AGRICULTURE

CROP ENHANCEMENT

A Revolution in Growth and Yield Enhancement.

Quantum Growth™

The Quantum Growth® Series of products consist of different combinations of naturally occurring microorganisms that share key traits for plant enhancement. The organisms inhabit the root zone and vascular system of a plant, helping to breakdown, hold and transport nutrients and water. Photosynthetic strains in the products are capable of converting radiant energy, including the sun's, into energy for plant growth. Other organisms have the extraordinary ability to unlock chemical bonds, facilitating nutrient uptake that would not be available to the plant in the organism's absence.

The Quantum Growth® Series replaces the natural soil microorganisms that are depleted through fumigation, tilling, harvesting and/or overuse of chemical controls. It is the only biological product on the market that is shelf stable, contains photosynthetic and other vegetative cultures and does not use growth inhibitors. There is no other product available that meets these criteria.

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AGRICULTURE - CROP ENHANCEMENT

10100 CITRUS CROPS

10101	Reduced Greening, Increased Yield & Orange Tree Survival
10102	Quantum Growth® HSC Leads to Healthy, Disease- Resistant Organic Citrus Trees at McLeans' Orange Orchards

The case study results listed above were achieved with MICROBE-LIFT® Technology and products, formulated and manufactured by Ecological Laboratories Inc., with technical support for administering the products provided by Ecological Laboratories Inc., in support of their worldwide representatives.

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Quantum Growth® Produces Healthier, More Disease Resistant Citrus Trees

Location: **McKenna Citrus Grove, Lake Wales, FL**

Background: An orange grove endures many assaults over the season including drought, freeze, and disease. At present in the US, grove managers are working hard to combat the effects of "greening", a disease caused by a bacterium designated Huanglongbing (HLB). Transmitted by insects (psyllids) this disease origin ated in Asia and is being transmitted to Latin America and now, the US. Trees may be infected two years before symptoms appear and the disease is generally fatal to the tree. One to three percent of orange trees are killed annually in the US due to this disease

Objective: Quantum Growth® products are known to enhance the growth rate and overall health of trees. Tests were run to determine if the health improvement could help the tree withstand infection by the bacterium responsible for "greening".

Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc (ELI)**, who developed and manufactures the technology.

AEM's technical representatives proposed a treatment protocol and assisted in initiating the treatment program. For this test, small trees were dug up and repotted. All trees received grower's practice culturing growth conditions while the treated trees also received Quantum Growth® technology.

The Experiment

Treated trees were first given one 36-ounce Quantum Growth® treatment on October 14th, 2008 while they were growing in the field. One week later they were dug up and potted.

Fig 1: *These pictures taken two weeks after treatment show the treated plant on the right has increased turgor, darker color, and less sun damage.*

Quantum Growth Produces Healthier, More Disease Resistant Citrus Trees

Fig. 2: *Additional pictures of control trees (left) versus* ***Quantum Growth®*** *treated trees (right). Note less growth and lighter color on the control as opposed to deeper color, increased turgor, and sheen full carriage of the treated trees.*

Fig. 3: *A closer view of the difference between treated plant leaves (left) and untreated control (right). Treated leaves show improved color, shape, and sheen.*

Fig. 4: *Note the heavy root growth shown in the treated Valencia liner on the left 6 weeks after treatment of 4 oz per week. The treated root ball is fuller and holds water, with moist roots holding soil together. The control root mass has retained less moisture with part of the soil base falling off, still holds the shape of the liner, and shows dry roots.*

Results Achieved:

Differences were noticeable just two weeks after treatment. The results of this test were so positive that the owners decided to treat a section of the field. Since 2008, more of the grove acreage has been converted to Quantum Growth® treatment each year.

The increased health of the treated trees not only provides greater resistance to disease but the trees are growing faster and have significantly increased yield.

Use of Quantum Growth® increases food and energy available to the trees, allowing them to increase root growth and fruit production. Treatment results in a healthier, hardier, more disease resistant tree with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

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Quantum Growth® HSC Leads to Healthy, Disease- Resistant Organic Citrus Trees at McLeans' Orange Orchards

Quantum Growth

Location: **Uncle Matt's Fresh/McLean Ag Chem Inc., Clermont, Florida**

Background: Ben McLean and his father, owners of the oldest organic orange juice company in the US, had been using Quantum Growth® HSC to improve the health and production of their citrus grove. Fully committed to maintaining groves free from synthetic fertilizers, herbicides, and pesticides they constantly battle insect infestations.

Objective: Mites are one of the most economically important groups of citrus pests. The Texas spider mite is an important pest. It feeds on the leaf causing visible white stippling, mesophyll collapse, and leaf drop.

Heavy infestations in moisture-stressed groves can cause serious tree injury. Grove managers in affected areas monitor populations of these mites.

Results Achieved

By routinely used Quantum Growth® on their groves, the McLeans achieved improved crop health and yield. Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc (ELI)**, who developed and manufactures the technology.

During their use of Quantum Growth®, the McLean's noticed a secondary effect.

"Whenever we spray Quantum Growth® HSC at a dosage rate of one quart per acre, we observe greatly reduced populations of the Texas citrus mite, also known as the spider mite" states Ben.

According to Ben, "During the spray treatment in November and January in the past year, we sprayed into areas that had growing mite populations. In these treated areas, we observe that the eggs that are laid on the midrib of the leaf are not hatching and they become clear instead of their normal milky color. It appears that these clear eggs have never hatched. The population of mites in the treated areas is very low when compared to a nearby, untreated section that shows evidence of viable egg production. "

While Quantum Growth® HSC does not claim insecticidal activity, it is postulated that Quantum Growth® improves the health of the tree allowing it to resist damage from insect infestations more effectively.

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AGRICULTURE - CROP ENHANCEMENT

10200 PEANUTS

10201 **Quantum Growth®** Increases Yield by 45.5% and Profit by 39% per Acre of Peanuts

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Quantum Growth Increases Yield by 45.5% and Profit by 39% per Acre of Peanuts

Location: **Agriculture Extension Center, University of Georgia, Moultrie, GA**

Background: In the US, over 1.3 million acres grow peanuts. The network of University Extension Centers is constantly evaluating new technologies to improve farming practices.

Objective: Since Quantum Growth® products had worked so effectively on other crops, the Agricultural Extension wanted to run a trial with Quantum Growth® on peanuts. Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc (EL),** the company that developed and manufactures the technology.

AEM's technical representatives proposed a treatment plan and assisted in initiating the program. Treated and control sites were placed side by side.

Results Achieved

Interestingly, as the plants grew it appeared that the treated plants did not show improved plant growth. In fact, if there were a difference, the treated plants would appear to have not grown as fast as the control plants.

However, when the peanuts were harvested, the difference between control plot, which utilized best grower's practice, and the plot treated with Quantum Growth® (Quantum Light & Quantum VSC) and best grower's practice were dramatic. When all the data had been tabulated, the treated plot produced a 45.5% increase in yield compared to the control plot.

Samples from the plant leaf, root, and legume (peanut) were assayed in the laboratory to determine any change in bacterial population in the treated plants versus the control plants (lab report available). Unlike the control plants, samples from the treated plants showed colonization of the beneficial strains from Quantum Light in both the endophytic zone and leaf surface. The strains detected in both these zones that were not present in the control plants included Bacillus pumilus, Bacillus circulans, Rhodopseudomonas palustris, Rhodococcus erythropolis, and Nitrobacter winogradsky.

In addition, two potentially pathogenic strains present in the control plants were no longer present in the plants treated with Quantum. This assay demonstrated that application of Quantum Light did successfully colonize the plant structure with the beneficial bacteria in Quantum with the potential to replace other less beneficial, potentially pathogenic, bacteria.

Fig 1: *This picture shows the increased yield of peanuts using added* ***Quantum Growth®*** *(right) versus growers' best practice alone (on the left).*

Use of the specialized strains in **Quantum Growth®** increases food and energy available to the plants, allowing them to increase root growth and fruit production. This results in healthier, hardier plants with decreased dependency on supplemental irrigation, fertilizers, and pesticides. In this case, with a 45.5% increase in yield, when the cost of product was factored in, the grower achieved a net profit of 39% per acre. Additional benefit can be achieved as irrigation, fertilizer and pesticide usage is optimized.

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AGRICULTURE - CROP ENHANCEMENT

10300 VEGETABLES

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Quantum Growth® Provides Faster, Healthier Growth of Lettuce on Farm in Mexico

Quantum Growth

Location: **Lettuce Farm, Mexico**

Background: This farm outside of Monterey, Mexico was a contract supplier for Subway. Yield is extremely critical to profitability.

Objective: This farm implemented a Quantum Growth® trial in an effort to increase productivity. A 2% solution of equal parts Quantum-Light and Quantum-VSC was applied via backpack sprayer to this lettuce crop as a foliar spray immediately after planting.

Results Achieved

In a few weeks the difference between treated and non-treated controls was dramatic. Quantum Growth® had produced plants significantly increased in size and overall heath.

Fig 1: *In addition to watering from the drip line, the plants on the right received a spray of 2% **Quantum Growth®**, made up of equal parts of **QG Light** and **QG VSC**.*

This farm continues to utilize Quantum Growth®, which provides it a competitive advantage in the marketplace.

Use of Quantum Growth® increases food and energy available to the plant, allowing the plant to increase root growth and fruit production. This results in a healthier, hardier plant with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

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CS10301

Experimental Program Validates Productivity Enhancement of Potatoes in Sao Paulo, Brazil

Location: Five Potato Growers, Sao Paulo, Brazil

Background: Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc (ELI),** who developed and manufactures the technology. This technology has been tested on numerous crops and demonstrated increased productivity, resistance to disease, and drought tolerance.

In 2010, four potato growers in the state of Sao Paulo, Brazil were involved in a study supervised by Professor André Palermo Tonietti from UNIPINHAL, University of Pinhal located in the city of Espirito Santo do Pinhal. Four students also participated on the development of this experiment as a part of training program from this University.
The experiment work was designed to test initially the productivity of the cultivars Monaliza and Agata, using the production systems upland and irrigated.

Objective:

The table below summarizes the farms' cultivar and production systems utilized in the experiments.

Farm	Name of the farmer	Production system	Cultivar
Rosario	Laercio Berbamasco	Irrigated	Monaliza
Momboca	Jair Varaldo	Upland	Monaliza
Casa Branca	Toninho Gomes	Irrigated	Agata
Casa Branca	Jose Pai do Paulinho	Irrigated	Monaliza

Fig. 1: *Lists the farms and farmers involved in the study and the production methods utilized.*

Each farm was visited five times during the experiment. Product was applied according to instructions from Applied & Experimental Microbiology (AEM). In the first visit to the farm AEM representatives explained the application protocol and benefits of Quantum Growth®. On the second visit, the potato seeding was performed with the addition of one gallon per hectare of Quantum VSC (root system) to the treated plots. Thirty days later Quantum VSC was applied again to the soil and after an additional 30 days

Quantum Light was sprayed on the leaves. Plants were harvested 30 days after the last application.

