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Making IPDM Work

KARIN TIFFT,
Greenhouse Vegetable Consultants

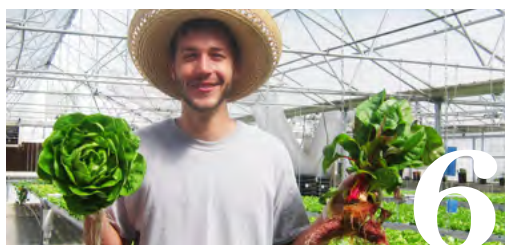
THE GROWHAUS: GETTING SERIOUS ABOUT HYDROPONIC VEGETABLE PRODUCTION

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On the cover: IPDM consultant Karin Tifft discusses what it takes to make an integrated pest and disease management program successful.
Photo by Adelyn Photography



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URBAN AG PRODUCTS BLOG

The **Urban Ag Blog** is designed to provide regular updates highlighting happenings within different niche segments of the agriculture industry.

We will do our best to keep you informed on what is happening, BUT we need your help. Please email us with ideas, topics and/or suggestions for stories you want to read about.

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And of course, continue to check the blog regularly for:

- Videos from growers focused on local markets and production issues.
- Political topics affecting growers and farmers.
- New ideas from our sponsors and partners.

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Urban Ag long sleeve shirt.

SIMPLY CLICK THE IMAGE FOR MORE INFORMATION.





The annual Growing Green Awards of the Natural Resources Defense Council (NRDC) recognize individuals who have demonstrated original leadership in the field of sustainable food. Through this national award, NRDC recognizes extraordinary contributions that advance ecologically-integrated farming practices, climate stewardship, water stewardship, farmland preservation, and social responsibility from farm to fork.

The 2013 Growing Green Awards honored an outstanding individual in each of the following four categories: Food Producer, Business Leader, Food Justice Leader, and Young Food Leader.

[You can read more about the NRDC and the Growing Green Awards by clicking here.](#)



FOOD JUSTICE LEADER
Tezozomoc
South Central Farmers Health and Education Fund
 Buttonwillow, CA



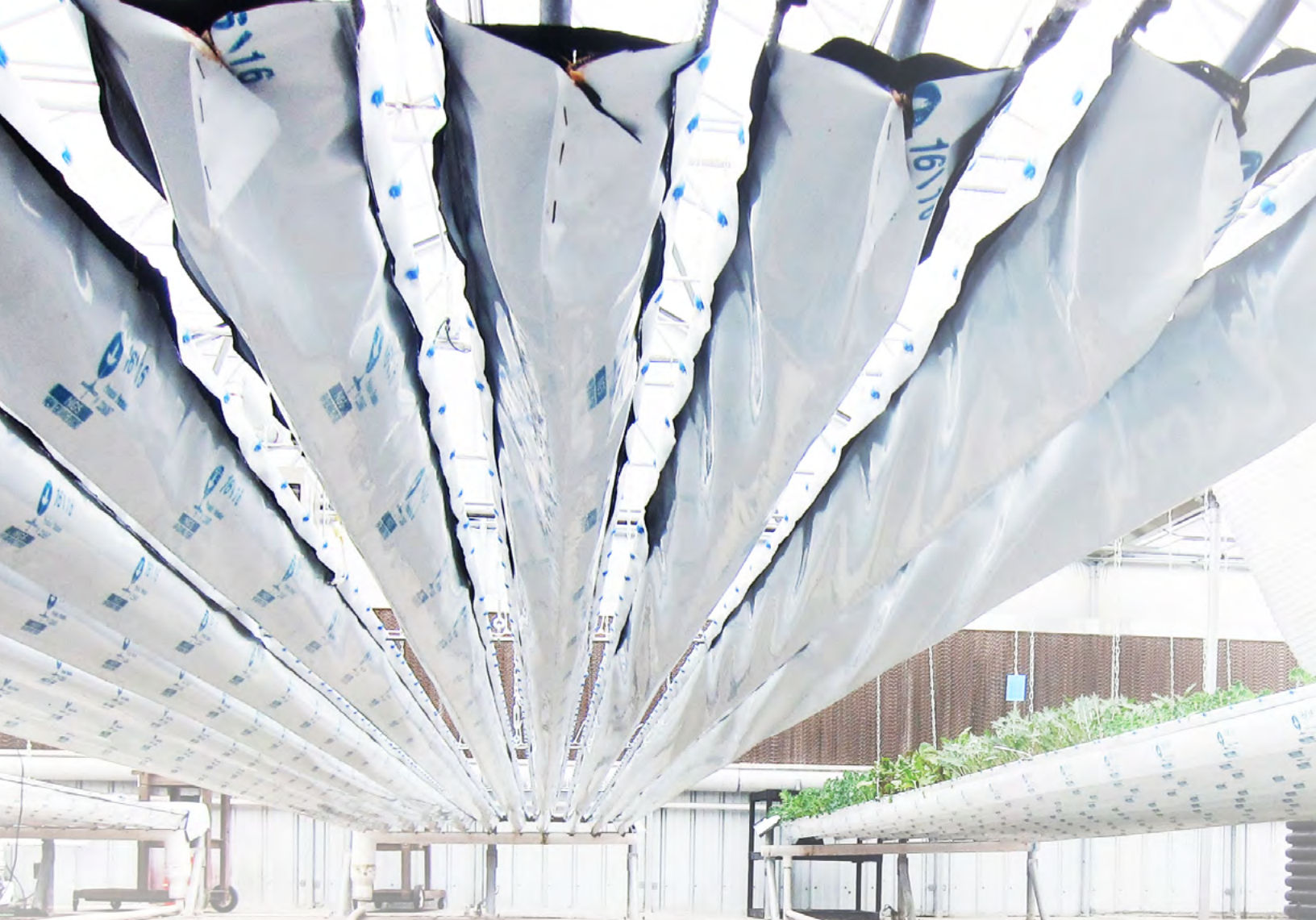
Business Leader
Larry Jacobs
Jacobs Farm
 Del Cabo / Pescadero, CA



Food Producer
Russ Kremer
Heritage Acres
 Frankenstein, MO



Young Food Leader
Brianna Almaguer Sandoval
The Healthy Corner Store Initiative
 Philadelphia, PA



Getting serious about **HYDROPONIC VEGETABLE PRODUCTION**

The GrowHaus is refining its production methods and product mix to satisfy its expanding customer base.

