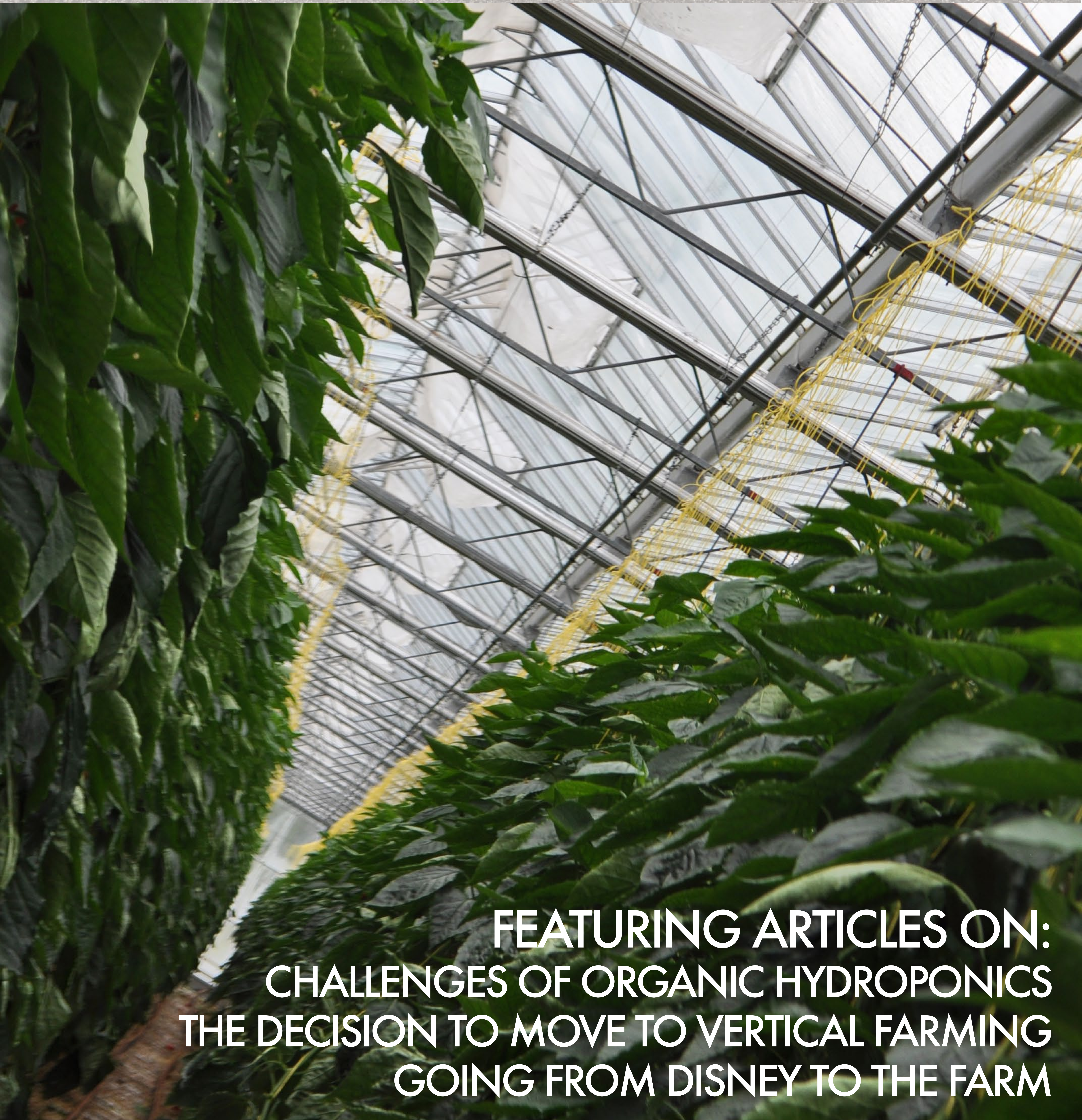


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**FEATURING ARTICLES ON:
CHALLENGES OF ORGANIC HYDROPONICS
THE DECISION TO MOVE TO VERTICAL FARMING
GOING FROM DISNEY TO THE FARM**

