

# How A Product “That Does Nothing” Can Enhance Yields And Replace Nitrogen Fertilizer

John Heard – Manitoba Agriculture, Food and Rural Initiatives



## Background

Many producers wish to use products that increase yield and reduce their dependency on purchased synthetic fertilizer.

A natural occurring and only slightly processed product was extracted from the *Acer negundo* plant in mid March-April.

To assess its beneficial contribution to Manitoba crops as a growth enhancer and nitrogen replacer, it was applied in experimental plots and analyzed using statistics.

## Method

**Study 1: Growth Enhancement** - The product was applied to a block of canola at the University of Manitoba – Carman Research Station. The product was applied in early June to established canola seedlings using a randomized complete block design (RCBD) with 3 replications. To simulate a multi-site study, this experiment was repeated 20 times in this same block, with each site assigned a letter (Figure 1). All other production and pest management was uniform.

**Study 2: Nitrogen Replacement** - The product was applied to an established spring wheat field in a RCBD with 4 replications as:

1. Unfertilized check (0 N),
2. 60 lb/ac N as urea
3. 60 lb/ac N as urea plus foliar product in early June
4. 120 lb/ac N as urea

In both studies biomass (whole plant) yield was taken in early July and leaf chlorophyll level was determined with a SPAD meter. Results were statistically analyzed using the Analysis of Variance or ANOVA procedure to identify significant differences.

