



# **CROP ENHANCEMENTS**

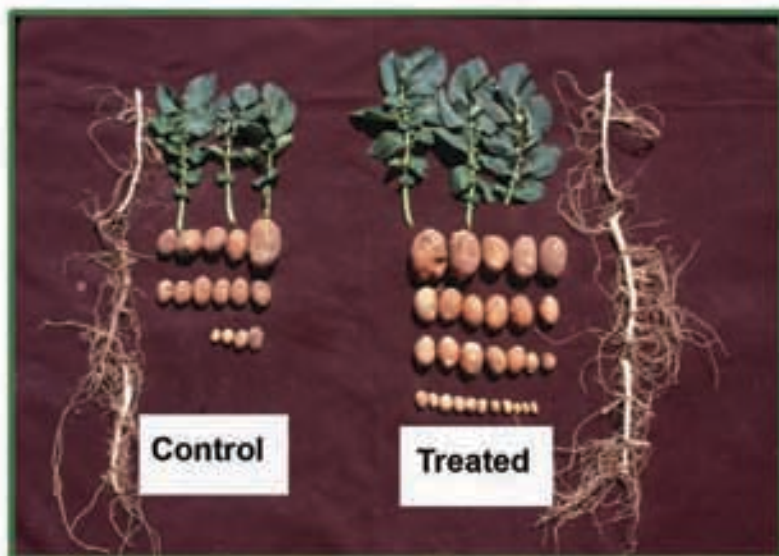
**REPAIR DAMAGED AND LIFELESS SOILS TO REDUCE  
INPUT COSTS AND IMPROVE YOUR END RESULT**



**Environmental Inc.**

*"Working with nature."*

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**The Crop Pro Gold Soil & Foliar Program is a product line that can be adapted to suit your cropping needs.**

**Our ideal program recommendation is:**

**1. Soil Carbon Mix:** Used to treat and amend the soil. Apply Spring or Fall at 4L (1US Gal) per Acre for the initial treatment, then 2L (2 qts.) per Acre in following years. (see page 4 for more information).

**2. LX7 Soil Mix:** Helps retain applied Nitrogen that would otherwise be gassed off. Apply with UAN at a rate of 10L/MT (2.5 US gal./ton) (see page 10 for more information).

**3. LX7 Foliar Blend:** Supplies added micronutrients in a slow release fashion. Apply first application with post emergence herbicide prior to 1st flower at a rate of 1L (1 qt.) per Acre. Apply second application at the same rate 5-6 weeks later coinciding with any fungicide, herbicide or insecticide treatments (see page 13 for more information).

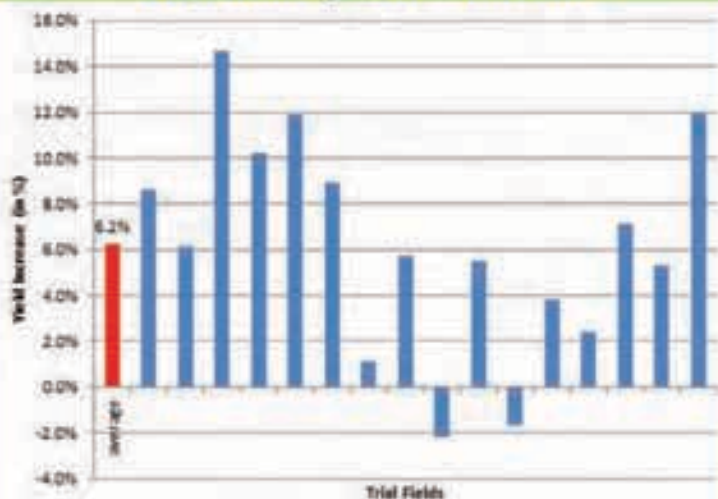
**Note:** All Crop Pro Gold products are compatible with most fertilizers and herbicides, but a jar test should be performed before using it with new products.

# Soil Carbon Mix

A humic carbon based product with an all-natural biostimulant containing vitamins, enzymes and gentle growth stimulators such as triacontanol, glycosides and others

- Exhibits earlier, stronger emergence
- Shows improved growth in cool soils
- Demonstrates less seedling disease
- Increases roots by 30-40%
- Increases dry matter yields of crops
- Reduces fungal plant diseases
- Reduces the presence of damaging insects
- Acts as a biostimulant
- Promotes proper soil structure (including reducing hardpan)
- Reduces soil born diseases
- Extends the life of Nitrogen applications
- Improves the release of both macro and micronutrients already in the soil
- Improves both water penetration and water holding capacity

**A Summary of Yield Trials**



## Application Details:

Apply Spring or Fall at 4L (1 US Gal.)/Acre for the initial treatment; 2L (2 qts.)/Acre for subsequent treatments.

Can also be applied with UAN at 20L/mt of UAN (5 US Gal./ton of UAN).

Soil Carbon Mix can be placed in-furrow with the seed, banded along side the seed, sprayed on the soil surface, or applied to crop residue after harvest.

Note: Soil Carbon Mix is compatible with all fertilizers and herbicides, but a jar test should be performed before using it with new products.



What makes our Soil Carbon Mix different than other carbon based products on the market is our pure, clean and powerful carbon.

**Tube on left: CROP PRO GOLD SOIL CARBON MIX**

- 1 drop added to water
- Instantly soluble
- Evident by colour change in water

**Tube in middle: Competitor A's carbon product**

- A number of pellets added to water
- 8 weeks later, still residue at bottom of tube
- Shows extremely minimal solubility

**Tube on right: Competitor B's carbon product**

- 1 pellet added to water
- 8 weeks later, pellet still at bottom of tube
- Shows nearly no solubility by colour of water

