Effect of Montra MX-3 products on Crop Development

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- **Mark Belmonte, PhD**

- Studying plants for over 25 years
- 14 years at University of Manitoba
- Active research lab
  - Directly trained over 60 HQP
- 65+ peer reviewed publications
- 4 patents

Belmonte Lab, University of Manitoba

Why are We Interested in Testing the Effect of Organic Acids on Crop Development?

- Agricultural practices have grown more intense to keep up the growing global population
- Use of unsustainable, chemical fertilizers have resulted in local air, soil, and water pollution
- Globally there's been a growing need for more sustainable agriculture
- Organic acid fertilizers have proven to be effective in both promoting agricultural stability and improving crop quality

How would MX-3 Gold Benefit Crop Development?

- increases available nitrogen and potassium content in soil
- chelates minerals and nutrients, increasing nutrient uptake
- enhances carbon and nitrogen metabolic processes
- enables greater water retention in roots and soil

Products tested and application rates

Products:

- MX3 seed treatment
- MX3 foliar
- MX3 drench

Product	Composition
MX-3	0.8% fulvic acid
Fulvi-Cal	0.8% fulvic acid + 1-2.5% SiO2, 6-10% Ca
Black	Humic acid

Applications:

- Seed treatment

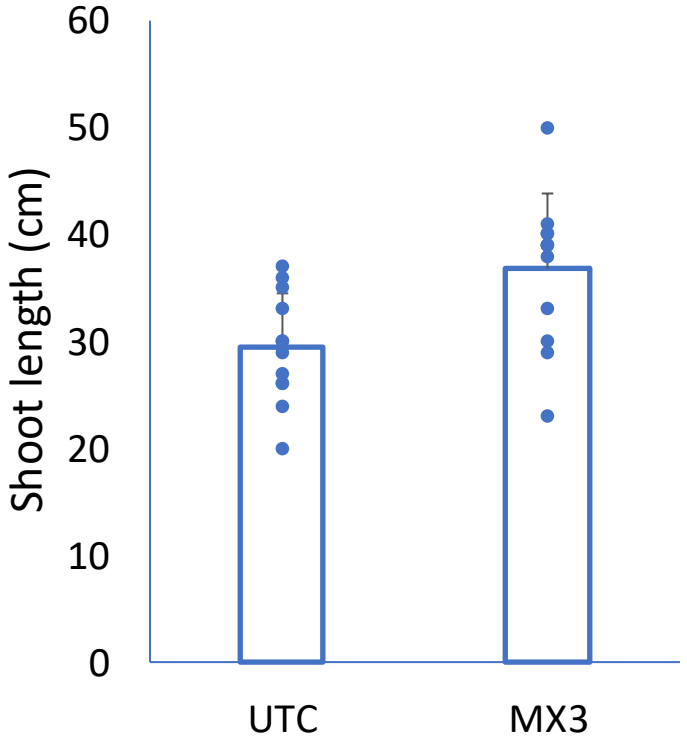
- Drench
  - 1:100
- Foliar
  - 1:100

Pictures of jugs with CFIA registration numbers

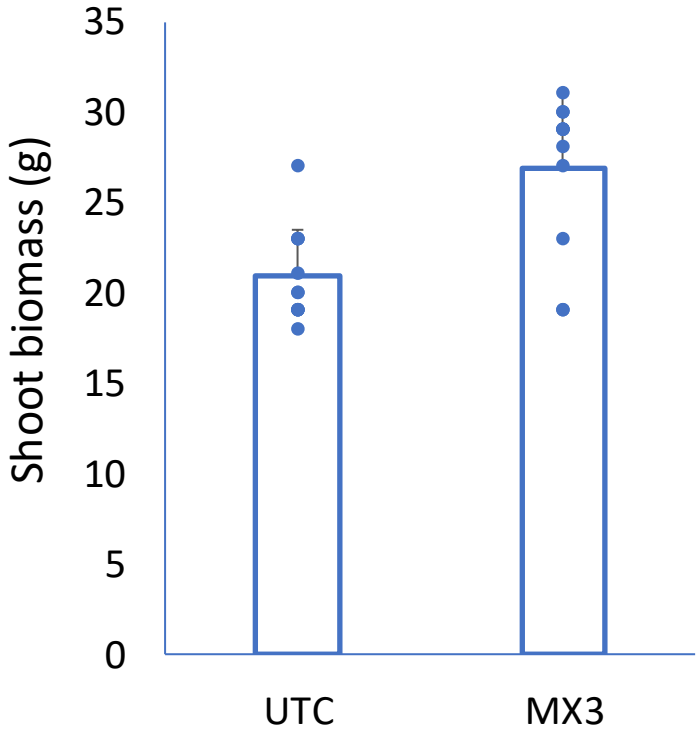
What Are the Effects of MX3 Soil Drench on Corn Development Under Greenhouse Conditions?

UTC MX3

- Greenhouse grown until 5 leaf stage
- Data collected 1 week post treatment



25% increase in shoot length



28% increase in shoot biomass

What Are the Effects of MX3 on Corn Nutritional Levels Under Greenhouse Conditions?

