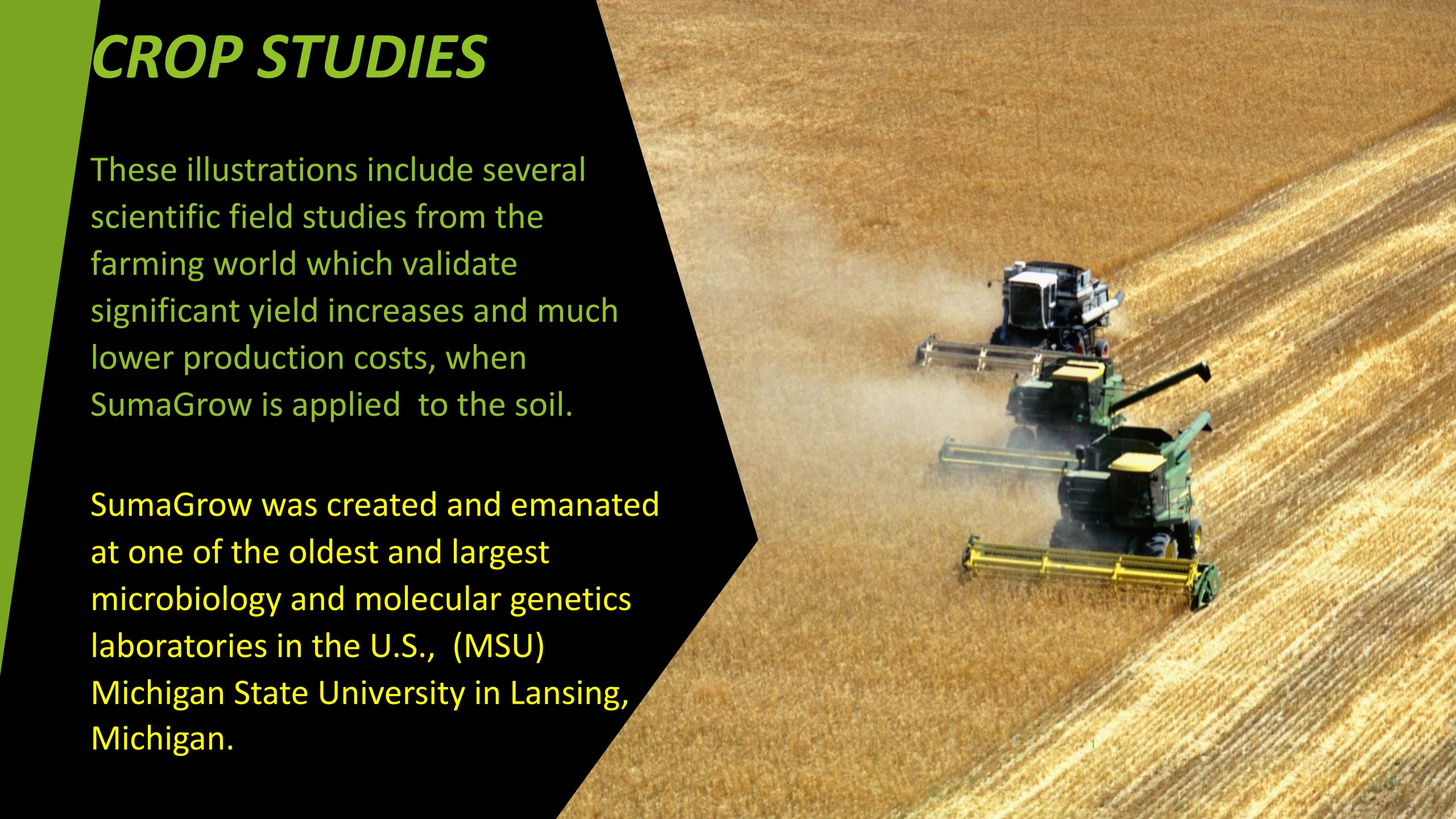
CROP STUDIES

These illustrations include several scientific field studies from the farming world which validate significant yield increases and much lower production costs, when SumaGrow is applied to the soil.

SumaGrow was created and emanated at one of the oldest and largest microbiology and molecular genetics laboratories in the U.S., (MSU) Michigan State University in Lansing, Michigan.



Crop Yields Attained from SumaGrow Usage

- CORN/MAIZE – 316% increase in South Africa. 13.85 tons more from 1 acre.
- RICE – 301% increase in USA & MSU. Myanmar boost 51% from only 1 application.
- SUGARCANE – 32% increase in South Africa. 140,000 lbs. more per acre.
- ALFALFA/LUCERNE – 130% increase in South Africa. 5.2 tons more plus organic meat/dairy.
- CATTLE - Gain 40+ lbs. eating SumaGrass. The power of SumaGrow in your fields.
- SORGHUM – Measuring in at over 10 feet tall. A remarkable increase in yield.
- POTATOES – 79% increase in South Africa. 220 tons more per acre. 57% more BRIX.
- PECANS – 40% increase in South Africa. 50% higher sales price.
- CARROTS – 27.6% increase in South Africa. 32 tons more per acre. 1,032% ROI.
- TOMATOES – 81% increase in Kenya. 21% increase in South Africa. +21.6% BRIX
- MANGOES – 51.5% increase in Ecuador. 50% reduction in fertilizer.
- WINTER WHEAT – 44.9% increase in Texas. Wheat is chest high. (see photo)
- BROCCOLI – 37.5% increase in Vietnam. Fertilizer reduced by 50%.
- CUCUMBERS – 25.8% increase in Bulgaria. 16 tons greater yield.

A PICTURE IS WORTH 1000 WORDS

A tobacco field 90 days after it was planted with SUMAGROW demonstrates a significant difference in YIELD. 100%+ ?

RICE ROOT SYSTEM and RICE TILLERS DOUBLED!

- The final harvest of RICE returned a **51.8%** increase in yield.
- *THE ROOT SYSTEM and RICE TILLERS* ***DOUBLED IN SIZE***
- The picture tells the story.

RICE

- A MYANMAR farmer harvests an incredible ***51.8%*** increase in rice YIELD with only one application of ***SumaGrow***. After a month, impressive results were noted, higher plant heights with multiple stems. At harvest time plant height had increased, stem length, weight of seeds, the yield per plot and per acre.

- **Myanmar Trial Result in 51.8% Yield Increase in Rice Crop**
- A trial was done on the effectiveness of SumaGrow on rice crops in Hlegu Township, Myanmar. Trial 1 was a control and Trial 2 was treated with a mixture of 1 gallon of SUMAGROW (GrowPros) and 10 gallons of water. There was only one application of SumaGrow during the testing period.

Data was collected twice; the first time was exactly one month after planting. "The test data from SumaGrow treated T2 field showed impressive results, higher plant heights and more multiple stems at just month trial period." The data shows Trial 2 producing a greater plant height of 55.2cm compared the Trial 1 (control) which had a plant height of 43.3cm. The number of multiple stems also varied between trials, with Trial 1 having 11.6, while Trial 2 had 14.4.

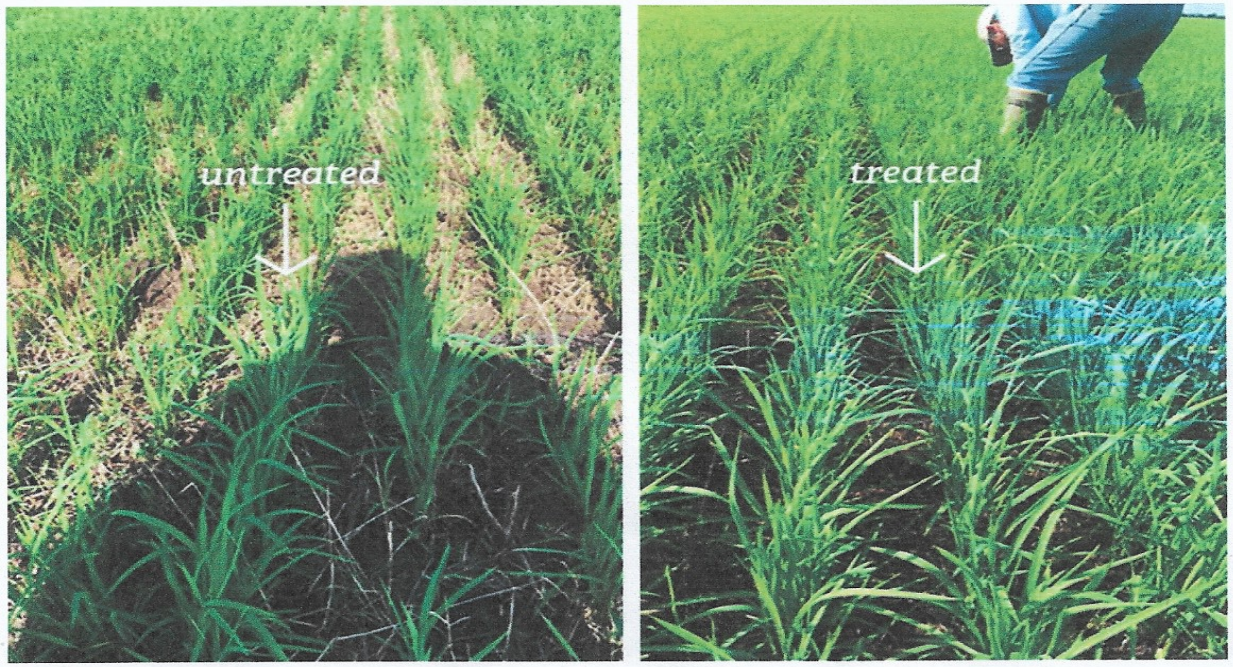
Trial	Plant Height (cm)	Multiple Stems	Note
T1	43.3	11.6	-
T2	55.2	14.4	-

Data was collected again at harvest time. The table below shows that SumaGrow increased plant height, stem length, weight of seeds, yield per plot and yield per acre.