*By David Kuack
Photos courtesy of The GrowHaus*



Left: The GrowHaus is using an hydroponic new growing system that was developed in Spain.

Below: The GrowHaus' bibb lettuce is marketed to Whole Foods Market and King Soopers, as well as other local customers.

In July when Tyler Baras took over as manager of The GrowHaus' hydroponic greenhouse operation in Denver, Colo., he knew that some changes were going to have to be made. Prior to taking the position, Baras had worked at 3 Boys Farm Inc. in Ruskin, Fla., which was the first certified organic recirculating hydroponic farm in the United States. While in Florida, Baras grew gourmet greens and heirloom tomatoes for high-end clientele including Disney World, Epcot and Emeril's Orlando.

“Before I arrived at The GrowHaus there was a more laid back approach to production practices related to pest management, sanitation and fertilization,” Baras said. “When I was growing organically in Florida there were a lot of little things that had to be done, especially pest control. Even though The GrowHaus is not a certified organic operation, I have taken a drill sergeant approach to production practices. Sanitation, including cleaning of floors and recently harvested hydroponic channels, is now done weekly. And packaging has been upgraded to meet commercial standards.”

Circle Fresh Farms distributes about 60 percent of The GrowHaus' crop, mainly red and green bibb lettuce. The lettuce is marketed to Whole Foods Market and King Soopers. The GrowHaus also has local customers including Denver Urban Gardens, Linger, Marczyk Fine Foods and LoHi Steak Bar. The produce is also distributed in a local food basket program for residents of the Elyria-Swansea and Globeville neighborhoods.





When Tyler Baras became manager at The GrowHaus, he implemented changes that increased lettuce production from 35 cases to over 70 cases per week.

EXPANDING PRODUCT MIX

Prior to Baras' arrival at The GrowHaus, the 5,000-square-foot greenhouse facility was producing about 35 cases of lettuce per week. Having implemented the changes Baras initiated has resulted in the production of over 70 cases per week.

"Growing hydroponically takes a lot of attention," he said. "You constantly have to be looking over lettuce. A disease can pop up quickly. If you don't handle it right away it can quickly get out of control resulting in unsalable product."

Baras said some of the plants that had been grown previously at The GrowHaus were used as repellants to insects.

"Crops like dill and cilantro were being grown more for their pest repellent properties," he said. "Unfortunately, the plants weren't being grown correctly so they weren't commercially salable. We eliminated those plants and added more crops that could be sold commercially."

Baras has expanded The GrowHaus' product offerings to include a variety of crops including bok choy, top soi, a couple different kale, 'Rainbow'

Swiss chard, a variety of lettuces, sorrel, nasturtium and pansies. He is experimenting with micro-greens and is trialing additional crops.

One of the environmental differences between Florida and Colorado that has made it easier for Baras to try different crops, especially lettuce, is the relative humidity.

"In Florida it's very difficult to really cool the greenhouses because of the high humidity," he said. "Evaporative cooling in Florida is pretty much ineffective. That makes it very difficult to grow lettuce in the summer. In Colorado because of the low humidity, using evaporative cooling I am able to drop the temperature by 20°F."



PEST AND DISEASE MANAGEMENT

Baras said his move from Florida to Colorado required a change in the way he produced greenhouse vegetable crops.

“In Florida there were no issues with powdery mildew on lettuce,” he said. “Tomatoes were the crop more likely to have problems with powdery mildew. In Colorado powdery mildew is the major disease that we are dealing with so we have to be really diligent. Sixty percent of what we produce is bibb lettuce. It is susceptible to powdery mildew so it needs constant attention. We use organic controls so applications have to be made when the disease symptoms show up.

As The GrowHaus has added new customers, Baras has been able to expand the product mix to include crops such as kale and Swiss chard that are more resistant to or not susceptible to powdery mildew.

“Diversifying our customer base that will buy a larger assortment of crops will definitely help in reducing our pest and disease issues,” he said. “We have one customer, 25 Farms, that makes up food boxes and wants a variety of items, not just bibb lettuce.”

One problem that Baras left in Florida is insect control issues.

“Insects were a much bigger problem in Florida, primarily whiteflies and aphids,” he said. “We do encounter aphids here, but they are a much smaller concern.”

ADJUSTING TO A DIFFERENT PRODUCTION SYSTEM

When Baras was growing in Florida he was using an American Hydroponics and Crop King nutrient film technique (NFT) hydroponic system. The production system he is using at The GrowHaus is a *New Growing System (NGS)* that was developed in Spain. Baras said the NGS system is not commonly used in the United States and is installed primarily in high tunnels and not greenhouses. He said the NGS system was designed to allow farmers to grow various crops. Tomatoes, cucumbers, strawberries and lettuce can all be grown in the same base system using different size plastic film channels.

Unlike an NFT system in which the water is constantly running, the water in the NGS system is pulsed into the channels. Plants in a NGS system are watered every 10 to 30 minutes for between 20 seconds to 1 minute.



The GrowHaus has expanded its product offerings to include a variety of crops, but lettuce still makes up 60 percent of its total production.



“An advantage to the NGS system is the channel can be longer in length,” Baras said. “With an NFT system there can be issues with low oxygen levels if the channels exceed 10 feet. With the NGS system the channels can be 30 to 40 feet long because they run on a pulse allowing plants to dry out and breath between waterings. The NGS system uses channels with multiple layers of plastic similar to a bag inside a bag. The NGS system also uses fewer water emitters than a NFT system.”

Baras said a disadvantage of the NGS system is that it is difficult to sanitize.

“With a NFT solid plastic channel it can usually be removed relatively easily and dropped into a bleach solution,” he said. “The NGS channels are locked into the system and they are difficult to clean thoroughly with their multiple plastic layers.”