Treated with the  
Crop Pro Gold Program

Untreated



# Seedling Emergence and Germination

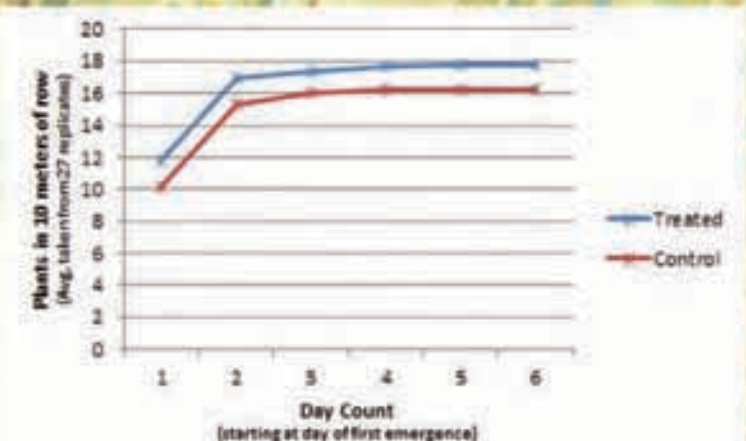
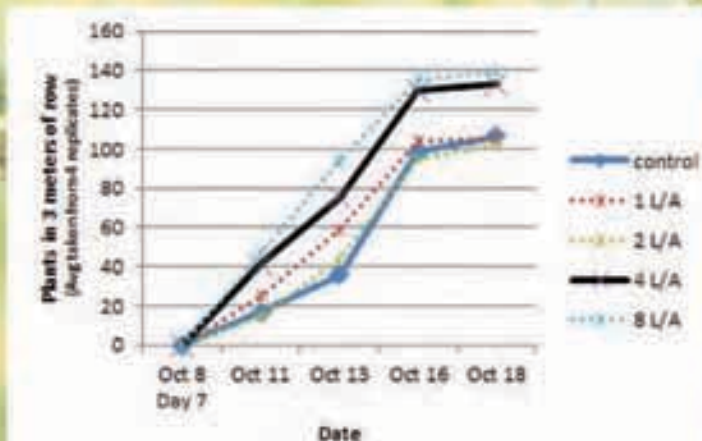
Day 13 - The plants on the left show the advantage gained when Soil Carbon Mix (component 1 of the Crop Pro Gold Program) is used. This faster emergence results in a continued advantage as the plant progresses.



Winter wheat seedling growth in random selected plants from comparison strips.

Not only were the treated strips through the ground first, but 6 plants were pulled from both the Soil Carbon treated and untreated and the roots were analyzed.

The treated plants averaged 3.16 roots/seed, and the untreated averaged 2.33 roots/seed. That's an improvement of 26%.



*Winter Wheat Emergence - October 2012.*

Control was tested against the Crop Pro Gold Soil Carbon Mix at 2L/acre, 4L/acre and 8L/acre.

*Corn Emergence - Spring 2016*

Control was tested against the Crop Pro Gold Soil Carbon Mix at 2L/acre, 4L/acre and 8L/acre.

# RESIDUE BREAKDOWN



**FALL  
2014**



Quote from the producer, Bert Anderson, "The spring pictures are within a foot or two of where the fall pictures were taken. What we noticed is that there is still good ground cover, but the material and stalks have very little life. Last fall, all residue was tough and wiry and now it is brittle and approximately half the bulk. I didn't sleep nights worrying how we might get through this stuff without using a match, but now I'm looking forward to it."



**SPRING  
2015**



# RESIDUE BREAKDOWN



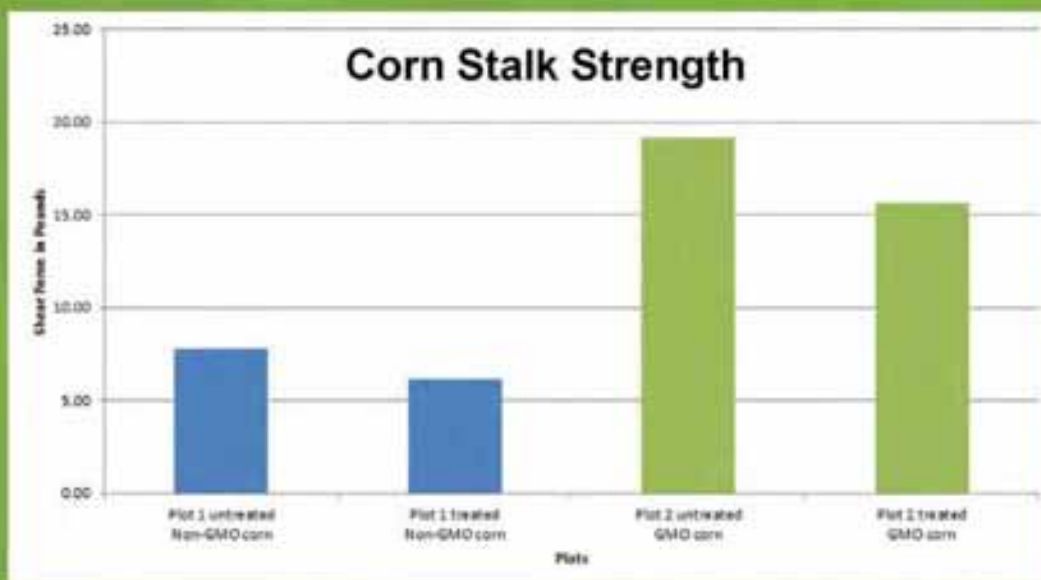
Corn trash treated in the fall of 2014 with the Soil Carbon Mix portion of the Crop Pro Gold Program. During spring 2015 tilling, the trash pulverized easily.



April 24, 2015 - Prior to turbo till



April 24, 2015 - After turbo till



**Repeated time and again, faster breakdown of crop residue is evident when treated with the Soil Carbon Mix.**

In this trial, repeated strips were sprayed with Soil Carbon Mix after harvest, in three no-till fields. In the spring, random stalks from the strips in all fields were chosen. In Plot 1, the **TREATED** stalks required **14% LESS FORCE** to break them. In Plot 2, the **TREATED** stalks required **23% LESS FORCE**.

**Note:** In both plots, treated stalks shattered vs. a definite cutting action required to get through the untreated stalks.

