

## EFAO 2024: Research Protocol Working Draft

# Reduced N Rates with Alternative Fertilizers for Field Corn

**Farmer-researcher(s):** Larry Dyck, Campden Grain - West

**Project type:** Research trial

**Research priorities:** Disease & pest control, Nutrition Quality, Soil health

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## Objective

To test the efficacy of AEA (Advancing Ecological Agriculture) products as an alternative fertilizer source for field corn.

Can we use biological products to reduce our regular fertility programs? The world of biologicals and how we use them on broad acre crops is just beginning to open up; just as there are pressures to reduce N fertilizer use. There is much info and many products out there to mislead. How do we choose?

## Background

Larry combined his observation that their best yield years are never related to how much fertility they applied; information learned from podcasts by John Kempf and Nicole Masters' book *For the Love of Soil*; and connections with a local lawn care outfit that mostly Johnson Su processes to build biologicals for use in his business, to get curious about the use of biologicals and alternative fertilizers for his grain crops. In 2023, he ran a trial with Johnson Su biologicals and observed good results. This led him to want to trial AEA products as a way to reduce inorganic N use on his farm, and potentially increase N use efficiency.

## Experimental Design

Larry will use a randomized block design with 5-6 blocks. The field geography is a triangle shape so Larry will record the strip lengths when they plant. They plan to plant as soon as possible after May 1st.

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Each block will have three treatments:

1. Regulate rate of N fertilizer
  - 45 gallon/ac UAN
  - 10% of total solution of ATS (ammonium thiosulfate)
2. 30% reduction of N fertilizer HumaCarb, Rebound Molybdenum, ATS
  - HumaCarb 3% of total solution
  - Rebound Molybdenum, 500 ml/ac
  - ATS 10% of total solution
  - Balance 28%UAN
  - Total solution applied, 31 gal/ac
3. 50% reduction of N fertilizer + HumaCarb, Rebound Molybdenum, Rejuvenate, ATS
  - Huma Carb 3% of total solution
  - Rebound Molybdenum, 500 ml/ac
  - Rejuvenate 3% of total solution
  - ATS 10% of total solution
  - Balance 28%UAN
  - Total solution applied 23 gal/a

All fertilizers will be applied at planting and side dressed 1 time in the 4-6 leaf stage of corn (with N reductions at this stage).

### Field Layout

Strips will be defined and maintained with GPS-guided machinery.

Approx size of the strips/blocks

#### Control - standard N fertility

30% reduction + AEA

50% reduction + AEA

co ntr ol	30 %	50 %	co ntr o	30 %	50 %	co ntr ol	30 %	50 %	co ntr o	30 %	50 %	co ntr o	30 %	50 %	co ntr o	30 %	50 %
Block 1			Block 2			Block 3			Block 4			Block 5			Block 6		

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Note: the order of the treatments will not be replicated, for practicality of application in the field. Given the blocking and number of replicates in this trial, we feel comfortable about the lack of randomization in this way.

### Statistical model

We will use an analysis of variance (ANOVA) with 5-6 replicates to analyze the data.

## Measurements

### *Yield*

- At harvest, Larry will weigh the yield off of each strip separately, using GPS-guided machinery.

### *Test weight*

- From each strip, Larry will take and measure a sample for test weight; keeping the samples separate and clearly labeled.

### *N use*

- For each strip or treatment, Larry will calculate the amount of N fertilizer or AEA product used.

### *Cost & Net return*

- For each strip or treatment, Larry will calculate the cost to fertilize and net return

### Photos

Please take the following photos:

- Planting
- The strips throughout the season
- Harvest

### Social media

If you are posting about your trial on social media, please tag EFAO, @efao2.

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### Research Plan

Please note that if data is submitted after the submission deadline, EFAO staff cannot guarantee that your data will be analyzed and written up before the Research Symposium and/or the next growing season.

Time	Task
Spring	Figure fertilization rates for treatment, and how they will be applied using the replicated strip design
As soon as possible after May 1st	Plant; establish treatments with fertilizing at planting
Summer	In-season management and fertilization according to the replicates strip design
Mid-November, or after soy and sunflower harvest	Harvest each strip separately; take yield weight and test weight from each strip separately.
ASAP in fall	Send EFAO your data!
December 31, 2024	Farmer-fee and research expense invoice with receipts for expenses. Submit invoices at this site: <a href="https://efao.ca/data/">https://efao.ca/data/</a>
January/February 2025	Finalize and publish research report. Work with EFAO staff to review polished research report for publication.

### Staff check-ins

After planting and before/after harvest.

### Farmer-fee

Farmer-fees for this project are \$1000 in total. You are eligible for 50% (\$500) for implementing the trial, and 50% (\$500) for submitting data and photos. EFAO staff will be in touch in the fall with invoicing instructions and deadlines. If you decline, cancel, or defer the trial, you also forfeit the payment.

### Memorandum of Understanding

Please fill out the MOU at <https://airtable.com/appPSElrt17OMWXia/shrgHQSEj7yONdGSm>.