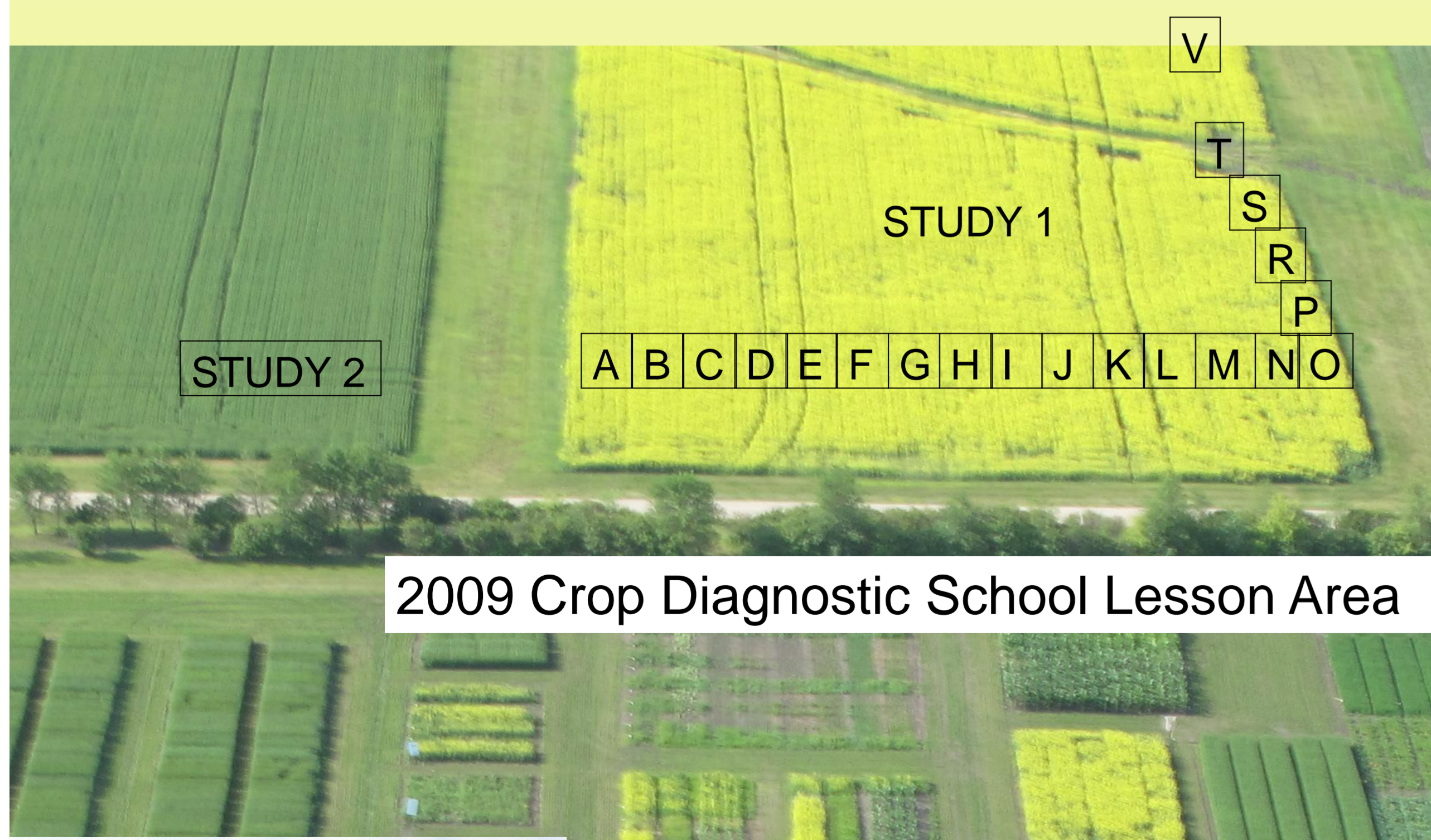


Figure 1 (above). Schematic of plot layout.



Figure 2 (left). Foliar application of product diluted with 40 parts water to emerged crops on June 2.

## Study 1: Results Of Growth Enhancement

Interpretation of the results may lead to contrasting conclusions.