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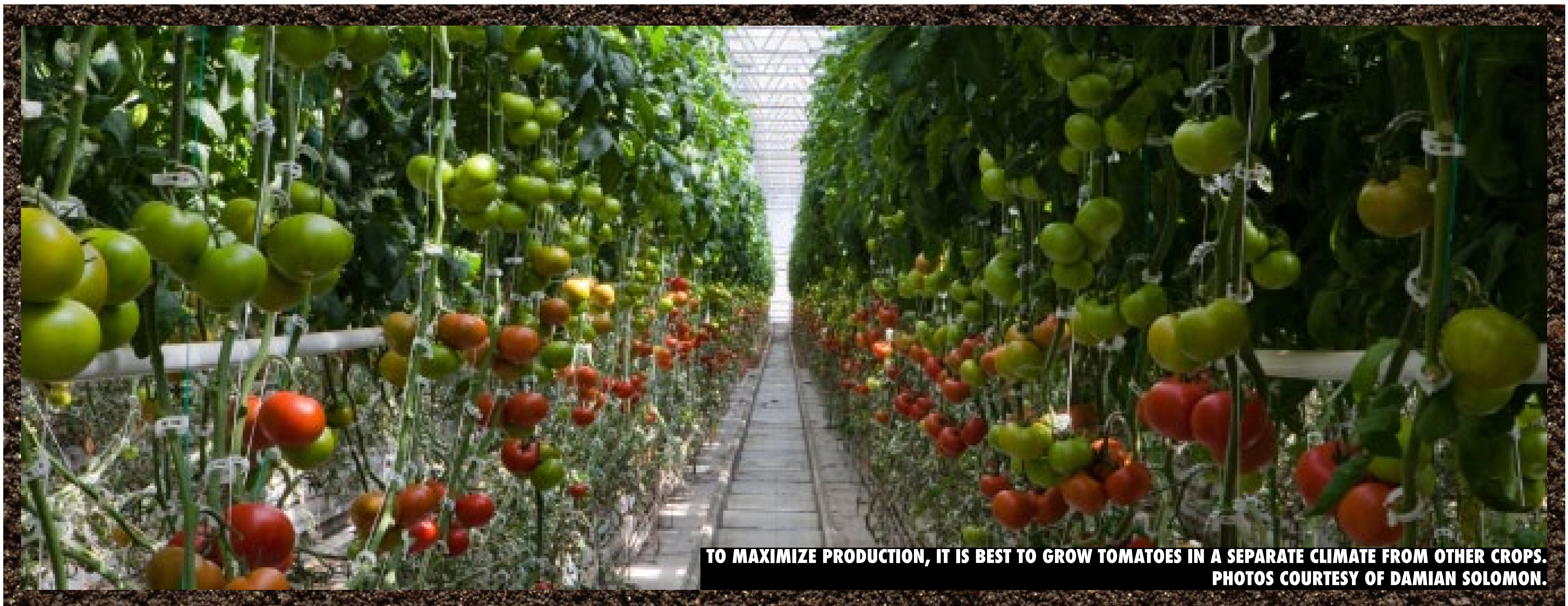
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COVER PHOTO: SHOT OF A HIGH TECH GLASS GREENHOUSE GROWING
HYDROPONIC PEPPERS. SHOT PROVIDED BY URBANAGPRODUCTS.COM



TO MAXIMIZE PRODUCTION, IT IS BEST TO GROW TOMATOES IN A SEPARATE CLIMATE FROM OTHER CROPS.
PHOTOS COURTESY OF DAMIAN SOLOMON.

OVERCOMING THE OBSTACLES OF GROWING ORGANICALLY

By David Kuack

WHILE FINDING EFFECTIVE FERTILIZERS AND PEST CONTROLS CAN BE MAJOR ISSUES WHEN GROWING ORGANIC GREENHOUSE VEGETABLES, SEED COMPANIES ARE DEVELOPING VARIETIES THAT PRODUCE HIGHER YIELDS, ARE MORE PEST RESISTANT AND DELIVER BETTER FLAVOR AND NUTRITIONAL VALUE.

Before becoming U.S. protected culture representative at DeRuiter Seeds in Oxnard, Calif., Damian Solomon saw the inside of many greenhouse vegetable operations. He knows well the trials and tribulations of growing both traditional and organic vegetable crops.

Simplifying production

One of the production companies Solomon worked for started its organic greenhouse operation with a variety of vegetables including tomatoes, cucumbers and bell peppers.

“After the first 18 months we began to concentrate solely on tomatoes and stopped growing the other crops,” Solomon said. “We quickly learned that trying to grow those crops in the same climate just wasn’t effective. The main crop was tomatoes. We had to make concessions on what climate we were going to grow in and usually that impacted the efficiency of the other crops.

“Bell peppers and cucumbers can grow well in a tomato climate, but you are not maximizing the production by trying to grow them in the same climate. They really need their own special climate in order to get the most out of them.”

Overcoming fertilizer issues

Solomon found the greatest limiting factor to growing organically was nutrition. “Because we had to use organically-based fertilizers, the growth rate of the crops



Growing organically requires a proactive approach to pest control, including the use of beneficial insects.

was reduced greatly compared to a conventional greenhouse tomato crop,” he said. “You have to allow the time for the organic fertilizers to break down through natural processes. Bacteria and fungal organisms have to break down organic fertilizers into usable forms of nutrients. In conventional greenhouses that use fertilizer salts, once the salts are dissolved in water and they are in their ionic forms, they are taken up by the plants. There is a lag time in growth of crops in organic production compared to conventional production. We had to adjust to that.”

Solomon said when he first started growing organically the challenge was to identify a sustainable organic fertilizer program. The tomatoes were grown in upright bags filled with a substrate of coconut fiber, composted plant material, perlite and a preplant fertilizer.

“The liquid fertilizer we used was fish emulsion which was a challenge in itself to try to keep the drip irrigation system clean when these organic particles are clogging up the system,” he said.

Solomon used a topdress fertilizer program that consisted of a chicken manure pellet and a seabird guano pellet. Both pellet fertilizers worked well and they became the main source of nitrogen, potassium and calcium.

Solomon said one of the biggest issues he faced related to organic fertilizers was finding a reputable supplier with quality fertilizers.

“We really had to do our homework and look for suppliers that were reliable and closely adhered to a set of production guidelines,” he said. “We used to do our own internal testing of the fertilizer products checking the nutrient analysis.”