Another potential disadvantage with the NGS system is the potential for the plastic channels to tear or to be cut.

“Since the NGS channel is like a sheet of plastic it can be cut or torn if workers are using scissors to harvest herbs or microgreens,” Baras said. “This can result in having to replace a whole channel, which are rated to last about five years. A NFT system channel can easily last 15 years or more. The initial cost to install a NGS system is substantially cheaper than a NFT system. But the long term maintenance for NGS can be more expensive since the channels have to be replaced sooner, especially if they are damaged.”

For more: The GrowHaus, (720) 515-4751; <http://www.thegrowhaus.com>.

David Kuack is a freelance technical writer in Fort Worth, Texas; dkuack@gmail.com.



An advantage to the NGS hydroponic system is the channels can be 30-40 feet long.



The GrowHaus is a nonprofit urban farm and education center in Denver's Elyria-Swansea neighborhood. It is based in an historic 20,000-square-foot greenhouse. The organization is using the space to grow fresh produce and teach about healthy living. There are plans to renovate more space to accommodate increased food production, educational facilities and a local food distribution network.

Using a grant from USDA's Farmer's Market Promotion Program, The GrowHaus started a food basket program for residents of the Elyria-Swansea and Globeville neighborhoods. The program provides weekly baskets of fresh fruits, vegetables and dry goods at an affordable price. The organization is working with area farmers and distributors to ensure that as many of the food basket products as possible are organic and locally-sourced.

The GrowHaus aims to be a learning center for nutrition, gardening, cooking and other essential skills for building healthy communities. Educational opportunities include fee-based public workshops, service learning workshops and a summer teen leadership program.



Growing peppers: pruning & blooming



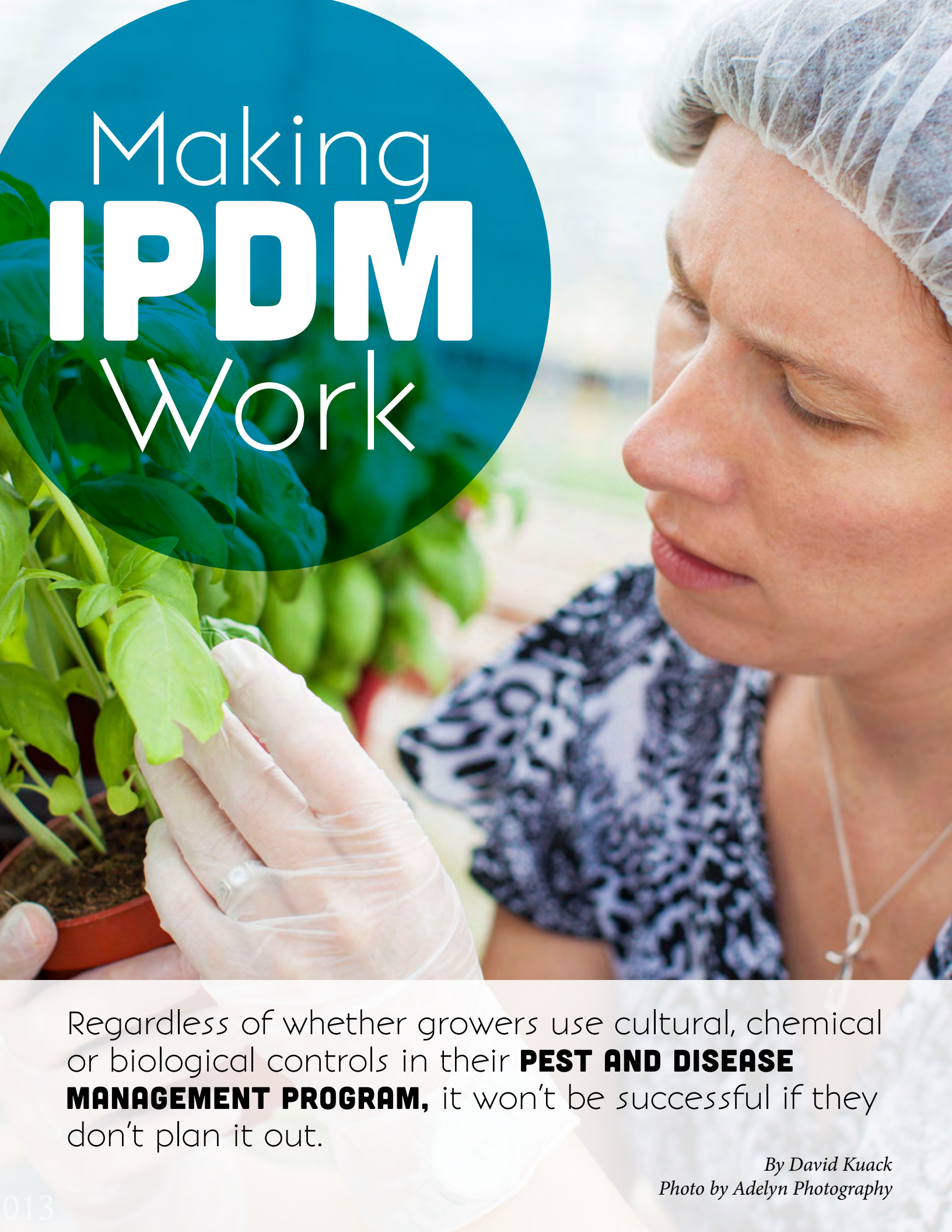
Educational video about growing peppers in hydroponic greenhouse where I show you how to start training pepper plants by doing the first pruning and you can see the start of blooming.

FARMERY!



The Farmery is an innovative urban market and farm designed to produce and sell locally grown food. The Farmery combines retail grocery and indoor agricultural systems that raise the value of food by offering the customer an educational and stimulating food shopping experience. At the Farmery, the consumer can witness and participate in the growth and harvest of crops and fish. [Go to the Farmery site >>>](#)



A close-up photograph of a woman wearing a white hairnet and white gloves, examining a basil plant in a red pot. She is looking down at the leaves with a focused expression. The background is a blurred greenhouse setting with other plants.