# Fertilizer Efficiency

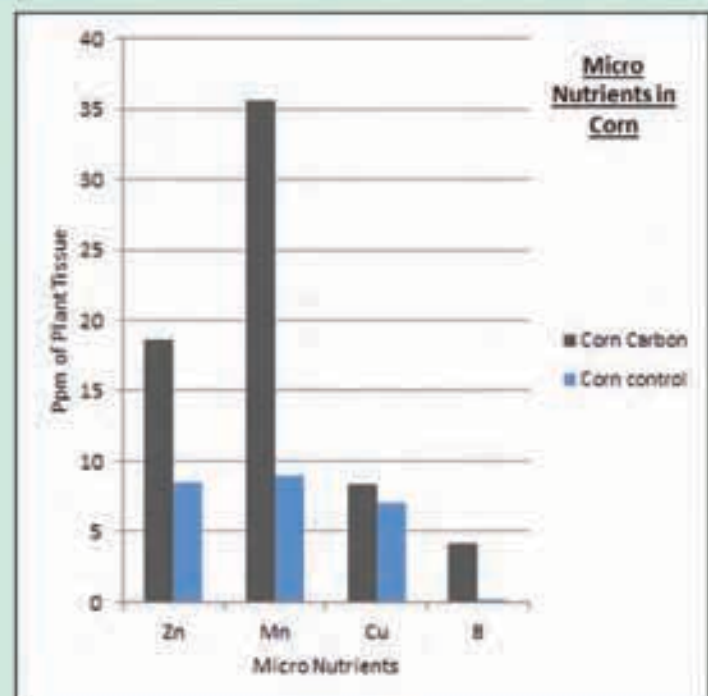
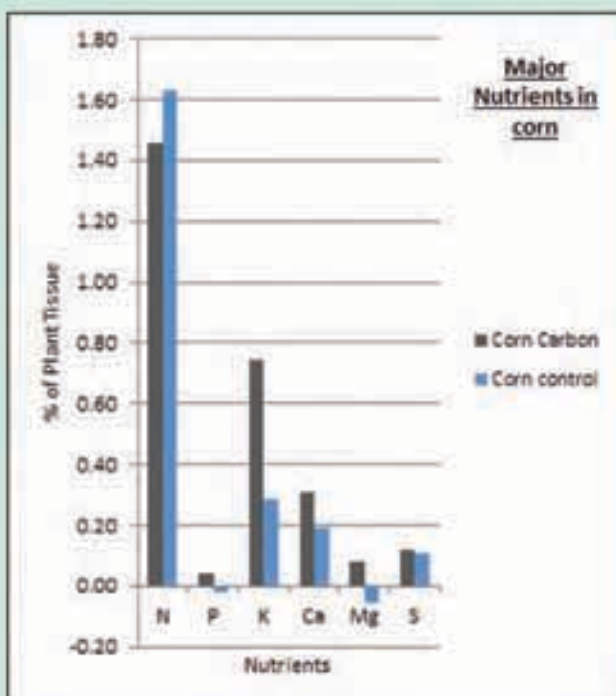


When U.A.N. or other Nitrogen containing fertilizers are applied, a certain amount of "gassing off" or volatilization occurs. Depending on the soil conditions, 12% - 55% of the applied Nitrogen can be lost to the atmosphere (as seen in the chart on page 10).

For example, at 100 lbs. of N and \$0.60/pound of N, \$12 - \$33/acre of Nitrogen is being lost to the air and not available for the crop.

In separate trials done using the Crop Pro Gold Soil Carbon Mix (SCM), it becomes evident that not only does it increase macro and micronutrients when plant tissue is tested, but it also raises the limiting factors of nutrients that were deficient, leading to better plant size, larger root development, better photosynthetic efficiency, better nutrient uptake and ultimately better yield.

Not only does the Crop Pro Gold Program help with issues of gassing off, but it also increases nutrients in crops, and makes them more readily available for uptake and utilization by the plants.



# LX7 Soil Mix

## (with Sulfur and Nitrogen)

Our proprietary natural LX7 Blend with added Sulfur - can be applied to soil surface or crop canopy

- Supplies 9% Sulfur in plant available Sulfate form, dissolved in a Fulvic Acid solution
- Supplies 9% Nitrogen in same solution
- Helps retain up to 50% of otherwise gassed off Nitrogen when applied with 28% UAN
- Extends the release time of applied nutrients and fertilizers, giving a larger application window
- Helps form important enzymes for optimal growth
- Assists in the formation of plant proteins
- Aids in the formation of chlorophyll
- Improves a plants resistance to disease - especially powdery mildews and black spot
- Improves the efficiency of other essential plant nutrients - particularly Nitrogen and Phosphorous

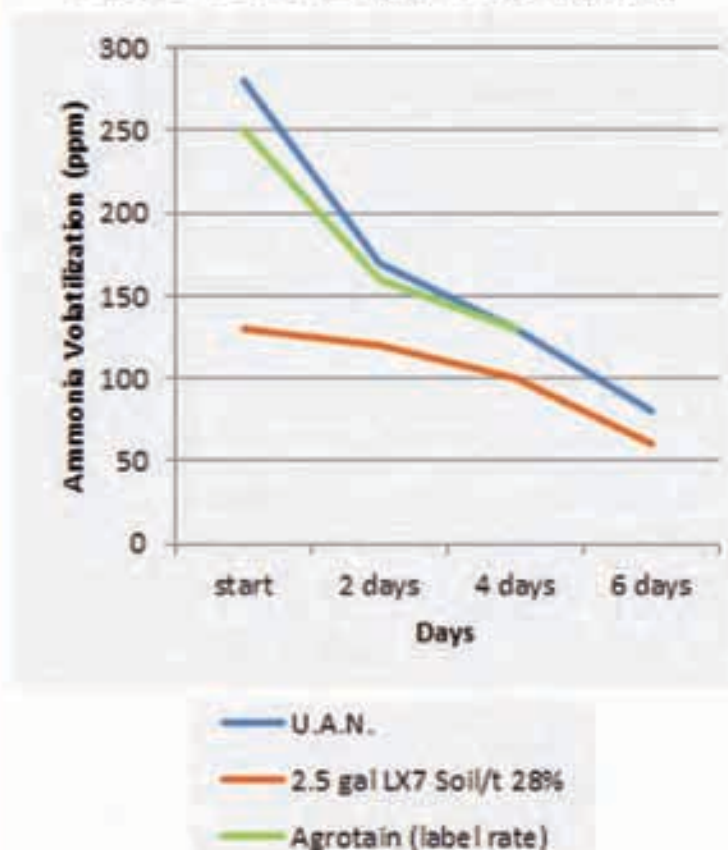
## Application Details:

Apply with liquid starter fertilizers at the rate of 1L (1 qt.)/ Acre. (do not mix with products over 9% potash)

Or apply with 28% UAN at the rate of 10L/tonne (2.5 Gal./ton). Apply to soil surface or crop canopy.

