



an Association of Floriculture Professionals

Bulletin

Managing Diseases on Herbaceous Perennials

by Margery Daughtrey

Disease worries on perennials can be kept to a minimum using careful crop management. Here are some easily anticipated problems to be aware of:

Botrytis

Botrytis blight management is most important for species that are especially Botrytis-prone, such as peony and dahlia. Collecting plant debris before overwintering is helpful. Providing sunny conditions with good air drainage is important for keeping the new spring growth Botrytis-free. Fungicides should be used to protect new peony shoots as they emerge,

because these are just as susceptible as the flowers. Temperatures in the range of 55 to 70°F and high humidity are conducive to Botrytis blight by *Botrytis peoniae* and *B. cinerea*, so fungicide treatments may be necessary to protect landscape or nursery plants in wet springs. Materials useful against Botrytis include Chipco 26019, Compass, Daconil/PathGuard/Concorde, Decree, Dithane/Protect, Heritage, Kocide, Phyton 27, and combination products such as Junction, Manhandle, Spectro, and Zyban. See labels for registered uses.

Leaf Spots

Leaf spot diseases will occasionally be encountered, caused by bacteria or

fungi. Diseases of perennials caused by **fungi** such as *Alternaria*, *Septoria*, *Ascochyta*, and *Cercospora* spp. are usually host-specific. Watch out for an *Alternaria* on aquilegia and *Septoria* diseases on phlox, aegopodium, and rudbeckia. Keeping leaf wetness to a minimum is helpful for control. Water early in the day to allow foliage to dry before nightfall. Replacing stock plants from a new source free from the disease is the ultimate control (if there are no weed hosts or closely related crops to carry over the inoculum). If fungal leaf spot diseases are severe enough to merit treatment, choose

Continued on page 8

Supplemental Lighting: Part 2

by A.J. Both

Editor's Note

The following article enhances material that A.J. Both presented in his article in the July/August issue of the *OFA Bulletin*. This supplement "paints a picture" of the amount of natural light that is received at a couple of locations in the United States, and it provides guidelines and a further understanding of how to make best use of supplemental lights.

Available Natural Light

To determine the amount of natural light available for crop production at a particular location in the United

States, one can consult the database of solar radiation data maintained by the National Renewable Energy Laboratory in Golden, Colorado (<http://www.nrel.gov>). This database contains solar radiation data for 239 locations across the United States and its territories. Another source of such data may be your local weather station (e.g. radio or TV station, airport), which may keep records of historic solar radiation data.

For plant production purposes, the solar radiation data can be converted into the units of mol/(m²d), indicating the daily sum (integral) of light available for photosynthesis (PAR, 400

Continued on page 10

September/October 2003

Managing Diseases on Herbaceous Perennials	page 1
Supplemental Lighting: Part 2	page 1
Executive Director Report	page 2
Ways We Waste Money in our Garden Centers	page 3
Why Vegetative Crops?	page 4
Becoming Your Employer's MVP	page 6
A FE Consumer Tracking Study	page 9
A Look at the Flowerbulb Research Program at Cornell	page 12
Sanitation of Irrigation Water	page 15
Visual Merchandising: Simplify! Simplify!	page 18
Employers Should Review Required Postings & New Hire Reporting	page 19
OFA Membership Report	page 20
OFA and OFAS 2002 Financial Statement	page 21
OFA Short Course Contributors	page 22
2003 Booth Awards	page 23
OFA News	page 24

OFA Mission Statement

To support and promote floriculture professionals through lifelong learning, career enhancement, and public awareness.

OFA – an Association of Floriculture Professionals

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Executive Director Report



by John R. Holmes, CAE

As a follow-up to my March/April *OFA Bulletin* article which served as part one of a 2002 Executive Director's Report, I'll now share details on OFA's 2002 finances as recently confirmed by independent auditors and accepted by the OFA Board of Directors.

In short, OFA's financial position continues to make gradual, but positive progress. For 2002, OFA (in combination with OFA Services) ended the year with net losses of \$5,888, based on a modified cash accounting system. This is an improvement over 2001, when the net loss equaled \$10,410. The 2002 net loss was largely due to over \$25,000 in unanticipated and unbudgeted obligations.

Beginning January 1, 2003, OFA moved to an accrual-based accounting system. As a result of that transition, the auditors also reported the 2002 results on an accrual basis. The 2002 net losses from an accrual-based system are \$36,179. This will be the number used for comparison purposes for the 2003 audit.

Also, total paid memberships have stayed steady at just under 3,600.

OFA continues to make great strides in the reallocation of its limited resources and investments in its long-term infrastructure. The fruit of those efforts are beginning to ripen as we look at year-to-date results, as compared to the 2003 budget. At the end of August 2003, OFA appears to be a good financial health, and may actually end the year with net income rather than net losses; the first opportunity of its kind in several recent years.