Making **IPDM** Work

Regardless of whether growers use cultural, chemical or biological controls in their **PEST AND DISEASE MANAGEMENT PROGRAM**, it won't be successful if they don't plan it out.

*By David Kuack
Photo by Adelyn Photography*

IPDM consultant Karin Tiftt said an IPDM program can incorporate multiple techniques, including cultural, chemical and biological.

Photo courtesy of IPM Laboratories

“Ironically, one of the biggest misconceptions greenhouse growers have with controlling pests and diseases is actually related to the success of their control programs,” said Karin Tiftt, an integrated pest and disease management (IPDM) consultant. “If growers are doing a good job, it seems simple. But when things go wrong, they can go wrong in a big way.”

Tiftt works primarily with greenhouse vegetable growers to develop IPDM programs. While she doesn't yet have any ornamental plant growers as clients, she said she expects setting up an effective IPDM program for ornamentals would be more challenging because the whole plant needs to look good, not just the fruit. She said that ornamental growers actually have more natural enemies and chemical options than food crop producers.

“Microgreens and lettuce probably come the closest to selling the whole plant like with ornamentals,” she said. “The difference is that microgreens and lettuce are such short term crops that there is not a lot of time for pest and disease pressures to build up as much. However, this does not mean proactive treatments, as in the release of natural enemies, are not needed.

The greenhouse is never usually empty when growing lettuce and greens.”

Tiftt said an IPDM program can incorporate multiple techniques, including cultural, chemical and biological.

“My specialty is what I call Bio-IPDM, biologically-based integrated pest and disease management,” she said. “I focus first on using natural enemies where I can. For the disease aspect, I look a lot at cultural control. This includes the ways disease can be prevented in the first place or limiting the spread and economic losses.”

MANAGING GREENHOUSE DISEASES

Tiftt said managing the greenhouse climate is the best way to manage fungal diseases.

“Fungal diseases, in particular, usually have an outbreak due to something going wrong with the climate,” she said. “Fungal spores, like Botrytis, are always present. But even though the spores are there, there is no disease outbreak.

“Growers have to be sure the greenhouse environment is not conducive to the expression of the disease. It is crucial that growers check their greenhouse environmental settings both by computer and



by personal observation at various times during the day, including early morning and at night.”

Tiftt said in the case of greenhouse tomatoes and peppers she doesn't usually recommend making any proactive preventive fungicide applications for Botrytis. She will use them if Botrytis is spreading quickly.

“Disease control with cucumbers can be more challenging,” she said. “Growers should select powdery-mildew-resistant varieties to avoid having to apply fungicides too frequently. There are other cucumber diseases that are prevalent including *Didymella bryoniae* that causes gummy stem blight and Botrytis.”

Tiftt said the greenhouse vegetable growers she is working with are currently applying chemical controls on an as-needed basis. She said for some of them there is the potential to move away from pesticides altogether.

“Growers considering aquaponics, which combines the raising of fish with plants, need to keep chemical applications at a minimum. Most pesticides cannot be used in an aquaponics system. This is a major consideration when growers think about this type of production system. Under these circumstances a grower would want to look at what he can do with cultural controls and natural enemies where there is no risk of anything getting into the water with the fish. This would also be the case with the growing of medicinal plants.”

Tiftt said based on her experience with the typical horticultural and agricultural crops there is going to be a place for pesticides for a long time.

“For vegetable growers it has become self-evident to many of them that they need to break the cycle of pests and diseases by emptying and thoroughly cleaning the greenhouse,” she said. “I have seen several cases where insect or disease problems have gotten out of control and there was no way to manage the problems other than to clear out the greenhouse. This may have occurred because of a change made to the IPDM platform. This could include a sudden drop in natural enemies or application of certain chemicals or because the correct action was not taken in a timely manner. The growers then attempted to do everything they could within the limits of the product labels, but weren’t successful at gaining control.”

BIOLOGICAL CONTROLS FOR INSECTS

Tiftt said most of the large greenhouse tomato growers in the United States and Canada are using natural enemies for insect control. She said in most of these operations the use of natural enemies is standard operating procedure.



Photo by Adelyn Photography

Karin Tiftt is working with a grower to evaluate the use of banker plants to determine the feasibility of producing a steady supply of natural enemies for aphid control.



Photo courtesy of IPM Laboratories

“The use of these biological controls has become easier because they have been well researched,” she said. “There are effective natural enemies and reliable suppliers with good distribution networks which can deliver the biologicals overnight.”

Tiftt said the use of natural enemies can be more difficult for the small grower because the cost of shipping can be prohibitive.

“Most natural enemies need to be shipped overnight,” she said. “For small growers, the cost of shipping may be higher than the cost for the amount of product that’s needed. And there usually is no way for growers to store the natural enemies without dramatically reducing their efficacy. They have to be used right away.”

Tiftt is currently working with a small vegetable grower to evaluate

the option of using banker plants to determine the feasibility of producing a steady supply of natural enemies. She said the banker plant system that is most established is for aphid control.

Cereal aphids are introduced into the greenhouse



**“EACH [IPDM] PLAN HAS
TO BE TAILORED TO THE NEEDS OF
THE GROWER, THE MARKET, THE CROPS,
THE CLIMATE AND STATE RESTRICTIONS.”**

—KARIN TIFFT, IPDM CONSULTANT



Karin Tiftt said what causes most IPDM programs to fail is quick changes.

on monocotyledonous plants (i.e., cereal plants such as rye, barley and wheat). The aphids serve as a food source for the parasitic wasp *Aphidius colemani*. The wasp, which reproduces on the cereal aphids, also feeds on several common greenhouse aphids.

“The banker plants allow for more reproduction and a consistent release of the parasitoids,” she said. “There is a lot of potential to use banker plants with other hosts and predators.”

ENSURING A SUCCESSFUL IPDM PROGRAM

Tiftt said every greenhouse grower, whether vegetable or ornamental, is using some sort of pest management platform, whether it uses chemical, cultural or biological controls. She said the thing that causes most of these programs to fail is quick changes.