Results Achieved

During each visit students applied Quantum Growth® as prescribed and recorded descriptions of visible differences between the control and the treated potato plants.

Experimental Program Validates Productivity Enhancement of Potatoes in Sao Paulo, Brazil

The following tables summarize the effect of Quantum Growth technology on productivity and economics of potato production.

Farm	Name of the farmer	Production system	Cultivar	Potato Bags Control	Potato Bags Quantum Growth	Productivity Increase Bags per hectare
Rosario	Laercio Berbamasco	Irrigated	Monaliza	600	914	314
Momboca	Jair Varaldo	Upland	Monaliza	327.29	594.34	267.05
Casa Branca	Toninho Gomes	Irrigated	Agata	873	951	78
Casa Branca	Jose Pai do Paulinho	Irrigated	Monaliza	721	848	127
				2.521.29	3.307.34	786.05

Fig.2: *Treatment increases productivity as measured by bags per hectare.*

The table above shows that Quantum Growth® technology improved overall productivity by 786 bags. This result is consistent with a paper by Thomas A. Selvig C.A. (2009) reporting that photosynthetic purple bacteria, as present in Quantum Growth® technology, produce sugar in the root rhizosphere which results in an increase in crop production mathematically commensurate with the quantity of sugar produced.

The table below confirms the economic advantage of utilizing Quantum Growth® technology:

Farm Location	Name of the farmer	Production system	Productivity Bags/hectare	Bag Value*	Return on Investment
Rosario	Laercio Berbamasco	Irrigated	314	R$ 26,70	R$ 8,383.80
Momboca	Jair Varaldo	Upland	267.05	R$ 26,70	R$ 7,130.24
Casa Branca	Toninho Gomes	Irrigated	78	R$ 35,00	R$ 2,730.00
Casa Branca	Jose Pai do Paulinho	Irrigated	127	R$ 30,00	R$ 3,810.00
Mean Values			196.5	R$ 29,60	R$ 5,513.51
				• mean values on harvest day	R$ 22,054.04 USD 12,972.9

Fig. 3: *Treatment with Quantum Growth® provided an additional R$ 5,513.51 per hectare increased productivity.*

The economic evaluation demonstrates significant economic benefit in utilizing Quantum Growth® technology based on increased productivity.

The University concluded that based on the results of the experiment, Quantum Growth® Technology successfully demonstrated its potential as a productivity enhancer and results indicate that it can be used on the Brazilian Potato Production System with success. This study was directed by Andre Palermo Tonietti, Ms and Expedito Tadeu Facco Silveira, PhD

REFERENCE

Selvig, T.A. (2009). **QUANTUM GRO, The Science of "Sudden and Significant"** Energy Growth.

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CS10302

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Quantum Growth® Helps Plants Recover from Late Blight Disease Progression in Connecticut

Location: **Organic Grower, Connecticut**

Background: Late blight (P. infestans) of tomato crops hit the Northeastern United States particularly hard in 2009. Estimates are that 25-50% of the total tomato crop in Connecticut was lost this year; with similar numbers across the Northeastern US. Organic farmers were almost completely wiped out as there are few effective controls approved for organic farmers. While copper treatment is approved, growers are generally reluctant to use this because of the potential off-target heavy metal effects. Approved biological controls (such as Serenade and Sonata) which each utilize single strains of Bacillus are preferred by organic growers but they do not exist for this application.

Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL.. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc (ELI),** who developed and manufactures the technology. The technology has been tested on numerous crops with success for increased productivity, resistance to disease, and drought tolerance.

Quantum Growth® contains a consortium of strains including four strains of Bacillus. It is also the only growth enhancement product on the market based on actively growing (vegetative) bacteria. The vegetative state plus the full complement of Bacillus, photosynthetic strains, pseudomonads, plus other strains may provide increased plant health and associated natural resistance to disease.

Objective:

In an effort to determine if disease resistance could be effective even after infection had been well established, a pilot test was developed. A mixture of one gallon Quantum Growth® Revive, 2 drops olive oil, 1 drop liquid hand soap, 1 oz of Quantum Growth® Revive was mixed by hand and sprayed liberally on tomato plants through a backpack sprayer on tomato plants in various stages of P. infestans infection (most had approximately 25% of fruit and leaves affected; some had more advanced disease). Effort was made to spray the underside of leaves, all fruit, and surrounding soil. This treatment was repeated four days later with the mixture diluted with four parts of water. Treatments were continued weekly for 3 weeks using the 1:4 mixture.

Results Achieved

Plants with >50% initial disease tended to be dead or dying by the end of the first week after treatment began and were removed and discarded. Plants with <50% initial disease tended to have stabilized or dramatically improved after one week. Leaves and fruit that were diseased prior to treatment did not recover and were removed. In some plants, new growth appeared on the treated plants, including new fruit development. Control plants continued to deteriorate (figure 1). The organic farmer was able to save and harvest some of her tomatoes.

Quantum Growth® Helps Plants Recover from Late Blight Disease Progression in Connecticut

Fig.1: *Image of tomato plants taken from the garden of an organic grower in Connecticut eight days after treatment began. The plant on the left was treated with* ***Quantum Growth®****: the plant on the right was left untreated. The untreated plant had more diseased fruit, more infected leaves, and did not appear as healthy. Unlike the control, the treated plant had much greener leaves and actually had new growth.*

Even though the tomato plants were already infected with the late blight P. infestans, treatment with Quantum Growth® along with pruning of the dead tissue was effective in stabilizing disease progression, even to the point of recovery, where some plants had new growth after one week. New fruits were also seen to begin developing on some plants. While some products utilize Bacillus strains to control this disease, Quantum Growth® has not been validated or registered as a biopesticide and cannot claim pesticidal activity.

We believe the benefit seen above comes from the full consortium of strains in Quantum Growth® that contribute to improve health and associated disease resistance of the plants. Larger field studies need to be conducted to validate this effect, but we have seen such resistance to disease throughout a wide variety of plants against numerous diseases based on the use of Quantum Growth®.

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CS10303

Quantum Growth® on Cucumber Seedlings Reduces Fertilizer Requirement in Half in the Netherlands

Location: **Commercial Greenhouse, Netherlands**

Background: This greenhouse grows seedlings in rock wool growing medium for transplant to garden soil. They wanted to determine if microbial growth stimulants could help speed growth, produce heal their plants, and reduce the need for fertilizer. Quantum Growth® was the product of choice as it has shown these effects in many situations.

Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and Ecological Laboratories Inc (ELI), who developed and manufactures the technology.

This trial was conducted for a five-week period in early 2011. The greenhouse developed its own protocol using a combination of Quantum Growth® Light (QL) and Quantum Growth® VSC (QVSC).

Objective:

The trial objectives were as follows:

- To evaluate the effect of growth stimulants QL and QVSC in enhancing plant growth after sowing based on addition of product to the rock wool growth medium.
- To evaluate whether the concentration of nutrients in the liquid fertilizer solution affects performance of the growth stimulants.
- To assess if any phytotoxicity symptoms or growth distortions would be caused by the application of an 8% concentration of QL+QVSC compared to reference concentrations.

Experimental Setup:

This trial was performed in a 250-m2 greenhouse equipped with mobile tables specifically designed for the cultivation of potted plants. The cucumber seeds, Cucumis sativus 'Proloog' were planted in a Grodan Delta rockwool cube (10 x 10 x 6.5 cm) with pre-drilled hole. Irrigation was ebb-flood with two concentrations of standard nutrient solution for cucumber: full strength and half strength. Climate set points were 20.0°C by day and 19.0°C at night. Supplemental lighting (3500 Lux) was applied by SON-T lamps for 14 hours/day.

Treatments:

The trial consisted of 8 different combinations of the QL+QVSC growth stimulants and nutrient solution concentration as shown below in Table 1. On 19 January 40 rockwool blocks per treatment were placed for 15 minutes in 20 L of solution, with the concentrations of growth stimulants and nutrient solution indicated in Table 1, prior to sowing.

Table 1:

Treatment Combinations of Quantum Growth® stimulates and nutrient solutions. Equal amounts of QL and QVSC were used to reach the final concentration. Treatments were carried out at moment of sowing and subsequently at weekly intervals from January 25 to February 23.

Nr	Name	QL+QVSC (%)	Fertilizer	Nplants
1	Untreated control	0	Full Strength	4 x 10
2	Quarter Dose	0.5	Full Strength	4 x 10
3	Half dose	1.0	Full Strength	4 x 10
4	Standard Dose	2.0	Full Strength	4 x 10
5	Phytotoxicity test	8.0	Full Strength	4 x 10
6	Quarter Dose	0.5	Half Strength	4 x 10
7	Half dose	1.0	Half Strength	4 x 10
8	Standard Dose	2.0	Half Strength	4 x 10

After 15 minutes the blocks were placed on inverted aluminum plates to drain off excess liquid. In each block one cucumber seed was placed in the hole, which was subsequently filled with vermiculite. Each table was covered with transparent plastic foil to ensure high humidity. Germination took place under plastic in the greenhouse at 20°C. After three days, the plastic foil was removed and plants were further grown under the conditions described above.

Each treatment consisted of four replicates making a total of 32 plots. All plots comprised 10 test plants; the final plot surface was approximately 1 m2 giving a plant density of 10 plants per m2. Plant blocks were placed in a randomly designed block design divided over two mobile tables as shown in Figures 1 and 2.

***Fig 1**: Positioning of treatments on table, 16 DAS*

***Fig 2:** Positioning of individual plants in plot, 16*

Per treatment 50 ml of the appropriate Quantum Growth® solution was added to each block (replaced by water for the untreated control). This was repeated on 3 February, 9 February, 16 February and 23 February. Plants were irrigated with the appropriate nutrient solutions on 28 January, and 7, 14, 21, and 25 February.

Assessments:

The following parameters were documented during the trial period:

- At 16 days, cotyledons completely unfolded, first leaf partly unfolded, and plant height was measured
- At 38 days, plant height, leaf number and total plant fresh weight was measured and root quality visually assessed
- For nutrient measurements, 2 blocks per replicate treatment were squeezed out and a sample was taken from the combined drains for measurement of free nutrients.