- Plants grown to the 5 leaf stage under greenhouse conditions before treatment
- Plant material collected 1 week post treatment
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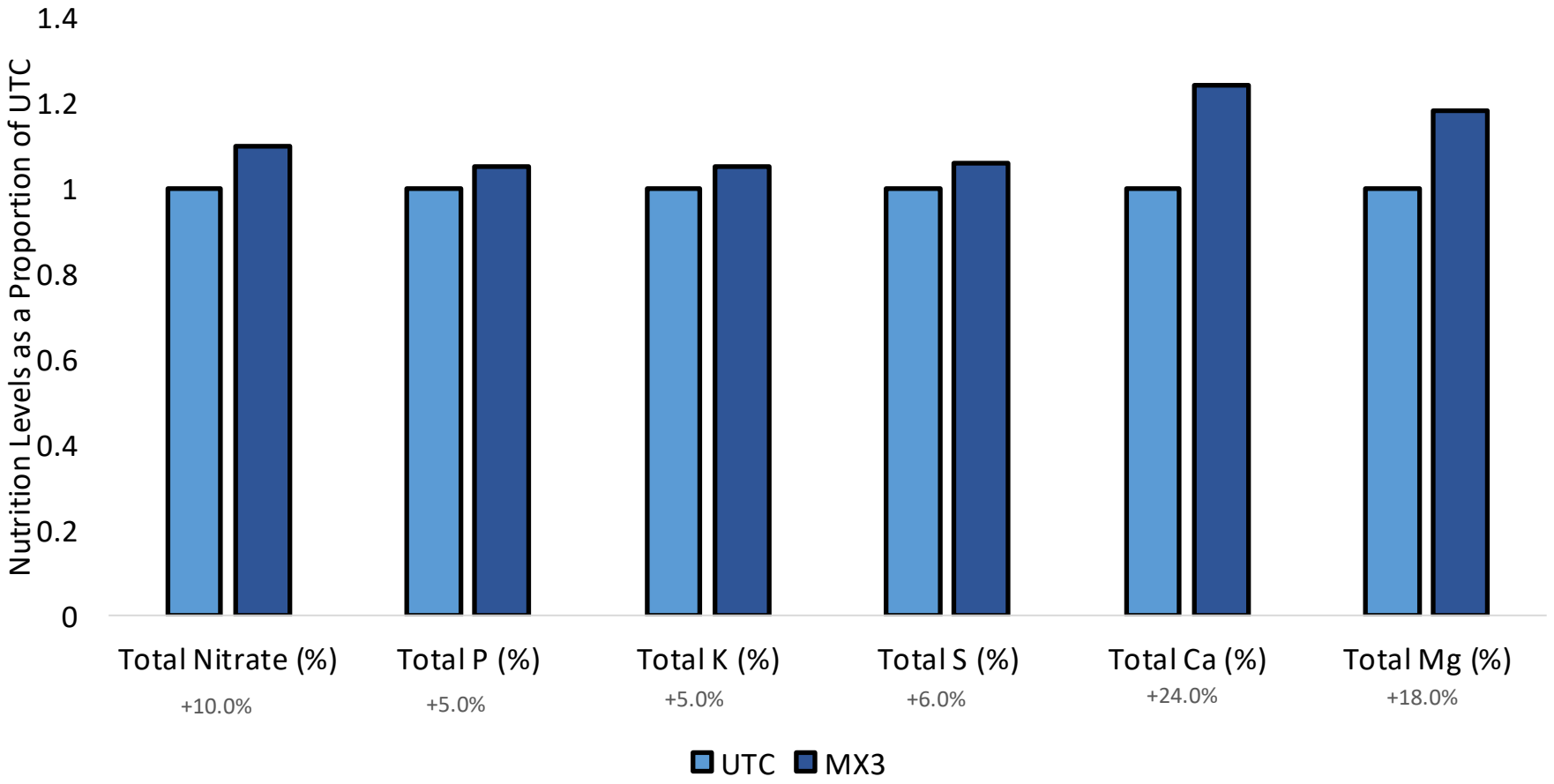
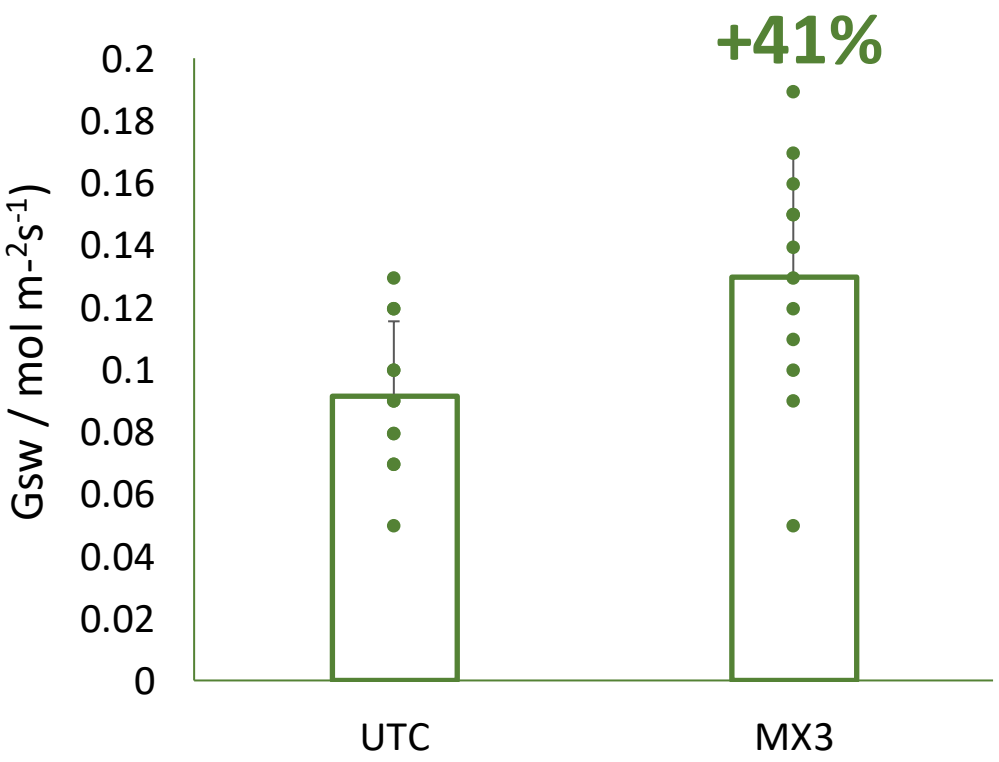
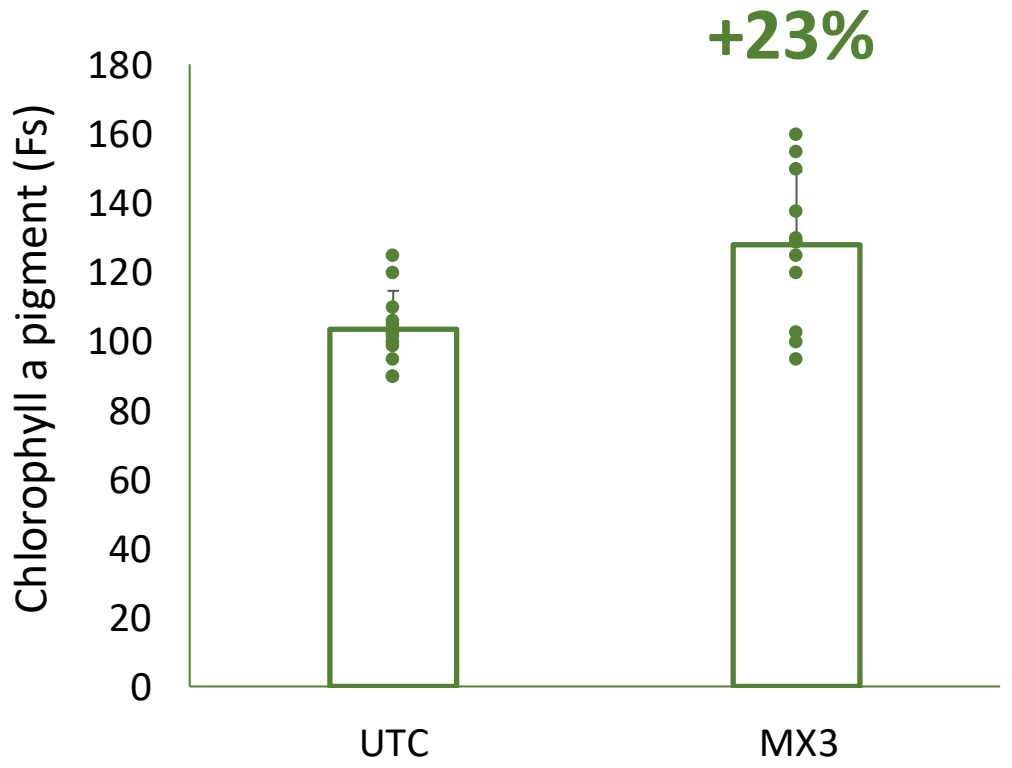
- **Macronutrient:**
  - 10% increase in N
  - 5% increase in P
  - 24% increase in Ca
  - 6% increase in S
  - 16% increase in Mg



