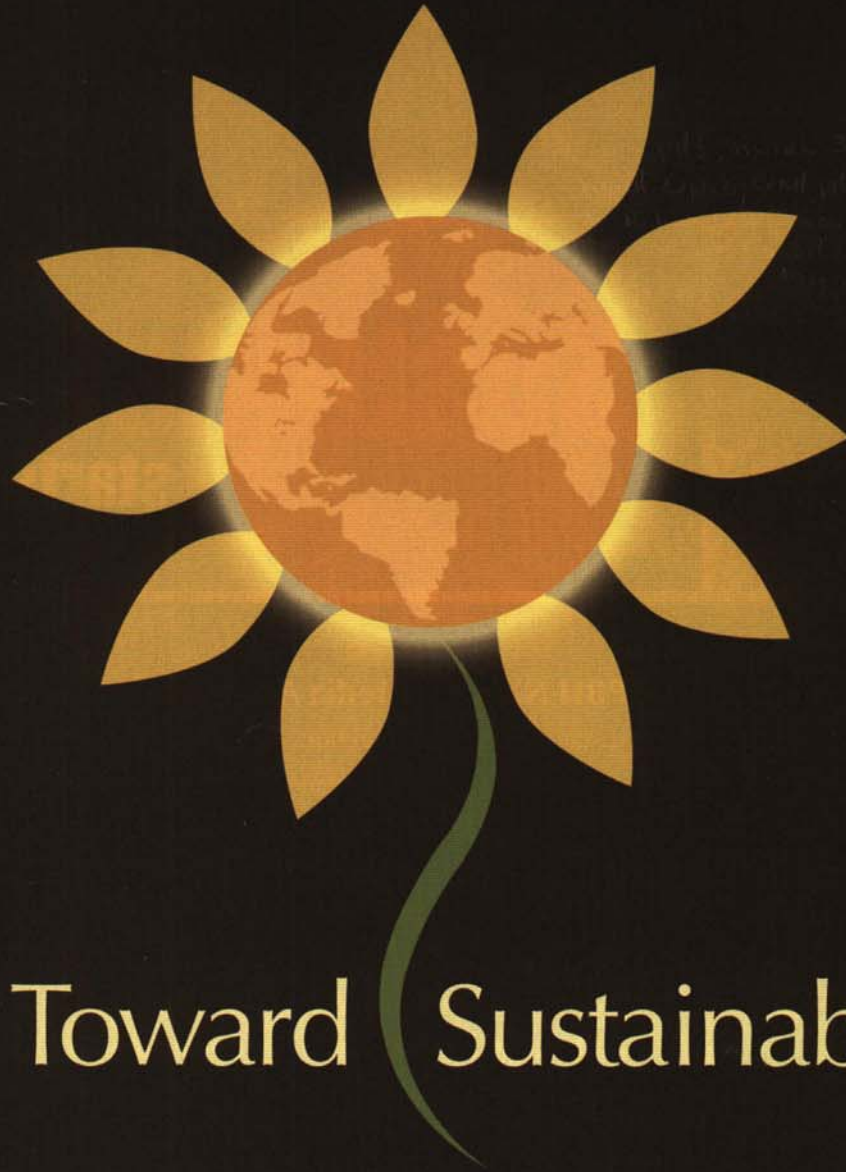


Certification • Grower Checklist • New Products • Training • Retailer Checklist



# Steps Toward Sustainability

A special report on what it takes to make  
your garden center or greenhouse operation  
environmentally responsible and sustainably profitable.

From the editors of Greenhouse Grower and Today's Garden Center Magazines



growing green: VeriFlora

# Certified Sustainability

The VeriFlora sustainability certification program offers ornamental growers new opportunities while ensuring social and environmental responsibility and product quality.

by Laura Drotleff, Senior Staff Writer  
ldrotleff@meistermedia.com



**W**e have seen the word everywhere. Sustainability, in its many forms, is at the grocery store, being driven by the big boxes and in the consumer press. But what exactly does the word mean? Can a grower who has adopted energy alternatives rightly market his crops as sustainable? What about the grower who sells his plants in biodegradable pots? Does a grower have to go organic to be considered sustainable or is reducing chemicals enough?

This is where Scientific Certification Systems (SCS) comes in. The organization is an independent certifier of environmental, sustainability, food quality and food purity claims, and runs a certification program called VeriFlora that emphasizes sustainability standards. Now available for the potted plants sector in the U.S. ornamental industry, VeriFlora is gaining ground with interest from growers, retailers, wholesalers and other distributors. And with sustainable practices becoming more important to consumers and a priority in many industries, proponents of sustainability certification are encouraging growers to take a hard look at their own production practices.

The idea behind setting a sustainability standard is to provide one clear definition to the industry so everyone is on the same page, says Linda Brown, SCS executive vice president.

"Having that will help to ensure that when people use the term sustainability to define their practices and products, that they are using the same

meaning," she says. "It will also have international ramifications because it will make sure that anybody making a sustainability claim on products sold in this country are being held to the same standard."

## Defining Sustainability

So what is VeriFlora all about? Aside from using crop production practices that build soil fertility and control pests without the use of chemicals, such as practices found in organic production, the program also emphasizes wildlife protection; energy and water efficiency; reductions in greenhouse gases and wastes; and fair labor practices, among other facets (see "Elements Of Sustainability"). VeriFlora is the first sustainability program for cut flowers and potted plants that addresses all of these areas.

"In the past three years, VeriFlora has grown exponentially in the cut flower sector, from about 18 million stems to more than 750 million stems this year," Brown says. "We are now beginning to see a surge in interest in the potted plant sector, fueled in part by growing retailer interest in sustainably grown products. As awareness of VeriFlora grows and general interest in sustainability grows, we expect a large segment of the industry to adopt sustainability practices and seek certification."