The growing operation that Solomon worked for had been doing field organic production for nearly 20 years. The company had an in-house agronomist who knew what fertilizer products would yield nutritionally.

Bumblebees are used to pollinate tomato plants.



Recent tomato breeding efforts have been to downsize the fruit so that they are more appealing to children.



“The company’s agronomist had developed a benchmark for many of the organic fertilizers,” Solomon said. “When we got these product analyses back he could tell if something was not right. He knew chicken manure would yield 4-5 percent nitrogen and seabird guano was going to be 6-8 percent nitrogen. He knew that fish emulsion or chicken manure was not going to provide 12 percent nitrogen. So if the nitrogen rates came back high, he suspected that the supplier was doing something to the product. He assisted us in picking some fertilizer products for the greenhouse crops.”

Solomon said some of the organic fertilizers that worked well in field production didn’t work well with greenhouse crops simply because the method of application was different.

“We couldn’t drive a tractor in the greenhouse,” he said. “The greenhouse was a typical trellis high tech operation.”

Being proactive against pests, diseases

One problem that Solomon found difficult to resolve was the ongoing infestation of pests, particularly whiteflies.

“We would bring a new crop in next to an old crop,” he said.

“Once we had a whitefly problem it was very hard to get rid

of because it would pass from the old crop onto the new crop. Also, we didn’t have a lot of the control products that growers who grew conventionally had at their disposal. They had control products if there was an outbreak, which we couldn’t use.”

Solomon said he took a proactive approach to pest control which included incorporating more beneficial insects and cultural practices. Insect exclusion netting was installed on the greenhouse ventilation system and blowers were used to push air out of the greenhouse when the doors were opened to keep out insects. Sticky tape was placed along one side of the greenhouse to catch any pests that would enter through the vents.

Solomon said the company also had an intensive scouting program with an employee going through the greenhouses and monitoring the plants weekly.

“The scout would walk the aisles and if a pest was identified at a very early stage there was a better chance of controlling it when it was in a hot spot before it could spread throughout the greenhouse. We always tried to make sure that we were on top of insect issues.”

Solomon said disease control was also a concern when growing organically.

“As with pests, we didn’t have as many tools to use as traditional vegetable growers when it came to certain diseases,” he said.

“We always had the challenge of being proactive in our approach to disease control.”

Solomon said to help prevent Botrytis infections, which could enter through plant wounds, pruning shears were used for plant maintenance to ensure clean cuts. These cut points would heal and scar faster helping to lower the occurrence of Botrytis. He said it was also important to maintain the proper greenhouse environment (temperature, relative humidity, air movement) during the early morning before sunrise to reduce Botrytis pressure.



Solomon said Pythium is a fungal pathogen that affects the roots and basal crown and can attack the plants at any time.

“The best way to control Pythium is with proper water management,” he said. “At planting it’s important to not overwater. This helps to build a strong root system from the start.”

Another proactive disease management practice that Solomon used was to release two earthworms (California red worms) into each grow bag.

“The worms provided a beneficial organism from their gut lining that would be released in the worms’ castings,” he said. “This beneficial protozoan would cling to the root hairs and help protect the plants from pathogen infection. Another benefit is the protozoan would also help break down the organic matter and release nutrients.”

Seed advancement benefits

Solomon said many of the seed companies that produce seed for greenhouse vegetable production have identified the type of pathogens that growers are up against.

“Most companies do a really good job of disease resistance as part of their selection criteria when they do their breeding and selection methods,” he said.

“They have certain criteria that they use including resistance to pests and diseases such as Fusarium and powdery mildew. As more varieties come out that are resistant to the pests and pathogens that occur in the greenhouse that is going to make it easier for growers. These resistant varieties will enable growers to feel confident that they don’t have to take as much time to prevent pests or diseases.”

Solomon said the seed companies continue to work with growers to be able to offer them more and better varieties.

“Growers are always looking for the next thing to try to set themselves apart from the competition,” he said.

“Progressive growers are always looking to be a little different and offering more products.”

Solomon said one trend that is happening with tomatoes, cucumbers and peppers is a push for smaller fruited varieties.

“The food industry is asking for even smaller fruiting varieties with the main target being children to raise nutrition standards,” he said. “If the goal is to get children to eat more vegetables and fruits, one way to do this is develop varieties that are smaller, cuter and fit in their hands. There is also a lot of effort to improve flavor and nutritional value as well.

Earthworms contain a beneficial organism in their gut lining that helps protect plants from disease pathogens.



“If the seed companies supply growers with varieties that not only have high yields, but also superior qualities including flavor and nutritional value, that gives the growers much more power. The growers can go to their retail customers and let them know that they can deliver products that have better flavor and increased nutritional value such as higher levels of the anti-oxidants lycopene and beta-carotene. Those are characteristics that seed companies really look for in their new varieties because they want to be able to give those types of advantages to growers.” 🌱

For more: DeRuijter Seeds, (805) 918-2385; <http://www.deruijterseeds.com>.