How does MX3 affect photosynthesis and pigment levels in corn following a drench application?



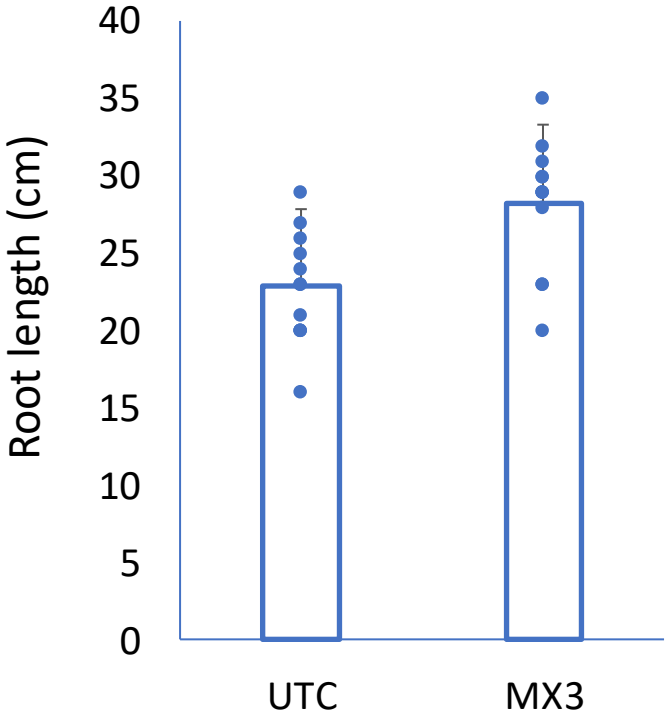


- Stomatal conductance to water and chlorophyll a content were taken 1 week post drench treatment using the Licor 600 porometer/fluorometer
- Greenhouse conditions

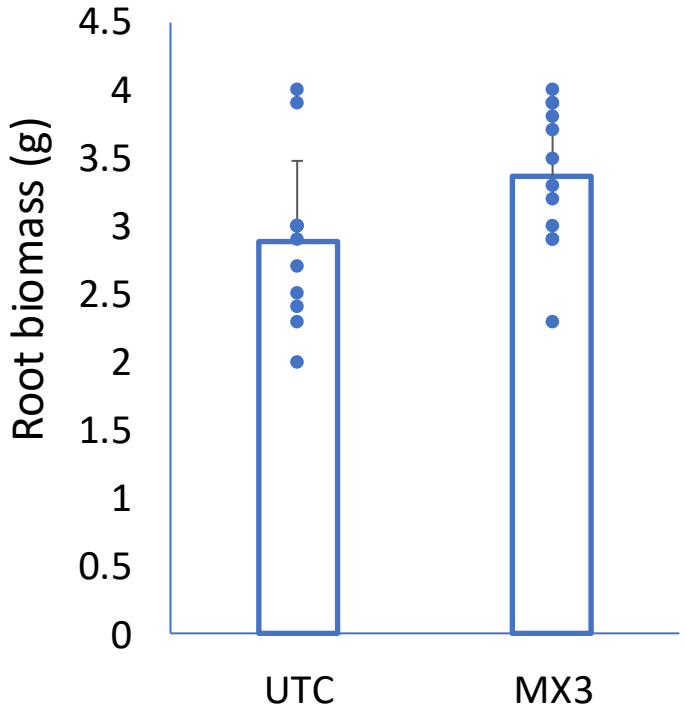
What Are the Effects of MX3 Drench on Soybean Root Development Under Greenhouse Conditions?

UTC MX3

- Greenhouse grown until 3rd trifoliate stage
- Data collected 1 week post treatment