Results Achieved

Graphs below show data generated at the end of the 5-week trial:

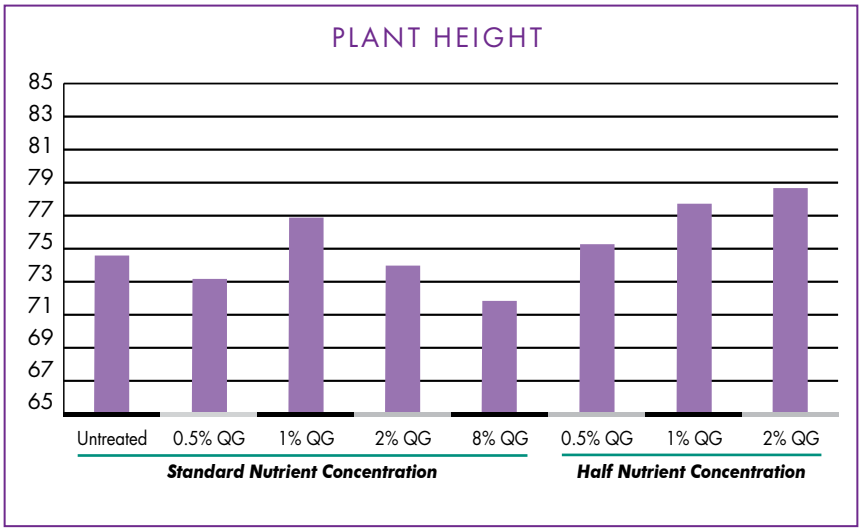

Fig. 4: *Shows slight increase in plant height for those plants with half the level of nutrient and at least 1% doses of CG.*

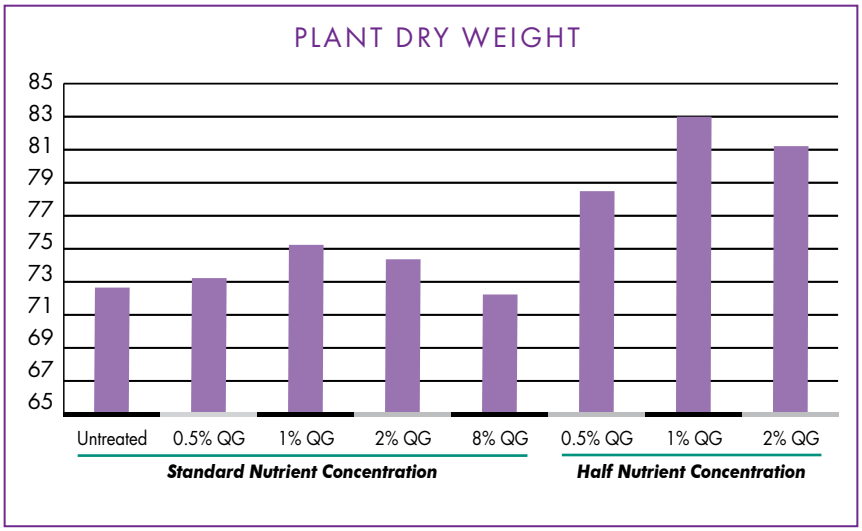

Fig. 5: *Larger increases are seen in plant dry weight with half nutrient level and at least 1% doses of CG.*

Quantum Growth® on Cucumber Seedlings Reduces Fertilizer Requirement in Half in the Netherlands

Treated plants with reduced fertilizer show the greatest increase in dry plant weight and slight increase in plant height. The general recommended dosage rate for Quantum Growth® is between 1% and 2%. These results are particularly of interest since they were developed in an optimal growth situation where nutrients and conditions have been optimized for cucumber growth with tailored nutrients and growth conditions. When plants are transplanted to field conditions, Quantum Growth® benefits are more dramatic as they compensate for less than ideal growth conditions.

Use of Quantum Growth® is well known for improving survival when these seedlings are planted on soil. It increases food and energy availability to the plant, allowing plants to increase root growth and fruit production. This results in a healthier, hardier plants with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

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University Study Shows MICROBE-LIFT® Technology Increases Yield of Green Peppers >23% In Spite of Significant Reduction of Fertilizer

Quantum Growth

Location: **New Jersey Agricultural Experiment Station, Rutgers University, Camden, NJ**

Background: AEM, Applied Experimental Microbiology, is Ecological Laboratories Inc.'s exclusive marketing partner for field of commercial agriculture. Using the private label brand Quantum Growth® for formulations based on MICROBE-LIFT® core technology, AEM has developed numerous successful trials in all types of vegetable farming. One of AEM's key distributors was challenged to provide university data on the benefits of Quantum Growth® technology on the growth of green peppers.

Objective:

A test program was developed with Rutgers University, a university well recognized as a leader in agricultural studies. In 2012, the test was set up at Rutgers New Jersey Agricultural Station. This was a well-controlled study whereby acres dosed with Quantum at a rate of one gallon per acre were compared to an equivalent control plot.

Results Achieved:

The following data from this experiment shows that treatment with Quantum Growth® increased the yield of green peppers by 23.5% versus the control in spite of a 23% reduction in fertilizer used.

DATA – YIELD PER ACRE	KILOGRAMS	CARTONS	DOLLAR VALUE
Control Yield per Acre	6,349	500	$5,015
Test Yield per Acre	7,844	618	$6,196
Pounds per Unit	2.21	28	
Average price per unit	$0.79	$10.03*	
Microbial Product	Quantum	None	
Application Rate (gal/acre)	1.00	0	
Fertilizer Expense per Acre	$180.95	$235 (standard)	
Percent Reduction in Fertilization Program	23%	0	

Note: *Each carton contains 1 1/9 bushels each weighing 28 lbs.*

** Price of $10.03 per carton is the average price for all sizes of green peppers in the month of October 2012 at the Philadelphia shipping terminal.*

The following financial analysis defines the return on investment of using **Quantum Growth®** in this growth cycle based on these benefits:

- A crop worth $6,196.00 was harvested in the treated plot versus a harvest worth $5015.00 without treatment, a $1,495 increase revenue per acre.
- In addition, this increase was achieved using 23% less fertilizer for a savings of $54.05 per acre.

RETURN ON INVESTMENT CALCULATION	
Yield increase per acre	$ 1,180.99
Microbial Expense per acre	40.00
Microbial Expense per acre	$ <54.05>
Net change in Fertilization Expense per acre	$ <14.05>
Net Gain (Loss) per acre	$ 1,195.04
ROI Multiplier for Microbial Expense	$ 29.88

This ROI analysis shows that this growth cycle achieved $29.88 additional revenue for every dollar spent on **Quantum Growth®**.

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Squash Harvest in Georgia Increased by 30% with Quantum Growth®

Location: **H&R Farms, Glenville, GA**

Background: In such a competitive market farmers are always looking for means of assuring and improving their harvest. Squash is produced on over 46,000 acres in the US producing crops worth almost $250 million (2010).

Objective:

H&R Farms heard of the benefits claimed by users of Quantum Growth® products and decided to run a trial on their farm. Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc (ELI),** who developed and manufactures the technology.

Results Achieved

The technologists at EAM developed a protocol for inoculating a trial section of the farm with Quantum Growth®. The evidence of faster, healthier growth was evident just 16 days after planting.

Fig. 1: *Early growth shows obvious benefit of inoculation with Quantum Growth®.*

Squash Harvest in Georgia Increased by 30% with Quantum Growth®

Fig. 2: *The increased plant growth results from increased root mass in plants treated with* ***Quantum Growth®*** *. This picture shows the difference between treated and control plants just 16 days after planting.*

At harvest, the treated crops showed a 30% increase in yield versus control, from 8,800 to 11,424 average pounds per acre. The treated plants appeared significantly healthier throughout the trial.

The microorganisms in Quantum Growth® work naturally to provide food and energy for plants allowing them to focus on root growth and fruit production. This results in a healthier, hardier plant with increased yields and decreased dependency on supplemental irrigation, fertilizer, and pesticides.

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CS10306

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Pennsylvania Farm Increases Tomato Yield by 39% with Quantum Growth®

Quantum Growth

Location: **Nolt Farm, Pennsylvania**

Background: The Nolt Farm had experienced excellent results from utilization of Quantum Light and VSC on a number of crops. They decided to extend the use of Quantum Growth® to their tomatoes.

Objective: Using a dosage rate of a total of 64 ounces (1/2 gallon) per acre at planting, the farm recorded results with the following photographs.

Results Achieved

The pictures below shows a comparison of root mass in young treated versus untreated tomato plants.

Fig 1 & 2: *The pictures above shows control root mass (left) is much smaller than the root mass of the plant treated with* ***Quantum Growth®****. The picture at the right again shows much larger root mass (left) in the* ***Quantum Growth®*** *treated plant versus the control plant.*

Fig. 3 & 4: *Treated plants (on right) showed 39% increased yields of tomatoes and provided an earlier harvest.*

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.

www.EcologicalLabs.com

CS10307

Renowned Agronomist Validates Increased Iowa Corn Yield with Quantum Growth®

Quantum Growth

Location: **Corn Crop, Algona, Iowa**

Background: **Dr. Michael McNeil** is an agronomist well known for his studies on modern practices of agriculture. His results have led to his activism against the use of GMO crops and glyphosate as he leads efforts to reduce the detrimental effects of these practices. Active as a crop advisor through his company, Ag Advisory Ltd., he is also a practicing farmer growing corn and soybeans in Iowa. He is highly sought after speaker addressing the falling yields in GMO and glyphosate-treated crops.
Based on data characterizing the detrimental effect of glyphosate on crops,

Objective:

Dr. McNeil claims the mineral-binding deficiencies responsible for killing weeds also contributes to decreased crop yields. As the levels of glyphosate in soils increase due to slow degradation and increased usage, soil biology and resulting crop yields suffer. Dr. McNeil understands the value of beneficial soil biology to maximize crop quality and yield.

In 2012, Dr. McNeil decided to test the use of Quantum Growth® as a means of increasing corn yields. A "strip trial" was developed where by a field was divided into four strips each containing 12 rows. The two outside strips were check or control strips. The inside two strips were treated with Quantum Growth® with low analysis starter fertilizer as opposed to normal fertilizer used in the control strips. The center 6 rows of each strip were harvested separately and assayed for yield and grain moisture.

Results Achieved

The data from this experiment shows that treatment with Quantum Growth® with reduced fertilizer increased the yield of corn by 8.7% in spite of 7% reduction in corn moisture.

Treatment	Corn yield (bushels per acre)	Grain Moisture (Percent)
Check 1	139.7	16.1%
Quantum 1	154.2	14.7%
Quantum	151.8	15.5%
Check 2	141.8	16.4%

Note: *Average yield of treated strips was 153.0 bushels versus the average control strip yield of 140.75 bushels.*

This increase in yield and resistance to stress was accomplished in spite of reduced fertilizer usage. It was also noted that where corn was planted on an end row that was severely compacted from hauling liquid hog manure to the field, rows treated with Quantum Growth® were normal in appearance while the untreated rows were severely stunted.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.
www.EcologicalLabs.com

CS10308

Made in the USA

Quantum Growth® Increases Cabbage Outplanting Survival from 70% to 90% in Hastings , FL

Quantum Growth

Location: Cabbage Farm, University of Florida, IFAS Center, Hastings, FL

Background: To speed the growing season, cabbage plants are often nursery grown and transplanted to the field. This process generates a re-planting to replace plants that did not survive.