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URBAN AG BLOG

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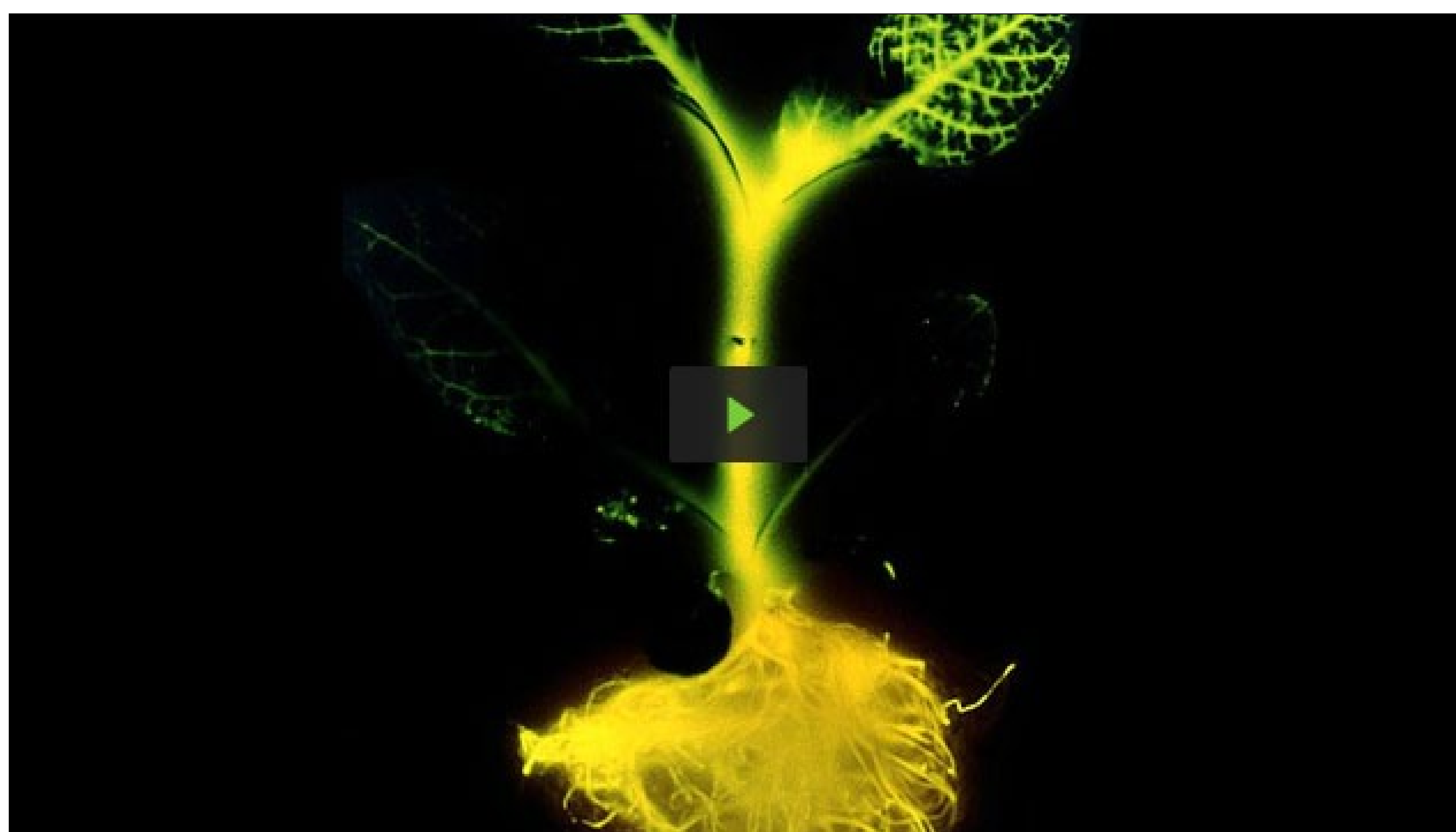
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KICKSTARTER VIDEO - GLOWING PLANTS



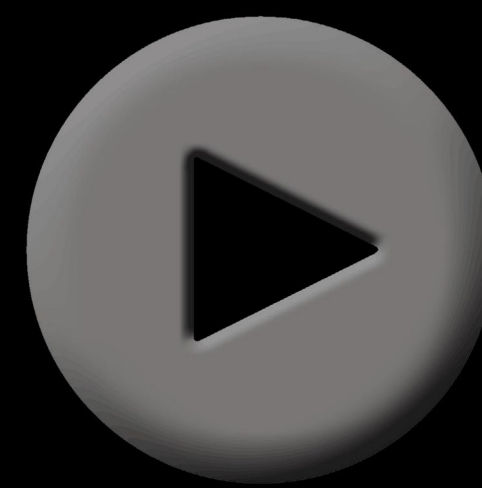
Create Glowing Plants using synthetic biology and Genome Compiler's software - the first step in creating sustainable natural lighting

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EDUCATIONAL VIDEO

FROM URBAN AG PRODUCTS

MANAGING LIGHT IN YOUR HORTICULTURE CROPS



Greenhouse growers know the importance of light, but few know how light really effects their crop and how that effect can dictate yield and plant production.

This video dives into understanding the basics about light and how plants grow, including daily light integral (DLI).

This video highlights the different aspects of light quality. 🌱



VERTICAL FARMING

AN EFFICIENT AND COST-EFFECTIVE ALTERNATIVE TO TRADITIONAL FARMING

By David Kuack

WITH THE INCREASING IMPACT THAT CLIMATE CHANGE IS HAVING ON TRADITIONAL FARMING, DAVID PROENZA AND HIS COMPANY GLOBAL FOODS DETERMINED VERTICAL FARMING COULD BE AN EFFICIENT AND ECONOMICAL ALTERNATIVE TO TRADITIONAL FOOD PRODUCTION METHODS.