Note: LX7 Soil Mix is compatible with most fertilizers and herbicides, but a jar test should be performed before using it with new products.

## Ammonia Gas Readings Taken 12 Inches Above Where Liquid Was Applied



The initial reading immediately after application indicated a 46% reduction in ammonia being gassed off from the 28% U.A.N., with a 33% reduction averaged over 6 days.

(This trial has been repeated 3 times over two years under different temperature and humidity conditions.)



Sulfur deficient wheat (photo taken in spring)

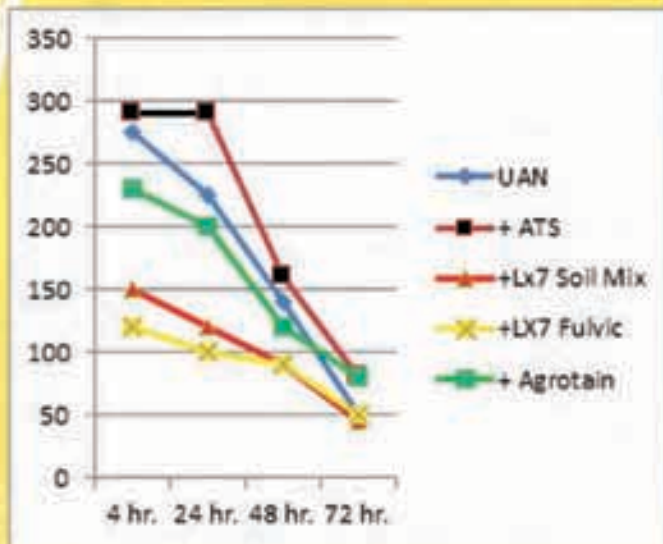
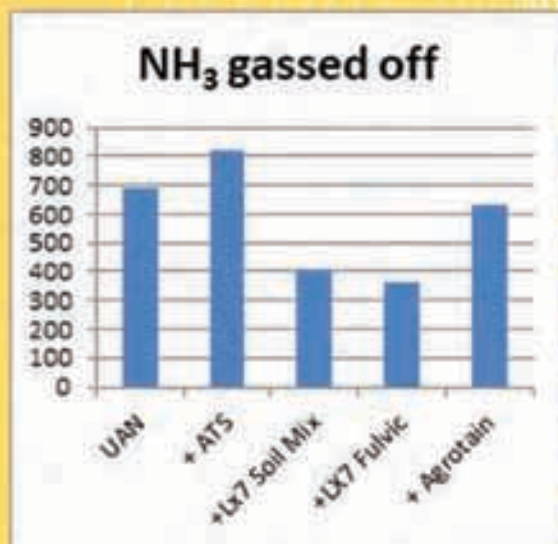
LX7 Soil Mix contains 9% sulfur, in plant available sulfate form - to help alleviate deficient spots in winter wheat until the soil warms and the microbial conversion of elemental sulfur can supply the crop.

# IMPROVE NITROGEN RETENTION AND REDUCE NITRATE LEACHING USING CROP PRO GOLD SOIL & FOLIAR

## Trial #1 Nitrogen Retention when Applying 28% UAN

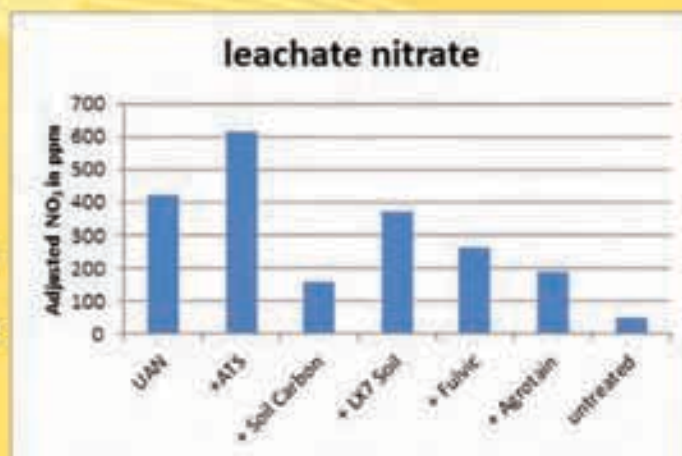
- 28% UAN was placed in open 10L bottles, with trial additives being administered at their appropriate rates for application of 140lb. of N/acre.
- The bottles were placed in an open building, out of wind and direct sunlight.
- Ammonia readings were taken with Gastec tubes from 6 inches inside the bottles, measuring ammonia in ppm.
- LX7 products reduced gassing off of ammonia by 50-60%

	4 hour	24 hour	48 hour	72 hour	Total	% of UAN
UAN	275	225	140	50	690	100%
UAN + ATS	290	290	160	80	820	119%
UAN + LX7 Soil Mix	150	120	90	45	405	59%
UAN + LX7 Fulvic	120	100	90	50	360	52%
UAN + Agrotain	230	200	120	80	630	91%



## Trial #2 Observing Leaching of Nitrates Through the Soil Profile

- Pots were filled with sandy loam and 6 winter wheat seeds planted in each
- Pots were bottom watered for 2 weeks to maintain moist soil conditions and re-establish soil biology
- At this point, Nitrogen from trial #1 was added to the centre of each pot at 140lb of N/acre (a sample of Soil Carbon Mix was added to its own pot for testing, along with an untreated sample)
- After 3 days, water was dripped onto pots to simulate 1 inch of rain in 12.5 minutes
- The leachate was tested with a Horiba Scientific B-74X compact meter for NO<sup>3</sup> ions