Objective: Replanting is a labor-intensive process adding significantly to the cost of the crop. In this farm's experience, approximately 30% of the plants required re-planting. They wanted to utilize natural technology to reduce this cost.

Results Achieved

When researching natural technologies, Quantum Growth® products stood out. Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc (ELI),** who developed and manufactures the technology.

AEM agreed to design a protocol utilizing Quantum Growth® to improve transplant viability. The test was conducted in conjunction with Dr. Amanda J. Givens of U. of Florida, department of IFAS Plant Pathology.

Fig 1: *The rows on the right were treated while the rows on the left, were grown by standard practices normally used by the farm. There is a clear delineation showing the beneficial effects of Quantum Growth®.*

In the words of Dr. Givens, "Initial observation of the treated areas indicated a reduction in the need for re-setting cabbage transplants. Approximately 30% of untreated field area required re-planting while less than 10% of the Quantum Growth® treated field area required re-planting."

In addition to this labor and cost advantage, the picture below shows increased growth of treated plants, a factor which should result in earlier harvest providing a significant marketing advantage.

Use of Quantum Growth® increases food and energy available to plants, allowing them to increase root growth and fruit production. This results in a healthier, hardier plant with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.

www.EcologicalLabs.com

CS10309

Quantum Growth® Dramatically Increases Size of Corn Plants in Elysburg, PA, While Reducing Nutrient Requirement

Quantum Growth

Location: **Knoebel Farm, Elysburg, PA**

Background: Mr. Knoebel farms 1500 acres in Pennsylvania and manages large swine facilities where he uses MICROBE-LIFT®/HOG to assist in manure management and to provide a high value fertilizer for his fields. Corn is an important feed supply and, as most farmers, he continually looks for means to achieve yield improvements.

Objective: For years, Mr. Knoebel has utilized 5000 gallons of treated manure per acre to fertilize his fields and increase yields. This manure is tilled into the soil well in advance of planting.

Recently, he conducted a study to determine if the application of Quantum Growth® could further enhance his corn yields by increasing water retention and nutrient availability, fixing nitrogen, and replenishing soil biology.

Treatment:

A treatment program was initiated according to the following dosage schedule:

Treatment	Corn yield (bushels per acre)	Grain Moisture (Percent)
Check 1	139.7	16.1%
Quantum 1	154.2	14.7%
Quantum	151.8	15.5%
Check 2	141.8	16.4%

Results Achieved

Compared to his original fertilization program, the additional treatment with Quantum Light and VSC produced dramatic results.

Plants grown in section 2 showed a larger root mass within three days and grew to twice the size of control plants within 16 days. Plants in Section 3 showed 10 to 20 times the root mass when compared to the control and produced a 15 to 20 times larger plant.

Fig 1: *From the control on the left (section 1) to the 1 gallon per acre treated (section 2) in the middle and the 2 gallon per acre treated plant on the right, dramatic differences in root mass and plant size are seen.*

With similar results, the Wen-Crest Farms in Lebanon, Pennsylvania treated their corn crop with a total of 1 gallon per acre. The results are evident in the picture below with treated corn stalks 40-50% larger than untreated stalks.

Fig. 2: *Wen-Crest farm treated at 1 gal/acre. Note the taller treated stalks on the left compared to the control stalks on the right.*

The combination of Quantum Light and Quantum VSC dosed at one to two gallons per acre consistently produces faster growing corn, and higher yields.

Use of Quantum Growth® increases food and energy available to the plant, allowing them to increase root growth and yield. This results on a healthier, hardier plant with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.

www.EcologicalLabs.com

CS10310

AGRICULTURE - CROP ENHANCEMENT

10400 FRUIT

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.

www.EcologicalLabs.com

CS10400

Made in the USA

Quantum Growth® Produces Record Fast Growth for Omena Organics' New Cherry Orchard in Arizona

Location: **Omena Organics Farm, Sulfur Springs Valley, Arizona**

Background: Bob Weaver grows cherries in Leelanau County, Michigan. His orchard includes several hundred acres of conventional and organic--grown red tart (sour) and sweet cherry trees. Michigan is the cherry capital of the world but Weaver's passion for cherry production led him to consider expansion to other states. Topping his list of options were Washington and Arizona. Weaver purchased 40 acres in Sulphur Springs Valley in southeastern Arizona and planted 141 trees per acre in 2009.

Objective: This was the first commercial red tart cherry farm in Arizona, a true adventure for Bob. His growing techniques had to be revised for a different climate. At 5000 feet above sea level, warm, arid conditions during the day were mixed with cold evenings providing the chill required to promote proper fruit set. Bob wanted to maintain natural conditions as much as possible.
When researching natural technologies, Quantum Growth® products stood out. Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc (ELI)**, who developed and manufactures the technology.

Results Achieved

When contacted, AEM's technical representatives proposed a treatment plan for Omena Organics' Arizona orchard. Bob decided to nurture his transplanted trees with the sole use of Quantum Growth® and water, excluding the use of other fertilizers. The following pictures show the results:

In the first seven weeks after planting, the trees had received a total of five quarts per acre Quantum Growth® and approximately three gallons of water per tree daily.

Fig 1: *Twig tree shows a bud within a week of planting.*

Fig 2: *shows a pen along side a branch of almost the same size, and a substantial leaf several weeks later.*

Fig 3: *Tape measures 18' new growth at seven weeks.*

Fig 4: *Down the row shot at seven weeks.*

Use of Quantum Growth® allowed the plants to pull nitrogen from the atmosphere eliminating the need for, and potential damage from, fertilizer. It also stimulated rapid growth, and improved soil water retention.

These trees showed 18" of new growth. Bob Weaver declared,

> *"In Northern Michigan I would only hope for 18" of growth over a season, not just in seven short weeks. In my wildest dreams I would not have expected this aggressive tree growth".*

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.

www.EcologicalLabs.com

CS10401

Produce Healthier, Beautiful Strawberries at Lower Cost with Quantum Growth®

Quantum Growth

Location: Stoney Meadows Farm, Dracut, Massachusetts

Background: Stoney Meadows Farm was founded as an apple orchard in 1820. Today they grow herbs, fruit, and flowers for use in manufacturing soaps, oils, and gifts. They have developed a substantial hydroponics system for growing strawberries.

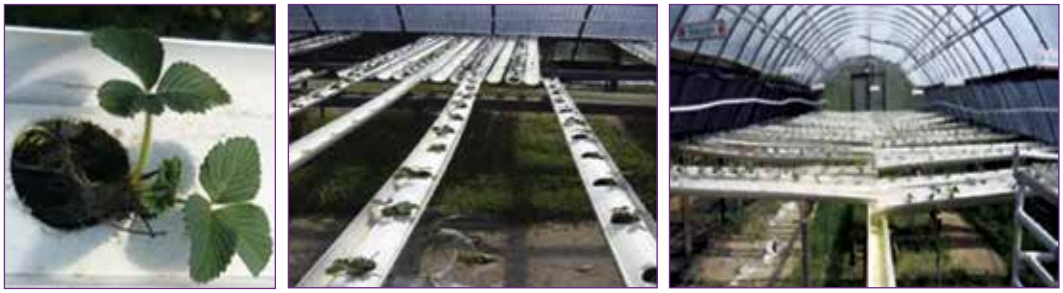

Fig.1: *This picture shows the operational strawberry growth facility.*

Objective:

The market for strawberries is highly competitive with demand for tasty, beautiful fruit at a competitive price.

Results Achieved

Based on the goal of producing better fruit at the same or lower cost, owner Jim Munger researched Quantum Growth® technology.

Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc (ELI),** the company that developed and manufactures the technology. Green Earth Agriculture is a key distributor for AEM.

After applying Quantum Growth® as recommended by the Green Earth technical representative, Jim was pleased to discover that he could reduce his fertilizer by 50% and completely eliminate the use of pesticides. Quantum Growth® helped stabilize the water pH as well.

Not only was his fruit ready for market two weeks earlier than expected giving him a significant market advantage, but the markets bought up all of his strawberries which were more symmetrical than the fruit that other farms were producing.

For more information on Quantum Growth® Products call Green Earth Agriculture 866-374-5101 www.greenearthagcom

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.

www.EcologicalLabs.com

CS10402

Strawberries in Israeli Greenhouse Regained Healthy Growth When Treated with MICROBE-LIFT® Technology

Quantum Growth

Location: **Israel**

Background: In 2012, an established greenhouse in Israel was experiencing a severe disease problem on their strawberry crop. The leaves were turning yellow which advanced to brown eventually drying the leaf. On close examination, it was apparent that disease was spreading from the base of the plants. This growth was identified as sclerotinia, the most nonspecific, omnivorous, and successful of fungal plant pathogens. Plants susceptible to this pathogen include over 361 species in 64 different plant families (Purdy, 1979) These plants demonstrated the typical dry lesions on stalks, stems, and branches. In this disease fungi attack the root and stem at the soil line. Typically lesions interfere with vascular flow causing silting and eventual death. Often a white mycelial mat appears that may eventually turn black in color.

Objective:

The greenhouse manager wanted to interrupt the disease progression in hopes of saving some marketable fruit from the crop. A program based on Ecological Laboratories core technology, sold under the Quantum Growth® brand, was recommended to promote the plants natural disease resistance and restore the health of the plants. A heavy dose including four ounces each of Quantum Light, Revive, and VSC were applied twice a week with irrigations and 2 ounces each of Quantum Light and Revive were diluted and used as a foliar spray daily.

Results Achieved

Plants began to respond after the first week of treatment. After two weeks of treatment the grower observed new broad, green foliage supplanting the old dead foliage, evidence of improved functioning of the vascular system. The disease and dramatic restoration of healthy plants is best shown by pictures.

Fig. 1: *Leaves show symptomatic yellowing followed by brown color and eventually death as seen in picture on the left.*

Fig. 2: *Plants show evidence of disease as lesions form at the base of most plants.*

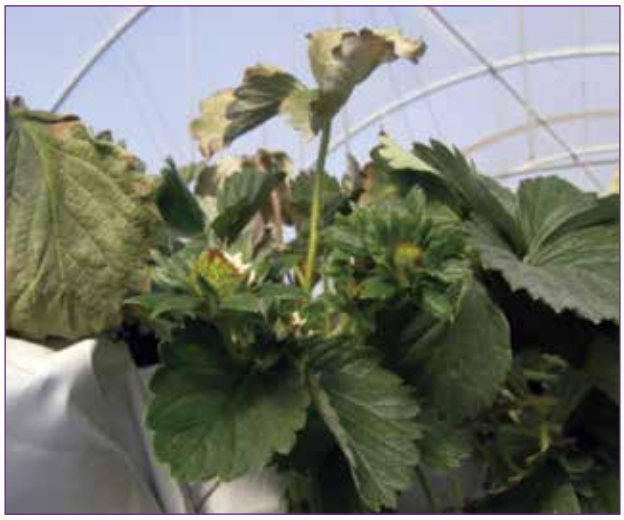

Fig. 3 & 4: *After the first week of treatment some new green growth is evident sprouting among the brown leaves.*

The plants continue to recover with healthy growth as seen in the following pictures.