“Consider an IPDM platform like a table,” she said. “If one of the legs of the table is kicked out, as in a change from a chemical to biological or biological to chemical platform, without putting in something to prop it up first, such as a new scouting plan or first switching to pesticides with less residual effects on natural enemies, the table will fall and the costs can be high. All of the changes to the platform need to be planned out. Each plan has to be tailored to the needs of the grower, the market, the crops, the climate and state restrictions.”

Tiftt said she prefers that growers looking to incorporate biological controls into their IPDM programs first do trials in a separate greenhouse if possible.

“Ideally a grower would use a separate facility to avoid the effects of pesticide drift from another area,” she said. “Of course, this is not always practical. There is a learning curve to using natural enemies, but IPDM when done correctly, will save money and lead to increased yields and higher quality fruit that sell for a better price. Reduced pesticide use also leads to fewer worker safety risks and less logistical challenges in terms of re-entry intervals.”

For more: Karin Tiftt, Greenhouse Vegetable Consultants; <http://www.greenhousevegetableconsultants.com>.

David Kuack is a freelance technical writer in Fort Worth, Texas; dkuack@gmail.com.



Integrated Pest Management (IPM) is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment.

IPM is not a single pest control method but, rather, a series of pest management evaluations, decisions and controls. In practicing IPM, growers who are aware of the potential for pest infestation follow a four-tiered approach. The four steps include:

1. Set action thresholds
2. Monitor and identify pests
3. Prevention
4. Control

IPM is best described as a continuum. The goal is to move growers further along the continuum to using all appropriate IPM techniques.

Once monitoring, identification, and action thresholds indicate that pest control is required, and preventive methods are no longer effective or available, IPM programs then evaluate the proper control method both for effectiveness and risk.

Effective, less risky pest controls are chosen first, including highly targeted chemicals, such as pheromones to disrupt pest mating, or mechanical control, such as exclusion, trapping or weeding. If further monitoring, identifications and action thresholds indicate that less risky controls are not working, then additional pest control methods would be employed, such as targeted spraying of pesticides.



The 2013 Thought For Food Challenge invites students from universities around the world to produce a robust project proposal – consisting of a business plan and creative pitch – that presents an unexpected and out-of-the-box solution to the global challenge of feeding 9 billion people by 2050. [Read more on their site >>>](#)



CHIGGINS CONSULTANCY is a company conceived and built to provide education information to the niche commercial horticulture and hydroponics industries. This includes Vertical Farming, Urban Agriculture, Controlled Environment Agriculture, Hydroponic Greenhouse Vegetable Production and related Products and Services.



If you would like to learn more about Chiggins Consultancy or the staff of experienced industry professionals then [click here.](#)



GROWING THE BEST ORNAMENTALS, VEGETABLES FOR DALLAS

Matt Ruibal, owner of Ruibal's Plants of Texas in Dallas, is looking to produce the best ornamental plants and vegetables for the local market. The company was started by his father in 1984 with a small retail stall at the Dallas Farmers Market selling bedding plants. Since then, the company has expanded to four retail locations, 300,000 square feet of greenhouses and 200,000 square feet of outdoor production used to grow annuals, perennials and vegetables.

Matt is committed to providing the local Dallas market with the best plants and vegetables by controlling the production. His customers value the products he is growing because of their quality and freshness.

For more: Ruibal's Plants of Texas, (972) 286-5270; www.ruibals.com.

Video created and produced by UrbanAgProducts.com. If you are interested in having a video created about your organization please contact us directly.



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Is water treatment in your future?

With continuing concerns about water availability, safety and regulations, more growers are looking at water treatment to protect this vital resource.

By David Kuack



The United Nations' Intergovernmental Panel on Climate Change is scheduled to release a report on the impact of climate change in March 2014. *A leaked copy of the final draft* identifies key risks that could occur because of climate change. One of these key risks is related to the lack of availability of drinking and irrigation water to farmers and the impact it could have on their livelihood. The draft indicates that increasingly rising temperatures will reduce renewable water sources. Climate change is also expected to reduce raw water quality and to pose risks to drinking water quality. The panel advises that "adaptive water management techniques" could address the uncertainty caused by climate change.

Rising concerns over water availability and the potential for increased legislation related to water issues are causing more growers to look more closely at their water supplies. Proactive growers are determining how they can better use and protect their sources of water.

For many greenhouse vegetable growers collecting, recycling and reusing their water is critical to the success of their business. The increasing focus on food safety issues is also causing growers to examine the impact water treatment can have on the production, harvesting and handling of their crops.

The recycle movement

Charlie Hayes, founder and president of Advanced Treatment Technologies, said an increasing number of people in the greenhouse industry have accepted the fact that water will eventually have to be recycled.

"Some growers are already recycling their water and long term I think everyone will have to be moving in that direction," he said. "Unfortunately, mistakes in how to accomplish this are going to occur. Growers stand the chance of damaging their whole crop

with different forms of contaminants or with disease-causing organisms through recycling water that has not been effectively and appropriately treated.