Table (2) Data Collected at Harvest Time Date: Apr 18, 2016

Trial	Plant Height (cm)	Multiple Stems	Stem length (cm)	One Stem		Weight of 1000 seeds (g)	Yield per Plot (g)	Yield per Acre (tin)*
				Successful Seeds count	Failed Seeds count			
T1	90.7	7.5	21.7	83	58	25.1641	378	72.4
T2	105.9	10.3	23.9	140	11	26.7089	574	109.9

"It was apparent that applying Suma Grow with beneficial microbes to the field before planting was effective and helped grow stronger crops. "



BSEI continues to initiate field trials in growing rice to measure how products containing SumaGrow® impact rice production in varied climates and soil conditions.

- SumaGrow® treated rice in the fields of Myanmar showed higher yields per acre than the untreated fields while reducing fertilizer. Consequently, the farmer profited an additional $150 more per acre with the increase in yield alone.

We expect to see an increasing reliance on microbial technology in rice production as the population soars to unprecedented numbers by 2050, mainly in Asia and Africa. For example, Asia and the Pacific account for more than 90 percent of world rice production and consumption, making the region's food security and people's livelihoods very much dependent on rice.

- Growing more Sugarcane with bio-organic fertilizer whilst reducing Chemical Nitrogen fertilizer by 44%

- Land 701: Traditional sugarcane farming (Control)
- Chemical fertilizer: (N-P-K 160-0-0)
  - 86 tons/ha
- Land 702: ExploGrow™ organic bio-fertiliser with a polymicrobial blend of soil beneficial microbes
- Chemical fertilizer: (N-P-K reduced -44% to 90-0-0)
  - 114 tons/ha (+32.5% increase)
  - pre-harvest Brix: +19% increase
  - beneficial soil microbial life: rejuvenated
- "The unique microbial composition places ExploGrow™ in a league all of its own".Dr Malherbe, BSc; BSc Hons.; MSc (Mikrobiologie); Pr.Sci.Nat. (Landbouwetenskap); PhD (Agronomie)

4 months after first ExploGrow™ biofertilizer application

- The farm: the largest private Sugarcane farm in the world irrigates 4,000 of the 24,800 hectares under cane.
- Planted: December 2016
- Nitrogen application:
  Control: 160 kg per hectare applied
  ExploGrow™ applied together with 90 kg per hectare (saving 44% N fertilizer)
- First ExploGrow™ application: 10 December 2016
- Root system: **more than double** after just 4 months. Further details below.
- Harvest: November 2017

Arial photo (850 ft) of the 100 hectare test area. Control on the left, ExploGrow™ treated land on the right.

- November 2017 harvest results:
  - Increased **leaf mass** and **photosynthesis** (statistical data: details below)
  - Increased soil life: **80 times more bacteria**; **50 times more fungi** (data below)
  - The ExploGrow™ area produced **114 tons** / hectare = an increase of **28 tons / hectare (+32.56%)**
  - Brix increased by +**18.9%** (statistical data: details below)

- [*Note that the control area (with an additional 70kg/ha chemical Nitrogen applied), produced 86 tons/ha*]

- "ExploGrow™ represents more than increased yield, crop quality and rejuvenated soil. True sustainable agriculture requires real and safe solutions enabling farmers to cut down on chemical fertilizers, poisons, and using less water. We must, before it is too late, give serious attention to the health and sustainability of our soils. We must now embrace more responsible new farming methods."Mnr Dreyer Senekal, Senekal Boerdery

Root development 4 months after first application of our bio-fertilizer

Root development 4 months after first application of our bio-fertilizer

- Five clusters of Sugarcane were taken from profile holes.

  The root systems treated with ExploGrow™:

  - **were more than double in size**
  - **penetrating the clay soil more than twice the depth**

- The more than doubling of the root system enhances the plant's ability to absorb nutrients, hence reducing chemical fertilizer requirements, reducing water needs (around -20%) and makes the plant more resistant to extreme heat, cold/frost (through absorption of more minerals) and typically increases the yield and the Brix dramatically.

Root development 4 months after first application of our bio-fertilizer

- Increased biological activity: visibly better soil
- After only 4 months, soil conditions are already visibly improved compared with the control.
- "This is due to the increased biological activity by the 17 microbes in ExploGrow™ and the consequent much larger root systems" Mark Young, BSc.
- Soil microbial analysis before and after

Soil microbial analysis
Received: 21 September [2016]

Sample label	CFU per gram soil*
Microbial analysis	
Total Bacterial Count	2.5×10^5
Total Fungal Count	2.0×10^3

Soil microbial analysis
Received: 23 February [2018]

Sample label	CFU per gram soil*
Microbial analysis	
Total Bacterial Count	2.0×10^7
Total Fungal Count	1.0×10^5

- Increased soil life:
- [Note: Microbial soil analysis was conducted at Rhodes University by Professor Joanna Dames, Department Biochemistry, Microbiology and Biotechnology]
- *Replicate soil samples were serially diluted, plated onto appropriate media, incubated and assessed for colony forming units (CFU).*

  Note: The analysis only provides a microbial count per gram soil, no identifications of the microorganisms have been made apart from separation into broad bacterial and fungal categories.

- Before: 21 September 2016
  - Total Bacterial Count: 0.25 million
  - Total Fungal Count: 0.002 million

- After: 23 February 2018

  - Total Bacterial Count: 20 million (**80 times more bacteria**)
  - Total Fungal Count: 0.1 million (**50 times more fungi**)

Enhanced drought stress tolerance observation

- After the sample Sugarcane plants were removed from the soil, the ExploGrow™ treated leaves retained moisture for a longer period (4 hours+) *versus* the wilting leaves of the untreated Sugarcane.

- "Drought is one of the major constraints on agricultural productivity worldwide and is likely to further increase... Plant growth promoting rhizobacteria (PGPR)* could play a significant role in alleviation of drought stress in plants. These beneficial microorganisms colonize the rhizosphere/endo-rhizosphere of plants and impart drought tolerance". **

- *Note that ExploGrow™ contains several plant growth promoting rhizobacteria (RGPR)*

- ** ["*Enhancement of drought stress tolerance in crops by plant growth promoting rhizobacteria*". *sciencedirect.com/science/article/pii/S0944501315300380 24 August 2015, by Sai Shiva Krishna Prasad Vurukonda...*].


ExploGrow

Increased Leaf Mass

The treated Sugarcane has more leaves that are both longer and greener. That results in more photosynthesis (also confirmed by chlorophyll fluorescence measurements below) and more growth over the remainder of the growth cycle till harvest.

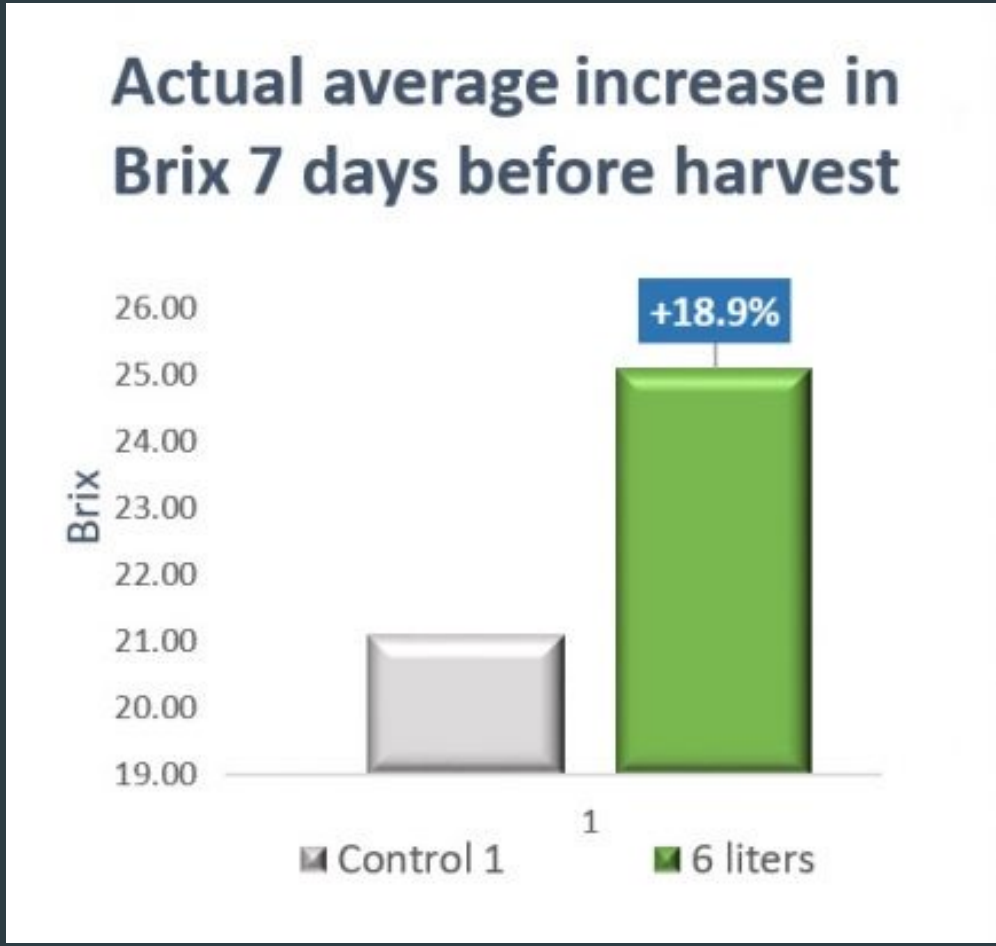
Improved Leaf Photosynthesis

Chlorophyll fluorescence was measured by Marguerite Wescott, MSc, PhD Candidate, Plant Science (pictured) using the Pocket PEA from Hansatech Instruments.