Fig. 5: *Green growth and healthy sprouts continue to dominate over the brown, diseased plant sections.*

Fig. 6: *After only two weeks of treatment healthy growth becomes more obvious and eventually the entire crop responded with uniformly improved growth.*

Conclusion:

As the result of four weeks of treatment with MICROBE-LIFT® (Quantum) technology, this greenhouse was back in business. After almost losing the entire crop, it was able to recover plant health and produce a marketable crop.

Strawberries in Israeli Greenhouse Regained Healthy Growth When Treated with MICROBE-LIFT® Technology

Fig. 7: *Treated plants turned a lush green with healthy plants and fruit replacing stunted, brown, dying plants. The recovered plants are producing a good yield of healthy strawberries.*

Based on treatment with MICROBE-LIFT® technology, marketed under the Quantum Growth® brand, the infected plants were able to rally their natural defenses to resist and overgrow the fungus. Healthy growth continued and these same plants produced a healthy crop.

Ecological's unique consortium of microbes contains highly specialized microbes which provide the following benefits which promote growth and increase the plant's energy and health helping it thrive in spite of pathogens and less than ideal conditions:

- Increase plant nutrition by fixing nitrogen and carbon from the atmosphere
- Provide readily available phosphorus by solubilizing phosphates
- Convert organics and minerals to usable forms
- Produce growth-promoting hormones such as IAA, gibberellins, and cytokinen
- Breakdown toxic metals and organics
- Work synergistically with the indigenous population, supporting and enriching soil biology to maximize potential benefits from the entire biological population.

With increased nutrition, health, and energy the success of these plants is dramatic. This nursery recovered the full crop for a successful yield without the use of chemical pesticides.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.
www.EcologicalLabs.com

CS10403

AGRICULTURE - CROP ENHANCEMENT

10500 OTHER CROPS

10502	Testing Confirms Increased Water Retention with Quantum Growth® at Ace Hardware in Jacksonville, FL
10503	Increased Out-planting Survival & Rapid Growth of Pine Trees with Quantum Growth®
10504	Quantum Growth® Increases Number and Frequency of Orchid Blooms for Florida Orchid Grower
10505	Ace Garden Center Increases Profitability and Customer Satisfaction Using Quantum Growth®
10506	Seedling Needle Turgor & Root Mass Increase in Just 30 Days with Quantum Growth®
10507	Quantum Growth®Increases Alfalfa Yield by 11 to 23% Plus Increased Nutritional Value on Southern California Farm
10508	Quantum Growth® Produces Increased Flower Blooms in Green House While Reducing Fertilizer Requirement
10509	Hydroponics Store Shows Increased Water Retention of Lettuce During Accidental Drying Incident
10510	Quantum Growth® Helps Sunset Farms increase Yield and Decrease Growing Time of Flowers in California
10511	MICROBE-LIFT® Technolog [Quantum Growth®] Increases Cotton Yield in California with Less Fertilizer
10512	Quantum Growth® Trial for Oil Palm Pre-Nursery Stage in Indonesia
10513	RICE–

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.
www.EcologicalLabs.com

CS10500

Made in the USA

Testing Confirms Increased Water Retention with Quantum Growth® at Ace Hardware in Jacksonville, FL

Quantum Growth®

Location: **AEM Nursery Trial For Ace Hardware, Jacksonville, FL**

Background: Every nursery has to deal with management of stock with watering being a major part of inventory control. Too often stock is lost or sold at a discount because it became too dry. Customers using Quantum Growth® consistently claim improved moisture retention.

Objective: This test was set up to validate the benefit of moisture retention with Quantum Growth® technology.

Results Achieved

Two "equivalent" Vinca plants were selected; one of the plants was watered with 6 ounces of a 2% solution of Quantum Growth® while the other "control" plant was watered with 6 ounces of water. No additional watering was conducted for the remainder of the trial. The plants were maintained under roof and received no rainwater.

***Fig. 1**: Two "equivalent" plants after watering with 6 ounces of water (left) and 6 oz of 2% **Quantum Growth®** (right).*

***Fig. 2:** The treated plant is healthy and turgid, showing no signs of water deprivation. In fact, the treated pot was heavier than the control due to retained moisture. The control plant on the left is obviously in decline caused by drought.*

After six days in Florida heat without watering, the plants looked very different. The control showed a high level of drought stress while the treated plant showed no sign of stress. The treated plant remained healthy and turgid and the control pot has lost more weight than the treated plant due to loss of more moisture. This effect is easily reproduced and is consistently noted by users of Quantum Growth® technology. It is postulated that in addition to supplying nutrients, hormone precursors, and compounds that discourage disease, the microbial consortium in Quantum Growth® produces beneficial polymers and causes soil structure changes that help retain moisture.

Use of Quantum Growth® not only increases food and energy available to the plants, allowing them to increase root growth and bloom production, but it also helps the soil retain moisture. This results in a healthier, hardier plant that grows faster, produces more, with decreased dependency on added moisture.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.
www.EcologicalLabs.com

CS10502

Made in the USA

Increased Out-planting Survival & Rapid Growth of Pine Trees with Quantum Growth®

Quantum Growth

Location: **Loblolly Pine Farm in Jacksonville, FL and Pine Tree Plantation, St. Augustine, FL**

Background: Once seedlings are transferred to soil the farmer knows that a percentage of them will be lost. Profitability depends in part on successful rates of survival.
These pine tree farmers wanted to improve the survival of their pine seedlings when they were transplanted. Applied & Experimental Microbiology (AEM) has a product line, Quantum Growth®, that increases transplant survivability of most transplants.

Objective:

This biotechnology-based product line, trademarked as Quantum Growth® is the result of a long-term partnership between AEM and **Ecological Laboratories Inc. (ELI)**, the company that developed and manufactures the technology.

AEM provided a treatment plan which recommended simply dipping seedling roots in a 30-gallon barrel that contained equal parts of Quantum Growth® Light and Quantum Growth® VSC at a 2% solution. One plot was to be transplanted seedlings using growers' best practices while an adjacent field uses growers' best practices plus the drench of Quantum Growth® solution prior to transplanting.

Results Achieved

The result, in two different farms, was a vastly improved survival rate and tree growth as seen in the following pictures.

Fig 1: *On the plot without* ***Quantum Growth®*** *many seedlings did not survive and the trees are relatively small.*

Fig. 2: *Taken at the same time as the picture above, this picture shows trees growing from seedlings treated with* ***Quantum Growth®*** *with significantly improved survival and the trees are well advanced in growth compared to control and are generally healthier.*

Likewise, similar results were seen at a former Rainier Timber site that is now a private pine tree plantation in St. Augustine, Florida.

Fig. 3: *Control pine on the left received fertilizer only. Quantum Growth® trees received fertilizer at half rate along with one-half gallon per acre of Quantum-Light and one half gallon per acre of Quantum-VSC.*

Fig. 4: *Note the density and shade of green in the treated seedlings on the right versus the untreated seedling on the left in spite of the fact that with Quantum Growth® microbial treatment fertilizer was cut in half.*

These results demonstrate a very cost-effective method of increasing growth rate and survivability of these pine trees while reducing the cost and potential run-off of fertilizers.

Use of Quantum Growth® increases food and energy available to the plant, allowing them to increase root growth and fruit production. This results on a healthier, hardier plant with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.

www.EcologicalLabs.com

CS10503

Quantum Growth® Increases Number and Frequency of Orchid Blooms for Florida Orchid Grower

Quantum Growth

Location: **Orchid Grower, St. Augustine, FL**

Background: An avid orchid grower, Paul Jones who is active in the St. Augustine Orchid Society, maintains over 100 orchid plants. He had been using a microbial additive with success for a number of years when he decided to test Quantum Growth®

Objective: The main objective for any type of flower fertilizer program is to develop healthier plants with increased root growth that can support increased blooms. In this case, the grower was growing Cattleya orchids.

Results Achieved

Within two weeks of switching from his previous microbial additive to Quantum Growth® , this grower saw a pronounced increase in new root production. This was followed closely by lush new growth and then blooms. Several strains of Cattleya plants that had bloomed once yearly for the past four years were now blooming 3 -4 times a year with Quantum Growth® .

The most dramatic results seen was with an Oncidium Sharry Baby "Sweet Fragrance" plant that literally exploded in growth. Just two months after starting with Quantum Growth® this plant had produced five separate flower spikes each one over three feet long with branching inflorescences. This plant had over 150 blooms. Numerous other types of orchids had similar results.

Paul also saw excellent results in developing roots on new cuttings. Dozens of new roots were developed in just two weeks. One Cyprus mount completely rooted in less than two months.

In the words of Paul Jones,

> *"I use on all my orchids. No other type of fertilizer is ever used nor will it (be used) in the future. Quantum Growth® is all natural and I do not need to worry about ppm levels of artificial chemicals. I highly recommend any orchid grower give it a try on your plants, you will not regret it!"*

Use of Quantum Growth® increases food and energy available to the plant, allowing them to increase root growth and fruit production. This results in a healthier, hardier plant with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.
www.EcologicalLabs.com

CS10504

Made in the USA

Ace Garden Center Increases Profitability and Customer Satisfaction Using Quantum Growth®

Location: **Ace Hardware Garden Centers, St. Augustine, FL & Evans, IL**

Background: Garden Centers are a highly competitive business where visual plant health and blooms are very important. A significant effort is required for plant watering, sunscreen, and protection against pathogens. Inventory loss is always a significant cost. Profitability is dependent on controlling this loss.

Objective: Quantum Growth® is a series of products that is the result of a unique partnership in agricultural technology development between **Ecological Laboratories** and Advanced & Experimental Microbiology.

Based on successful application to major agricultural crops, this testing was conducted to determine the benefits of using Quantum Growth® in garden center operations. Potential benefits include:

- Improved water retention
- Increased flower yield
- Improved disease resistance
- Increased plant health
- Faster seed germination
- Reduced fertilizer requirement

Results Achieved

Every parameter measured showed a benefit of using Quantum Growth. The picture below shows increased flowering of Lantana plants in hanging baskets as a result of Quantum Growth® application.