While recognizing organic growers as the top tier in sustainable production, VeriFlora also requires conventional growers to develop a plan for converting to organic pest management and soil fertility practices over time. It also covers three other areas



*Merchandising is available for VeriFlora certified cut flowers, and more is on the way for potted plant growers, according to the new VeriFlora Sustainability Council.*



## growing green: VeriFlora

beyond organic practices: environmental and social responsibility and product quality.

"Sustainability is a larger umbrella than organic, and organic is contained within the scope of sustainability, but not the other way around," Brown says. "So ultimately sustainability is the direction of the future. That's why we need a comprehensive standard that takes all of these issues under one framework, and organic practices will thrive under a sustainability framework rather than being shoved off to being something opposite."

### Getting Started

Growers interested in the VeriFlora certification start by filling out an application, which is available at [www.veriflora.com](http://www.veriflora.com). The initial process involves entering into a certification agreement, including confidentiality. Next, the applicant completes the Self-Assessment Checklist, a crucial step of the entire certification

## Elements Of Sustainability

Criteria for being VeriFlora certified fall under three categories:

### 1. Environmental Sustainability

- Sustainable Crop Production
- Resource Conservation and Energy Efficiency
- Ecosystem Protection
- Integrated Waste Management

### 2. Social & Economic Sustainability

- Fair Labor Practices
- Community Benefits

### 3. Product Integrity

- Product Quality
- Product Safety

Source: [www.veriflora.com](http://www.veriflora.com)

grower needs to go through the set-up phase in Track 1.

"Depending on the readiness of the grower or handler, the *timeframe for sustainability is two to six months*," Brown says. "Two months if sustainability practices are in place, six months or more if sustainability practices are not well documented or if corrective actions are required."



Several cut flower growers in North America and South America are already VeriFlora certified in sustainable growing practices. This year there have been 750 million stems produced sustainably, up from 18 million three years ago.



Track 1 follows a set of steps specific to the individual grower, depending on the policies or practices the grower may need to write or implement. For example, a grower may not have a written policy on harassment in the workplace, a subject under the fair labor practices element. The grower would then need to draft and enact such a policy to move forward with certification.

For areas in which a grower needs assessment, SCS and the applicant together identify areas that are deficient to certification standards and a plan to correct these areas in current practices and procedures. SCS works with applicants to help them establish new practices, procedures and policy documents, and provides any necessary information. The organization will also visit growers on-site to provide training to key personnel and help managers develop written procedures and documentation.

"Achieving Track 1 sustainability is an incremental process, whereby a company tackles one issue at a time in a manner that is most cost effective and practical for its operations," Brown says.

After all areas identified as needing attention are completed, the applicant submits an updated Self-Assessment Checklist and if approved, moves on to Track 2 toward certification.

In Track 2, SCS conducts an on-site inspection in which the auditor reviews documents, gathers evidence and interviews employees, and prepares an Audit Report that identifies any major or minor Corrective Action Requirements (CARs). Once CARs are completed, SCS reviews the grower's steps to do so. Finally the SCS Certification Committee evaluates the applicant's actions and policies and decides whether to issue a new certification, extend an existing certification or deny, suspend or revoke an existing certification, as the case may be.

"If this is an initial audit, CARs are identified. A major CAR must be corrected before certification can be granted, while a minor CAR generally must be implemented within a defined timeframe," Brown says. "If this is a certification renewal inspection and major CARs are identified, then a certification may be suspended or revoked, unless immediate corrective action is undertaken."

*Continued on page 6*



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### Generating Interest And Awareness

So far, one potted plant grower has become VeriFlora certified in the United States, Ball Tagawa in Arroyo Grande, Calif. The operation, a joint venture between Ball Horticultural Co. and Tagawa Greenhouses of Colorado that produces young plants for wholesale growers, was certified this past summer, following Ball's lead. Ball Horticultural Co. has become certified sustainable, farm by farm, in each of the countries where it owns production operations, through VeriFlora in the United States and other similar sustainability certification programs worldwide, says Bill Doeckel, general manager of Ball Innovations, who is heading up many of the company's efforts on sustainability. Ball has already been a big influence in the industry-wide sustainability movement.

"One of our goals as a company is to promote sustainability

soon to be certified, including industry leaders Sun Valley Group and B&H Flowers. In addition, certified handlers include three of the largest floral distributors in North America – Delaware Valley Floral Group, Savoir Fleur and Sierra Flower Trading, Ltd.

The newly forming VeriFlora Sustainability Council is an organization that will aim to promote the VeriFlora brand in the marketplace and educate the industry and consumer public about what it means to be sustainable and the importance of sustainable agriculture practices. Annie Gardiner, the council's executive director, says the organization is looking to formalize its structure in the next 60 days.

"We are constituting ourselves as a legal entity and putting a membership structure in place and at the same time starting some of our mission-driven activities," she says.

In addition to promotion and education, the council will provide

## The Future Of Sustainable Agriculture

Scientific Certification Systems (SCS) is working to take the tenets of VeriFlora to the next level by turning sustainable agriculture practices into a national standard through the American National Standard Institute (ANSI). At press time SCS was conducting open meetings in the San Francisco Bay area to glean interest and support for the Sustainable Agriculture Practice Draft National Standard for Trial Use.

"The draft standard was developed by SCS in consultation with numerous stakeholders and represents a compilation of some of the most important

documents that have been developed on environmentally and socially responsible practices in agriculture, with extensive stakeholder input," says Linda Brown, SCS executive vice president.

Another set of meetings will be held in the Midwest in early 2008.

"The substance of the meetings is to introduce the draft standard for trial use in the American National Standard Institute process that will allow this standard to be converted into a national standard," Brown says. "We want to engage and include stakeholders from various industries and organizations and environmental groups that have an interest and want to be part of the process of creating a national standard."

While SCS does not have a set goal in terms of numbers of grower operations it would like to certify in sustainable production in the coming years, it does have other goals in mind and ideas of what kind of en-

vironmental impact its goals would have.