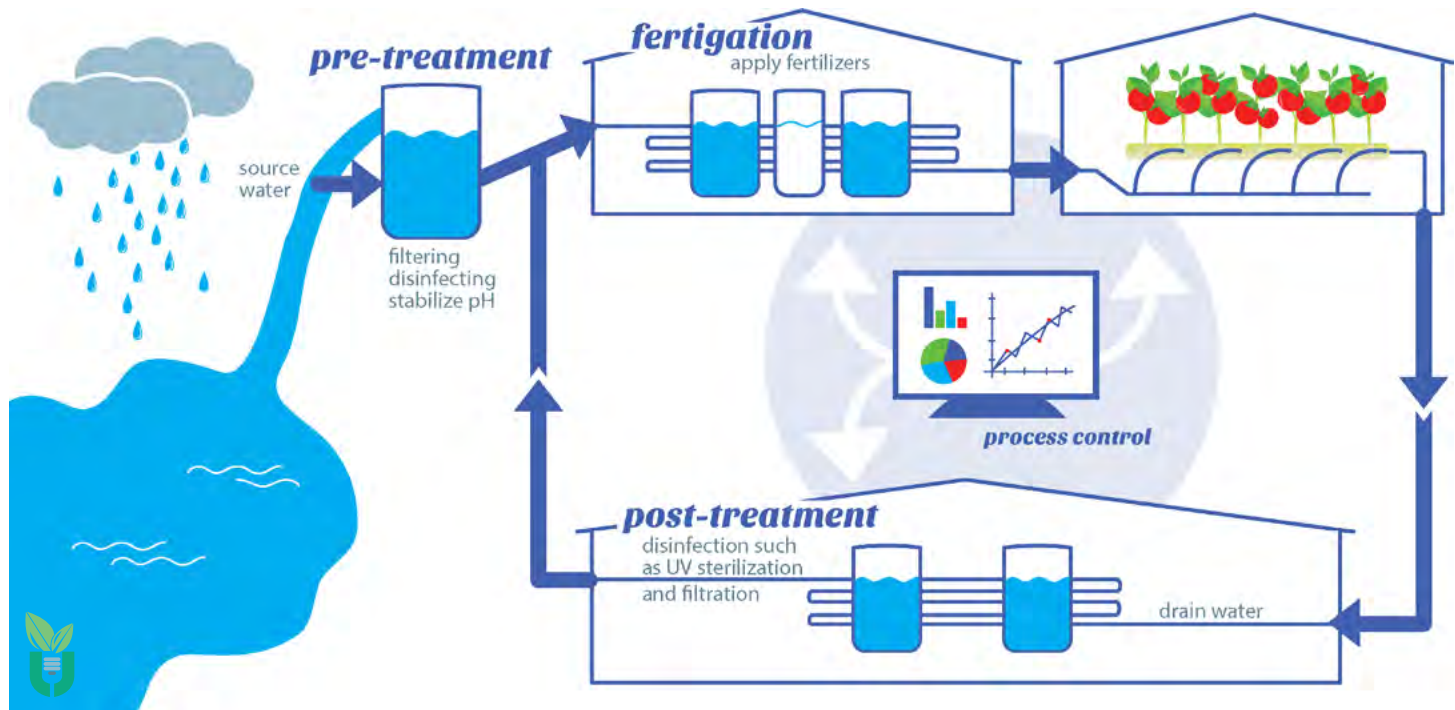
"Understanding water treatment involves a lot of things, including types of filtration, types of oxidizers, dissolved oxygen levels, what is being left in the water and what is being taken out of the water. A grower can take too much out of the water. For example, if a grower uses reverse osmosis, it puts a much bigger onus on him to make sure the proper nutrients for the plants are reintroduced into the water. This will require much more testing because there are some micronutrients in water that growers don't consider when they are looking at fertilizers. Using RO water that is devoid of all ions will require a grower to make sure he puts back the nutrients that the plants are going to need."

The goal of water treatment

Hayes said it doesn't matter whether growers are producing edible or ornamental crops, they want the best quality water they can get for their plants.

"Looking at the incoming water for food crops, increasing regulatory mandates are requiring growers have potable quality water if it has the potential to ever contact the surface of the plants," Hayes said. "This could happen in any irrigation system that greenhouse vegetable growers are using, including troughs or channels and floating pond systems. The type of irrigation system won't impact the quality of the incoming water, but if the water is in a closed loop system, the type of crop and production method will impact the water treatment system."

Hayes said the goal of water treatment in most industries is twofold: 1.) to keep equipment, piping and delivery systems clean and 2.) to kill the potential pathogens in the water.



By having a well-designed and well-thought-through water treatment plan, growers can continually improve their water quality.

“My water treatment goal is very different,” he said. “My goal is to deliver water that is going to produce the healthiest plants possible. I have learned over the nearly 30 years of being a biochemist and studying water treatment that accomplishing that goal will take care of the other goals related to mechanical issues and the destruction of potential plant pathogens.”

While incorporating chemicals into their water supplies can keep the growers’ equipment clean and control pathogens, Hayes cautions that these same chemicals can have an adverse effect on the growers’ plants.

“Plants can be sensitive to oxidizers,” he said. “Even though growers may not be seeing any negative effects on the plants, these chemicals may be affecting plant growth. The beneficial microbes around the plant roots may also be negatively impacted.”

Hayes said the most common oxidizers used for greenhouse vegetable crops include different forms of chlorine, chlorine dioxide, ozone and peroxide.

“Some oxidizers are more prone to phytotoxic effects than others,” he said. “With all oxidizers, it is a case of what is the target level, what level is being taken up by the plants and how well can that level be controlled? Many growers don’t

understand and know what level of oxidizer residual is being delivered to their plants. This can occur with any of the oxidizers. The control system that is used to inject and monitor the oxidizer is critical. Some oxidizers are very pH sensitive and in order to work correctly the pH has to be within a narrow range. Other oxidizers create byproducts that can be phytotoxic or have negative effects on the plants depending on what inorganic or organic compounds are in the water.”

Avoid a pieces-parts system

Hayes said a common mistake made by growers trying to install a water treatment system is they look at it as a component purchase.

“A grower thinks he needs a filter so he buys one and installs that into his irrigation system,” he said. “Then the grower may consider adding an oxidizer to treat the water and adds that to his system. What eventually happens is the grower has installed a conglomeration of components that are dispersed throughout his system that were never designed to work together. Some of those components can cause problems for each other and sometimes they can leave gaps in the system.”



Photos courtesy of Priva North America Inc.

Growers are advised to work with companies that design water treatment processes and are not simply trying to sell treatment components.



Photos courtesy of Priva North America Inc.



Photo courtesy of Advanced Treatment Technologies

Hayes advises growers considering treating their water to work with companies that design water treatment processes and are not simply trying to sell treatment components.

“Very often growers don’t have the upfront capital to install a water treatment system all at once,” he said. “What I do is work with growers to determine where they are currently, where they could potentially be and determine the steps necessary to get them there, allowing them to take the right steps in the right order.”