Ace Hardware's Best Practices 08/21/09 | *Ace Hardware's Best Practices Plus TG Quantum Growth® Applied weekly (3 weeks)* | *Ace Hardware's Best Practices 09/11/09* | *Ace Hardware's Best Practices Plus Quantum Growth® Applied weekly (3 weeks)*

***Fig. 1**: With the same fertilizer and watering protocols duplicate plants were treated with **Quantum Growth®** added to their water supply. Treated plants on the right of each pair showed a dramatic increase in flowering, a factor that increases marketability.*

Ace Garden Center Increases Profitability and Customer Satisfaction Using Quantum Growth®

Janet Skimmer, the Ace Garden Center Manager in St. Augustine, FL, claimed,

> *"I've used Quantum Growth® both personally and professionally and this is truly a miracle product."*

Janet uses one-tenth the amount of fertilizer, fungicides, and insecticides compared to her use prior to using Quantum Growth®. She also noted that the plants require less water when treated with Quantum Growth®. Quantum Growth® treated plants do not suffer from the heat stress that is characteristic of the untreated plants.

> In side-by-side comparisons, Quantum Growth® treated plants always look healthier and have more blooms than untreated plants. In fact, when the center has plants that don't look as well as other plants, Janet treats them with Quantum Growth and "I see immediate recovery".

Janet much prefers to use Quantum Growth®, a non-toxic, organic product, on herbs and vegetables than chemicals.

Janet states that she derives great satisfaction from the use of Quantum Growth®.

> *"My customers at the garden center are always coming up to me to tell that I have the best looking plants in the area."*

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.
www.EcologicalLabs.com

CS10505

Made in the USA

Seedling Needle Turgor & Root Mass Increase in Just 30 Days with Quantum Growth®

Location: **International Forest Company, Moultrie, GA**

Background: Large forest companies routinely re-plant harvested forests. Robust tree survival and growth are essential to a profitable business model.

Objective: A company planting Longleaf Yellow Pine Seed decided to test the benefits of using biological growth additives.

Based on prior data in forestry, Quantum Growth® products appeared to have excellent potential. Quantum Growth® is a series of biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc. (ELI),** who developed and manufactures the technology.

AEM provided a treatment plan for a test plot of one acre for approximately 900,000 container seedlings. Initial application of 1 gallon Quantum VSC and 1 gallon of Quantum Light was applied by a chemical injector through overhead irrigation just after seeds were put in flats.

A second application of the same dosage was applied through the overhead irrigation system two weeks later.

Results Achieved

After 30 days, needle vigor and root mass increase was pronounced as evidenced in the following pictures.

Fig 1: *Seedlings treated with* ***Quantum Growth®*** *are on the left in each picture. The visual evidence would indicate root mass increase on inoculated trees is greater than 25%.*

Seedling Needle Turgor & Root Mass Increase in Just 30 Days with Quantum Growth ®

Fig. 2: *In the picture on the left, the four plugs were sampled from the trees treated with growers' best practices plus* ***Quantum Growth®****. The four plugs in the picture on the right have been grown with best growers practices only.*

In the treated tree plugs roots are more evenly spread throughout the treated plugs on the left in the above picture. The microorganisms in Quantum Growth® distributes water more evenly in the soil. The roots in the picture on the right show roots extending out the plug following the water that has filtered through the soil as opposed to being absorbed and contained as in the treated plugs. Moisture retention will be especially important as these trees grow in the forest with only natural rainfall or moisture.

Fig. 3: *The tree on the left has been treated with* ***Quantum Growth®*** *. Root mass and root collar diameter of the inoculated trees are improved.*

These results demonstrate a very cost--effective method of increasing growth rate and survivability of these trees. Use of Quantum Growth® increases food and energy available to the plant, allowing them to increase root growth and fruit production. This results in a healthier, hardier plant with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

For more information on MICROBE-LIFT® Technology contact

Ecological Laboratories Inc.

www.EcologicalLabs.com

CS10506

Quantum Growth® Increases Alfalfa Yield by 11 to 23% Plus Increased Nutritional Value on Southern California Farm

Location: **Southern California Farm**

Background: This southern California farm had an alkaline, clay based soil planted with hybrid alfalfa WL625 HQ.

Objective:

This test was designed to determine the effect of Quantum Growth® on yield and quality of alfalfa when applied as an addition to grower's best practices and to determine return on investment of any benefits provided.

Quantum Growth® is a series of unique biological products marketed by Applied & Experimental Microbiology (AEM) of Jacksonville, FL. This biotechnology-based product line is the result of a long-term partnership between AEM and **Ecological Laboratories Inc (ELI)**, who developed and manufactures the technology.

AEM's technical representatives provided a treatment plan and assisted in initiating the program. In the experiment four 1.5-acre blocks were designated as side by side treated vs. control:

Block 1:	Control
Block 2:	1 gal Quantum-VSC applied with boom sprayer in late April 8 oz Quantum-VSC & 8 oz Quantum-Light within one week after each cut starting after second cut on July 18th.
Block 3:	Control
Block 4:	1 gal Quantum-Light boom sprayed in late April 8 oz Quantum-VSC & 8 oz Quantum-Light within one week of each cut starting after the second cut.

Samples were taken from Blocks 1 & 2 on April 30th and June 18th and sent to Harris Laboratories to determine differences in nutrient uptake levels. Each block was cut, raked and loaded into a weigh wagon to determine the yield in pounds. Additional samples were taken after the 4th cut. Samples were sent to Agri Analysis in Leola, PA for evaluation as dairy feed.

Results Achieved

Use of Quantum Growth® VSC and Quantum-Light had significant positive impact on the yield and nutritional value of the alfalfa. (Fig.1).

	Cut 1	Cut 2	Cut 3	Cut 4	Total	% Change
Block 1	No	14,320	16,453	14,100	44,873	
Block 2	X	21,140*	18,675	15,190	55,005	+23%
Block 3	X	14,250	13,152	14,110	41,512	
Block 4	X	15,125	14,512	16,510	46,147	+11%

Fig. 1: *Both Quantum treatments in block 2 and block 4 showed increased yields ranging from 11 to 23%.*

Color and density differences were observed on treated plants:

QUANTUM GROWTH® CONTROL

FIRST SEASON NEWLY SEEDED

Fig. 2: *A distinct color and density improvement was seen in the picture on the right. The root structure of treated plants also had a more complex and thicker root system.*

The difference is further demonstrated in the picture below. The treated blocks had a darker green and held their color to the base of the plant while the control tended to "brown out" at the base:

Fig. 3: *Shows the improved lushness including size, depth of color, and density of alfalfa on the plants on the left that had been treated with Quantum Growth.*

Quantum Growth® Increases Alfalfa Yield by 11 to 23% Plus Increased Nutritional Value on Southern California Farm

ROI

Dairy analysis of the alfalfa found the treated alfalfa of both VSC and LIGHT to have higher value of milk pounds per ton of dry matter. (lab reports available). In fact, in alfalfa from block 2 the grade was increased from Good to Premium and alfalfa from block 4 was raised from Good to Premium/Supreme. These improvements provide a substantial increase in profitability. The analysis of value based on quality follows:

Calculations are based on the California Weekly Hay Report supplied by USDA Market News for Friday Nov. 13, 2009, the day when the crop analysis was reported.

With Respect to the Return of Investment (ROI):

	Cut 1	Cut 2	Cut 3	Cut 4	Total	% Change
Block 1	No	14,320	16,453	14,100	44,873	
Block 2	X	21,140*	18,675	15,190	55,005	+23%
Block 3	X	14,250	13,152	14,110	41,512	
Block 4	X	15,125	14,512	16,510	46,147	+11%

This translates to additional income per acre of $188.10

This savings is very significant when multiplied by the total acreage planted.

Quantum Growth® increases food and energy available to the plants, allowing them to increase root growth and fruit production. This results in a healthier, hardier plant with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

Use of Quantum Growth® can provide a significant increase in profitability for alfalfa farmers.

For more information on MICROBE-LIFT® Technology contact
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www.EcologicalLabs.com
CS10507

Made in the USA

Quantum Growth® Produces Increased Flower Blooms in Greenhouse while Reducing Fertilizer Requirement

Quantum Growth

Location: **Large Commercial Greenhouse, North Carolina**

Background: The most successful greenhouse products are those healthy -looking plants with plenty of blooms. Quantum Growth® products are known to enhance the growth rate, number of blooms, and increased water retention of nursery plants, often with less fertilizer added.

Objective: Each commercial greenhouse wants to validate the benefits of new technology in their own nursery. In this case, a section of the petunia plants were treated and evaluated versus the untreated control plants. Since this greenhouse was also interested in fertilizer savings, they set up separate sections with different fertilizer levels to evaluate how much the fertilizer can be reduced without sacrificing quality of the plants.

Results Achieved

Matured plants showed dramatically increased blooms and better plant structure even without any added fertilizer.

0 ppm 40 ppm 80 ppm **Fertilizer Rate** 0 ppm 40 ppm 80 ppm

CONTROL QUANTUM GROWTH®

The picture above demonstrates the increased blooms in treated plants. In addition, the above picture is a dramatic example of nitrogen fixation. The purpose of this trial by a commercial greenhouse was to compare fertilizer versus fertilizer and Quantum-1 and also determine what amount of fertilizer dosage was optimal with Quantum-1. As you can see, the 0 ppm fertilizer and Quantum-1 flat performed exceptionally well. This is an excellent example of how, in the absence of applied nitrogen, the Quantum-1 organisms sequestered atmospheric nitrogen to sustain growth. This picture also demonstrates the negative effects of excess nitrogen, as illustrated in the rightmost two flats. Excess Nitrogen leads to unregulated growth, characterized by pronounced stem elongation and lack of blooms as the plant allocates all of its resources to growth and not reproduction.

Use of Quantum Growth® increases food and energy available to the plants, allowing them to increase root growth and bloom production. This results in a healthier, hardier plant with decreased dependency on supplemental fertilizer. Other studies have shown that Quantum Growth also decreases dependency on added water and pesticides.