The average Chlorophyll fluorescence in the ExploGrow™ 6 liter/ha came out at +46.1% increase, as compared with the average of the Controls. The +46.1% increase in Chlorophyll fluorescence correlates with the +32.56% increase in yield. The Chlorophyll fluorescence is an indicator of the improved leaf photosynthesis taking place in the plant, due to the enhanced activity of the beneficial microbes.

More data available upon request.

Sugar content (Brix) increased by +18.9%



The around "30" reading of the refractometer pictured above, shows Brix measuring well above the average Brix content

Actual Brix measured 7 days before harvest

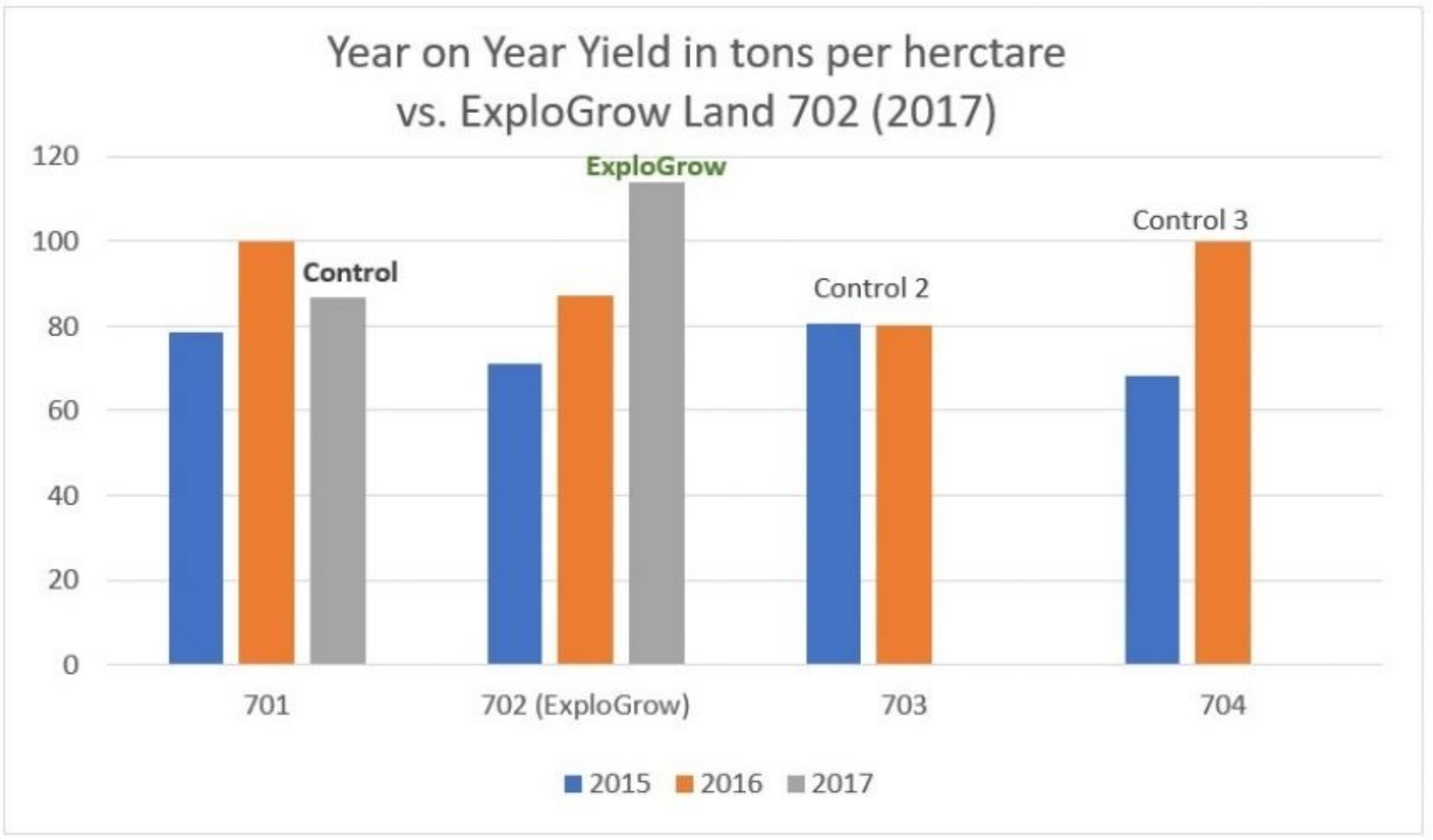
ExploGrow™: average Brix: **25.08** (from 24 internode samples)

Control: average Brix: **21.08** (from 12 internode samples)

Actual Brix increase: **4.0** = +**18.9% increase**

More data available upon request.

Year on year yield comparisons



[Note: Graph above: 2015 -2017 year on year yield comparisons from the 4 quarters (land 701; 702*; 703 & 704) in the 100 ha pivot trial area.] *Land 702 received ExploGrow in 2017.

At harvest: increase in Sugarcane yield (tons per hectare)

- The control area with 160 kg N/ha, produced 86 tons/ha
- The area treated with only 1 liter/ha ExploGrow™ and 90 kg N/ha produced 54 tons/ha
- The area treated with only 3 liters/ha ExploGrow™ and 90 kg N/ha produced 62 tons/ha
- The ExploGrow™ area with 6 liters/ha produced 114 tons/ha

The main ExploGrow™ area (at 6 liters/ha) produced 114 tons / hectare = an increase of 28 tons / hectare (+32.56% increase)

"The doubling of the root system and the huge amount of Nitrogen activity is just unbelievable!"...
"ExploGrow™ is truly a game changer"

~Mnr Dreyer Senekal – die befaamde suikerrietleierboer - van Senekal Familie Boerdery

Acknowledgments:

- We thank Mr. Dreyer Senekal, Mr. Danie Willemse and the farming team at Senekal Familie Boerdery for their assistance in conducting the field trial
- Jonathan Bucke (Air Wing) for drone videography and aerial photos
- Dr. Joanna Dames for microbial analyses (Rhodes University)
- Marguerite Wescott, MSc, PhD Candidate, Plant Science (University Free State, South Africa and Carbon Fertilizer Technologies)
- ExploGrow™ team members and consultants not yet mentioned, you know who you are :) thank you!

Funding was provided by **Senekal Familie Boerdery, ExploGrow™**, **Carbon Fertilizer Technologies** (Carbotech® Liquid Carbon) and **Afran Ammonia** (Keystone Calcium).
More statistical data available from around 1,500 canes:
Indicating increased length of cane, internode counts, remarkable thermal heat mapping observations etc.

Additional research paper:
Yield and Brix increases of sugarcane (Saccharum sp.) with organic beneficial soil microbes after reducing chemical nitrogen fertilizer (observational pilot trial, Senekal Familie Boerdery, South Africa)

CATTLE

- THE POWER OF SCIENCE IN YOUR FIELDS
- CATTLE GAIN 40 PLUS POUNDS EATING SUMAGRASS
- WITH SUMAGROW AS YOUR INPUT IT WILL ADD TO YOUR BOTTOM LINE

Making Your Soil Work For You

Mike Arnold, owner of Arnold Land and Cattle, is onto something. Spending the majority of his life in the cattle industry, Arnold understands what it takes to produce exceptional dairy and beef cattle. That's why, three years ago, Arnold founded Agrigain, a company that offers the power of SumaGrow for today's dairy farmer and cattleman, resulting in exceptional feed for their herds, as well as profitable, sustainable farming practices.

“I’ve been in the cattle business all my life,” Arnold says, “Before I got involved with SumaGrow, I watched the product being used for five years. I watched the tests and the trials because I needed to know that it really worked before venturing into starting a company that offers SumaGrow. Our product can be used for both organic and conventional farm practices. We are reducing fertilizer by up to 50 percent and increasing yield from five to 20 percent.

If there is one thing Arnold knows a thing or two about, its cattle. In the past 20 years he’s backgrounded more than 50,000 cattle and successfully served as a Superior Livestock Representative for 25 years. When he came upon SumaGrow, a liquid concentrate microbial agricultural product designed by Bio Soil Enhancers, Inc. (BSEI), to promote soil and plant health, he decided to market the product to help other cattleman and farmers to meet their yield goals and improve their bottom lines.

Proven Results

And that’s where SumaGrow comes in. SumaGrow has been shown to result in higher yields, as well as increased nutrient density in forages.

Agricultural consultant Chuck Grantham explains the beneficial microorganisms contained in SumaGrow are a key part of the product functionality as they stretch the overall plant health and soil health. By producing a healthier plant, the animals are able to take in more of the nutrients from the soil, which results in a higher quality product that the dairy cattle consume.