Like other farmers, David Proenza, president of **Global Foods** in Panama City, Panama, is an optimist, but he's also a realist. His company has over 300 hectares (741.3 acres) of field production in Panama and it also buys from producers who farm about 150 hectares (370.7 acres) in Panama. His company also purchases and distributes produce grown in Argentina, Chile, Peru and Ecuador. In addition to Global Foods' field production, it operates about 2 hectares (215,278 square feet) of greenhouses for growing field transplants along with growing tomatoes, cucumbers, bell and chili peppers and eggplants for the local market.

"In 2008 we experienced the first weather problems in our production fields due to climate change," Proenza said. "That year we lost several million dollars because of weather-related problems. It was the first time that had ever happened in 25 years. That kind of opened our eyes."

In 2009, Global Foods experienced considerable crop losses again due to weather-related issues.

"That started to set off a lot of alarms," Proenza said. "The fact that we were having a lot of problems in the field due to climate change caused us to start looking at what was happening to food production on a global basis. You hear about these different weather-related problems like floods, droughts, etc. It didn't really hit home until it started to affect us."

Proenza said when his company started researching what was happening worldwide related to climate change, global warming and other weather-related issues, he learned other organizations had the same concerns.

"We quickly realized that the United Nations, the World Bank and other multi-lateral organizations were alarmed as to what was going on in regards to global food production due to climate change as well as the increase in the world population," he said. "As we started analyzing the whole situation including what we had experienced, that is when we decided if we were going to stay in business we had to do something different. We began to look at what we needed to do as a company in order to survive. If we continued doing what we did and the weather patterns continued, then we would soon be out of business."

Global Foods' officials got together to discuss potential solutions including the construction of additional greenhouses and the use of hydroponic production, which wasn't being used at the time.

"Farming in the Sky"

Proenza said even though his company discussed several alternative production solutions he wasn't satisfied with the options that were discussed.

"During this time I read the article 'Farming in the Sky' in Popular Science about vertical farming," he said. "I was intrigued by it. I started to analyze the viability of



David Proenza at Global Foods first got interested in vertical farming after his company experienced weather-related production problems. Photos courtesy of David Proenza.



David Proenza said his company has developed a mechanized harvesting system for melons produced with vertical farming.

vertical farming from a technological and food production standpoint inside a warehouse. That's how we got started down the path of vertical farming."

Proenza said there are a lot of characteristics about vertical farming that he likes and should appeal to farmers.

"It is a totally hermetically sealed environment where no pests, viruses or bacteria can get in," he said. "It allows for the production of healthy, highly nutritious food that is much better than field grown. What makes food production successful is being able to keep costs down and having high yields. What I like about vertical farming is instead of producing horizontally at one level, we can maximize production by producing in several levels to maximize the yields. We can produce vertically as high as we can and maximize the production yields."

Proenza said when Global Foods began to investigate the viability of vertical farming, company officials set out to talk to as many people as possible who were involved in this method of production. Multiple visits were made to the United States, Europe and Asia.

"We looked at a lot of systems, concepts and ideas from entrepreneurs from around the world," Proenza said. "Some of them were good, others we questioned their viability. It's not as much an issue of how to produce the food vertically as it is how to harvest the food economically and efficiently. Some systems were good from a production standpoint, but were lacking from a harvesting standpoint."

Proenza said the vertical systems he has seen in Asian countries are simplistic compared to the ones he has seen

in the United States and other parts of the world.

"In Japan and other places in Asia I have seen their harvesting methods and in many cases, they're very slow, inefficient and costly," he said.

After observing vertical farming systems worldwide, Proenza was not satisfied that they provided a complete food production option. He said all of the systems concentrated on producing food and did not include an automated approach to harvesting, packing and distribution. The prototype systems being developed by his company are small, but they are designed for large scale vertical farms, which is his ultimate objective.

"We designed mechanized harvesting equipment so that we not only can produce a large amount of food, but we can also harvest more efficiently and actually reduce the cost," he said. "For example, in our traditional field melon production there are no practical ways to mechanize the harvesting. It is very labor intensive. In our vertical farming melon production tests, we developed a mechanized harvesting system that is very efficient and reduces the harvesting costs substantially. I wish we could apply the vertical farm harvesting system to our traditional field business."

Proenza said depending on the type of product, the plants are grown in levels so that production can be maximized at 10 to 12 levels high.

"Vertical farming increases production over traditional and greenhouse production by factors of two to 10 times or more depending on the number of levels used," he said.

David Proenza said the vertical farming systems used in Japan and other Asian countries are simplistic compared to those in the U.S. Photo courtesy of MIRAI Corp.



David Proenza is trialing 12 different crops in his company's vertical farming system.

Comparing apples to apples

Proenza's development team has created cost and financial analysis projections that show the vertical farming system his company is developing will be able to compete year-round with traditional farming and greenhouse production.

"We are in business to make a profit," he said. "If vertical farming is going to work and have a place in global food production, then it has to compete against traditional and greenhouse farming. We are going to compete and make a profit all year. A lot of people I talk to say vertical farming is expensive. Then I ask them compared to what? I tell them they have to compare vertical farming to something. They just can't say it's expensive."

