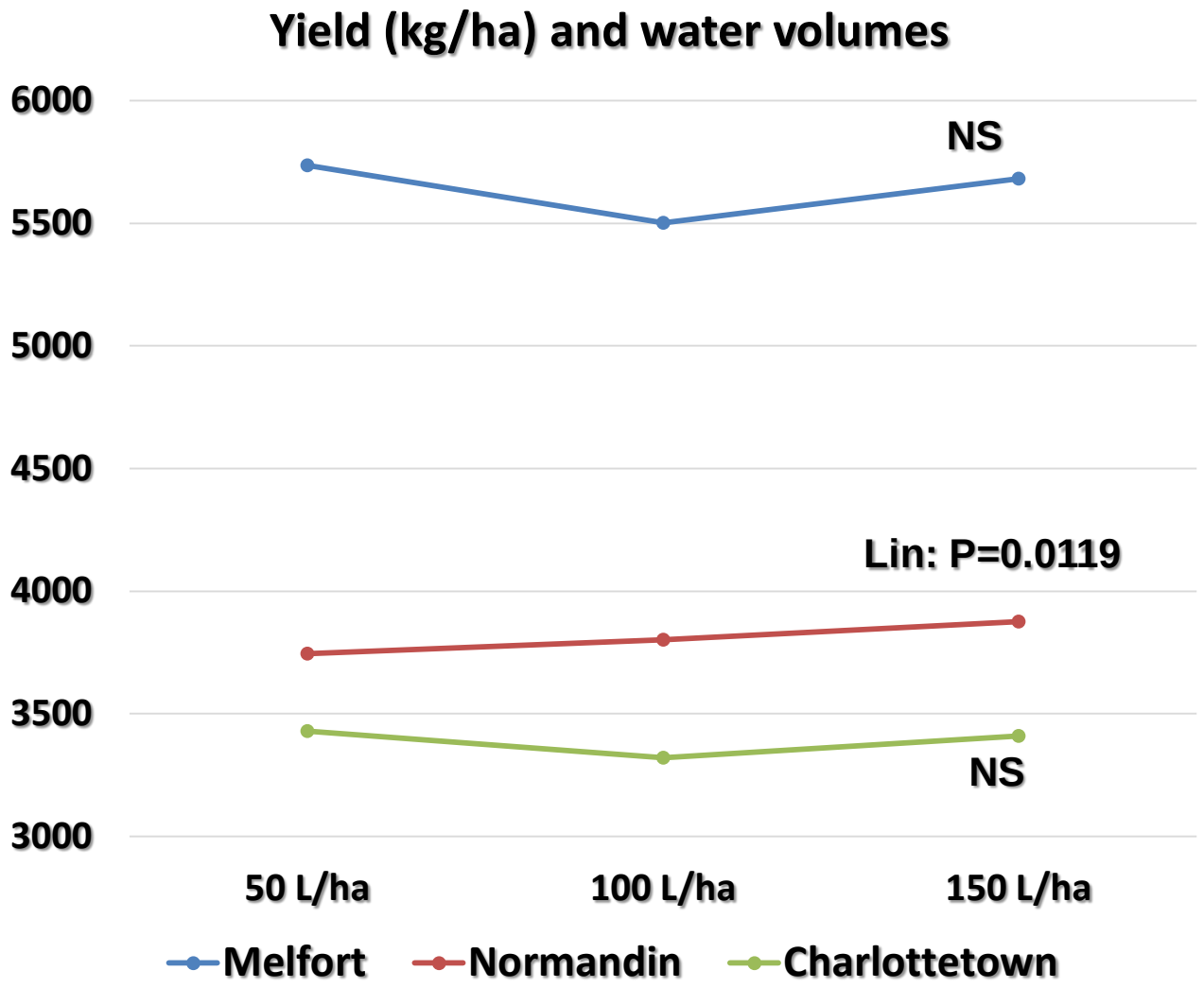


# % leaf area diseased and fungicide timing treatments, Melfort, Normandin and Charlottetown



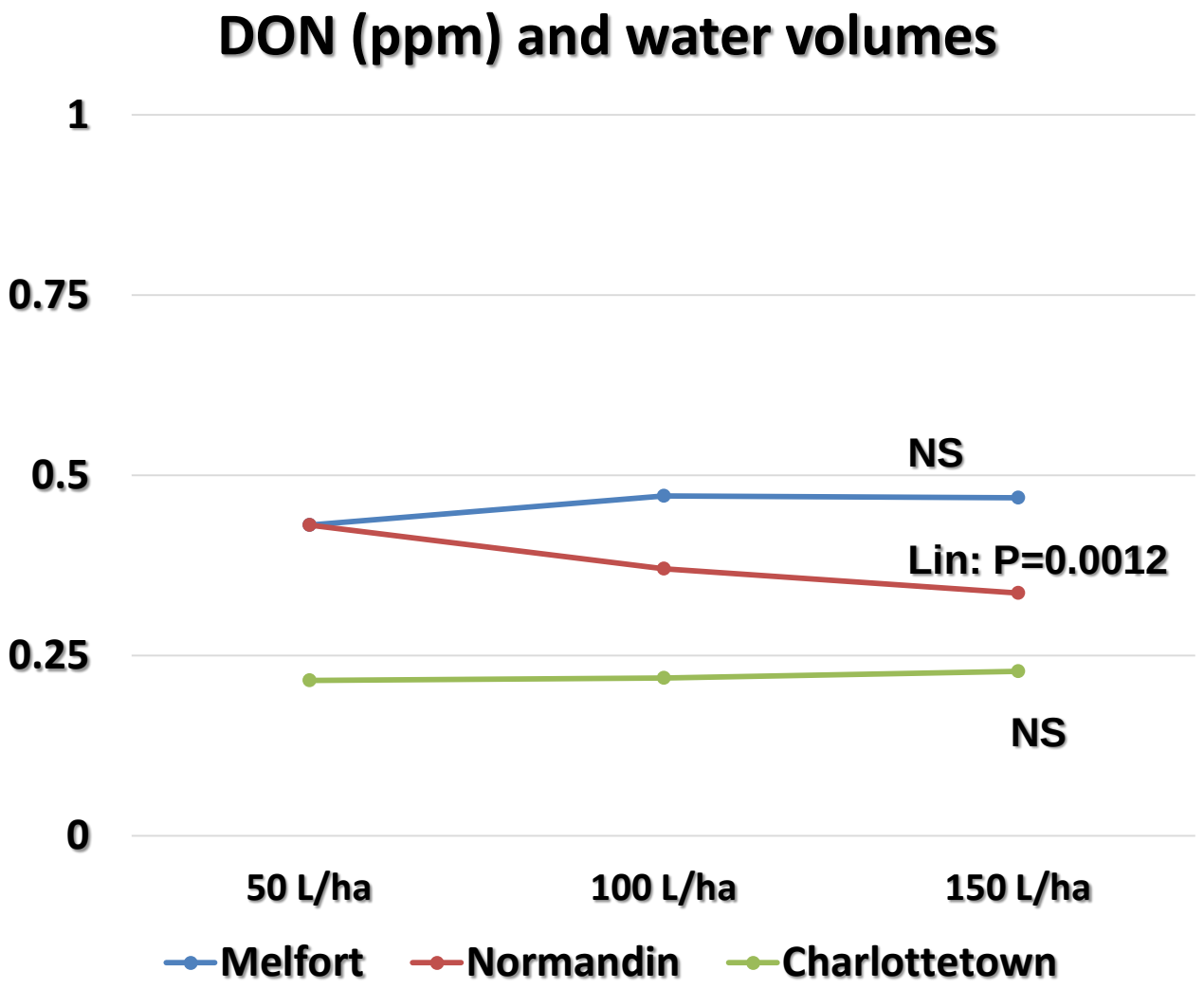
# Treatment effects and grain yield (kg/ha)

- **Water volume**
  - No effects at Melfort and Charlottetown
  - Small but significant effect at Normandin (linear effects only)
- **Seeding rate**
  - Melfort (P=0.0478)
    - 5792 vs. 5488 kg/ha, 200 vs. 400 sd. $m^{-2}$
  - Normandin – no effect (P=0.3279)
  - Charlottetown (P<.0001)
    - 3040 vs. 3733 kg/ha, 200 vs. 400 seeds $m^{-2}$
- **No effect of fungicide timing**