“In dairy, that means growing a feed that has a higher crude protein, higher total digestible nutrients, and a higher relative feed value. The higher the quality of the forage, the more milk production that these dairy farmers can expect,” Grantham says.

It also means that dairy farmers who use SumaGrow have reported higher stocking rates, higher average daily gains and healthier dairy cows with shiny hair coats. Mineral requirements for dairy herds may decrease as the livestock ingest more natural minerals in the plant from grazing healthier, more nutrient-dense forages.

According to Pam Barr, owner of Barr Farms, a diversified dairy farm in Mendenhall, MS, the cows can tell. “They will walk past a bale of untreated hay to eat the SumaGrown hay. It’s sweeter,” Barr says.

The SumaGrow team works with each dairy farmer to determine the proper application protocols of products containing SumaGrow that are specific to the needs of each farm. When used in conjunction with current growing practices, growers can see a decrease in fertilizer inputs of up to 50 percent. The objective is to reach the producer’s production goals while reducing fertilizer inputs.

How?

SumaGrow helps improve fertilizer efficiency thus reducing the amount of applied nutrients required. The microorganisms contained in SumaGrow were specifically selected for their abilities to improve nutrient mobilization, unlock soil bound nutrients, and sequester nitrogen. Different concentrations and application rates may apply based on various factors such as soil condition and crop type.

“SumaGrow will help anything with a root system and can be used on all sizes of crop production,” Arnold says.

Arnold recommends performing soil tests when using SumaGrow because a soil analysis will show the fertility and mineral density of the soil and indicate what SumaGrow will best benefit a farm’s operation to meet production goals and animal health and well-being.

What does this mean for animal performance?

In a study of beef steers' summer grazing performance, the research indicated that the animals that grazed on SumaGrow treated sorghum plots had a cost advantage of +$101.45 over the conventionally fertilized plots. SumaGrow grazed cattle gained an average of .27 lbs per day more than the cattle grazing the untreated plots, and the SumaGrow treated pasture could handle two animals more per unit than the conventionally fertilized fields.

Conducted by Murray State University in Western Kentucky, the primary focus of this study was to determine the effectiveness of different methods of alternative pasture inoculations compared to traditional nitrogen fertilization. Thirty-two cross-bred steers were divided into four equal groups that weighed an average of 628 pounds at the beginning of the grazing period. BMR sorghum was planted no-till at a seeding rate of 19 pounds per acre. The four groups of steers were moved to fresh grazing paddocks when approximately 50 percent of the available forage dry matter in each paddock had been consumed.

The SumaGrow treated plots of BMR sorghum, showed a higher Average Daily Gain (ADG), a higher Animal Unit Month (AUM), and a significant cost advantage when compared to the nitrogen fertilization, raw milk, and a control (no treatment).

The ADG for the steers grazing the SumaGrow treated forage showed an additional gain per steer of 40.5 pounds for a 150-day warm season grazing period when compared to either the fertilizer only or the control group.

In calculating AUM, which for this trial was defined as the number of beef steer that one acre of forage could support for every 30 day period, once again the SumaGrow treated forages were significantly greater than the fertilizer only or control treatments.

Per acre cost analysis for the treatment and application costs indicated an advantage of $101.45 per acre for the SumaGrow treatment compared to the control. The SumaGrow had the best overall performance with higher ADGs, increased AUMs, and better return on investment.

Improving Soil Water Efficiency

“Everything above ground is dependent on what’s going on below ground. So the fertility of the soil is paramount,” says Chuck Grantham, agricultural consultant at SumaGrow. “When you have an increase in soil fertility, you have an increase in the water holding capacity of the soil. So instead of running off or standing, the water is held within the soil leading to increased water holding capacity therefore retaining vital nutrients that are available for the plants. This is key when evaluating the water stress that is occurring across the agriculture industry today and what is predicted for the future.”

Every state in the US is predicted to experience water stressors within the next ten years and uncertainties well beyond that. As thousands of acres are left fallow as drought conditions prevail in some parts of the country, wet and muddy farmland has frustrated other producers and delayed planting and harvesting. Both conditions will adversely affect producers’ crop production and earning potential.

“It has made a significant difference with drought tolerance,” says Barr, who has been using SumaGrow products for three years. “We planted our rye grass around October and had such a dry season that my neighbor’s fields didn’t germinate. They are literally across the street from our fields. Our neighbors told me that we were the only ones around that grew any grass.”

As Arnold further explains, it is because the biologicals in Agrigain increase the soil's fertility and nutrient efficiency that plants and forages produce longer, denser root systems that capture untapped water and nutrient resources. This produces the healthy, resilient and higher-nutrient crops and forages.

"This winter we had some ice and our grass recovered much quicker than the neighbors. It's also convenient because we can mix it with our herbicide applications so we have to make only one pass over the fields," said Barr.

The Future is Here

There have been unprecedented shifts in agricultural production in recent years. From polarizing policies to the growing concern over the environmental impact of conventional agricultural production, the agricultural industry has seen a dramatic increase in the emphasis on using products and procedures that will positively impact the environment.

Agricultural industries and publications all now increasingly publish informative material that stress a healthy community of microorganisms are essential to improving soil health and reducing the environmental and economic impact of agriculture while meeting our global nutrition demands.

While many in agribusiness may be newly aware of the benefits of agricultural biologicals, BSEI has been recognized for being in the forefront of this biological movement for almost a decade, nationally and internationally. Consider way back in 2011 when SumaGrow was highlighted in "Bison World."

(left to right)- Chuck Grantham, agricultural consultant, Knox Flowers, Director of Field Services, and Dr. Christopher Flood, Director of Research and Development discussing a field trial.

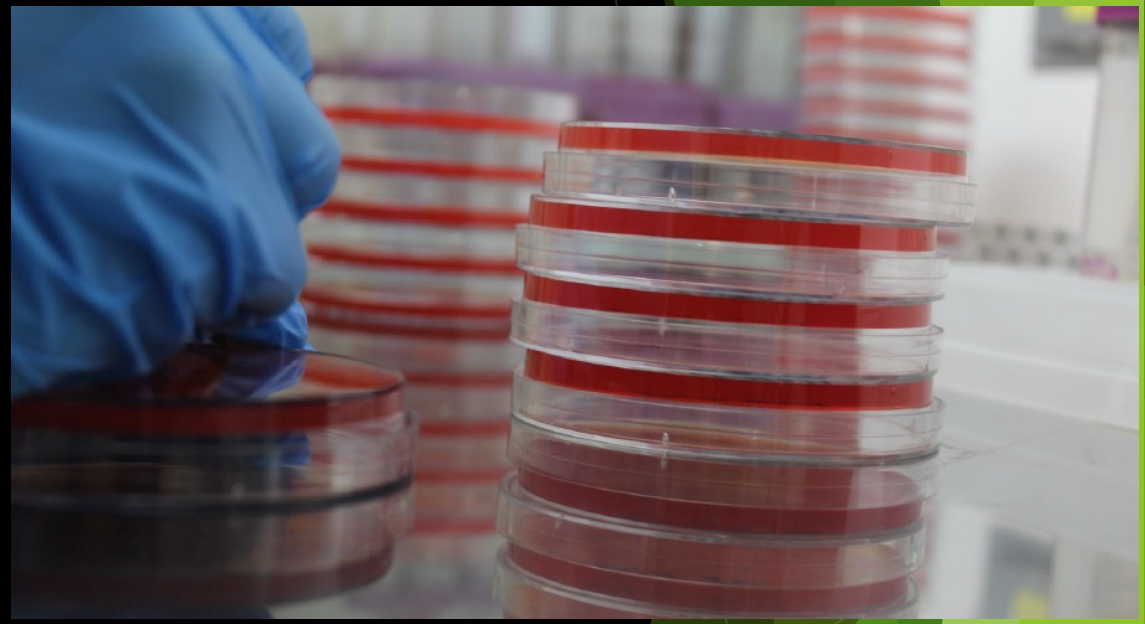
“A new organic soil microbial introduced by Bio Soil Enhancers, Inc. shows significant promise for increased forage and crop yields, improved brix levels and significant or elimination of chemical and forms of fertilizer.” (Bison World, 2011)

“Bottom line,” says Arnold, “We are reducing nitrate runoff because we are putting something back in the soil. We know which microbes work best in the soil, and which ones do not. That’s why we are so far ahead of anybody in the industry.”

For more than a decade, SumaGrow biologicals have been in production, following more than 20 years of research and development by BSEI. Ongoing research that includes numerous field trials from universities, third parties, and specialized testing facilities, demonstrates the benefits of using agricultural microbials for higher yields, lower input costs, and improved water-holding capacity of the soil.

Specifically, using SumaGrow products help repopulate the soil with beneficial microorganisms that work in the root zone of the plant to help retain water and nutrients for the plant’s use. This supports higher yielding and hardier crops.

“At the end of the day what we really want to do it is leave it better than we found it,” Arnold says. “At Agrigain we realize it is about maintaining a healthy balance, and if we don’t do something soon—because we have fertilized with mostly harsh alkaline commercial fertilizer for so long—we aren’t going to get as good of results as we want, both now and in the future.”