Proenza said when his company decides to produce a crop using traditional farming methods, it is a costly and multifaceted endeavor.

"The land has to be cleared and prepared, plastic mulch has to be laid down, herbicides have to be applied--there is a complex and costly process we go through until the crop is harvested, packed and shipped," he said. "There is a cost associated with field production that we don't have to perform



David Proenza said if vertical farming is going to succeed it has to be able to compete against traditional and greenhouse farming.



for vertical farming. We figure there is 30 percent waste from harvesting to packing with traditional farming. You won't have this with vertical farming if you do it right."

Even though vertical farming's initial set up costs are high, Proenza believes his company can be a profitable venture year-round.

"When we compare the total costs of traditional farming with vertical farming, even though LED lights are currently expensive, we realized that we can compete and we can be profitable," he said. "Vertical farming has high initial capital investment costs, but depending on the product, we figure the return on investment is anywhere from 36 to 48 months. If you take everything into account, and compare all of the costs associated with traditional farming, greenhouse production and vertical farming, vertical farming is actually more profitable based on the way we are developing our business model."

Tweaking the system

Global Foods formed the company Urban Vertical Farms to conduct the research and develop the vertical farm systems. Proenza said Urban Vertical Farms was ready two years ago to use its vertical farm system to produce lettuce, a variety of greens and microgreens.

“These are the crops currently being grown most with vertical farming worldwide,” he said. “We decided not start producing these crops because as a farming and distribution company selling to supermarkets and food buyers, these companies want a variety of products including cucumbers, bell peppers, melons, a whole host of different products.”

To be able to offer a wider selection of products and to make vertical farming economically viable, Urban Vertical Farms began to design vertical production and automated harvesting systems for a variety of crops.

“We are researching 12 different products,” Proenza said. “We estimate to come out commercially with most of these products by the end of this year or first quarter of 2014.

“In order to produce these crops we had to design a vertical growing system specifically for each product. Instead of adapting the crop to the vertical farm system, we designed the system to the



David Proenza said if vertical farming is going to succeed it has to be able to compete against traditional and greenhouse farming.



crop. Being able to produce lettuce is good, but it's not our business model. As a food distributor we needed to be able to offer a variety of high value products.”

Proenza believes the vertical farming system developed by Urban Vertical Farms will revolutionize the way his company's products will be grown in the future.


“Vertical farming isn't just about food production,” he said. “You have to look at it from a total production standpoint, including harvesting, packing and distribution. Our vertical farm system looks at the entire production process from beginning to end. Unfortunately, not all companies are looking at it this way. But this will change in the future.

“I think vertical farming is another viable means for food production in the future. Vertical farming won't replace traditional farming, but it will be a welcomed addition to needed food production.”

Sharing the knowledge

Proenza said his company plans on

sharing the information it develops on vertical farming with other companies, organizations and growers who want to learn about this method of food production.

“We are foremost a for-profit organization and I make no apologies for this,” he said. “However, we believe that every person on this planet has a right to healthy, nutritious food. To help accomplish this, we are in the final stages of developing a research and training center in Panama. The center will be open to anyone who wants to learn about all aspects of vertical farming, including production, harvesting, packing distribution and operating and managing a successful vertical farm. The Panamanian government and its agencies are supporting our initiatives.” 