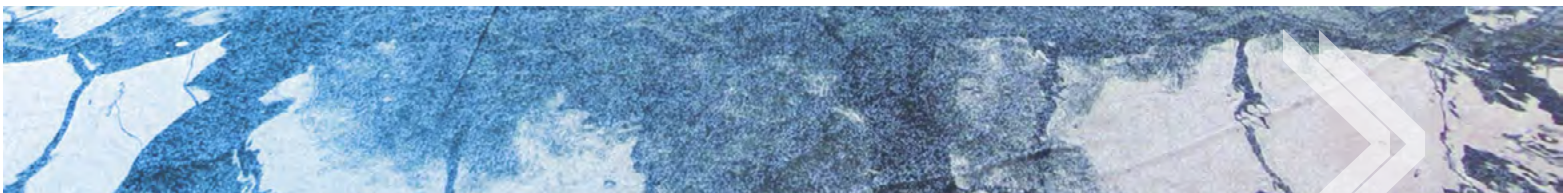
Hayes said the process usually begins with the water source.

“Many growers are pulling from ponds that are collecting rain water runoff from their greenhouses,” he said. “It could start with something as simple as aerating the pond. Then the grower might add beneficial organisms to the pond in order to prevent the buildup of pathogens and to ensure the breakdown of nutrients that need to be removed from the pond. By having a well-designed and well-thought-through plan growers can gradually and continually improve their water quality as they invest in their water treatment system.”

Monitoring is critical

Hayes said water sources change and they can get better and worse.

“Water sources can swing back and forth in the types of contaminants and pathogens that they contain,” he said. “These things should be monitored. Growers need to know their source water quality during the summer and winter. In addition, when growers do something to manipulate the water quality, they need to test, verify and monitor the water. If growers are not monitoring their water, they will never know that changes have occurred. They will see problems in the crop that they can’t explain because they weren’t monitoring their water quality both during and after the treatment process.”



Hayes recommends that growers monitor their incoming source water twice a year.

“Growers should monitor during the driest time and the wettest time of year because the water table goes up and down,” he said. “I recommend growers monitor the treated water in the greenhouse on a continuous basis. If not on a continuous basis, the water quality should be checked daily.”

Don't forget maintenance

Jerry van Kampen, inside sales support at Priva North America Inc., said one of the biggest adjustments some growers have to make after installing a water treatment system is maintaining the system.

“For those growers who installed a water treatment system, they went from not having to do anything to now having to maintain it to ensure it operates optimally. Maintenance of the system needs to be ongoing. Growers should also step up their water quality analysis once they have a treatment system in place.”

van Kampen said even if a grower's water treatment system consists of only installing a filter, the filter will require regular maintenance to perform at its optimal level.

“Installing a filter is the easiest way to go,” he said. “Maintaining the filter will result in less maintenance in the greenhouse or the field. The water will be cleaner so valves won't stick as often and the irrigation drippers won't clog as much. But the filter is going to have to be maintained in order for it to be effective.”

*For more: Advanced Treatment Technologies,
(855) 696-6348;
<http://advancedtreatmenttechnologies.com>.
Priva North America Inc., (903) 562-7351;
<http://www.priva.ca>.*

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Fort Worth, Texas; dkuack@gmail.com.*



Photo courtesy of Priva North America Inc.

One of the biggest adjustment some growers have to make after installing a water treatment system is maintaining the system. Maintenance has to be ongoing.