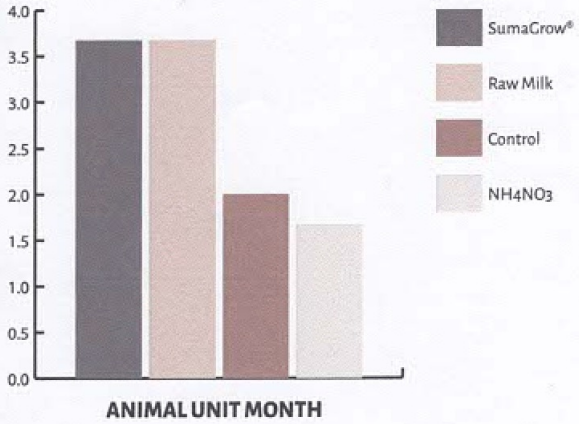
CATTLE

FORAGE & HAY - KENTUCKY

Research on the effect of products containing SumaGrow® on Mid Rib (BMR) Sorghum to determine effectiveness on beef steer summer grazing performance and ADG at Murray State University, Kentucky

RESULTS	
Treatment:	**ADG (lbs)**
SumaGrow®	2.35
Raw Milk	2.26
NH_4NO_3	2.08
Control *(no treatment)*	2.08

COST ADVANTAGES *(VS CONTROL)*	
SumaGrow®	+ $101.45
Raw Milk	+ $67.63
NH_4NO_3	- $170.01



PRIMARY POINTS:

Crop: BMR Sorghum

Location: Western Kentucky

Trial Date: 2011

Growing Conditions: Relatively stable with adequate moisture

Application Method: Boom Sprayer

TREATMENT SCHEDULE:

SumaGrow®: 1 gal/acre split application

Raw Milk: 2 gal/acre split application

NH_4NO_3: 100lbs/acre split application

Control: No Treatment

CHALLENGES

We understand that growing high quality forage and hay crops requires intense soil management in the best of circumstances. With the escalating challenges of looming regulations, unstable fertilizer costs, and widespread droughts and environmental extremes, growing high quality forage is becoming increasingly difficult.

SumaGrow® can help.

SUMAGROW® SOLUTION

Our goal has always been to support the producer in growing a quality product and increasing their bottom line. The award-winning technology of SumaGrow® is a blend of multifunctional microorganisms selected for their ability to improve soil, crop, and animal performance. Our forage and hay trials are conducted globally on a wide variety of forages and forage combinations to ensure that we produce a product that meets your performance goals. Our products contain no Genetically Modified Organisms and are available in OMRI and CDFA OIM certified formulations. Products containing SumaGrow® have been recognized by *Stockman GrassFarmer, Bison World, Forbes.com,* and *Corn and Soybean Digest* for maximizing yields, reducing fertilizer, and reducing irrigation needs.

VIRGINIA TRIAL

Tellus Consulting evaluated the performance of bulls over a 60-day period on SumaGrow® amended pasture, pasture amended with synthetic fertilizers, and pasture not amended with any fertilizer. All of the results obtained from this study indicate that forages treated with SumaGrow® increased nutrient uptake, quality, and yield in cool-season forage compared to the grower standard (commercial fertilizers at recommended rates) for optimal plant growth. In addition, bulls grazing on SumaGrow® treated forages showed higher increases in average daily animal gain.

	AVERAGE DAILY GAIN (IN LBS)	DRY MATTER YIELD (LBS/ACRE)
SUMAGROW®	2.1	2,840
GROWER STANDARD	1.9	2,090
CONTROL	1.8	2,366

KANSAS TRIAL - LHOP

A field trial was conducted to determine the effec treatments on the growth and yield of forages utilized specifically for a beef cattle grass finishing ope located in the Southern Flint Hills region of Southeastern Kansas. The trial was conducted over a 150-day warm season grazing period from mid-May through mid-October. The cattle were actively rotated across each treatment and replicated throughout the growing season with grazing days per treatment monitored. SumaGrow® treated forages outperformed the comparison plots treated with Nitrogen and Organic Broiler Litter.

	YIELD (LBS/ACRE)	ANIMAL UNIT MONTHS
SUMAGROW®	2,263.8	2.36
BROILER LITTER	1,405.8	1.46
NITROGEN	1,289.2	1.34

BENEFITS

Fertile soil is the foundation of any productive crop. SumaGrow®'s biological products restore, improve, and maintain soil fertility. Our microorganisms have been field tested for almost a decade on a variety of crops in diverse climates and soil conditions. Overwhelmingly, they have demonstrated the ability to increase soil and forage productivity. The benefits below are the advantages gained by achieving high soil fertility.

- **Reduce fertilizer use** — improves fertilizer efficiency and reduces input costs by increasing nutrient uptake
- **Reduce irrigation needs** — increases the soil's water holding capacity by increasing soil organic matter
- **Increase ADG and raise brix** — improves crop quality for greater animal performance
- **Increase AUM** — grows higher quality and higher yielding grasses
- **Maximize yields** — increases forage yields 15 to 20 percent on average

Sorghum Success Story

Mississippi farmer Charles Murphree brought Bio Soil Enhancers, Inc. a stalk of freshly-harvested sorghum cane with had been treated with SumaGrow.

When this stalk was harvested, approximately 2 feet were cut off the top and approximately 6 inches from the bottom. This let the remaining can measuring in at approximately 10 feet 2 inches in length.

Mr. Murphree stated that his sorghum normally reaches an average height of only five and a half to six feet in height.

Sorghum Success Story

ALFALFA

- South African farmer *Francois van Rooyen*, an alfalfa and pecan nut agriculturist announced that
  "SumaGrow has just raised the maximum yield ceiling for my land and the 130% increase in yield represents a massive increase in profits."
  "My YIELD more than doubled."
  The area treated with SumaGrow produced ***13*** more tons per hectare.

South Africa Lucerne (Alfalfa) Achieves 130% Yield Increase

Mr. Francois van Rooyen, a lucerne and pecan nut agriculturist, carried out the following interesting controlled test on his lucerne.

- The right-hand field was treated with ExploGrow™ (***SumaGrow***).
- The left-hand field was *not* treated.
- The soil is the same in both fields: very brackish and shallow water table, and is well drained with underground pipes.
- In all other respects the two fields were treated the same, except a variation in the type of Lucerne.
  On the left hand field: Sardi 10 cultivar. On the right hand field WL 711.
- Both fields were therefore top producers with low dormancy and both fields were also treated identically with organic acids, clay minerals, macro-elements, micro-elements and activated carbon, to provide an effective and balanced soil due to brackish conditions prevailing in the area.

"ExploGrow™ (SumaGrow) has just raised the maximum yield ceiling for my land and a 130% increase in yield represents a massive increase in profits."

Mr Francois van Rooyen, Lucerne and Pecan Nut agriculturist


Untreated
Treated

TOMATO AND FRENCH BEAN

SumaGrow was used as a biofertilizer on horticultural crops in ***Kenya***.

Tomato and French Bean harvest came in at ***81.8%*** ***Increase in yield.***

SUMAGROW

Tag: Tomatoes

81.1% Yield Increase for Vegetables in Kenya

The results indicated that application of SumaGrow produced a consistent positive effect on plant growth and yield on both crops at each site. Higher rates of SumaGrow had a pronounced effect on vegetative growth while better effects on harvestable yield were achieved at a lower product rate of 3.8L/acre. These results support the recommendation of SumaGrow for use as a biofertilizer on horticultural crops in Kenya.

CORN / MAIZE

- In Kimberley, Northern Cape, South Africa a maize farm was experiencing historically low yields due to the lack of “commercial level resources.”

The farmer increased his Yields by an average of *5.54* tons per hectare or *316%* with one application of Sumagrow, 8 weeks post-emergence.

It was applied with a pivot center covering 21 hectares .
The control group consisted of two additional pivots covering 20 hectares as comparisons.

Of importance to the farmer was the realization of a significant yield response to Sumagrow without great disruption in his management practice.”

Bottom Line: Cost savings, increased ROI, with a regenerative, sustainable solution for increased yields now and in the future.

Rural Development Maize Up by +316%!

Plus, a large-scale commercial maize operation saw a 127% return on investment in the first season!

Subscribeto our email list.

The owners of ExploGrow™, an international brand of SumaGrow sold primarily throughout South Africa, reached out to us recently to report amazing results on maize.

In Kimberley, Northern Cape, South Africa lies a farm suffering from historically low yields due to the lack of 'commercial level' resources. Through the efforts of the Pniel Youth Development Cooperative and the donation of the ExploGrow™ product by Ingomso Labalimi Base Africa Pty Ltd., the farmer increased his yields by an average of 5.54 tons/ha, or 316 percent!