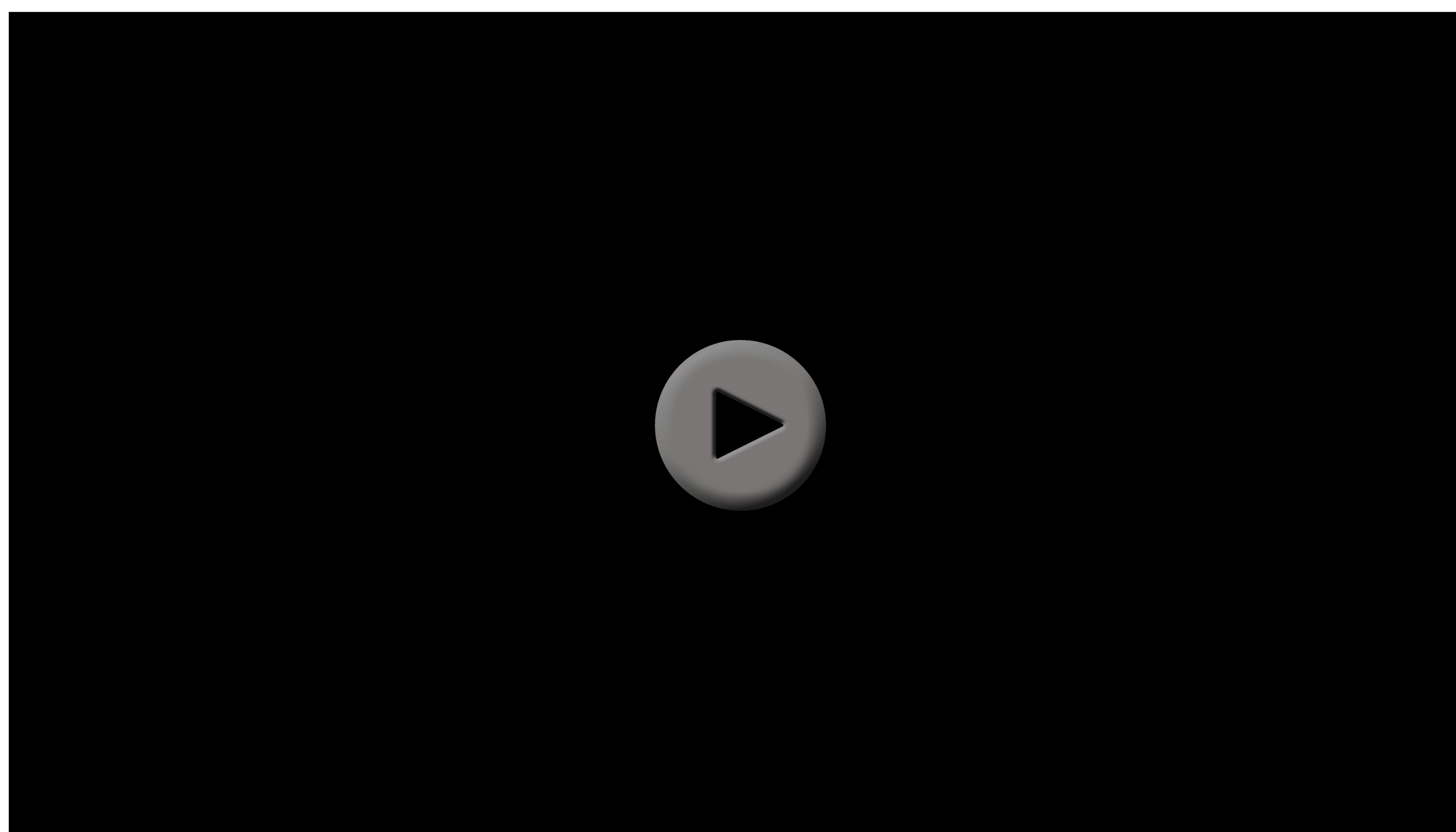
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Tim Blank said doing more growing with vertical aeroponics and no growing media can significantly reduce the carbon footprint of plant production.



GROWING GREEN

by David Kuack

TIM BLANK HAS GROWN MANY FOOD CROPS FROM AROUND THE WORLD IN MANY TYPES OF HYDROPONIC GROWING SYSTEMS. NOW HIS MISSION IS TO EDUCATE URBAN AND COMMERCIAL GROWERS ON HOW TO BE SUCCESSFUL PRODUCING MORE FOOD IN LESS SPACE USING VERTICAL AEROPONICS.

Tim Blank knows a thing or two about hydroponic food production. Prior to starting his own company Future Growing in 2005, Blank had a 12-year career working at Walt Disney World's Land Pavilion at Epcot in Florida. "I initially worked as a research scientist with NASA, the Department of Energy and USDA on various research hydroponic projects in the Land Pavilion," Blank said. "The Land is the largest and most diverse hydroponic research and showcase facility in the world. When I was there we were growing 100 different food crops from around the world year-round, using every form of hydroponic production imaginable. That included everything from floating culture to a futuristic greenhouse where we did vertical aeroponics." In 2000, Blank became the Land's greenhouse operations manager overseeing the whole facility. "I was in the greenhouses producing the crops," he said. "I was also traveling around the U.S. looking at technology, sharing what we were doing at Epcot and bringing back technology and ideas that could be incorporated into the research and educational displays in the Land. One of our larger displays was a production greenhouse where we demonstrated all of the traditional commercial hydroponic systems. Vine crops, including tomatoes, cucumbers, bell peppers and eggplants were produced along with lettuce and herbs in grow bags and buckets, floating culture and channel culture."

Blank said the biome that made the greatest impression on him was a futuristic greenhouse consisting primarily of

vertical aeroponics demonstrating soilless production and the future of hydroponics.

"It was very apparent to me that commercial hydroponic growing media had a significant carbon footprint on our planet and was ever increasing with the industry," Blank said. "Hydroponics doesn't require growing media, so why use them? What was done in the futuristic greenhouse focused on reducing our carbon footprint by doing more vertical aeroponics growing in less space without growing media. Most rockwool grow bags used in hydroponic greenhouses are shipped from other parts of the world. The other two greenhouses in the Land included other production methods like sand culture where we grew mangoes, dragon fruit and other exotic crops. This wasn't the most economical way to produce these crops, but we wanted to show that it was possible to grow any type of crop using a modern hydroponic facility."

Growing "green"

Having traveled extensively, Blank has seen a lot of production systems in both undeveloped and developed countries.

"In some ways undeveloped countries are actually far more "green" than developed countries," he said. "Growers in undeveloped countries are producing, harvesting and eating what grows on their lands in their environment and what is seasonal. In the U.S. since the post-World War II era, we got accustomed to mass producing and shipping

Freshness and flavor are important to consumers. More consumers want to know where their food comes from.



everything wherever it was needed. Most grocery stores have to have a wide assortment of produce year-round. The local food movement in the U.S. seems to trend towards consuming what is grown locally and what is in season. Freshness and flavor are important to consumers and it is simply a smarter, greener, more practical way of doing it.

“In every country, including undeveloped countries, there is a place for protected cropping and hydroponic growing. It might not be for fruit trees and fresh bush-type berries, but more for fruiting vine crops, lettuces, leafy greens and microgreens.”