### A) The growth enhancer works!!!

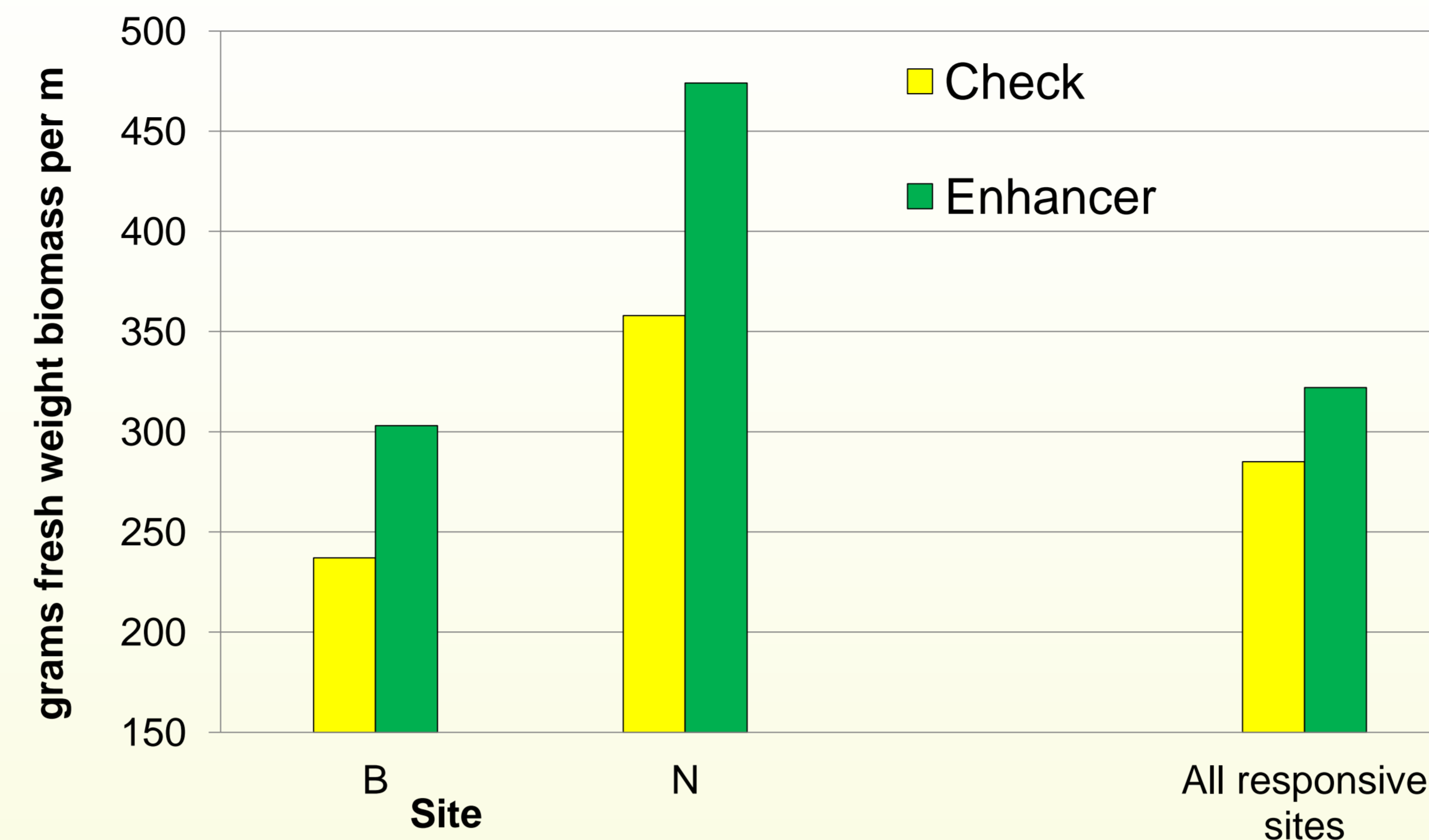


Figure 3. Canola biomass yield response to the product.

- Growth was increased at 11 of 20 sites. These responsive sites had an average 13% growth increase over the check.
- At 2 sites (B and N) statistically significant growth increase was measured at the 90% probability level ( $P < 0.10$ ).

### B) BUT

- Have you viewed all the study results? (see Figure 4 below)
- Colour and growth are important factors but grain yield increase is required to pay for the input.
- Significance at the 90% probability level means that 1 time in 10 something with no effect may be identified as significantly different.