Key and Conversions

1 hectare= 2.47 acres

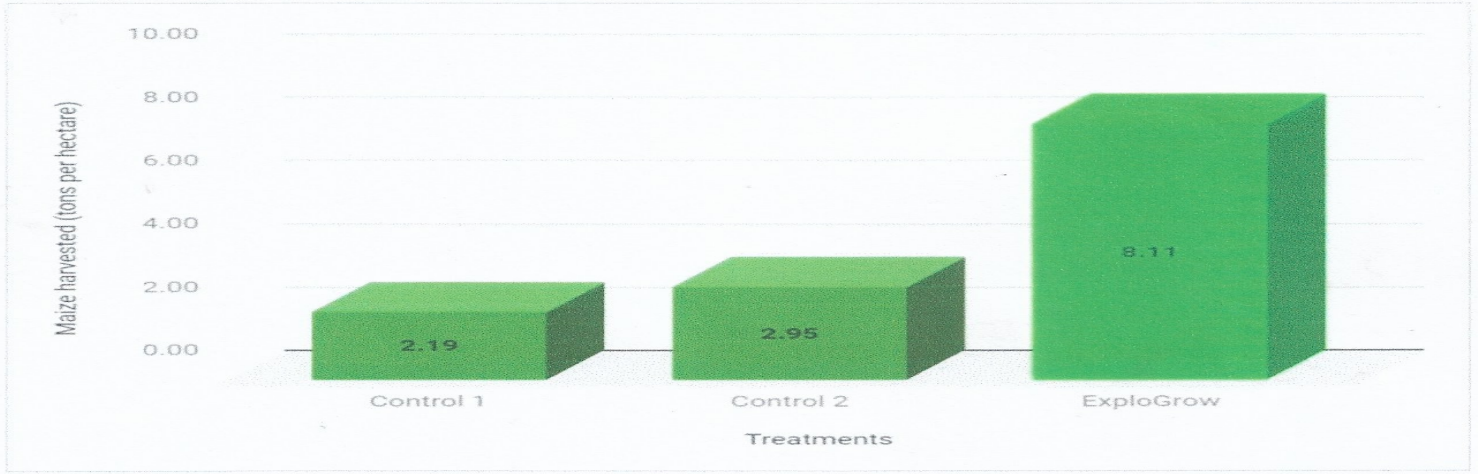
1 liter= .26 gallons

1 meter= 3.28 feet

ExploGrow™ is a SumaGrow product.

R=South African Rand (currency) which is currently 0.068 of United States Dollar.

ExploGrow™ was applied 8 weeks post-emergence on white maize through a pivot covering 21 hectares. The control groups consisted of two additional pivots covering 20 hectares as comparisons.



Data points include: Percent increase ExploGrow™ Control 1: +370%;Percent increase ExploGrow™ Control 2: +275%; Average yield increase: 5.54 tons/ha

"It was important to the producer that there was a significant yield response to ExploGrow™ without great disruption in his management practice."

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Rural Development Maize Up by +316%!

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WINTER WHEAT

- A farmer on the *Fannin Ranch*, North of Dallas, Texas is happy with a ***44.9%*** increase in his *Net Profit* from SumaGrow use for his Red Winter Wheat.

250 Acres of Winter Wheat Treated with Only a Single Application of AgriBiotic Microbics w/ SumaGrow

There is an obvious visual difference in the height and density of the two wheat fields. The grower reports that wheat heads on the ***SumaGrow*** wheat were significantly larger and yielded 36–40 seeds per head, compared to 30–34 seeds per

250 Acres of Winter Wheat Treated with Two Applications of Ammonium Nitrate Fertilizer

MANGOES

- A stellar ***51.5%*** increase in mango harvest was realized on a farm in Ecuador. This was accomplished with a 50% reduction in fertilizer, which demonstrates a double advantage. First, by increasing production by 51.5% and secondly, by decreasing the cost and use of chemical fertilizer by 50%.

Mangoes in Ecuador Achieve Stellar Yield Increase of 42.7% to 51.5%

From the analysis carried out and the results obtained, it can be concluded that: The best production result was seen in the T2 [***SumaGrow*** plus a 50% reduction in fertilizer], which shows a double saving. First, by increasing production by 51.5% and second by decreasing the use of chemical fertilizer by 50% • T3 (100% Genesis with ***SumaGrow***) versus T1 (100% Chemical) shows an increase in production of 42.7% clearly showing the benefit of applying only (Genesis with ***SumaGrow***) against traditional chemical fertilization.

BROCCOLI

- ***With the advice and assistance of…***
- ***The National Fertilizer Testing Center and the Dat Viet Xanh Farmers Association, in collaboration with Gia Lam District, fertilizer trials were performed with SumaGrow.***
- ***A 37.5%*** harvest increase for broccoli was attained while reducing fertilizer by ***50%***.

The plant height increased, fewer pests were noticed, soil organic matter increased 67.5%, and, of course, the yield increased 37.5% while the chemical fertilizer was reduced by 50%, which resulted in a net increase in profit of over $431/hectare (May 8, 2018 exchange rate).

The plant height increased, fewer pests were noticed, soil organic matter increased 67.5%, and, of course, the yield increased 37.5% while the chemical fertilizer was reduced by 50%, which resulted in a net increase in profit of over $431/hectare (May 8, 2018 exchange rate).

The use of EarthCare with ***SumaGrow*** inside reduced the urea nitrate residue in the broccoli. This is an important criteria for evaluating the product as safe or not before being used.

This trial was supervised by Dr. Ngo Thi Dao, Former Head, Department of Soils University of Pedagogy in Hanoi, who is also the author of two books on agriculture.

The report also contains detailed soil analysis reports.

The original report is in Vietnamese, which was translated into English: Vietnam Report in English — Broccoli

Farm / Broccoli, Fertilizer Reduction, Government Study, Increase in Soil Organic Matter, Plant Health, University Study, Vietnam, Yield Increase / Leave a comment

CUCUMBER

- A Bulgarian farmer announce a ***25.8%*** increase in his recent cucumber harvest done in greenhouses, the total area was 1000 square meters. The yield was 16 tons greater from the ***SumaGrow*** treated area than the control, an increase of ***25.8%***.

Bulgarian Farmer Increased Cucumber Yield by 25.8%

Conventionally Fertilized Crop

"(Sumagrow)"treated

Bulgarian Farmer Increased Cucumber Yield by 25.8%

- A farmer in the village of Yunatsite, Bulgaria increased their cucumber crop yield by using SumaGrow. The trial was performed in greenhouses; total area was 1300 square meters. SumaGrow was used to treat the crop in 1000 square meters and the control was performed in the final 300 square meters.
- "The plants treated with SumaGrow were noticeably higher than the control: their height was 170-175cm, and in the untreated greenhouses their height was 150-155cm."
- The leaf mass and fruit size from the treated greenhouses and control greenhouses are equal. The leaf color in the treated area was darker than the non-treated area.
- While the plants entered the fruiting stage at the same time, the treated area had a longer vegetation period of about 14 days.
- "The yield of the area treated with SumaGrow was bigger in comparison with the untreated: 21 tons from the treated area of 1000 sq.m and 5 tons from the untreated area of 300 sq.m." This resulted in an increased yield of 25.8%.

SUMAGROW

Bulgarian Farmer Increased Cucumber Yield by 25.8%

A farmer in the village of Yunatsite, Bulgaria increased their cucumber crop yield by using Farmorganix, also known as SumaGrow. The trial was performed in greenhouses; total area was 1300 square meters. Farmorganix was used to treat the crop in 1000 square meters and the control was performed in the final 300 square meters.

"The plants in the treated-with-Farmorganix greenhouses were noticeably higher than the control: their height was 170-175cm, and in the untreated greenhouses their height was 150-155cm.''

The leaf mass and fruit size from the treated greenhouses and control greenhouses are equal. The leaf color in the treated area was darker than the non-treated area. While the plants entered the fruiting stage at the same time, the treated area had a longer vegetation period of about 14 days.

"The yield of the area treated with SumaGrow was bigger in comparison with the untreated: 21 tons from the treated area of 1000 sq.m and 5 tons from the untreated area of 300 sq.m." This resulted in a increase yield of 25.8%.

ONIONS

- *South Africa again…* a monumental Return on Investment (*ROI*)
- *of 3,959%*. The estimated ROI is based on the farmer harvesting an extra
- 298.8 tons of onions from the 6 hectares planted and the use of SumaGrow.
- That equates to 49.8 extra tons per hectare that were harvested.

Tag: Onions

South Africa Onion Trial Achieves a Return on Investment of 3959%

Return on investment: for every R1.00 invested in ExploGrow™ (*SumaGrow*), the farmer received a return of R39,59 (3,959%)

- Hectares planted: 6
- ExploGrow™ (*SumaGrow*) applied: 48 liters
- Normal yield: 55 tons per hectare (5 year average)
- ExploGrow™ (*SumaGrow*) yield: 104.2 tons per hectare
- Additional tons per hectare: 49.8
- Additional income per ton: R3,000.00
- Additional tons harvested: 298.8 tons
- Additional income over 6 hectares: R896,400.00
- Return on investment: 3,959%

The estimated investment gain (return) is based on the farmer harvesting an extra 298.8 tons of onions by the use of ExploGrow™ (*SumaGrow*). This

PECAN NUTS

- Mr. Van Rooyen in South Africa, an agronomist, had additional success with his pecan trees, realizing a ***40%*** increase in yield in nuts.

SUMAGROW

Tag: Increase Yield

UPDATE – Pecan Nut Trees in South Africa- 40% Increase in Yield in Nuts

POTATO

- SumaGrow usage increased the Yield in a potato trial in South Africa by ***79%*** and
- ***88 TONS PER HECTARE***
- and
- Increased the ***BRIX*** value by ***57%***.