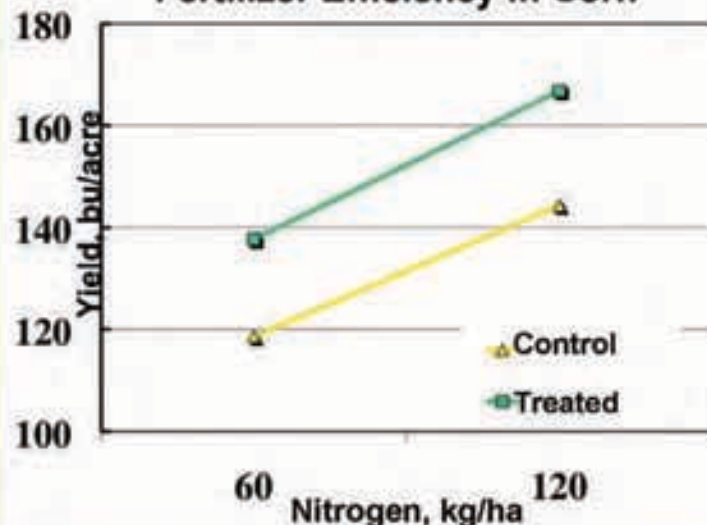


**Conclusions:** The Crop Pro Gold products work in different ways to save on Nitrogen losses. Based on these trials, recommended usage would be to use LX7 products with 28% in situations where NH<sub>3</sub> gassing off is a major concern, such as spring application to winter wheat, but use Soil Carbon Mix when leaching is the bigger concern, such as incorporation in the Spring or Fall applications.

# IMPROVE SOIL BIOLOGY and SAVE NITROGEN BY USING THE CROP PRO GOLD SOIL & FOLIAR PROGRAM

- Increasing the number and activity of soil microorganisms is an essential means of saving on nitrogen use
- By returning organic material to the soil, the resident bacteria, fungi and other organisms will thrive - especially along root surfaces - where they feed on the organic carbon compounds and convert nutrients into available forms
- Many crops, especially corn, wheat, and canola require high levels of nitrogen for optimum growth
- Legume crops can obtain most of their needs from the air through symbiotic nitrogen fixation. This nitrogen is free if there is a good supply of beneficial microbes in the soil
- Crop Pro Gold Soil Carbon Mix has been shown to increase the quantity of soil microbes, therefore helping to preserve N in the soil and prevent losses due to leaching or gassing off

**Effects of Crop Pro Gold on Nitrogen Fertilizer Efficiency in Corn**



## NITROGEN RETENTION TRAIL RESULTS

**Ontario Trial A:** Spring soil N tests, 2008 on wheat stubble

Plot # 1 -No soil carbon program, seeded to Red Clover

Plot #2 -With Soil Carbon program, no Red clover, no manure

**A reduction in N requirement of 48%**

86 lb/ Acre N required

41 lb/ Acre N required

**Ontario Trial B:** Spring soil N tests, 2009 on wheat stubble

-No residue program, seeded to Red Clover

-With Soil Carbon program, no Red clover, no manure

**A reduction in N requirement of 100%**

21 lb/ Acre N required

0 lb/ Acre N required

**Ontario Trial C:** Soil N tests, 2011 on wheat stubble Red Clover plow down, good catch.

Side dress N recommendation

**A reduction of N requirement of 68%**

Control 133 lb/ Acre N required

Treated 42 lb/ Acre N required

**Ontario Trail D:** Soil N tests, 2011 on wheat stubble with no clover, Side dress N Recommendation

Soil program in the 2nd year, soil carbon mix only with herbicide in spring of 2010

Control 99 lb/ Acre N required

Treated 70 lb/ Acre N required

**A reduction of N requirement of 29% as part of an ongoing Soil Carbon program**

**Summary:** In Ontario trials, where Nitrogen losses over winter can be significant, we consistently see increases in soil Nitrogen levels available in the spring to succeeding crops whether Soil Carbon Mix is applied to wheat stubble after harvest, or when it is applied as part of the ongoing Crop Pro Gold Soil & Foliar Program This can potentially reduce Nitrogen applications, or preferably, increase yield in the succeeding crop when normal levels of Nitrogen are applied without the excessive growth sometimes seen when higher levels of Nitrogen are spring applied.

# LX7 Foliar Blend

A proprietary natural blend of fulvic acid and additional micronutrients to be foliar applied throughout the growing season

- Supplies Manganese, Zinc, Sulphur and Boron, chelated and dissolved in a Fulvic Acid solution
- Provides additional macro and micro plant nutrients
- Affects the release of plant nutrients contained in the soil
- Improves nutrient uptake by the roots
- Increases the rate of translocation within the plant - allowing soluble food to be moved from one part of the plant to another
- Aids in the expulsion of waste through chelation
- Incorporates nutrients in the cells of the plants, aiding growth
- Increases stress tolerances, including heat and drought
- Allows for reductions in water requirements by 25-40%
- Aids in producing an overall healthier plant, which is better able to fight off disease and insect attacks

2 Applications of LX7



*A noticeable difference can be seen in leaf disease presence on corn treated with LX7 Foliar Blend.*

1 Application of LX7



*The top photo shows the recommended 2 applications, which protects your crop from 4-leaf stage through tasseling to seed fill.*

1 Application of Quilt



*The middle photo had 1 application of LX7 at post emergence, and still shows good protection.*

*The bottom photo had no LX7 treatments, and leaf disease is apparent.*

**LX7 Foliar Blend treats common limiting factors within crop production and can be applied as part of a crop enhancement program, or for corrections of deficiencies of the guaranteed trace minerals in the blend (as determined by foliar or soil testing).**

## Application Details:

Apply approximately every 5-6 weeks throughout the growing season at the rate of 1L (1 qt.)/ Acre. Apply first treatment with post-emergent herbicide spray prior to first flower. Apply subsequent treatments with fungicide, herbicide or insecticide applications.

Note: LX7 Foliar Blend is compatible with most fertilizers, herbicides, and insecticides, but a jar test should be performed before using it with new products.

# DISEASE SUPPRESSION

The School of Environmental Sciences at the University of Guelph (G.J. Boland & M.S. Melzer) studied *Rhizoctonia solani* at 4 differing rates of our LX7 Foliar Blend.