"We are clearly interested in converting hectares of land to sustainable production," Brown says. "Sustainable agricultural techniques compliant with the standard will have the effect of reducing carbon released from soil into the atmosphere. If we can achieve conversion of 75 to 100 million hectares of land to sustainable agriculture practices in conformance with the standard, we believe that will result in eliminating carbon storage of 8 billion tons of carbon dioxide. This goal is very possible now that there is awareness building and interest from retailers. We're right at the cusp of something turning."

For more information on attending meetings to support the Draft National Standard for Trial Use, contact [ddulmage@scscertified.com](mailto:ddulmage@scscertified.com) or visit [www.scscertified.com](http://www.scscertified.com).

and to get more growers producing sustainably," Doeckel says. "Certification does require a commitment on behalf of the grower. You have to decide what is important to you as a business. We think it's important for the industry to move in that direction and that is why we have spent time volunteering on these different committees to move the effort forward."

Currently, 13 growers in South America with a total of 32 farms are either certified or soon to be certified by VeriFlora. In the United States, six growers and a total of 18 farms are certified or

certified members with support around their VeriFlora certified product and train them to talk to buyers about it, as well as work with retailers to set up appropriate merchandising to draw their customers' interest in sustainable products. The council will also work to train retail sales staffs to sell VeriFlora certified product.

"There is a VeriFlora merchandising program so plants can be marketed at retail," Gardiner says. "We also have the consumer Web site, [www.veriflora.com](http://www.veriflora.com), and are aggressively targeting the consumer press to get that pull through." ●



growing green: checklist

# The Green List: Growers

We asked the experts for basic tips on moving greenhouse production toward a more sustainable model. Here's what they said. Which boxes have you checked?

**RAYMOND CLOYD**  
Associate Professor,  
Extension Specialist,  
Kansas State  
University,  
Manhattan, Kan.



- Sanitation: Remove weeds, plant and growing media debris regularly from the greenhouse. These are sources of insect pest populations.
- Scouting: Initiate a scouting program that is designed to detect pests (insects and mites) early so that populations can be controlled easily.
- Properly time applications of pest control materials: Use the information obtained from scouting to time applications of pest control materials at the most vulnerable life stages (i.e. larvae and adults).
- Use biological controls: Gather as much background information as you can and consult biological control suppliers and Extension entomologists before implementing a biological control program. This will increase the likelihood for success. Also, be sure there is a commitment to initiating a biological control program.
- Obtain information on what pest control materials may be used in "sustainable production" programs. Then know the benefits and limitations of these products. For example, know what life stages (i.e. eggs, larvae or adults) these products are most effective on.

**WALLY GAIPA**  
Owner, Marion Gardens, Herbs,  
East Marion, N.Y.

- Pest control should be with biologicals and approved pesticides.
- Adjust your growing schedules to use slower acting (organic) fertilizers.
- Pay more attention to your plants. Remember you cannot use any systemic pesticides. Actually this has other benefits, too.
- Promote your growing practices.
- Sleep better knowing you are doing something good for the environment and your fellow man.

**ROBERTO LOPEZ**  
Assistant Professor,  
Extension Specialist,  
Purdue University,  
West Lafayette, Ind.



- Recycle all materials that are recyclable in your community (cardboard, plastics, paper, metals, glass).
- Create a community compost from organic wastes (plant material and media) or donate organic wastes to local composting / landscape recycling centers.
- Incorporate biological control measures.
- Properly dispose of chemical wastes (pesticides, fertilizers and plant growth regulators).
- Replace incandescent lamps with energy-efficient compact fluorescent lamps.
- Properly clean reflectors on supplemental lighting fixtures to increase efficiency.
- Properly clean furnaces and filters to increase efficiency.
- Use nonchemical height control measures for height control of greenhouse crops

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# SUSTAINABILITY

## Conserve and Preserve with Wetting Agents

by Kathleen Conard, Marketing Mgr., T&O  
www.aquatrols.com

"Sustainability" – "Going Green" – "Environmentally friendly" – "Doing more with less" – these are all words and phrases that are showing up in everything we see, hear or read. But why all the attention and what is sustainability?

Regulatory mandates, increased water and energy demands from population and industry growth, reduced water supplies, run-off and leaching of fertilizers and chemicals are all contributing to the need for adopting a sustainability program. Sustainability is the ability to meet the needs of today without compromising the ability to meet the needs of the future...AND you are adopting practices and products that fit this definition in order to do your part to conserve and preserve.

### Why include wetting agents (media surfactants) in your sustainability program?

Since the 1960's wetting agents have been a tool growers and soilless mix producers have used for wetting and re-wetting mixes. Most commercially prepared mixes contain a starter charge of wetting agent and this addresses the initial wetting problems; this small amount helps the grower get started but is not enough to last throughout the production period or in the retail environment. Reapplication of a wetting agent is necessary to offset the degradation (caused by microbes, chemical decomposition and physical breakage) of the original application and more.

Research and grower use proves that reapplication of a wetting agent during production allows for efficient use and reduced waste of water, chemicals and fertilizers as well as improved irrigation system efficiencies – all important parts of a successful sustainability program. How does a wetting agent do this? We can't change water's chemical make-up or the medium we grow in, but there are other factors we can modify to gain more control over where water – and everything it carries – goes.

### Maximizing Water's Leading Role

Water is Nature's transport system for the delivery of all soil-directed fertilizers and chemicals. It has become in-

creasingly apparent that when infiltration is interrupted, both water and the soil-directed materials it carries will sit on the soil surface or run off to non-target areas or through preferential flow paths. This can negatively impact the performance of applied materials, lead to lower than expected plant quality, drying around pot edges, and have a detrimental effect upon the environment because of increased run-off and leaching.

Using wetting agents (media surfactants) gives more control over where water, and everything it carries, goes in the rootzone. Wetting agents increase infiltration and uniform penetration of irrigation or rainfall, making it more readily available for plant uptake. Because water is delivered more efficiently into the soil, photosynthesis and other metabolic functions can be maintained with less water. In addition less fertilizer and chemicals are lost to run-off or leaching; instead they are uniformly distributed throughout the rootzone and can be utilized more effectively helping you to manage your growing environment and these resources more effectively.