SUMAGROW

Potato Farmer with Record 88 tons per hectare- Limpopo, South Africa

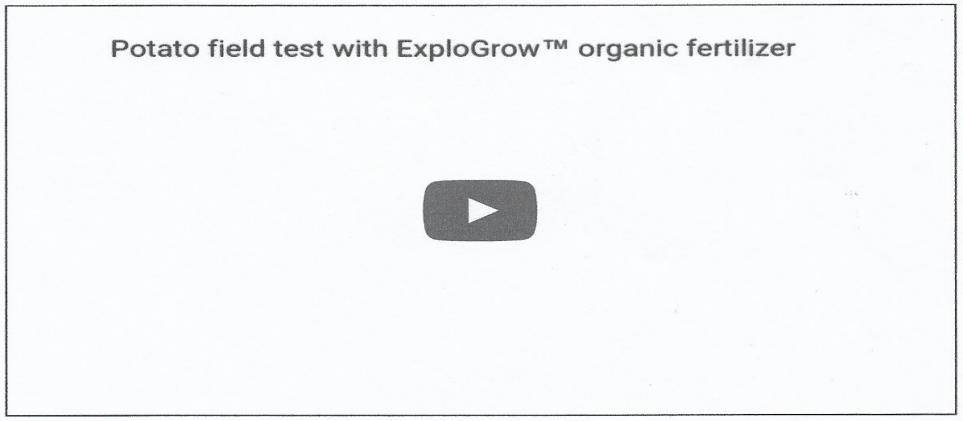
After seeing the positive effects on other crops, the farmer added SumaGrow (referred to as ExploGrow in report) to his normal fertilizer program, treating all his potatoes. He left no control areas, comparing only year to year results. SumaGrow was applied by pivot irrigation between 8 and 10 liters per hectare. 88 tons per hectare were achieved on one of the 18 potato lands.

SUMAGROW

Tag: Higher Brix Levels

South Africa Potato Trial Increases Yield 79% and Brix Levels by 57%

In South Africa, and some nearby African countries, ***SumaGrow*** is marketed under the ExploGrow name. Here is a video of a potato trial, which increased the yield by 79% and the brix (natural sugars and nutrients) levels by 57%!



TEA

- SumaGrow use in a TEA Field study in China concluded that the YIELD increase was OVER *80%.*
- ***"It was in the leaves!"***

and crown width, and to count the buds per plant. Some tea leaves were harvested to measure the length and fresh weight of buds.

Measurement of height of tea trees (left)

Measurement of crown width of tea trees (right)

Sampling buds of tea trees

Checking the number of buds

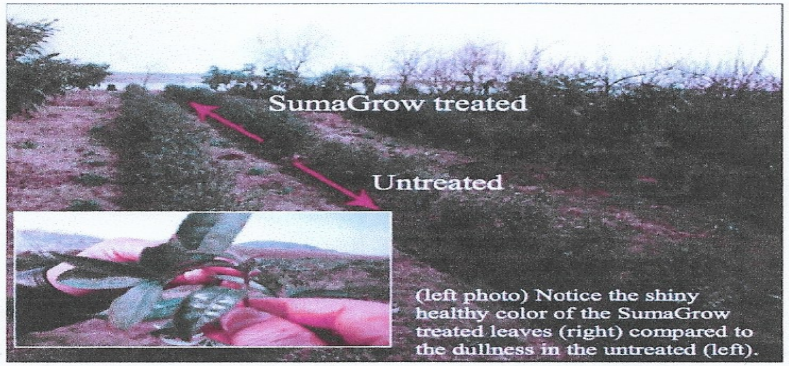
TRIAL RESULTS
EXECUTIVE SUMMARY

TEA – CHINA

Research on the effect of Products containing SumaGrow® on Tea for the Government of China & Nanjing Forestry University

TEA RESULTS				
Treatment:	**SumaGrow®** *(Plot A)*	**Control** *(Plot A)*	**SumaGrow®** *(Plot B)*	**Control** *(Plot B)*
Ave. Plant Height *(cm)*	71.3	57.3	72.8	56.8
Ave. Crown Width *(cm)*	74.5	62.5	70.3	50.0
Ave. Number of Buds/ Plant	48	34	77	44
Ave. Bud Length *(cm)*	1.39	0.97	1.05	0.83
Ave. Weight of buds *(g)*	0.022	0.014	0.015	0.014

AVERAGE PLANT HEIGHT



(left photo) Notice the shiny healthy color of the SumaGrow treated leaves (right) compared to the dullness in the untreated (left).

TRIAL SUMMARY:

The report was prepared by a Chinese government agency in cooperation with Nanjing Forestry University. The average number or buds per plant increased by an average of 83.8 percent while the plant mass averaged an increase of 64.3 percent. Also noteworthy, the soil analysis showed the available nutrient content increasing significantly–Phosphorus 31.9 percent, carbon 27.2 percent and sulfur 14.6 percent.

The conclusion of the report stated, "...all parameters related to plant growth vigor increased by more than 25 percent as compared with those of untreated tea trees" and the product "produces positive effect on the soil."

BIOSOIL ENHANCERS

SUMAGROW INSIDE

Tea Field Results from China

The following written report was prepared by a Chinese government agency in cooperation with a Chinese university. The conclusion in the report stated, "...all parameters related to plant growth vigor increased by more than 25% as compared with those of untreated tea trees" and the product "produces positive effect on the soil."

While the report presents raw data, it does not calculate the yield increase. The yield increase calculations below are Bio Soil's interpretation of the numbers.

The harvest-able parts of a tea tree are the leaves and buds. The report did not give enough detail on the leaves, but yield increase can be inferred by the increase in growth of the trees as measured by the tree height and crown. Moreover, the buds become leaves, so given time; the bud count is the leaf count.

The correct formula is pi times radius squared times length, but length times width is very close to the correct answer and length and width are the numbers provided in the report so they are easily compared for accuracy.

Plot A

Untreated -- 57.3 (height) x 62.5 (width) = 3581.25 (plant mass)

Treated -- 71.3 (height) x 74.5 (width) = 5311.85 (plant mass), an increase of 48.3%

Plot B

Untreated - 56.8 x 50 = 2840

Treated - 72.8 x 70.3 = 5117.84, an increase of 80.2%, and average, with Plot A, of 64.3% increase for the plant mass

It is assumed the leaves per square centimeter would be equal; however, this is unlikely as other crops grown with SumaGrow products have denser plant mass so the number of leaves in the treated trees should be greater, and therefore, the yield increase even higher. This is confirmed by the number of buds per plant increasing by an average of 83.8% while the plant mass averaged an increase of 64.3%.

There was adequate data for calculating an exact increase in the extra weight of the buds on the tea trees:

Plot A

Untreated 34 (average buds per plant) x 0.14 (average weight of buds) = 0.476 (total bud weight per plant)

Treated 48 x 0.022 = 1.056, an increase of 121.8% in bud weight

Plot B –

Untreated 44 x 0.014 = 0.616

Treated 77 x 0.015 = 1.155, an increase of 87.5%, and average, with Plot A, of 104.7% increase for the bud weight per plant

It is interesting to note the average weight of untreated buds was exactly the same (0.014) for both plots.

Assuming a 50/50 mix of leaves and buds, the average yield increase for the treated trees is 84.4%.

CAUTION: The report is silent on fertilizer. If the control would normally be fertilized, and have a higher yield, then the increase would not be as sizable.

Some interesting data applicable to ALL crops grown with SumaGrow products include the soil analysis which shows the available nutrient content increasing significantly -- Phosphorous - 31.9%, carbon 27.2% and sulfur 14.6%. Apparently, nitrogen and potassium were also measured but no data is listed.

The carbon increase in the soil could be extremely significant in determining carbon credits.

Additionally, there was a wide variation in the pH of the soil between the test plots; Plot A was 4.64 while Plot B was 7.63

And finally, the leaves being "shiny" are probably an indication of higher nutrient value. Other crops grown with SumaGrow products have shown higher protein levels, higher brix levels, and higher chlorophyll levels, so we should expect a higher nutrient value in the tea, but no quality testing is presented in the report.

Bio Soil Enhancers, Inc.
1161 James Street, Hattiesburg, MS 39401
+ (601) 582-4000
www.SumaGrow.com

Carrot Farmer Achieves 28% Increase in Carrot Quality

Value gained by Carrot farmer: big difference in quality

- ExploGrow™ (SumaGrow) bio-organic fertiliser out-performed all the 5 Carrot farm lands on quality by +28.71% with a yield increase of +12.8% (on average)
- Carrot quality: on average ExploGrow™ resulted in harvesting +12.88 tons per hectare more Carrots "fit for market"
- Carrot yield: on average ExploGrow™ resulted in yielding +8.02 more tons per hectare
- The market value of the additional ExploGrow™ Carrots "fit for market" added up to +R41,216.00 per hectare
- Return on investment: 1,032%

Carrot harvest data in tons per hectare (Increased yield)