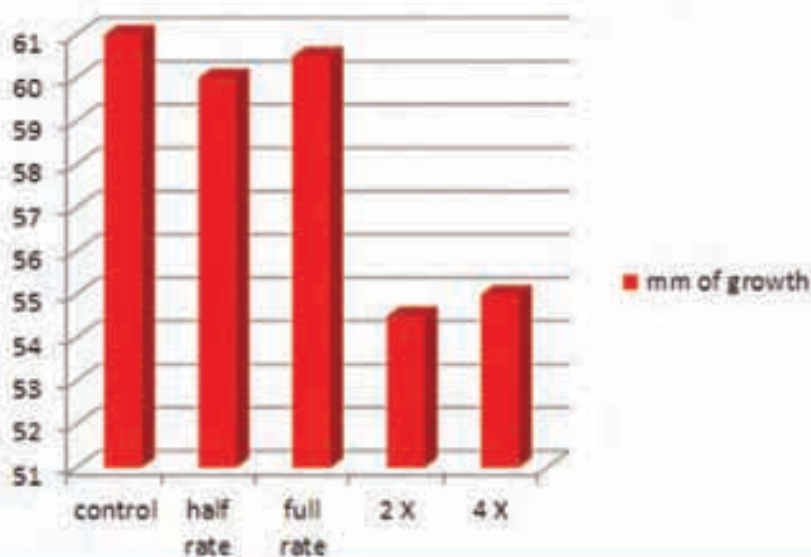
A plug of *Rhizoctonia solani* was placed on the left side of each petri dish. A plug of LX7 Foliar Blend was placed on the right side of 4 of the petri dishes (at varying rates) and one was left as a control.

The proof of the disease suppression abilities of LX7 Foliar Blend is apparent. All rates are lower than the control, but the best defence against the growth of fungal pathogens is when the LX7 Foliar Blend is applied 2-4 times throughout the growing season.



*Rhizoctonia solani* at 4 differing rates of LX7 Foliar Blend

Growth of *Schlerotinia homoeocarpa* at 240 hours



Treatment	% Flag leaf damage
Untreated	90-100
Fungicide only	40-50
LX7, Soil Carbon without Fungicide	60
LX7, Soil Carbon and Fungicide	30

## PLANT DISEASE EVALUATION JULY 29, 2011

Field evaluations performed by commercial producers participating in the Agri Skills Field Trial Network.

# Brix Levels & Insect Pressures

As extensively studied, the Brix or sugar levels of plants have a direct correlation to the insect population and therefore damage to a crop. The higher the Brix reading, the lower the insect population. Treating with the Crop Pro Gold Program allows plants to carry more chlorophyll in their leaves, allowing them to produce more sugars, which translates to higher Brix.

## Plant Readings And Insect Population

BRIX	aphid count/ plant
9.5	0-10 aphids
8.0	50-100 aphids
250 aphids per plant spray threshold	
7.2	200-500 aphids
5.8	2000- 3500 aphids
5.7	over 3500 aphids

University of Illinois study

Area	Crop	Treatment	Brix Reading	% Increase Using Crop Pro Gold
Winnipeg, Manitoba	Oats	Crop Pro Gold Spring Applied	8	60%
		No Treatment Applied	5	
Winnipeg, Manitoba	Soybeans	Crop Pro Gold Fall Applied	9.6	8.10%
		No Treatment Applied	9.5	
Portage La Prairie, Manitoba	Wheat	Crop Pro Gold Spring Applied	7.3	13%
		No Treatment Applied	6.5	
Portage La Prairie, Manitoba	Carrots	Crop Pro Gold Treated at top of roots	10.5	10.50%
		No Treatment Applied	9.5	
Lethbridge, Alberta	Corn	Crop Pro Gold Spring Applied	6	20%
		No Treatment Applied	5	
Granton, Ontario	Soybeans	LX7 Foliar Blend Treated	6.5	18%
		No Treatment Applied	5.5	

Note: The treated area was noticeably taller than the untreated.

Hensall, Ontario	Soybeans	LX7 Foliar Blend Treated	6	20%
		No Treatment Applied	5	
Centralia, Ontario	Rutabagas (leaf)	1 Application of LX7 Foliar Blend	7	40%
		No Treatment Applied	5	
Centralia, Ontario	Rutabagas (root)	1 Application of LX7 Foliar Blend	9.5	72%
		No Treatment Applied	5.5	
Hay, Ontario	Broccoli	Crop Pro Gold Treated	7.1	31%
		No Treatment Applied	5.4	

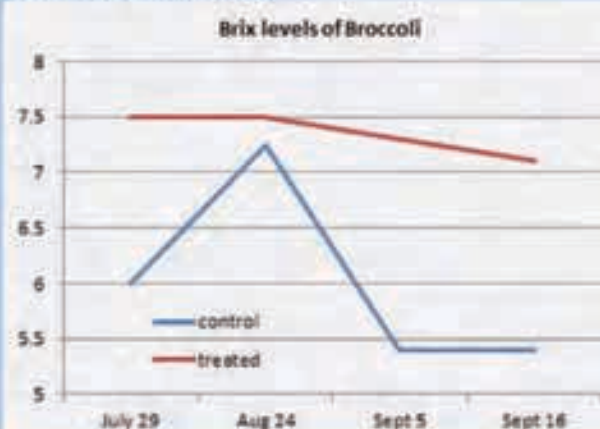


Control Sugar Beets - less foliage, smaller root (beet), and a **Brix reading of 14** (taken from the beet).

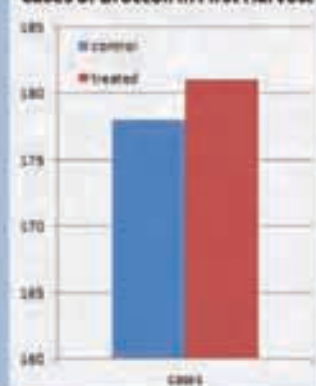


Treated Sugar Beets - more foliage, larger root (beet), and a **Brix reading of 19** (taken from the beet), glossier, more vibrant foliage, suggesting healthier plants.