The end result is better plant quality even under stressful conditions and better environmental stewardship at the same time. You will see more dependable plant growth, more saleable plants and better quality in the retail environment while utilizing an environmentally sound management program.



retailing green: training

# Teaching Green

Garden center owners and managers are teaching employees the benefits of organic, natural and sustainable products so they can pass along the knowledge to customers.

by Jennifer Polanz

The entire planet seems to be on a shift toward “green” living. Because of the fairly recent change in the zeitgeist, many garden center retailers have been taking the opportunity to look at what they’re selling and ask, “Is this what my customers are looking for?”

But to carry new lines of products that are either certified organic, natural or sustainable, the challenge becomes training the employees in the benefits of said products to pass that along to the customers. We asked a few retailers who have been in the business of selling earth-friendly products to provide some helpful hints on how to get employees up to speed.

### Straight From The Source

Many retailers have brought in specialists or representatives from earth-friendly product

manufacturers to provide detailed information about these types of products. One example is Rockledge Gardens in Rockledge, Fla., which brought in Suzanne Wainwright-Evans of Buglady Consulting, a well-known, industry specialist in natural pest control.

“Our philosophy is for the safest and most earth-friendly options for nutrition and pest control,” says Theresa Riley, co-owner of Rockledge Gardens. “We believe in integrated pest management, which includes respect and appreciation for the natural order of things. We try to train our staff and customers that most insects are actually beneficial, or at the very least, benign.

“One thing that Suzanne did for us when she was here was to categorize all of the products that we sell for nutrition and pest control. She then charted them according to what they control from friendliest to the environment to most harmful. There are very few symptoms that require the stronger controls. We have shared this chart with all employees.”

Merrideth Jiles, garden center manager of The Great Outdoors in South Austin, Texas, uses written material from Grow Green, a city organization that promotes organic and natural methods of pest control and fertilization. He, too, brings in industry members and company representatives to speak to employees about the products they will sell.

*Continued on page 22*

*Some retailers let their employees take home samples of natural and organic products to try. This helps them become more confident about recommending the products to their customers.*





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### Hiring From The Start

Though it's not necessary to hire someone with an extensive background in organic or natural products, several retailers say they state their philosophy upfront and find many times the hiree feels the same way.

"We seem to be attracting many folks to our business who already share our philosophy, and when they express it during our job fairs or an interview, it certainly gives that applicant a leg up," says Skip Shorb, owner of American Plant Food Co. in Bethesda, Md. "But we really are looking for 'people' people, and most of them adapt quickly to our philosophy."

John Dromgoole, owner of The Natural Gardener in Austin, Texas, agrees. "They don't have to know everything to be hired here, but we find out they have a basic knowledge of what we're doing here."

## Defining Green

Several terms get thrown about when talking about the green movement in horticulture. We asked several retailers what they thought the following three terms meant. Here are some of the answers:

### Organic

This one is more cut-and-dried than the rest. Several retailers said organic is a product that is certified either by a state or a body like OMRI. Also, another retailer said organic refers to a carbon-based product.

### Natural

This one is a bit trickier. In fact, one retailer said the word 'natural' gets abused because it doesn't have a true definition when applied to horticulture products. Several said it refers to ingredients that are naturally occurring in the environment with little or no human processing. Two of the retailers make their own products and label them natural, even though they could be certified organic. They both said the expense to have them certified would only translate to a higher price on the product, and wouldn't increase sales or make the product any better.

### Sustainable

This term relates to the product's ability to renew or carry on, says one retailer. Another says the sustainability movement is about creating a "softer" living or growing space. And finally, one retailer says sustainability means the practice can continue without exhausting the resources the Earth has to offer. He quoted Gandhi in his response: "The Earth has enough for man's need, but not enough for man's greed."

As long as they have an interest and a desire to learn, he says, they can't go wrong.

"Many have no clue when they get here and they leave as ambassadors."

Once Shorb hires, much of the employee orientation program is built around the decision seven years ago to sell natural and organic products and be a beacon for green living.

"Once a year we close for a day (in January) and present Earth-wise University," he adds. "This is an all-day program around organics, sustainability and customer service."

### Do As I Do

Several of these garden centers also train employees simply by living what they preach. Dromgoole has a garden master named Roger Igo, who takes care of the many display gardens on the 8-acre retail site. The display gardens are all managed organically and naturally, so employees spend time with Roger to watch how he uses certain products and what the effect is on the plants.

"He explains stuff as he's working, and they're sponges," Dromgoole says of the employees. "Pretty soon they have real-life experience."

Riley says Rockledge Gardens allows employees to take natural and organic products home to use. That way they, too, can see first-hand how effective the product is.

Shorb sent more than half his staff to a three-day seminar on earth-friendly alternatives and de-toxifying and feeding the soil. He also sent one employee to a three-day seminar on how to make compost.

### Why It's Vital To Train

Retailers who begin to delve into the world of organic, natural and sustainable products must keep employees knowledgeable to ensure the products are being used properly. Dromgoole says if employees tell customers incorrect information, it can mean an unsuccessful gardening experience, and not only will they stop gardening organically, but they'll stop shopping at your garden center.

Customer success is imperative, and Jiles says a well-trained employee absolutely equates to better sales.

"You have to believe in what you sell," he says. "I encourage employees to use these products themselves, give away samples to them, and use most of what we sell around the nursery when necessary. If they see it work, then they can be confident recommending it to others." ●

Jennifer Polanz is a freelance writer based in the Cleveland area. She can be reached at [jepolanz@gmail.com](mailto:jepolanz@gmail.com).





retailing green: checklist

# The Green List: Retailers

We looked to the experts for tips on creating a more sustainable retail operation. Here's what they said. Which boxes have you checked?