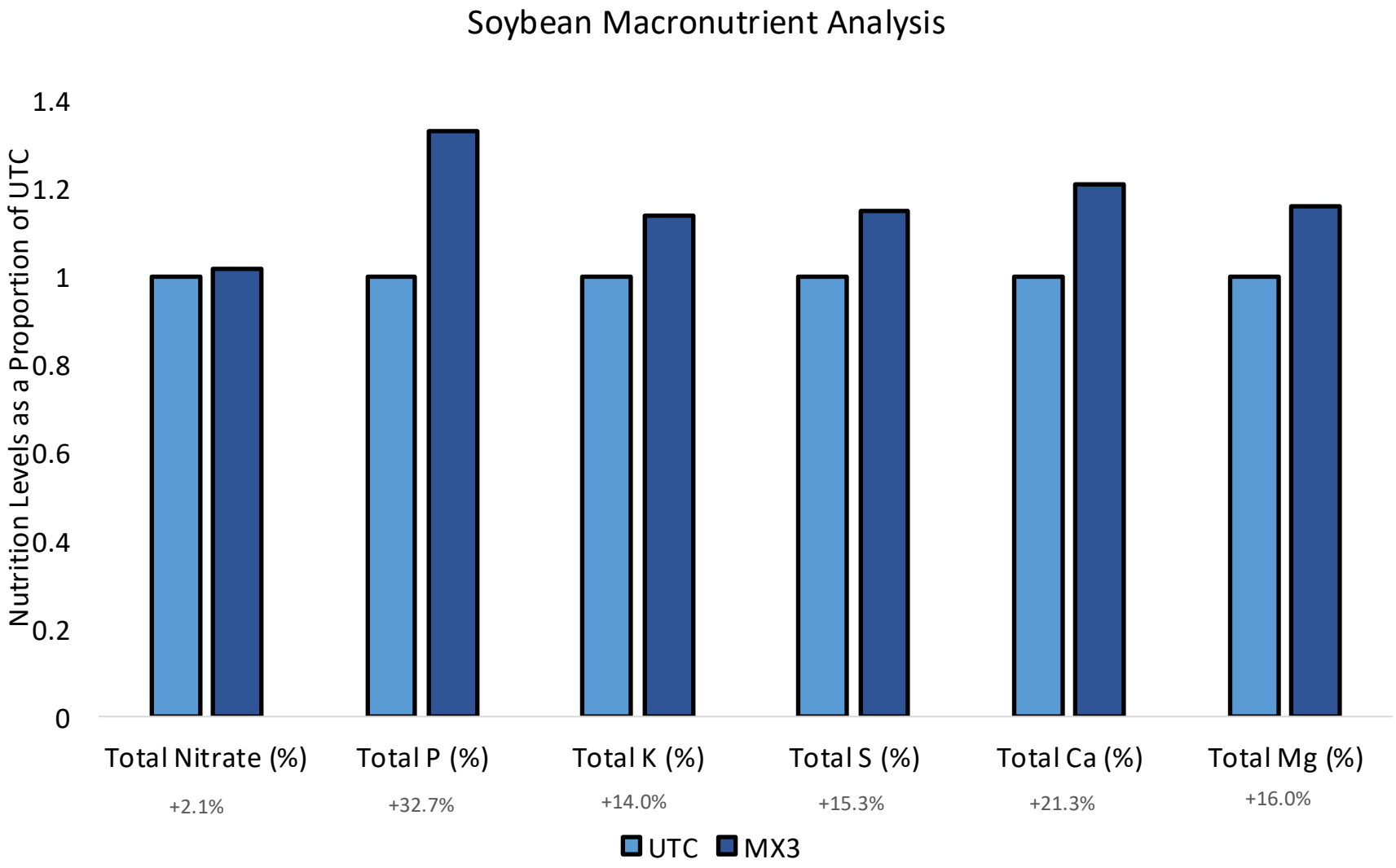
23% increase in root length



16% increase in root biomass

What Are the Effects of MX3 on Soybean Nutritional Levels Under Greenhouse Conditions?

- Plants grown for 3 weeks under greenhouse conditions before treatment
- Plant material collected 1 week post treatment
- **Macronutrient:**
  - 32% increase in P
  - 21.3% increase in Ca
  - 15% increase in S
  - 16% increase in Mg



Percents on graph indicate an increase or decrease compared to control

What Are the Effects of Fulvi-Cal Foliar Spray on Soybean Shoot Biomass Under Greenhouse Conditions?