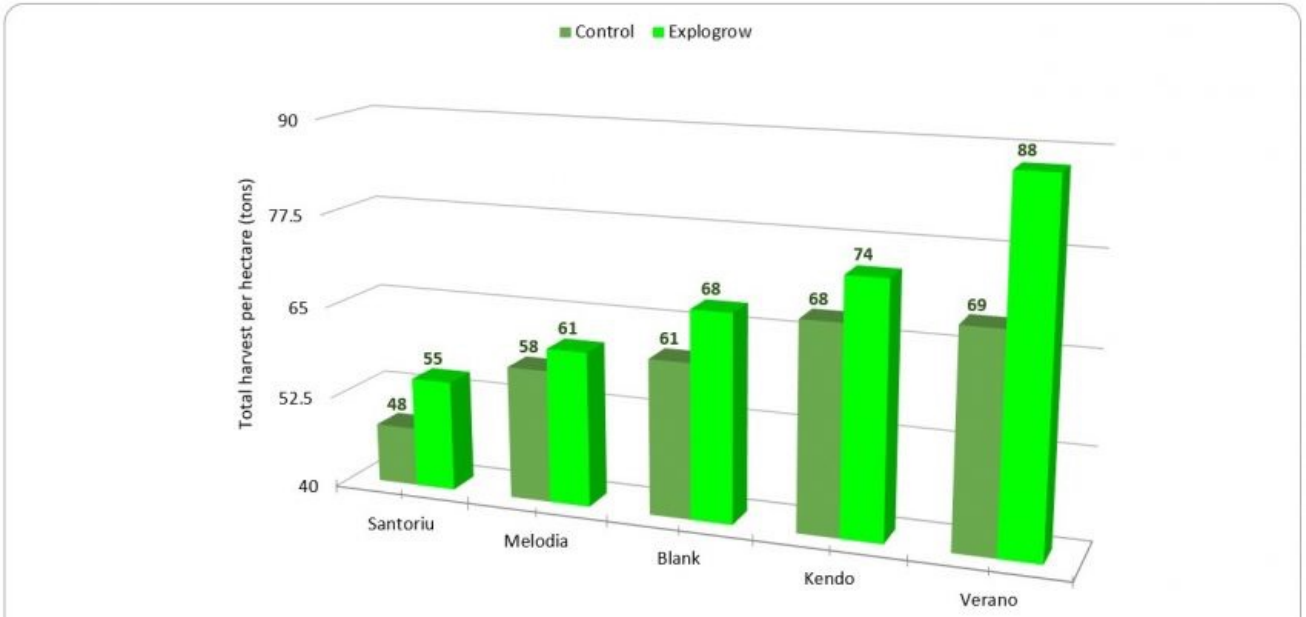
- **Carrot variety: Verano**
- Untreated 68.97t/ha
- ExploGrow™ treated 87.98t/ha
- Increased yield: 19.01 tons per hectare = +27.6% more carrots harvested
- **Carrot variety: Santorin**
- Untreated 48.25t/ha
- ExploGrow™ treated 54.78t/ha
- Increased yield: 6.56 tons per hectare = +13.5% more carrots harvested

Carrot harvest data in tons per hectare (Increased yield) continued…

- **Carrot variety: Kendo**
- Untreated 68.16t/ha
- ExploGrow™ treated 74.17t/ha
- Increased yield: 6.01 tons per hectare = +8.8% more carrots harvested
- **Carrot variety: Melodia**
- Untreated 58.48t/ha
- ExploGrow™ treated 60.66t/ha
- Increased yield: 2.18 tons per hectare = +3.7% more carrots harvested
- **Carrot variety: Blank**
- Untreated 61.12t/ha
- ExploGrow™ treated 67.50t/ha
- Increased yield: 6.38 tons per hectare = +10.4% more carrots harvested

Carrot harvest data in tons per hectare (Increased yield) continued…

- On average ExploGrow™ (SumaGrow) out-performed every untreated Carrot farm land by 12.8% (8.02 tons per hectare), however there was a very big quality difference in terms of marketable Carrot quality.
- The improved quality of the ExploGrow™ treated Carrots enabled the farmer to deliver **+28.71%more Carrots** "fit for market" compared with the untreated Carrots as illustrated below:

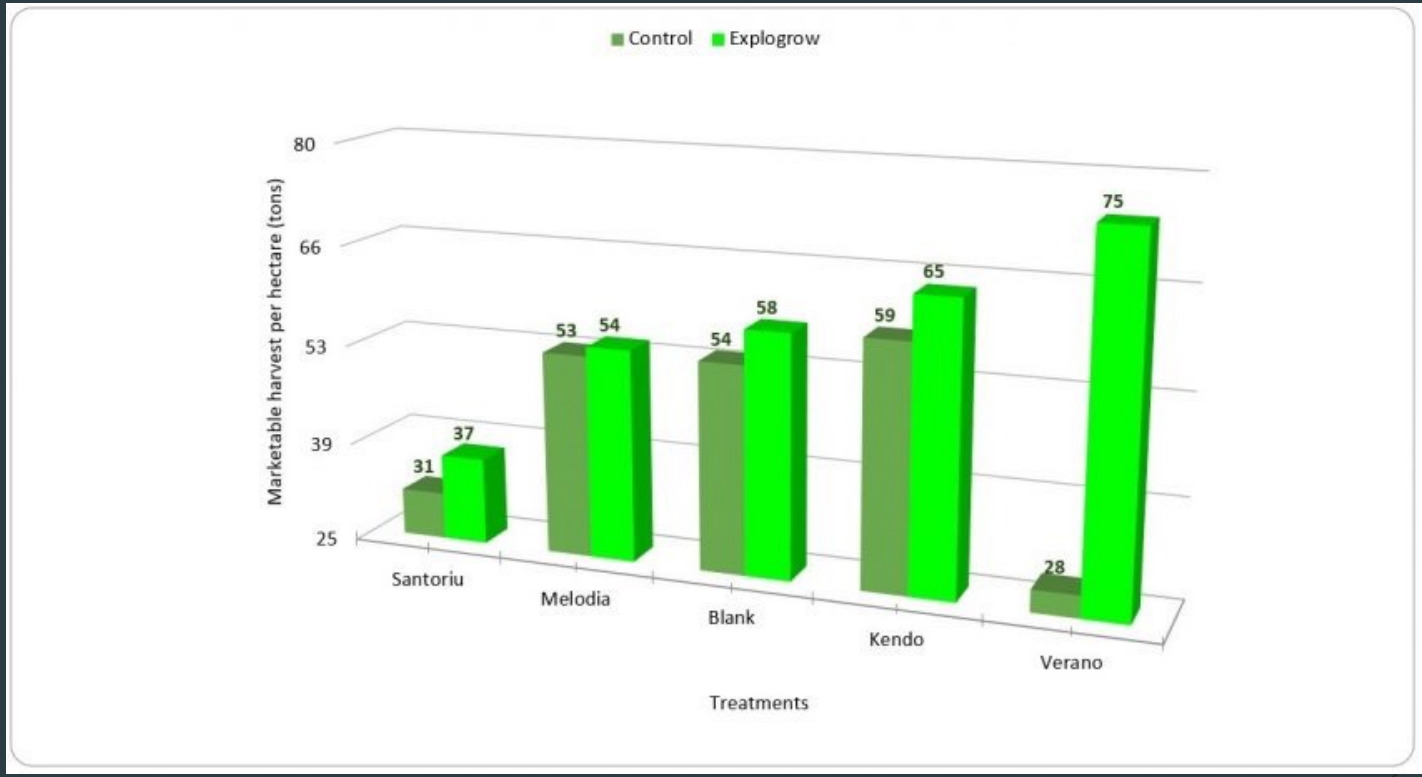


Marketable Carrots (quality fit for market versus crop damage)

- The untreated Verano block showed signs of being quite infested with root pathogens. The quality of this block was by far the worst of the tested areas. This was in spite of conventional preventative action. The quality and yield of the carrots in ExploGrow™ treated Verano block is a triumph under these circumstances.
- On this particular farm, the soils have high concentrations of crop damaging Root-knot Nematodes.

- **Carrot variety: Santoriu**
- Untreated 31t/ha
- Treated 37t/ha
- **Carrot variety: Melodia**
- Untreated 53t/ha
- Treated 54t/ha
- **Carrot variety: Blank**
- Untreated 54t/ha
- Treated 58t/ha
- **Carrot variety: Kendo**
- Untreated 59t/ha
- Treated 65t/ha
- **Carrot variety: Verano**
- Untreated 28t/ha
- Treated 75t/ha

- **Differences in marketable crop quality after applying ExploGrow™**
- the ExploGrow™ (SumaGrow) treated lands out-performed all untreated Carrots lands
- an <u>additional +12.88 tons per hectare</u> Carrots “fit for market” harvested (<u>+28.71%</u>)
- the market value of the additional ExploGrow™ Carrots harvested equalled <u>**+R41,216.00 per hectare**</u>



SumaGrow is a Revolutionary New Input that will *BOOST your PROFITS*…
with substantial *YIELD* increases and Transform your crops into “true” *ORGANIC* fruits and vegetables!

IN DEPTH REPORTS

- These exceptional Yields are the result of our ongoing Research and Development (R&D) of more than *19* years of working with microbes.
  We now can offer the increased biological activity of numerous different strains of microbes that can be utilized to maximize crop results.
  NO one else in the world is close to our accomplishments to offer so many varieties of microbes.
- *THANKS for your interest,*
- *Richie McNamee*

HOWEVER, how about a 611 pound or 277 kilo PUMPKIN!... and a 181 pound /82.3 KILO WATERMELON

Wednesday, October 12

Congratulations to Tony Prochasaka from Simpson, Kansas who became the first person to win the award for both the largest pumpkin AND largest watermelon at the Kansas State Fair. Tony took first and third in the largest pumpkin category, and first, second and third in the largest watermelon category. The winning watermelon weighed in at 181.5 pounds (82.3 kilos) and the winning pumpkin came in at 611 pounds (277.1 kilos).

Tony said, "SumaGreen when applied correctly boosted my weights 60-80 percent. I believe SumaGreen put my watermelons and pumpkins over the top. We grew at least 25 meions over 120 pounds and two over 180 pounds. Thanks and put me in for an order for next season"

Richie McNamee
Chairman/Founder

Call 424-365-5824
(Viber or WhatsApp)
rmcnamee@sumagrowintl.com

OUR VISION IS TO SPREAD SUMAGROW ALL OVER THE EARTH