**CHARLIE COLE**  
General Manager,  
Cole Gardens,  
Concord, N.H.



- Create a sticker that identifies eco-friendly or natural products.
- Push Espoma (which contains more natural ingredients) and other earth-friendly products.
- Use a potting mix that contains a maximum of 10 percent perlite.
- Use capillary mats. We use them in our greenhouse and perennial area, which means less watering because the plants will suck up the excess water that goes on the bench.
- Encourage customers to bring back their pots. We do, and we are then able to get the customer back into the store.

**MERRIDETH JILES**  
Garden Center  
Manager, The Great  
Outdoors, South  
Austin, Texas



- Look at how your business operates. I think every owner, general manager, etc., should spend a few days in the trenches with their employees seeing how

the business really operates. Are employees trying to recycle materials such as grow pots, cardboard, cans, old soil, etc? As much as we do to "Reduce, Reuse, Recycle," I am amazed at how much trash our store generates. I'm sure I would be appalled at many other stores that don't do the things we do. We have a dedicated dumpster for cardboard and paper, bins for aluminum, glass and plastic, a grow pot reuse program and a used soil reuse program.

- If you order a "package" of product from a vendor that comes with a display you will never use, ask them not to send it. They may even give you a discount on the order since they do not have to cover the cost of the "free" display unit.

- Ask vendors, when possible, to combine pieces into one larger box instead of several smaller ones. It may save on freight.

- Look for growers that try to be natural or organic, possibly even using biodegradable pots.

- Look at the corporate philosophies and histories for the companies you deal with. You may be surprised at how un-earth-friendly some companies are.

**THERESA RILEY**  
Co-owner Rockledge Gardens,  
Rockledge, Fla.

- The most important thing a garden center can do is to be conscious of conserving energy,



retailing green: checklist

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## retailing green: checklist

water, etc. Irrigation practices are very important, as is the use of power to heat, cool, etc. Recycling is a simple step, whether it's recycling soda cans and bottles, cardboard or plastic pots.

❑ Composting (or at least separating compostable materials from trash) is another fairly easy-to-implement practice.

### SKIP SHORB

#### Owner, American Plant Food Co., Bethesda, Md.

❑ Look at where you buy your material. We just dropped a supplier of over 50 years, because they ship a product halfway across the country that we can buy within 100 miles of our stores. We sell and promote locally composted waste material (as soil conditioners) that in the past either filled up landfills or polluted local water ways.

❑ Look at your lighting. We are currently changing over all of our light fixtures to the energy saving products.

❑ Recycle. We sort our trash and paper/cardboard.

### JOHN DROMGOOLE

#### Owner The Natural Gardener, Austin, Texas

❑ Look at what general retailers are selling as consumer green products – alternative lighting (solar, compact fluorescent, etc); low VOC paints; alternative building materials like bamboo; selling a reusable carry out bag that customers can bring in and use again.

❑ Look at runoff to ensure it is being managed properly before it gets to local rivers and streams.

❑ Use recycled materials in the store, and sell products made of recycled materials.

❑ Seek out fair trade items to sell in the gift shop.

❑ Think about the next generation. Part of the sustainability philosophy at The Natural Gardener includes directing all charity activities toward schools to create organic gardeners for the future.



### JENNIFER ZURI

#### Marketing Communications Manager, Aquascape, Inc., St. Charles, Ill.

❑ One of the easiest things a business can do to move toward being eco-friendly is to adapt a recycling program. Contact the local waste management company to get started. Oftentimes, they'll supply recycling bins at no extra cost to you. Be sure to take the time to educate em-



ployees on the benefits of recycling cans, newspapers, and other types of recyclable trash found at your establishment.

❑ Another easy fix for garden centers to focus on sustainability is to look overhead – literally – to lighting fixtures. The next time a light bulb goes out, replace it with a compact fluorescent light. Although these bulbs cost more initially, you'll not only save on electric costs, but since the fluorescents last up to nine times longer, you'll be spending less on replacement bulbs over the long haul.

❑ Do you sell decorative containers in your retail center? Advertise them as rainwater containers! Either sell waterproof sealant for the interior of the porous container, or take the time to seal the containers yourself as an added service to your customers. Instruct homeowners to direct downspouts into the decorative container. They can then use the captured rain to water their garden plants.

❑ Since the majority of rain water runs off the yard and into the local sewer system, it's important to capture the rain so it soaks into the soil. To show your dedication to the environment's sustainability, create rain gardens on the property of your retail location:

– Choose an area a few feet from the exit point of a downspout. Dig and remove 3-4 inches of soil, then loosen remaining soil to a depth of 8-12 inches. Add sand and organic matter.

– Dig a trench between the hole and the downspout, and lay a drainpipe that leads from the downspout to the rain garden.

– Plant the rain garden with a variety of water-loving plants.

❑ Better yet, you can hold a rain garden how-to class for customers at your garden center. After the seminar is over, be sure to sell the supplies your customers will need to make their very own rain gardens. Don't forget to provide a variety of aquatic bog plants from which to choose for the garden.

### TINA MAST

#### Communications Director, Homewood Nursery, Raleigh, N.C.

❑ Conserve water.

❑ Use integrated pest management in production facilities with a focus on organic methods and chemicals non-toxic or less toxic to humans and that also pose reduced water pollution issues.

❑ Sell plants in biodegradable pots.

❑ Sell pest controls, fertilizers and soil amendments that are organic and that do not pose risks to humans, wildlife or ecosystems.

❑ Educate customers about these things. ●



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growth regulators were applied.

The Lily Looks cultivars were grown in a glass greenhouse set at 68°F under a 16-hour photoperiod provided as day extension using high pressure sodium (HPS) lamps. HPS lamps also provided about 1,200 footcandles of supplemental light when ambient light was low. During the January and December trials, the light levels in the greenhouse were lower compared to August and October trials. Also, the greenhouse was warmer than the set point during August trials.