Blank said one indication that people in the United States are showing a greater interest in local food and healthier diets is the increase in the number of farmers markets. In 2012, USDA reported there were 7,864 farmers markets registered in the U.S. This is a 9.6 percent increase over 2011. About half of U.S. consumers are willing to pay higher prices for locally-grown food, according to a 2012 Whole Food Market survey.

“It is clear that there is a segment of our population that is looking to go back to the way it was in regards to knowing who you buy your food from,” Blank said. “In many places locally grown food is actually equal to or surpassing organic food sales simply because people realize that something labeled organic coming from another country isn’t necessarily healthier or safer. People want to know where their produce comes from. This has resulted in companies like CISCO and others involved with the distribution and sale of fruits and vegetables working to support local farmers because that is

where the demand has increased at a very rapid rate.” Blank visits several dozen vertical aeroponic urban farms in the United States during the year.

“You simply have to experience firsthand the joy of watching people in a local community stumble across what was once an empty lot or rooftop and be in awe of vegetables growing sky high,” he said. “Then you watch them taste quality, chemical-free, fresh food for the first time in their lives. Vegetables all of a sudden become good again and the parents get their children involved and want to learn more.”

Lack of education

Blank has seen a wide range of crop production methods including outdoor growing systems to inside warehouses to systems set up in airports.

“What’s missing in this new emerging food movement is almost a complete lack of basic plant physiology education and an understanding of the environmental and economic inputs that apply to most food production,” Blank said. “Many of the people who are getting into this food movement have little or no experience in agriculture. Historically, people who were involved with agriculture either came from a farm or they went to school to learn about agriculture.

“During the last decade what has occurred worldwide, including in the U.S., is a huge surge of non-agricultural people looking to get into agriculture. They have a complete lack of understanding or knowledge base. This makes them vulnerable to the next f y-by-night growing system, fish farm or greenhouse. We are looking to change that one successful farm at a time. Farms that stay in business become contagious.”

Blank questions whether growing plants in a warehouse is an economical and environmental friendly production system.

“If it was highly profitable to grow in a warehouse with lights, successful growers all over world who have square miles of profitable greenhouses would be doing this,” he said. “The key limiting factors with growing in a warehouse are actually the most important things needed by plants. Plants require quality air and gas exchange, quality nutrients and a quality light source. Light is the limiting factor in all production systems. It is scientifically proven that the volume of light dictates how quickly a crop is going to grow and how much fruit is going to be produced.

“In regards to growing in a warehouse, if sunlight is free why are we trying to build warehouses and then pay for energy to light them up when sunlight is already available at no cost. It is the one input in hydroponic food production that is free. Generally speaking warehouses don’t make a whole lot of sense from an economic standpoint. Where

Greens grown by Montecito Urban Farms in Summerfield, Calif., are used by local restaurants in Santa Barbara County.



Tim Blank at Future Growing worked at Walt Disney World's Land Pavilion at Epcot (right) before starting his own company.



Growing in warehouses or other locations, such as Chicago O'Hare International Airport, makes sense in areas where sunlight is low or the climate is harsh.



Tim Blank said one of the things missing in the emerging food movement is almost a complete lack of basic plant physiology education.

they could potentially make sense is in large cities or regions where sunlight is low or not available. In areas where the climate is very harsh, this is where warehouse growing becomes more sensible. This is already being done in airports and places with cold climates like Alaska.”

Making the right connections, choices

One of the concerns that Blank has with the continued success of the local food movement and hydroponics in general is the amount of misinformation that is being disseminated over the Internet.

“Historically worldwide, as new hydroponic technologies emerged so did the shysters in the industry ready to exploit them,” he said. “Some of the growing systems we have seen are ridiculous as are the production claims made for them. Companies that promote these systems tend to put a lot of marketing behind their products. Many of the new companies during the last three decades are just trying to sell “stuff” rather than teach people how to become good growers and good stewards of the environment. But this is changing.

“New growers want to first see quality results and examples of successful growers who are using a specific hydroponic product, greenhouse or company. We now see local growers concerned with chemical pesticides, polystyrene foam and cheaper types of disposable plastics. They are demanding high quality, long lasting, non-leaching, food-grade plastics. Growers are saying, “If I can't feed it to my own children, why would I want to sell it to someone else.” It is incredible and rewarding to see this grass roots movement towards safe, environmentally friendly, closed-growing systems and “green” production practices in hydroponics.”

Blank said one of the aspirations he has had since starting his business is to educate people.

“One of the key missions of our company is to create successful growers one family or one business at a time,” he said. “When I speak at a conference, one of my intentions is how to connect current and potential growers with the right information, including the right integrated pest management resources, reputable greenhouse companies and the right growing systems for their crops and the environment.

“The trend in hydroponic food production is going to continue to explode or it's going to implode on itself if we don't make sure that there are more successes than failures. The more we worked with various technologies over the years it became evident that the wave of what is coming is growing up instead of growing out. Also, with the impact of rising oil prices on the products used in hydroponic production, it made sense from a sustainable standpoint to grow up instead of out. We have become focused more on vertical growing and aeroponic growing techniques-- being able to grow more food in less space with less water and no herbicides.” 🌱

For more: Future Growing LLC, <http://www.futuregrowing.com>.

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