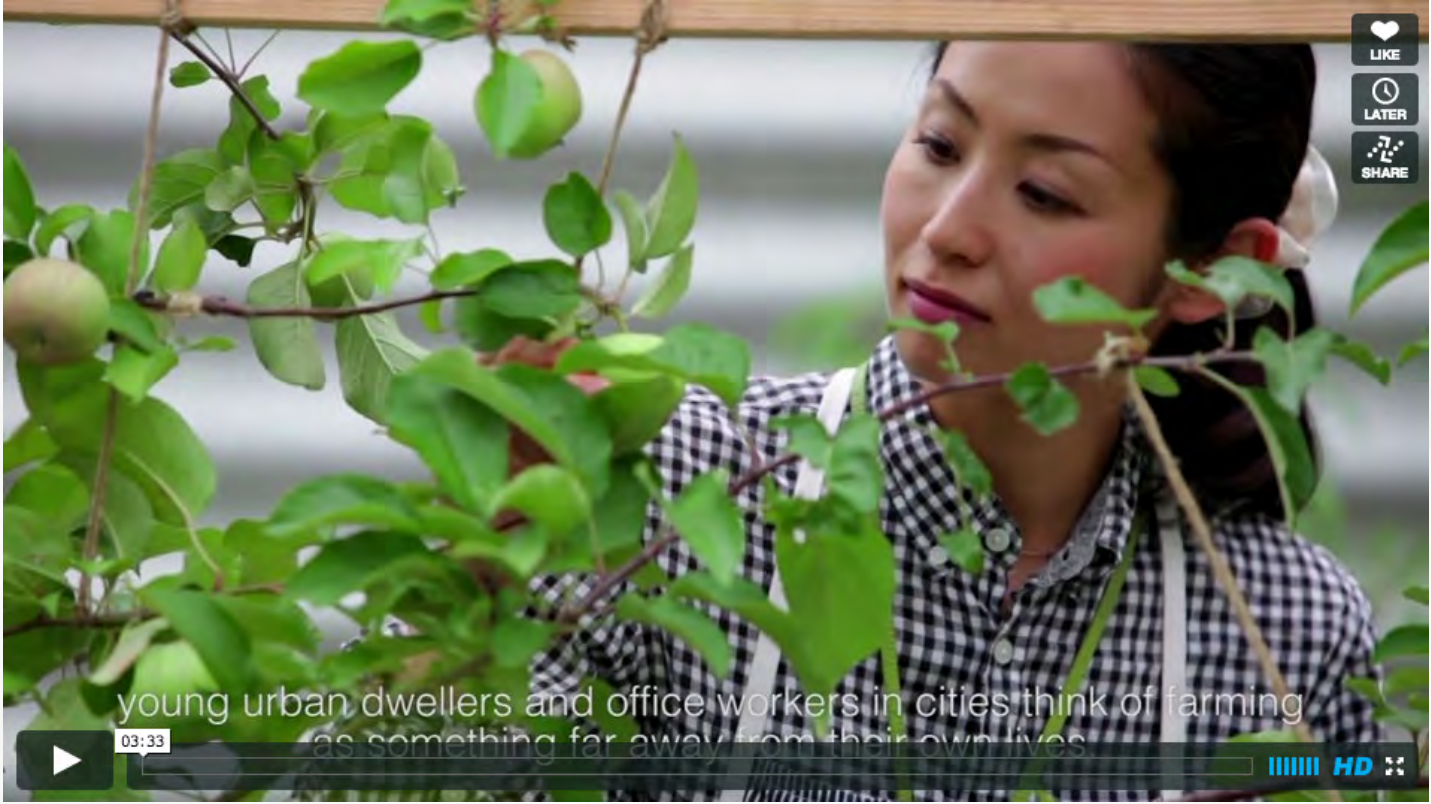


Photos courtesy of Advanced Treatment Technologies



Photos courtesy of Advanced Treatment Technologies

URBAN FARMING IN TOKYO



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young urban dwellers and office workers in cities think of farming as something far away from their own lives

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Pasona headquarters in Tokyo, Japan

Video by imageMILL

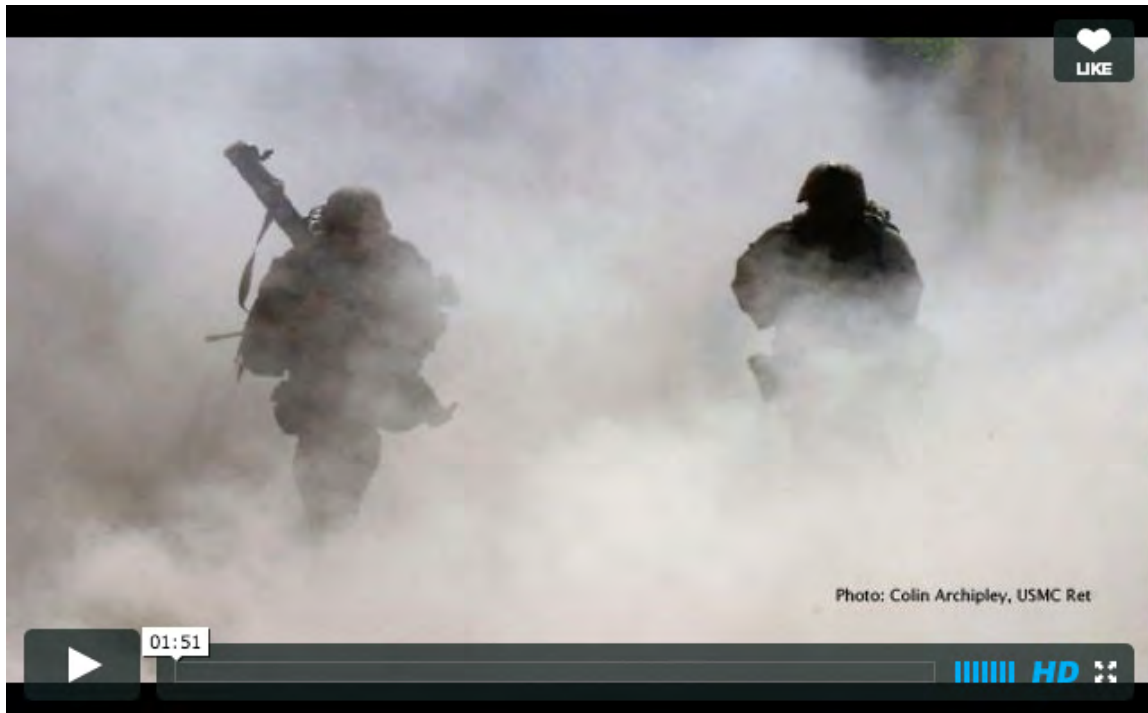
What can go wrong in an aquaponics system?



"The number one question I am asked regarding Aqua Vita Farms is: What happened? In this video I shed some light on the three issues that prevented success with Aqua Vita Farms." -Mark Doherty



Ground Operations: from battlefields to farmfields



Veterans returning from the wars in Iraq and Afghanistan often face overwhelming challenges transitioning to civilian life. Ground Operations is the story of a growing number of veterans who've discovered farming as a way to heal from the trauma of war and continue their service by ensuring a safe, local food supply for America. [Read more...](#)

Ag Education providers



LEDs vs. T5f Final Results by The Lettuce People



This is the final result of a trial comparing LEDs and T5f fluorescent lamps in a stacked vertical hydroponic system. The LEDs did as good a job as the T5f but used $\frac{1}{3}$ of the energy. Basically, the Dark Red/Blue LED Production Modules peak at 450 nm and 660 nm. Blue diodes are also useful for anthocyanin content. If growing red lettuce varieties, sometimes higher blue light levels may be necessary. Cooler ambient temperatures also increase anthocyanin content.



HORT AMERICAS LED GROW LIGHTS

Hort Americas is very happy to be a sponsor of UrbanAgProducts.com. We feel that it is important for our industry to grow through the exchange of known information and creative ideas. We encourage everyone to get involved!

Hort Americas is proud to be a supplier of LED Grow Lights (including the Philips GreenPower Horticultural LED line) as well as numerous other products important to the commercial hydroponic, horticulture and agriculture industries. Those products include lines like Smithers-Oasis Horticubes, Grodan Rockwool, Riococo Hydroponic Coir products, Bato products and Orchid Mixes and Substrates from Hort Americas and Slingerland.

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Asa Wright is a production company in the Dallas area with a passion for cinematic filmmaking. With roots in extreme sports and wedding videography, and branching into animation and graphic design, we have a unique perspective and love what we do.

Email info@asawrightproductions.com for additional information.

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