## Broccoli Trials



## Cases of Broccoli in First Harvest

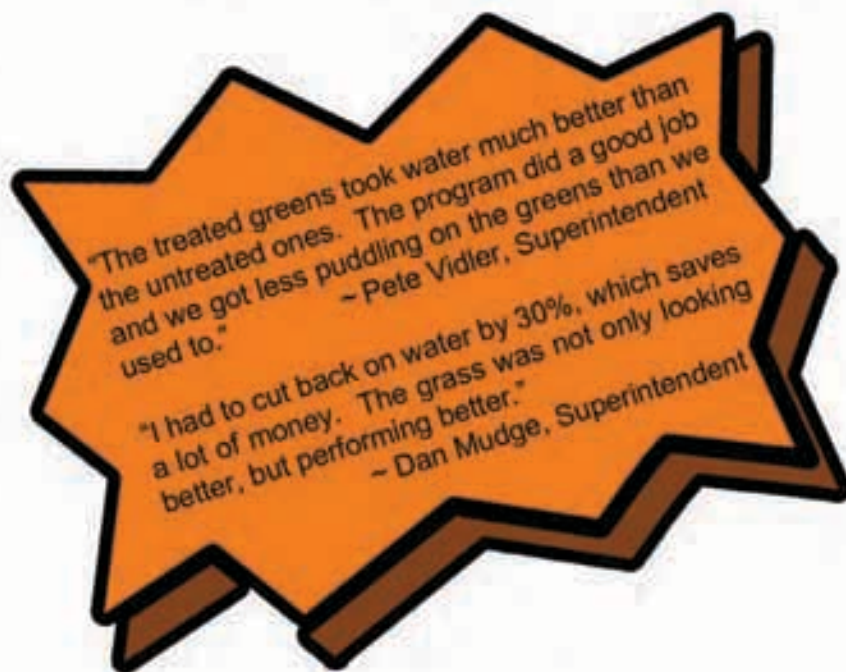


The larger root mass from the start sets the plant up for success throughout - from higher Brix readings, to lower insect and disease pressures, to a higher yield.

# Water Retention Using Crop Pro Gold

Using the Crop Pro Gold Program helps to promote proper soil structure. In doing so, not only does it improve the release of micro and macro nutrients in the soil, help reduce soil born diseases, but it improves water penetration and water holding capacity. In fact, in the golf industry where water usage is better measured, courses reduce their water usage by 30% and still see improvements.

**\*\*Think drought and stress tolerance\*\***



## Improved Soil Drainage



This shallow slough (wetland) in Leader, SK covers approximately 8-9 Acres of land and was historically considered wasted land. They continue to plant into the area, but generally lose a percentage of the crops - partly attributed to hardpan and poor soil structure not allowing moisture to escape or percolate down.

The 2 fields are split by a raised pathway. The owner of the left field has been treating his land with **Soil Carbon Mix** for 6 years. After year 2 of treatment, a crop has been harvested from the area every year since. This field is the deepest portion of the slough, generally stays wet longer into the spring, and receives all runoff from the field to the right. There is also no outlet from the treated field, so all moisture has to percolate into the ground.

The field to the right was planted with canola during this photo year, and the front corner was drowned out completely, which happens most years.

**Dollars and Cents:** The producer of the left field was able to harvest 51 bu/Acre of wheat from the slough land. Assuming 5 acres of land from the treated field at \$6/bu of wheat = \$1530 extra profit.

# Humic Carbon

Our clean, pure and water soluble Humic Carbon in a liquid concentrate, best used for amending and improving soil

- With regular use, will improve soil structure, which leads to:
  - better water drainage
  - improved water holding capacity by up to 95%
  - less compaction, allowing roots to penetrate deeper more easily
- Helps retain Nitrogen in the root zone
- Aids in the breakdown of crop residue, freeing nutrients in the soil to be used by plants
- Greatly increases root systems and soil organisms to improve plant nutrition
- Increases drought tolerance in plants
- Increases seed germination

## Application Details:

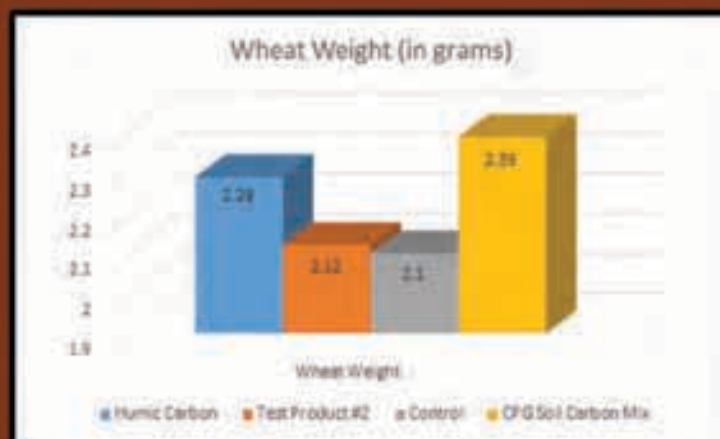
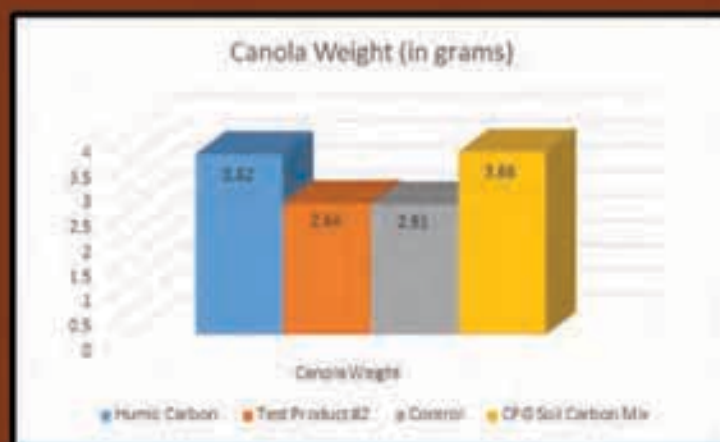
Apply Spring or Fall at 4L (1 US Gal.)/Acre annually.

Humic Carbon can be placed in-furrow with the seed, banded along side the seed, sprayed on the soil surface, or applied to crop residue after harvest.

Note: Humic Carbon is compatible with all fertilizers and herbicides, but a jar test should be performed before using it with new products.