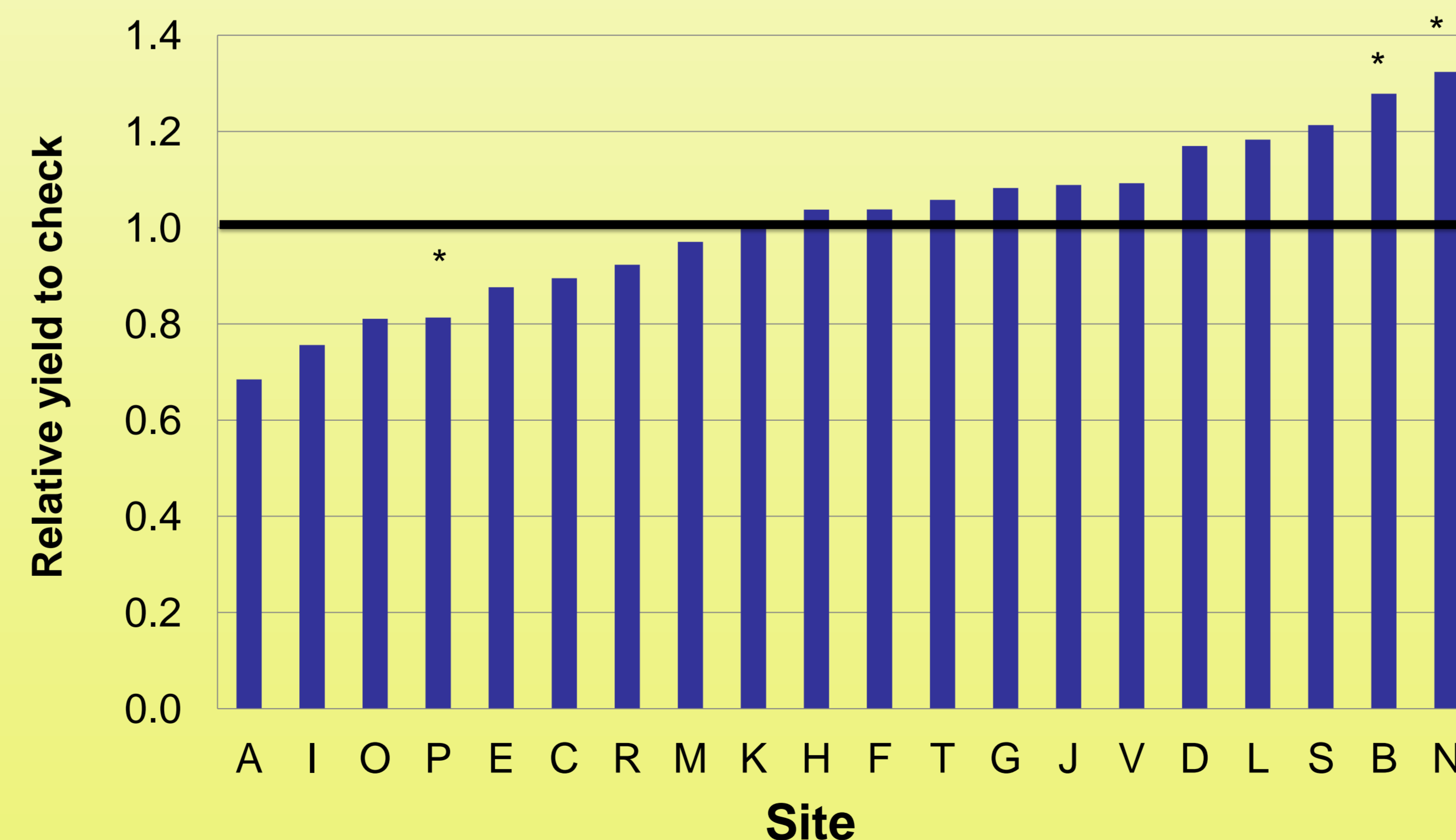


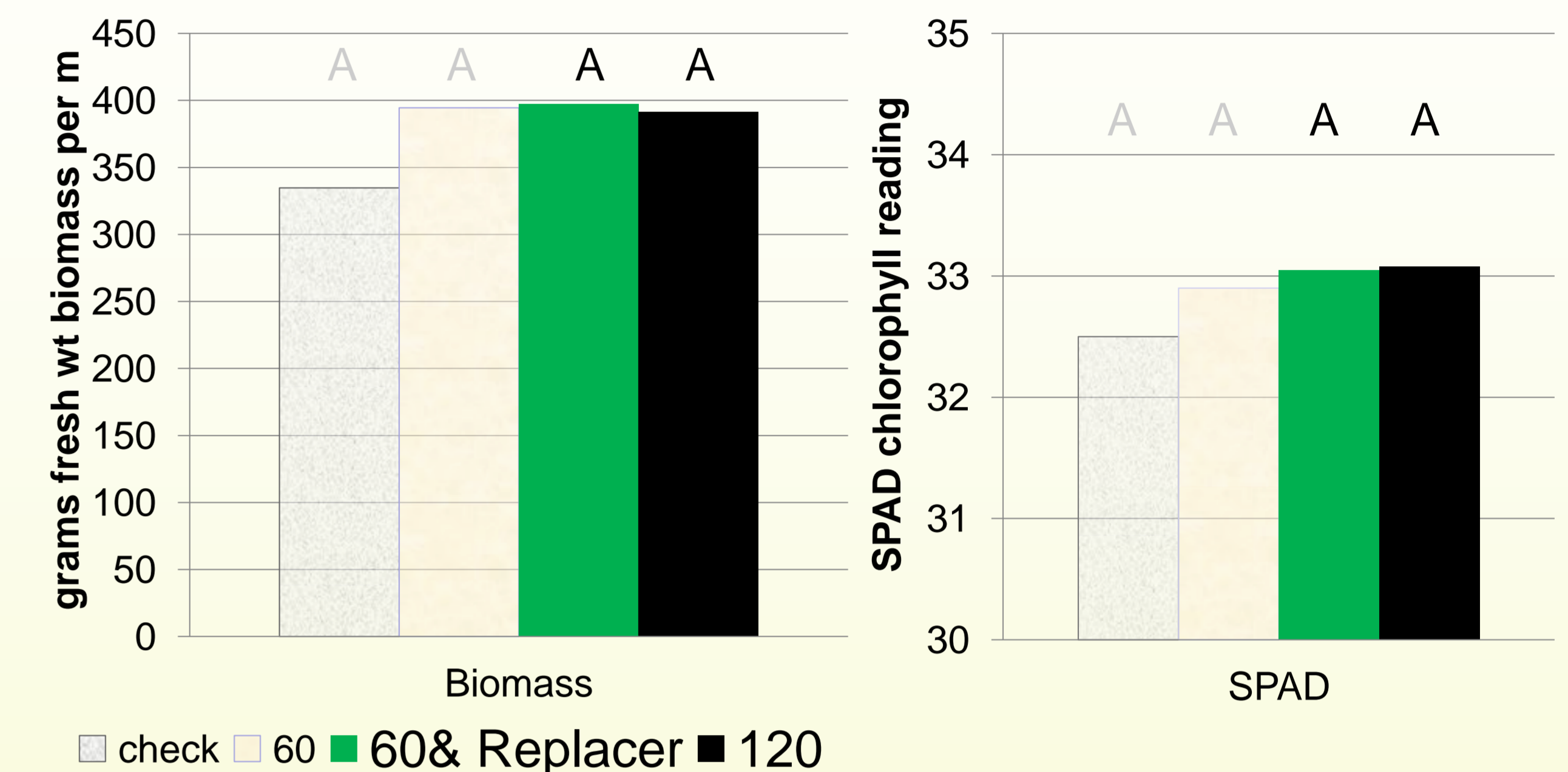
Figure 4. Piano graph of all sites and biomass yield relative to the check (1.0). Bars under an asterisk (\*) are significantly different than the check at the 90% probability level.

- A significant growth reduction occurred with the product (at site P).
- 8 times of 20 the yield was numerically lower with the product.
- SPAD chlorophyll results showed one significant positive result and 2 negative (data not shown).

## Study 2: Results Of Nitrogen Replacement

### A) The product replaces 60 lb/ac N!!

Statistical analysis of biomass and chlorophyll content indicate no significant difference (at the 90% probability level) between the 60 lb/ac N plus Replacer and the 120 lb/ac N treatment (Figure 5-6).



Figures 5-6. Effect of Nitrogen replacer on wheat biomass and chlorophyll content. Bars under the same letter are not significantly different at the 90% probability level ( $P < 0.10$ ).

### B) BUT

- Have you viewed all the study results?
- The complete data shows that neither the 60 lb/ac N treatment nor the check were different from the 120 lb/ac N treatment.
- What could cause such results? The previous crop had been fallow of drowned out soybeans. Soil residual N was 98 lb/ac nitrate-N in the 0-24" depth.

## Discussion

Statistics and graphs can be used to misrepresent data. Agronomists and growers should exercise critical thinking in their assessments.

Ask questions such as:

1. Are these all the test site results?
2. Are yields for biomass or grain? For relevant crops?
3. Are the soils and climate similar to your area?
4. How did the untreated check and standard treatments perform?
5. What were previous cropping history and soil test values?

What formal mechanism will prevent John Heard's dilute Manitoba maple syrup (*Acer negundo*) from entering the crop nutrition marketplace?

- CFIA, under the Fertilizers Act, requires that many such products be evaluated for safety and efficacy prior to registration as a fertilizer supplement.

## References

- Guide to Canadian Federal Regulatory Requirements for Fertilizers and Supplements
- [www.inspection.gc.ca/english/plaveg/fereng/guide/sect2e.shtml](http://www.inspection.gc.ca/english/plaveg/fereng/guide/sect2e.shtml)