This stability would not be possible without the loyal support of OFA's members, volunteers, Board, staff, and numerous other industry professionals. Thanks for maintaining your commitment and confidence in OFA!

Ways We Waste Money in our Garden Centers & How to Avoid It

by Bob Van Cura
A Proper Garden, Delaware, Ohio

- Watch labor! For several years now, we have heard that people are our most valuable asset. While this is true, we need to watch the performance of that asset closely. For starters, payroll that goes into unproductive time is lost forever – nothing will recoup that cost. But even more, look at the trickle-down effect that ineffective help has on the productive staff. Last, but not least, look at the ways we pile unimportant tasks, such as certain kinds of record keeping, on staff that take them from customers.

- We waste money every time we divert attention from a customer.

- We waste money by failing to consistently work at doing add-on sales. We spend the money on advertising to get them in the door, and money on overhead to staff the place and make it look good, and then fail to tap a very easy additional source of revenue.

- Watch sunlight. We have been told to “cross merchandise” by industry consultants and that packaging is “water proof” by the vendors. Yet I have seen lots of faded, gross-looking bottles detracting from healthy plant material that is neither attracting a customer nor providing additional revenue. It does provide an end of the year write-off (as if you really need any more).

- There are many very worthwhile causes out there to make a donation. Yet trying to support all of them can be extremely expensive.

- Don't fail to watch open-to-buy budgets. It is easy to get a lot of money tied up in stuff that we thought would sell, but now we have to water or dust regularly.

- Never take anyone who utters the phrase “Isn't it cute” to a gift show. Not only does it cost you the money for a flight, room, and extra food, but all that “cute” stuff that we just had to



have does not necessarily appeal to the core customer and gets expensive as you pay personnel to dust it. Make sure any potential buyer says “this product line isn't right for our customer base” to at least three out of four potential vendors before you even consider giving them the corporate credit card.

- Not following Mom's advice to put everything away when you're done with it has cost our garden center a lot of money over the years. We have actually had an employee on overtime drive 20 minutes one way to buy a hammer that “Suzy” left lying at the other cash register.

by Nancy Baker
Baker's Acres, Alexandria, Ohio

- We've wasted money paying someone to pull weeds, but they leave the roots.

- Having the inexperienced people do the watering equals death in three days to most plants.

- Not putting things back where they belong means the next person wastes a lot of time.

- Have jobs for cashiers to work on at all times. The cashier's time goes faster, and customers like to see people work instead of doing nothing. Just be sure the cashier knows the customer ALWAYS comes first.

- Pay attention to past sales, so you don't over or under grow or buy.

- Treat seasonal help as valuable as full-time. Provide good pay and as many benefits as you can, so they come back many years. One year is just training. They are so important to our industry's success!

- Growing or selling poinsettias and mums at today's prices – get real on a real profit.

- Trying to sell annuals in flats or anything past the shelf life hurts all sales and wastes watering/“tending to” time.

- Teach employees how to walk fast. It's good for them and a lot more will get done.

- Wrong employees for the job wastes money. Use everyone to their best ability.

- Close your store in January. Remodel, regroup, do paperwork, plan, order, clean, and sleep.

by Chuck Behnke, Ohio State
University Extension, Elyria, Ohio

- Does your garden center have a Best Management Plan? Have you evaluated and measured run-off to avoid future investigations by EPA?

- Are your fertilizers in a safe spot so bags are not punctured, spilling chemicals out ... i.e. getting into drains?

- Is there a spill plan in place?

- Are products stored safely so they don't freeze in the warehouse area?

- Are rodent controls in place to limit mice feeding on grass/birdseed?

- Are you tracking bulb sales so you don't have to dispose of excess spring bulbs?

- Could excess bulbs be offered to your city for a planned planting?

- Is your aquatic display area free of mosquito breeding sites especially where there is non-moving water?

Information provided by OFA
Garden Center committee members.



Why Vegetative Crops?

by Jack Williams

So what is all the noise about with vegetative product? Why are these crops any different than crops produced from seed or other methods? What makes these plants “premium products” and justifies higher prices for growers and at retail? People have been asking and been asked these questions, and rightfully so. The simple answer is: vegetative reproduction allows our industry to use plants that might otherwise never be available if they must be produced from seed. What a difference these products have made for growers and gardeners alike!

To understand the differences between vegetative production and seed-produced crops, it is necessary to look at the basics of “why” each is important.

In seed production, the goal for product is twofold:

- To create plant types that can be easily replicated from high quality seed which is suitable for plug production and technology.

- To have plants with uniform characteristics – height, size, flower color, etc. By adhering to these criteria, a “weeding out” occurs of unique genetics found in the breeding process that are not be easily replicated through traditional seed production. Vegetative reproduction gives breeders an alternative method to bring forward plants that do not meet the criteria detailed above. Even if plants are sterile or produce poor quality seed, they can be multiplied and replicated in mass quantity through cuttings. Vegetative production allows our industry to capitalize on “individuality” versus the “uniformity” required with seed production. Some benefits of this process include:

- Good performing cultivars/species with enhanced characteristics

can be used rather than discarded because they do not reproduce by seed.