#### Irrigation And Nutrition

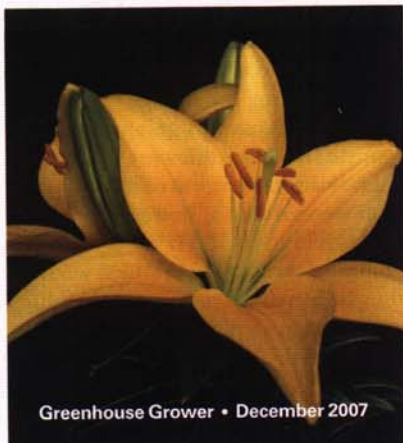
During the period of emergence, plants were watered sparingly. The potting soil was allowed to dry out slightly but not completely between waterings. Following emergence, plants were watered regularly when necessary. Plants were fertilized at each watering with a complete fertilizer containing macro and micro nutrients and 125 ppm N.

#### Data Collection

Following emergence, plants were centered in the pots and grown until flowering. The date of first open flower was recorded and days to flower were computed from the day of planting of bulbs. At flowering, the number of flower buds, plant height from the base of plant to the tallest point and number of chlorotic and necrotic leaves were recorded. The date of senescence of the last flower on each plant was recorded, and bloom time was computed as days from opening of the first flower to senescence of the last flower.

#### Postharvest Performance Trial

The postharvest performance of lilies was evaluated by storing them at



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Figure 1. Lily Look cultivars featured at Hortifair in 2006. Photo courtesy of Dr. Erik Runkle.

41°F or 68°F in boxes for one week. The storage experiment was initiated when the first bud on a plant showed color. Plants were watered prior to, but not during, storage. Following storage, plants were returned to the greenhouse and monitored. The number of yellow leaves

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## PRODUCTION

### FORCING LILIES

was recorded and the overall plant appearance was evaluated.

#### Flowering

Lily Looks cultivars were compact and offered large and vibrant flowers with a great splash of color ranging from yellow, orange, red, pink, white to speckled and bicolored flower forms (Table 1). The flower bud number of the Lily Looks cultivars ranged from three to 10, depending on the cultivar and bulb size. The average number of flower buds on each cultivar from 12/14 cm bulb size is presented in Table 2. Typically, plants from larger bulbs produced more flower buds (Figure 3), since bulbs are underground carbohydrate storage structures and larger bulbs had more energy reserves.

During forcing, the rate of progress to flowering of lilies is regulated by average daily temperature. We forced Lily Looks cultivars at a constant 68°F setpoint and the average time to first open flower from potting of bulbs from the four plantings ranged between six to seven weeks. During the trial initiated in August, when greenhouse temperatures and light levels were higher, flowering was hastened by about two weeks compared to the January trial. Note that we forced lilies under supplemental lighting provided by HPS lamps and heat given off by the lamps may have slightly hastened flowering in the winter trials.

Bulb size impacted flowering time of some cultivars. Overall, the influence of bulb size on flowering time was variable and cultivar dependant. For example, 'Tiny Hope' flowered one to seven days earlier when larger sized bulbs were used. In contrast, bulb size had no influence on flowering time of 'Tiny Icon.'

Overall, Lily Looks cultivars performed very well and we observed only a few problems with bud abortion or lower leaf chlorosis and no incidence of pests or diseases. For instance, bud abortion was noted only during the summer trial on two individual plants of 'Tiny Toes.' Also, 'Tiny Bell' exhibited some lower leaf chlorosis during the trials.

Overall, Lily Looks cultivars performed very well and we observed only a few problems with bud abortion or lower leaf chlorosis and no incidence of pests or diseases. For instance, bud abortion was noted only during the summer trial on two individual plants of 'Tiny Toes.' Also, 'Tiny Bell' exhibited some lower leaf chlorosis during the trials.

Figure 3. Lily Look cultivars typically had more flower buds when grown from larger bulbs. This photograph shows 'Tiny Icon' grown from 10/12, 12/14 and 14/16 cm bulb size (from left to right) that averaged six, seven and 10 buds per plant, respectively.



#### Plant Height

Lily Looks cultivars were not treated with plant growth regulators during our trials and ranged in heights from 10 to 22 inches at flowering (Table 3). About 70 percent of cultivars were 12 to 15 inches tall and would require little to no plant growth regulation when forced in 6-inch containers. Generally, larger bulbs produced somewhat taller plants, though this effect was cultivar dependant. For instance, with each unit increase in bulb size, 'Tiny Kissed' plants were about 2 inches taller, while there was no change in the plant height of 'Tiny Diary.'

#### Bloom Time

We recorded bloom time for each cultivar as days from opening of the first flower to senescence of the last flower on a plant. The average bloom time for Lily Looks cultivars grown at 68°F is reported in Table 4. At 68°F, plants bloomed for about 11 to 17 days. Lower production temperatures would likely extend the bloom time.

#### Postharvest Performance

All cultivars except 'Tiny Bell' stored well at both 41°F and 68°F. The lower leaves of 'Tiny Bell' became chlorotic, particularly after storage at 68°F. At 68°F, flowers continued to open and develop during the storage while, at 41°F, this process was greatly delayed. Many dark colored flowers faded slightly after storage at 68°F, while after storage at 41°F, flowers were more vivid in color (Figure 4A and B). Shipping at cool temperatures would thus be beneficial to prolong shelf life and to improve plant quality.

Table 1. Flower colors of Lily Looks cultivars.

Flower Color	Cultivar
Yellow	Tiny Bee, Tiny Dessert
Orange	Tiny Diary, Tiny Dino, Tiny Invader, Tiny Skyline, Tiny Star
Red	Tiny Ghost, Tiny Hope, Tiny Kissed, Tiny Puppet
Pink	Tiny Athlete, Tiny Bell, Tiny Icon, Tiny Todd
Salmon	Tiny Toes
White	Tiny Nanny, Tiny Snowflake
Bicolored	Tiny Sensation

Table 2. Average number of flower buds produced by Lily Looks cultivars forced from 12/14 cm-sized bulbs.