UTC Fulvi-Cal

UTC Fulvi-Cal

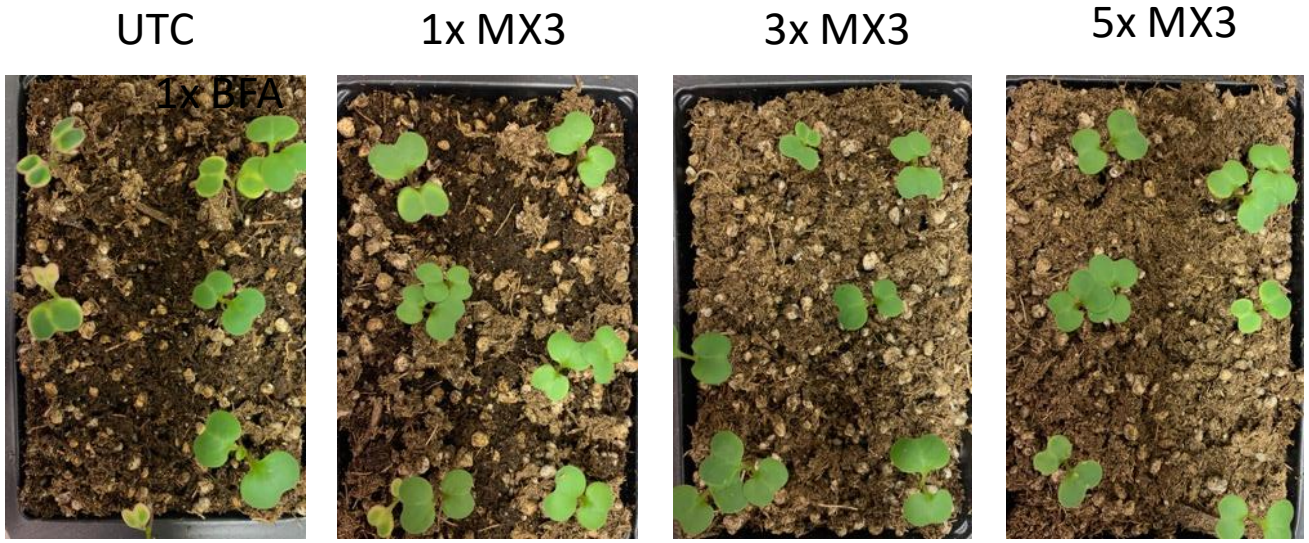
MX-3 Black seed treatment

Effect of Montra products on plant performance under cold conditions

- Canadian farmers face increasing pressure to get their seed in the ground early in the growing season
- Early season soils are often cold and may negatively impact seed emergence and establishment
- 3-5% of total yield can be lost to cold soils alone
- MX3 has previously been shown to improve plant performance
- Does application of higher seed treatment rates improve seed germination under cold conditions?

Fall growth chamber experiments:
Effect of MX3 seed treatment on cold treated seed in canola

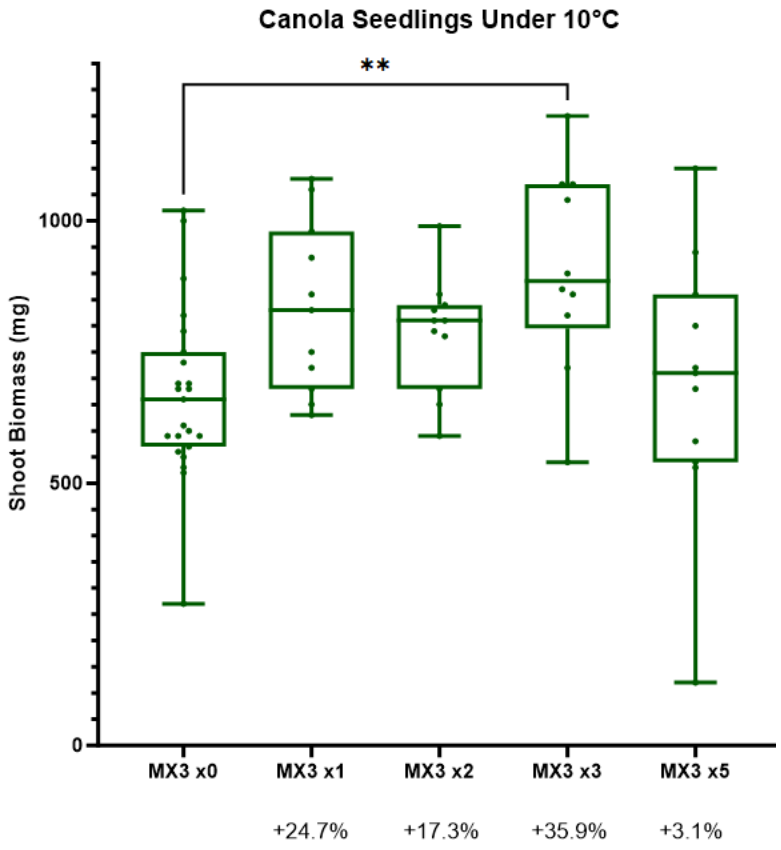
- MX3 has previously been shown to improve crop performance
- Seeds were grown at 10ºC
- MX3 seed treatment applied at 1, 3, 5X label rate
  - n=36/rate
- Cold treatment shows chlorosis and cot damage on control plants
- MX3 improves germination time, cotyledon expansion, and reduces cold stress damage