For more information on MICROBE-LIFT® Technology contact

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CS10508

Made in the USA

Test Confirms Increased Water Retention with Quantum Growth® in Lettuce Plants

Quantum Growth

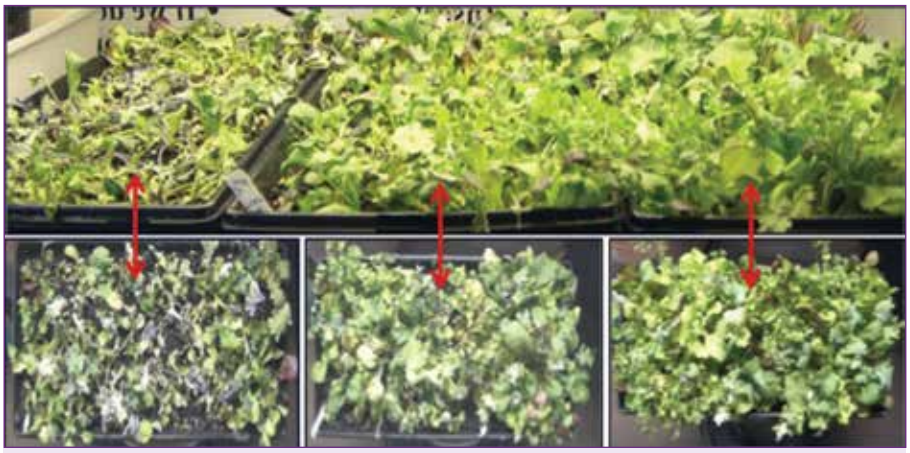
Location: **Hydroponics Store**

Background: This "test" occurred when a hydroponics store was testing the beneficial effects of Quantum Growth®.

This was an accidental situation whereby grow lights were left on over a long 3-day weekend during this test at a hydroponics store. Excess heat dried the flats more than expected and the results were dramatic. The original test targeted increased growth and healthier plants.

Results Achieved

Three flats were prepared with lettuce seeds. The first was grown by standard growers practice. The remaining two were grown by standard growers practice but with added treatments of Quantum Growth® solution. All plants received the same water and ambient moisture.



CONTROL | QUANTUM GROWTH® Low rate (0.25 oz/gal) | QUANTUM GROWTH® Normal rate (2 oz/gal)

Fig. 2: *The 2 oz/gal treated plants are healthy and turgid, showing no signs of water deprivation. Even the low rate of 0.25 oz/gal showed substantially healthier plants than the highly damaged control plants.*

Drought and sun damage are common challenges in farming produce such as lettuce. After tree days with constant exposure to grow lights in a hydroponics store, the lettuce that was treated with the standard dosage of 2% Quantum Growth showed no signs of drought or sun damage. The plant with the very low dosage (0.25%) also showed substantial resistance to drought and sun damage.

By comparison, the control plants were destroyed. This is a dramatic example of the moisture retention capabilities of Quantum Growth® technology.

This moisture retention effect of utilizing Quantum Growth® is shown consistently with many types of plants. It is postulated that, in addition to promoting a significantly more extensive root system, the microbial consortium in Quantum Growth® produces beneficial polymers and causes soil structure changes that help retain moisture.

In addition, the use of Quantum Growth® increases food and energy available to the plants, allowing them to increase root growth and production. This results in a healthier, hardier plant with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

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Made in the USA

Quantum Growth® Helps Sunset Farms increase Yield and Decrease Growing Time of Flowers in California

Quantum Growth

Location: **Sunset Farms/Sweetfield Flowers, Jamul, CA**

Background: This farm plants seedlings in screened houses exposed to the elements. Beds are lined with newspaper then filled with new organic soil at the end of each season. Plugs of various flora are planted in separate 4 ft X 100 ft beds and flowers are harvested for use by restaurants for garnishes and salads. The flowers are sugar coated for use by bakeries for wedding cakes and other confections. They are also gold dusted for use by high-end cocktail lounges in specialty drinks and gold dipped for use as jewelry. A very high quality of blooms is required.

Objective: This field test was developed using the same 4 ft X 100 ft bed whereby a section of 30 linear feet was treated and 70 linear feet remained untreated as the control.

The treated area included plugs dipped in a 4% solution of Quantum-VSC and water, then planted and watered. Control plugs were simply planted and watered.

Results Achieved

Plugs treated with Quantum Growth® VSC showed the following results compared to the control plants:

1. The root ball structure of treated plugs was much thicker, a factor that leads to a healthier, faster-growing plant.
2. Better transplant survival rate of treated plugs was evident.
3. Quicker harvestable flowers resulted from treated plants
4. Increased yield of flowers was obtained from treated plants

The pictures below show the differences between treated plants and untreated controls.

Fig. 1: *This picture was taken two weeks after treatment and planting on 10-07-08. Note the difference in thickness of the roots. The control plant is on the left while the treated plant with larger root ball is on the right.*

Quantum Growth® Helps Sunset Farms increase Yield and Decrease Growing Time of Flowers in California

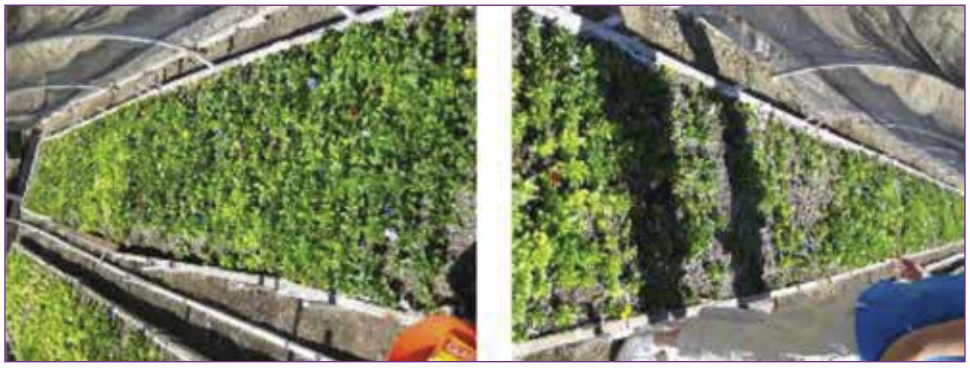

Fig. 2: *On 10-22-08, the treated flat on the left shows substantially higher survival than the control flat on the right.*

Fig. 3: *The roots of treated plants (right) consistently showed a thicker root system.*

Fig. 4: *The control on the left has produced 1 harvested flower and has 4 new buds forming while the treated plant on the right has produced 4 harvested flowers with three new buds forming.*

For this business, the use of Quantum-VSC provided greater yield and increased the speed of producing a marketable crop, both major factors in assuring profitability. This farm continues to utilize Quantum Growth, which provides it a competitive advantage in the marketplace.

Use of Quantum Growth® increases food and energy available to the plant, allowing them to increase root growth and flower production. This results in a healthier, hardier plant with decreased dependency on supplemental irrigation, fertilizer, and pesticides.

For more information on MICROBE-LIFT® Technology contact

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CS10510

MICROBE-LIFT® Technolog [Quantum Growth®] Increases Cotton Yield in California with Less Fertilizer

Quantum Growth

Location: **Cotton Farm, Buttonwillow, California**

Background: Like most agricultural operations, this cotton farmer is continually looking for cost effective solutions to optimizing yields in all types of weather and disease pressure conditions. Based on the results Microbe-Lift® technology, sold as Quantum Growth®, had achieved on other crops, he was anxious to determine potential benefits on cotton production.

Objective: The goals of the project were well defined:

1. Improve plant production volume including fiber, seed, and total weight
2. Increase production quality as determined by quality of fiber and seed
3. Improve plant health as determined by fiber and seed
4. Reduce nitrogen fertilizer use vs. standard recommended protocol

The design of the field test included five 10-acre plots. The control plot used standard fertilizer protocol with no Quantum Growth® applied. Each of the remaining plots were dosed with one acre per gallon of Quantum Growth® and various amounts of nitrogen fertilizer to determine optimal application parameters for the following season. Reductions in the application of anhydrous ammonia, ranging from 48% to 64%, were compared to the control that used the standard 250 units/acre. (One unit of fertilizer equals 1.2195 lbs. at a cost of $0.59 per unit)

Results Achieved

All plots with added Quantum Growth® increased the cotton yield per acre. Interestingly, the plots with reduced nitrogen fertilizer application performed better as the amount of fertilizer was reduced. This has been seen in field applications with other crops.

Plot	Quantum Growth®	NH_3 used Units/acre	NH_3 Reduction	Cost Savings Per acre	Yield Lbs Cotton	% Yield Increase
1	None	250	0	$ 0	5274	
2	1 g/ac	130	48	$ 71.71	5280	0.11
3	1 g/ac	120	52	$ 77.69	5334	1.14
4	1 g/ac	102	59	$ 88.71	5488	4.06
5	1 g/ac	90	64	$ 95.62	5648	7.09

With 64% reduction in ammonia fertilizer applied, a cost savings greater than the cost of Quantum Growth®, a yield increase of over 7% or 160 lbs of cotton per acre was achieved. Based on this study, further reduction in ammonia could produce additional yield increase for an even greater return on investment (ROI).

Using less than half the amount of ammonia fertilizer improved yield with the added advantage of reducing fertilizer runoff. Less fertilizer also mitigates salt build-up and negative effects of synthetic fertilizers on soil biology proving one more time the natural solution of Quantum Growth® not only improves growth and yield but it solves many of the problems resulting from farming with chemicals.

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CS10511

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Quantum Growth Trial For Oil Palm Pre-Nursery Stage.

Location: **Wilmar Benih Indonesia. North Sumatra, Indonesia**

Background: Quantum Growth® trial for tissue culture palm oil pre-nursery trial to improve health, growth rate and survival rate.

Results Achieved

Using the Quantum Growth® microbial innoculant improves the health of the seedlings and reduces the mortality rate by 50%. The trial seedling shows more uniformity in the growth rate.

The Experiment:

After coming out from the tissue culture stage, the oil palm seedling is put in acclimatization stage in the soil polybag with plastic cover in the green house over 45 day period. During this stage the mortality rate is about 20-25%. The batch of 208 seedling are separated into two groups, Control group and Quantum Growth® group.

Quantum Growth® Light (250ml) and Quantum Growth® VSC (250ml) are mixed into 10 liters of water to create a Quantum Growth®mixture with 5% concentration. The seedlings are dipped into fungicide for 1 hour before being dipped into the Quantum Growth® solution for 15 minutes, before being planted into the soil polybag. The soil polybag consists of top soil, compost and sand (10:3:1 ratio).

The Quantum Growth® Mixture is then applied to each polybag at 50ml (Quantum Growth® Light & Quantum Growth® VSC total is 2.5ml/tree).

At the end of 45 days after the acclimatization period, the seedlings are observed and measured.

Data

The Seedlings are categorzed into 3 different grades:

1. **Grade A.** Very healthy and good
2. **Grade B.** Moderate health and sellable
3. **Grade F.** Dead and rejected.

From The control and the Quantum Group the data collected are as follow:

Grade Control	(total 203 seedlings)	Quantum Growth® (203seedlings)
A	57 (28%)	77 (38)
B	101 (50%	103(50%)
F	45 (22%)	23 (11%)

Quantum Growth Trial For Oil Palm Pre-Nursery Stage.

Observation:

We notice that the color of the leaves has a more homogenous green in the Quantum Growth® group compared to the control group.