Average Flower Buds from 12/14 cm Bulbs	Cultivar
4	Tiny Dessert, Tiny Skyline, Tiny Star
5	Tiny Athlete, Tiny Diary, Tiny Invader, Tiny Sensation
6	Tiny Bee, Tiny Bell, Tiny Dino, Tiny Ghost, Tiny Hope, Tiny Kissed, Tiny Toes
7	Tiny Icon, Tiny Snowflake, Tiny Puppet
8	Tiny Nanny, Tiny Todd

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## The Inside

Solutions For  
Successful Growing



Ken Harr

### Q. What environmental conditions will initiate bud formation in Maverick™ and BullsEye™ Geraniums?

**A.** 'Maverick' and 'BullsEye' Geraniums are day-neutral plants, meaning once the juvenile period of vegetative growth has been fulfilled after seeding (approximately day 13 – 28), the plants are receptive to bud initiation. Primarily it is irradiance (total light accumulation) that causes bud development. HID lights turned on for 18 hours over the Geranium plug trays or a total of 16 – 20 mols daily for 5 – 6 weeks will initiate buds in the earliest possible time-frame. An average daily temperature (ADT) of 68° - 70°F (20° - 21.1°C) is a secondary requirement to further enhance flower development.

### Q. What are some objectives to key in on during the germination and growing of plug production?

**A.** In the **Germination 1** stage where radicle emergence and the initial root penetration occurs, the goal is to achieve the germ percentage possible. This is done by having 100% humidity over the trays, the correct soil temperature maintained for the specific crop and where applicable, approximately 20 – 30 footcandles of light. In the **Germination 2** stage the goal is to get the highest number of usable seedlings. Dropping the humidity in the air to 40% will result in better root expansion, cotyledons become fully expanded, and the roots will readily expand throughout the growing substrate. Maintaining the appropriate temperature ranges specific to the crop and supplying 2 – 6 mols of light (1000 – 2000 f.c.) and feeding with 40 – 75 ppm of N will enhance growth. Once true leaves appear, the **Initiated Bulking** stage is where many crops become receptive to flowering. The goal is to develop flowers as quickly as possible and lay a foundation to maximize garden and landscape performance. Finding out what the photo-periodic responses of all crops being grown will determine what light conditions will be necessary to finish them in the shortest amount of time. Are they day-neutral, facultative long-day, or obligate long-day? An average daily temperature for most crops is 67°F (19.4°C) is optimum. Implementing a negative DIF or 5 – 10°F drop in temperature at sunrise will greatly improve the tone of the crop and lessen the need for growth regulators. A 40% humidity level will aid in

keeping the seedlings from stretching as well. As the **Bulking and Flower Initiation** stage continues, the goal is to produce the most vigorous and proportionate plant...that is, develop a great 'chassis'. Increasing light levels to 8 – 14 mols (2500 – 4000 f.c.); again keeping humidity levels at 40% and ADT's at 67°; and fertilizing with 17-5-17 and 14-4-14 @ 60 – 75 ppm N will also give the plugs 6 – 12 ppm of P. By watching these key points throughout plug production and knowing the specific lighting requirements for each crop and cultivar, a plug grower will greatly enhance the end result of well-toned, bud-initiated plugs with healthy root systems that are ready for transplanting.

### Q. I am hearing more and more about using Cyclamen in the landscape. What more can you tell me about this?

**A.** In more moderate parts of the US and Europe during the cooler months of late fall and winter, Cyclamen are being planted in decorative mixed containers, window boxes, and even in mass plantings with great success. Once Cyclamen begin to bloom, the plants continue to send up new flowers every day that last for a week or more. Goldsmith's series of Cyclamen were bred for maximum leaf production on a plant that allows for good air movement through its canopy of foliage. At every leaf axel there is a potential bud. The result is a long-lived plant that continues to bloom for months. Perfect for the lower, moderate temperatures of the southern and western US states. We're seeing more garden centers, grocery stores and chains offering Cyclamen for outdoor use than ever before.

### Q. What are some key points to watch for when finishing Cyclamen crops?

**A.** Many Cyclamen growers will purchase plugs or liners and transplant directly into the finished containers. The mini-types such as 'Miracle', 'Midori' and 'Silverado' will be grown in 4" pots; intermediate types like 'Laser' and 'Sterling' can go into 4" – 5"; 'Sierra' into 6" – 7"; and 'Robusta' into 6" and larger. The grower's customer will ultimately determine what series and pot size will be used. For all Cyclamen, strict sanitation practices will help ensure the quality of the finished product. Using new pots, disinfecting benches, floors, and equipment will greatly reduce the incidence of unwanted algae growth where fungus gnats and shore flies may live. Thrip can and will infect Cyclamen with tospoviruses resulting in an unsaleable crop at finish. In addition to the overall cleanliness in the greenhouse, the following points should be followed:

- Use a porous media that drains well. Cyclamen are sensitive to high soluble salt levels – maintain a soil EC of 1.2 – 1.4.
- Provide shade to allow a maximum of 4,400 f.c. but make sure levels do not drop below 2,200 f.c. as Cyclamen struggle to flower below this threshold.
- Maintain cool days as much as possible – around 65°F nights – until the roots have reached the sides of the pots. Afterwards, drop to 62°F nights to assist in flowering. Once roots have the bottom of the pots, the temperature can be dropped further to 58°F nights.
- Water Cyclamen to a level 4 (wet), allow to dry down to level 2 (medium) before re-saturating to a 4.
- Maintain a somewhat higher humidity level at around 60% during the day and between 80 – 85% at night. Low humidity levels can result in yellow leaves.
- Feed weekly or every 2 – 3 watering initially with a N:K ratio of 1:1, gradually increasing the ratio to 1:3.

• Plants can be grown pot-tight until the leaves begin to touch, then space plants to ensure adequate air circulation between the pots. Good air circulation is necessary for quality growth and maintains a favorable climate for disease resistance. ■

For additional or more specific, in-depth cultural information on Cyclamen and other Goldsmith crops, contact Goldsmith Seeds Technical Managers at 800-549-0158.