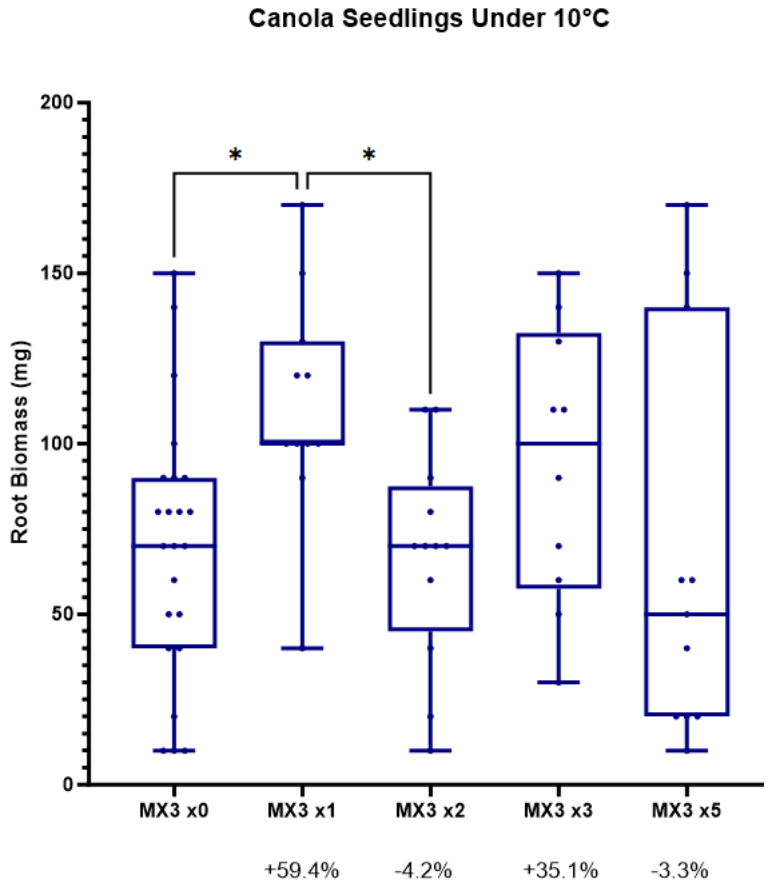


Three week old canola seedlings treated with 1x MX3 seed treatment grown at 10ºC

Effect of MX3 on canola seedling development under cold stress conditions

- Plants grown for 3 weeks under 10 ° C temperature controlled environment conditions.
- Root and shoot biomass increases when seeds treated with MX3
- 5°C and 7 ° C also tested and how similar results





When to apply Montra products to your crop?

SEED TREATMENT

Jump start germination

Overcome cold soils

IN FURROW / DRENCH

Improve soil structure and root architecture

HERBICIDE/ EARLY VEG

Reduce herbicide flash

Promote canopy and root growth