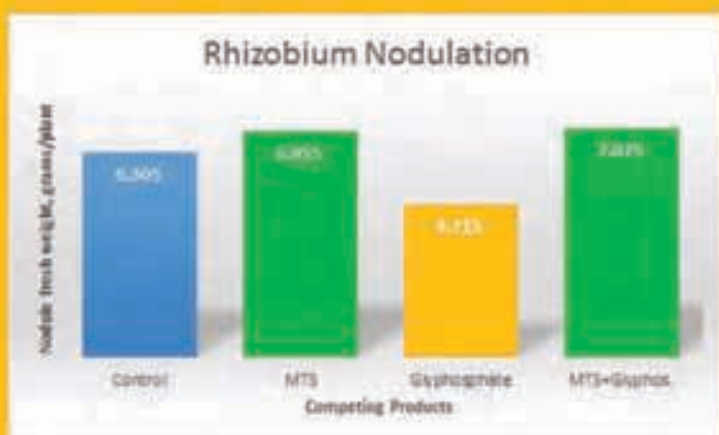
## Product Comparison Test - Seeding to 28 Days

Mix of silt loam (Carberry) and soilless mix			
Total Weight Dry Matter of Roots & Shoots in Grams			
Treatment	Alfalfa Weight	Canola Weight	Wheat Weight
Humic Carbon	0.37	3.62	2.29
Test Product #2	0.29	2.64	2.12
Control	0.27	2.61	2.1
CPG Soil Carbon Mix	0.26	3.66	2.39

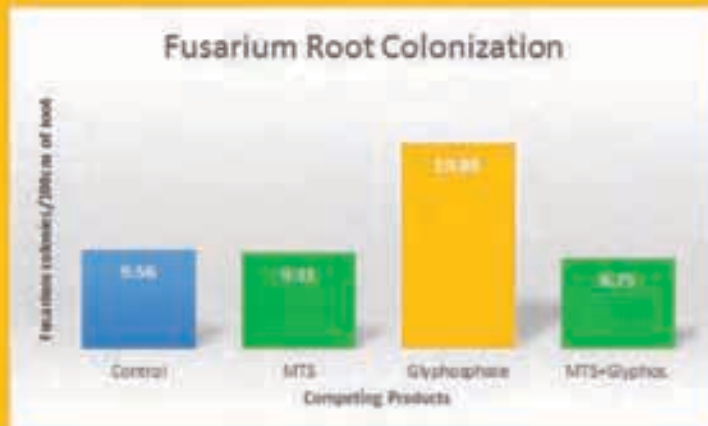


# Heal Glyphosphate Damage

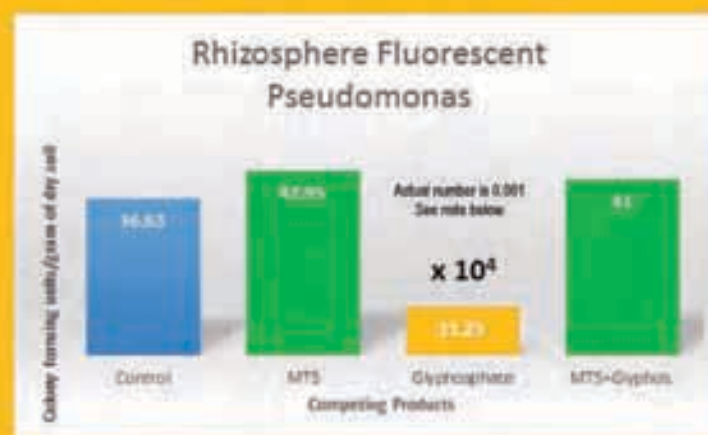
At a 2014 University of Missouri study, led by Dr. R. Kremer and Dr. M. Nathan, an ingredient contained in a number of our crop products was examined for its ability to remediate the damaging effects of glyphosphate on roots and rhizosphere microorganisms. See graphs.



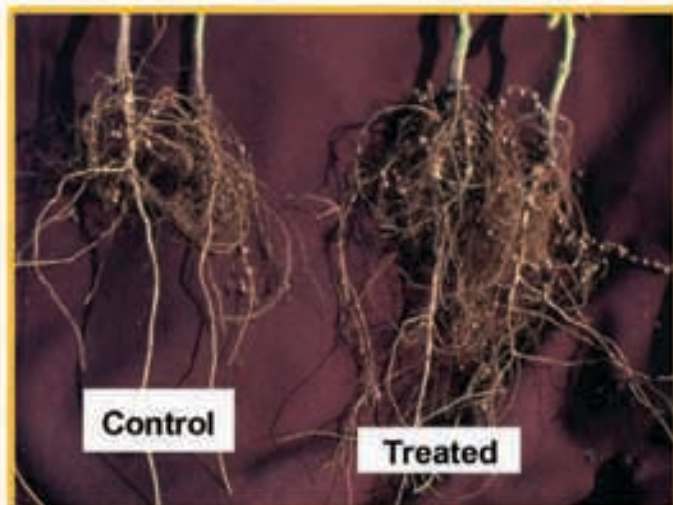
Looking at fresh weight of nodules in grams/plant, that treated strictly with glyphosphate showed a **decrease** of 25% vs. control. Using Crop Pro Gold along with the typical glyphosphate applications showed an **11% increase** in nodules over control.



The number of Fusarium root colonies per 100cm of root showed that having glyphosphate present caused a 52% increase in the disease over control. Using the Crop Pro Gold Program alone, or mixed with the normal glyphosphate applications showed a 3% and 8.5% decrease in fusarium colonies vs. control.



Rhizosphere Pseudomonas act as growth promoters around the root system. In control, there were 36.63 colony forming units (cfu)/gram of dry soil. When glyphosphate was used, that number decreased to 0.001 cfu/gram of dry soil. Using Crop Pro Gold with glyphosphate actually increased the Rhizosphere Pseudomonas by 11% over control.



## Soybean Nodules

# Alfalfa - Treated vs. Untreated



The treated portion of the field had alfalfa that was 12"-13" tall, with larger leaves and slightly darker green colouring. Higher yield/acre.  
The untreated portion of the field had alfalfa at 8"-9" tall.



Treated



Untreated



Treated

The untreated portion of the field produced a crop with hollow stems.

The treated portion of the field had a crop with stems full of plant material.

Again, this equates to more tons per acre, and more profit.



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