It is also noted that the uniformity of the seedling size in the Quantum Growth® group as compared to the untreated seedlings shown in the picture below:

Further studies

Further studies will be conducted on the group to see how Quantum Growth® can be utilized to improve the growth rate and reduce the usage of fertilizer to offset the cost of the chemical use.

PLANETBIRU INDONESIA
ENVIROTECH COMPANY SOLUTIONS FOR THE ENVIRONMENT

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CS10512

Quantum Growth Increases Rice Yield and Restores Soil in Indonesia

Location: **Indonesia**

Background: Indonesia achieved rice sufficiency in 1984. Between 1970 and 2006, Indonesia's average rice yield rose by 90% from 2.35 t/ha to 4.62% t/ha. Most of Indonesia's rice producing areas are in the island of Java.

Today, Indonesia is the 4th most populous country in the world. A population increase of 1.5% per year requires a corresponding increase in food supply.

Indonesia's rice consumption in 2010 was more than 139 kilograms per capita per year and is among the highest in the world. IRRI estimates that Indonesia will need 38% more rice in the next 25 years, which means that the average yield of 4.6 tons per hectare must rise to more than 6 tons per hectare to fill the gap. (source IRRI.org)

Factors Affecting Rice Yield

- Climate Factor (climate changes)
- Water supply (irrigation)
- Land & soil factor (type of soil, lowland or highland)
- Farming practices (overuse of fertilizer)
- Disease (blast, leaf blight, sheath blight, root rot etc.)
- Pest (insects, rats & birds)

Non-Sustainable Farming Practices

Past 40 years usage of synthetic N Fertilizer has increased 7 fold and usage of Pesticides increased 3 fold, but the yield of major food crop has only remained stable.*

Agricultural intensification and continuous cropping can result in a loss of soil organic matter leaving soil less fertile, which then drives increased application of synthetic N fertilizer and pesticides.

Pesticides reduce symbiotic efficiency of nitrogen-fixing rhizobia and host plants.

*Source: Pesticides reduce symbiotic efficiency of nitrogen-fixing rhizobia and host plants. By Jennifer E. Fox et al

Common Soil Bound Disease in Rice

- **Bacterial disease**
  - Bacterial leaf blight due to Xanthomonas Oryzae
- **Fungal disease**
  - Blast by Pyricularia Oryzae
  - Root rot due to Fusarium
  - Sheath Blight due to Rhizoctonia Oryzae

Conventional Approach of Increasing Yield

- Relies heavily on fertilizers and chemicals
- Overuse of these synthetic products destroy the microbial and other organism or the subterranean eco-system called the soil-web (The soil web is critical to all plants' health and hence their yield)

Solution:

Quantum Growth®

Quantum Growth® is a highly active microbial consortium of naturally occurring micro-organisms that function to restore soil and plant health. The micro-organisms are required to repair and support soil webs functions.

It was developed by Applied and Experimental Microbiology (AEM) with 35 years of experience in development of microbiology from Ecological Laboratories Inc (ELI).

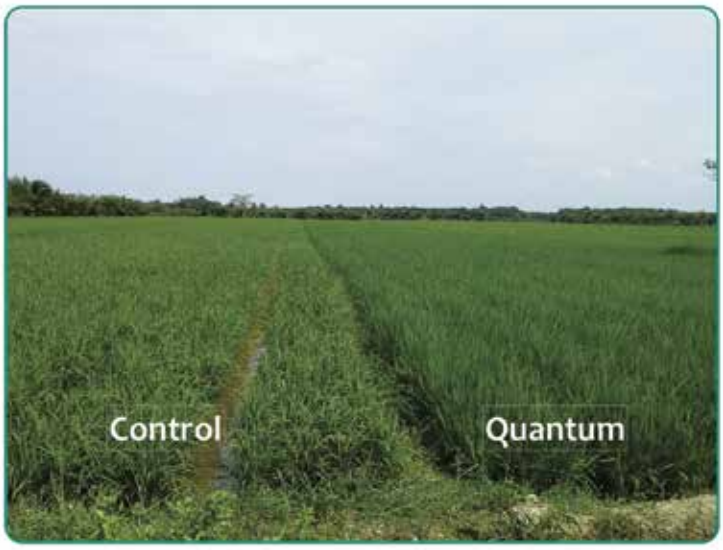
Quantum Growth® –The Sustainable Solution

- Revitalizes soil web with right biological products
- Most biological products are locally cultured, short in shelf-life , lack of organism types and ineffective
- Non-pathogenic and produced in an EPA and FDA registered facility
- Contain NO Chemical products, synthetic amino acids, hormones and/or genetically modified organisms (GMO)

Quantum Growth® Blast Diseases • Gebang, Langkat

2 weeks after application of Quantum Light, the rice field has been restored.

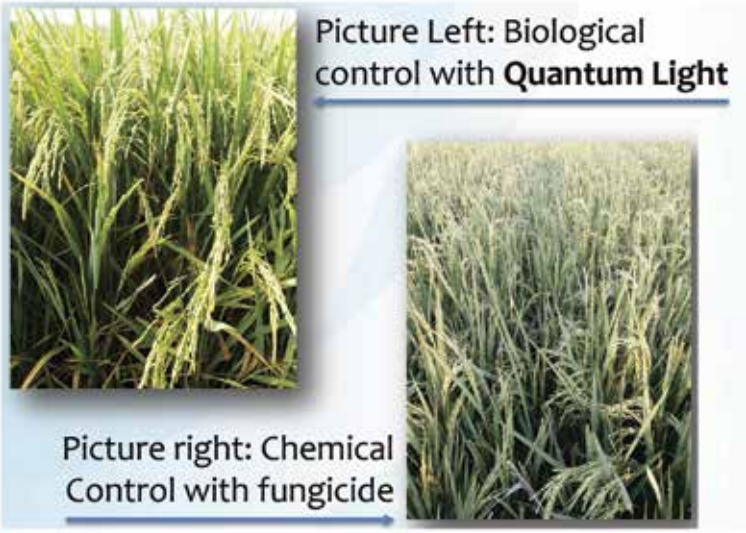
(week 5 after replanting)



Quantum Growth Increases Rice Yield and Restores Soil in Indonesia

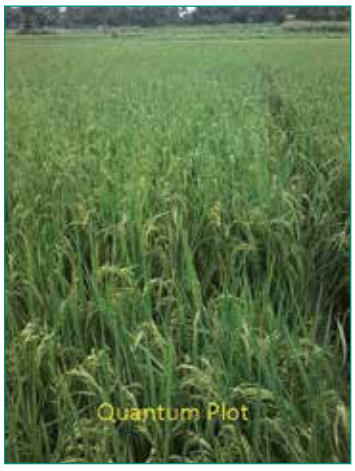
Quantum Growth® Blast Disease Control - Solo

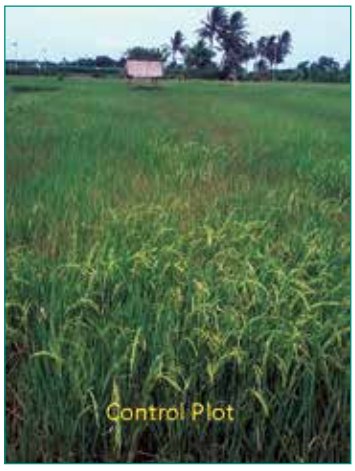
10 days after application with **Quantum Growth®**, the rice field is restored in the trial by Pak Mohd Ansori in Solo. Picture compared the microbe control vs the chemical control



Quantum Growth Leaf Blight Disease Control - Situbondo, East Java

- Rudi at Situbondo, East Java. He culivated 2500 sqm. His surrounding field has been under attack from bacterial leaf blight (BLB) caused by Xanthomonas Oryzae.
- His field has been resistant to pathogen attacks as shown in the pictures.





- Final yield is 937 kg, 30% increase from his average yield of 700 kg.
- The control field only yields less than 300 kg.

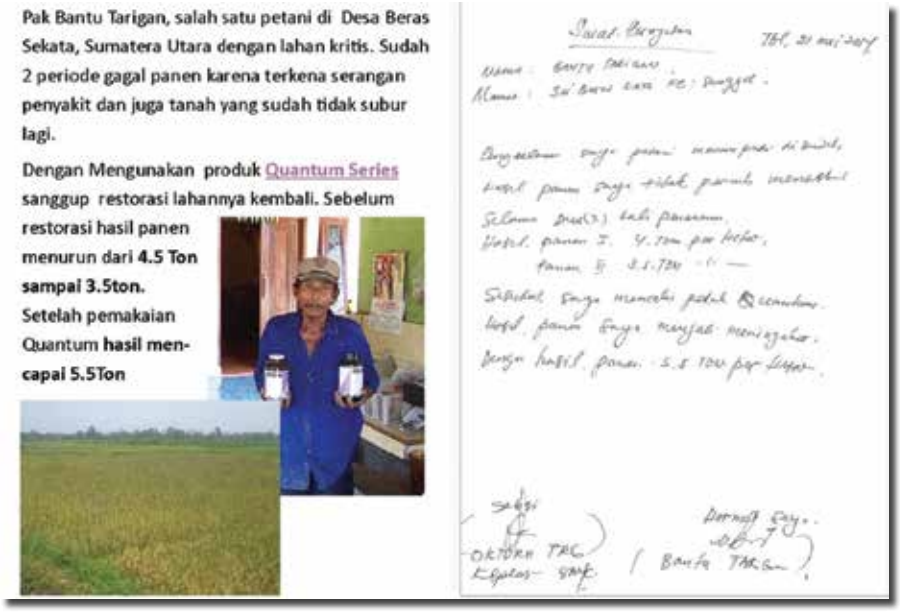
Quantum Growth Increases Rice Yield and Restores Soil in Indonesia

Quantum Growth®: Reduced Fertilizer and Improved Yield at Gebang, Langkat

25% Reduction of Urea but increase in the yield by 30%. The Control yielded 4.5 ton/ha, **Quantum Growth®** increased yield to 6.2 ton/ha.

Testimonial from Pak Bantu

Pak Bantu, a farmer from North Sumatera has been using bactericide to fight against Leaf Blight disease caused by Xanthomonas. His crop yield has been declining ever since and at one point reached 3.5 tonne/ha. We have managed to restore his land within the first season of application. Yield after application is 5.5 tonnes/ha



Pak Bantu Tarigan, salah satu petani di Desa Beras Sekata, Sumatera Utara dengan lahan kritis. Sudah 2 periode gagal panen karena terkena serangan penyakit dan juga tanah yang sudah tidak subur lagi.

Dengan Mengunakan produk Quantum Series sanggup restorasi lahannya kembali. Sebelum restorasi hasil panen menurun dari **4.5 Ton sampai 3.5ton.** Setelah pemakaian Quantum **hasil mencapai 5.5Ton**

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