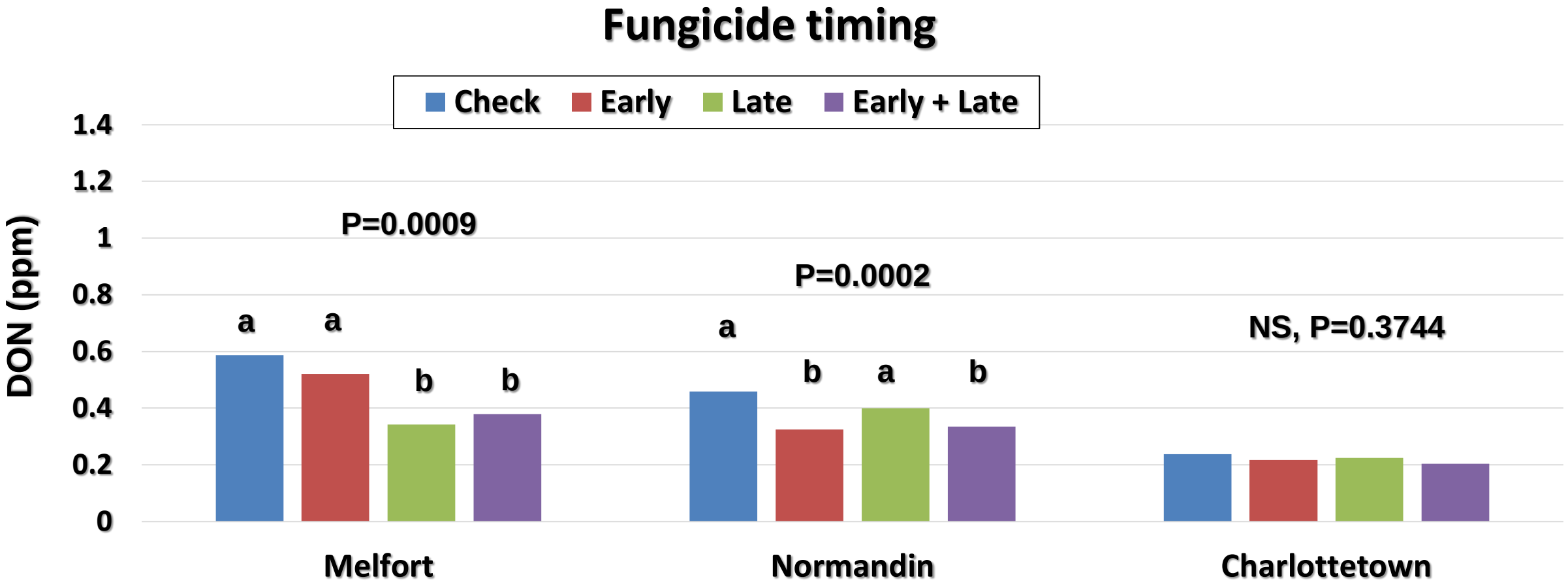


# Treatment effects and deoxynivalenol (DON, ppm)

- **Water volume**
  - No effect at Melfort and Charlottetown
  - Small but significant effect at Normandin (linear effects only)
- **Seeding rate**
  - No effects at Melfort and Normandin
  - Weak effect at Charlottetown (P=0.0716)
    - 0.23 vs. 0.21 ppm, 200 vs. 400 seeds $m^{-2}$



# Deoxynivalenol and fungicide timing treatments, Melfort, Normandin and Charlottetown



# Preliminary conclusions

- 2018 was generally a dry year at most sites
  - Limited leaf disease, FHB and DON development
- Increasing water volume may help to improve leaf disease management and reduce DON levels
- Fungicide application can help with leaf disease and DON
  - Will vary depending on conditions and early-mid season leaf disease risk
  - Optimal timing for reducing DON contamination will vary depending on weather conditions prior to and after head emergence
- Grain yield effects limited, likely due to low disease risk

# Thank you

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