**Ken Harr** is a Product Technical Manager for Goldsmith Seeds. He can be reached at 408-382-9791 or [ken@goldsmithseeds.com](mailto:ken@goldsmithseeds.com)

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## PRODUCTION

### FORCING LILIES

#### Effect Of Bulb Storage

During our four trials, which spanned nearly a year, no deterioration in greenhouse performance of any Lily Looks cultivars was observed. All the bulbs were from a single field harvest and stored at temperatures just below freezing. Thus, there was no evidence that extended storage had any negative effect on subsequent performance.

#### Additional Tips For Successful Production

- **Planting depth.** Although lilies develop bulb roots, stem roots are the primary source of nutrition and plant support. Correct planting depth influences the available space for development of stem roots and therefore, bulbs should be planted at least 2 inches deep. Additionally, the planting depth influences time to emergence and subsequently the flowering time. Hence, planting at a uniform depth is necessary for a uniform crop time.

- **Centering shoots in pots.** Shoots should be centered immediately after emergence. If it is delayed, newly formed stem roots can make this process cumbersome.

- **Fertigation.** Since the bulbs act as

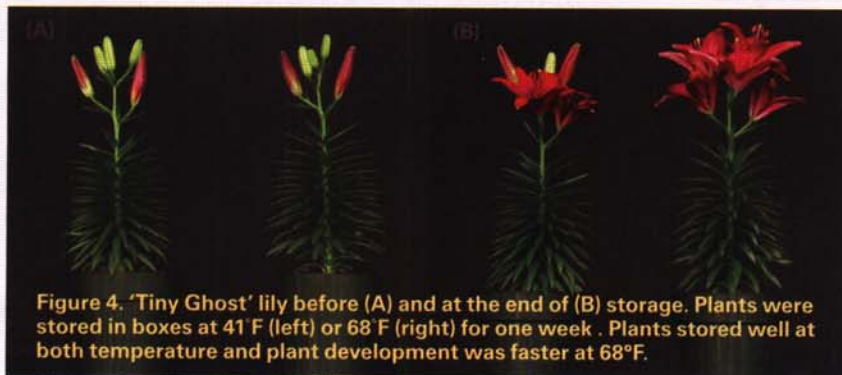


Figure 4. 'Tiny Ghost' lily before (A) and at the end of (B) storage. Plants were stored in boxes at 41 F (left) or 68 F (right) for one week. Plants stored well at both temperature and plant development was faster at 68°F.

a source of nutrient reserve, lilies are light feeders. The plants can be fertilized after emergence using a slow release or constant liquid fertilizer.

- **Fluoride toxicity.** Lilies can develop phytotoxic symptoms of leaf burn when an excessive amount of fluoride is present in irrigation water, particularly likely when city water is used for irrigation.

- **Calcium deficiency.** Due to insufficient calcium translocation, many lilies can develop leaf tip burn, particu-

Table 3. Height of Lily Looks cultivars from 12/14 cm-sized bulbs at flowering, measured from the tip of the plant to the surface of medium.

Plant Height (inches) from 12/14 cm bulbs	Cultivar
10-12	Tiny Invader, Tiny Skyline, Tiny Diary, Tiny Nanny, Tiny Bell, Tiny Sensation
13-15	Tiny Bee, Tiny Dino, Tiny Star, Tiny Toes, Tiny Dessert, Tiny Ghost, Tiny Athlete, Tiny Puppet
16-22	Tiny Todd, Tiny Icon, Tiny Hope, Tiny Snowflake, Tiny Kissed

Table 4. Average bloom time computed as number of days from opening of the first flower to senescence of the last flower. Plants were maintained in the greenhouse set at 68°F while the flowers developed.

Average Bloom Time (days)	Cultivar
11	Tiny Sensation
14	Tiny Hope
15	Tiny Icon, Tiny Diary, Tiny Bee, Tiny Puppet, Tiny Athlete, Tiny Kissed, Tiny Invader
16	Tiny Dessert, Tiny Star, Tiny Dino
17	Tiny Bell, Tiny Skyline, Tiny Nanny
18	Tiny Toes, Tiny Ghost
19	Tiny Snowflake, Tiny Todd

larly when grown under high humidity. This problem can be corrected by improving air circulation and applying foliar prays of calcium. In our studies, leaf tip burn was not observed.

- **Forcing temperature.** Asiatic lilies are best grown at relatively cooler

will likely bend towards HPS lamps. Therefore, appropriate spacing of supplemental lights creating uniform light distribution is important to ensure upright plant growth.

- **Supplemental lighting.**

Reportedly, when grown under very low irradiance, flower bud abortion or drop can occur and hence, supplemental lighting may be beneficial. We used supplemental lighting in these studies and observed no abortion that would have been caused by low irradiance.

- **Photoperiodic response.** Most lilies are day neutral after flower initiation and hence, can be successfully forced under any photoperiod. However, there are notable exceptions, particularly some Oriental lilies which flower considerably earlier under long days. We grew lilies under a 16-hour photoperiod, and did not determine the influence of photoperiod on flowering time. **GG**

**About the authors:** Sonali Padhye is a post doctoral research associate and Art Cameron is a professor in the department of horticulture at Michigan State University. The authors gratefully acknowledge Mak Breeding Company for financial support of the trials, Michigan Grower Products for donations of media and The Blackmore Company for donations of fertilizer. They also thank Mike Olrich and undergraduate student employees in the Floriculture Program at Michigan State University for providing plant care.

temperatures. It has been reported that growing lilies at temperatures over 71°F (21°C) can promote abortion and subsequent abscission of flower buds. We forced lilies in our research greenhouses set at 68°F, although during the August trial, greenhouse temperatures were warmer than 68°F. We did not observe any obvious physiological disorders related to high temperature stress.

- **Phototropic response.** Lilies are strongly phototropic and the stems