- Sterile plants tend to have bigger, showier flowers that last longer (they are not genetically programmed for the key purpose of creating seed).

- There are examples of products in the market today that could not be brought forward through seed programs. Bacopa is a great example of this. We know how much bacopa is sold in the market today; almost every consumer has some in their yards or landscaping.

A significant difference between vegetative and seed production is the time involved bringing new plants to market. Seed products can take up to seven years to be fully available to the market. There are three to four years invested in breeding/selection work, followed by two to three years to build up seed production, especially where seasonality of the crop may influence when and how seed is harvested. In contrast, vegetative products can be introduced into the market within a two- to three-year window. Products can be brought forward faster and changed quickly if necessary to meet changing consumer tastes and trends. In an ever-changing, dynamic marketplace, this flexibility allows breeders and their distribution companies to be more responsive to demand.

There are characteristics of vegetative products that are superior to their seed counterparts. Geraniums and New Guinea impatiens are both examples of this. The leaves of both these crops are thicker, the stems are stiffer, and double flower forms are possible in vegetative-produced selections that have been difficult, if not impossible to match with seed-produced selections. Despite advancements in the newer products, zonal geraniums are still considered superior to any of the seed-produced varieties. Double-flowering

petunias are another example of something that has been difficult to get through seed production, and those that have come about have not proven to be of the same quality or performance.

Additional processes like heat treatment and tissue culture of mother plants are also commonly used to clean new plants of harmful bacteria and viruses. These processes can result in improved vigor and performance of the crop, making a significant difference for growers by reducing the time and effort required to create large, showy plant specimens and mixed containers. These containers are very popular today with so many families living in condos, patio homes, or homes with minimal yard space. Our consumers still want the look, feel, and atmosphere of a “garden” in these small spaces; and they accomplish this by purchasing “instant gardens” in the form of large containers. They can take the containers home, and their patio is instantly transformed. For this transformation, the customer is willing to pay a higher price for the containers because they provide “instant gratification.” And, the value they are receiving in this container makes it worth the higher price they are willing to pay! Also, showcasing the larger containers at retail encourages additional sales of collateral material such as pots and soil; your customers may purchase one or two large pots and then buy supplies to make additional smaller planters to go along with the large ones.

However, one of the most compelling reasons for using vegetative-produced crops is the enhanced garden performance and consumer satisfaction possible with these plants. If in doubt about which plants really perform best for your area, visit one of the many summer field trials and see how these vegetative crops perform under outdoor conditions, then you’ll know what you and your customers can expect.

With plants and gardening, consumers are looking for what's new and different. We are seeing a significant resurgence in their interest in gardening largely because of the unique, new,

and exciting choices being made available through the expansion of vegetative-produced annuals and perennials! Give them a try and find out yourself!

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New OFAS Release – Tips on Growing Vegetative Annuals

The book features sections on 21 vegetative annuals. A page for each crop contains production information on topics such as media, pH, light, temperature, and fertilizer requirements. It also provides comments from the breeders about producing the best crops. For each crop, color pictures show detailed flower, stem, leaf, habit/form, and combination and landscape plantings. The primary authors of this "Tips" book are John Gaydos, Proven Winners; Steve Jones, Bodger Botanicals; Jack Williams, The Flower Fields; and Mark Wilson, Simply Beautiful.



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Becoming Your Employer's MVP – Most Valued Person

by Bernie Erven

Editor's Note

Bernie Erven was a speaker at the 2003 OFA Short Course. This article is a summary of one of his presentations.

Introduction

Getting along well with your employer and co-workers can be more challenging than doing the work for which you were hired. Enjoying the people you work with helps make your job fun. Employees who master the skills necessary to get along are highly valued. They are often their employer's MVPs – Most Valued Persons. Being named an MVP is a big honor in any organization. Such recognition comes from dedication, hard work, and application of proven basics.

I want to suggest practical steps you can take to get along with your employer and co-workers. In the process, you will increase your worth, make yourself a highly respected employee, and create opportunities to advance in your career.

Knowing how to get along is important for three reasons:

- Getting along directly affects your happiness, self-esteem, and income.
- You are creating opportunities for yourself.
- You are managing a career, not just doing a job.

The following lists give you a starting point to develop your own recipe for getting along. Not all the suggestions will be useful to you. Your strengths, weaknesses, interests, and experiences will affect what you can do. The characteristics of your employer and co-workers also affect what you can do. Carefully consider

the lists, and then pick the suggestions that best fit you and your situation.

What to Do to Get Along with Your Employer and Co-workers

1. Arrive on time every day and stay until your day's work is done. Timeliness communicates a positive attitude about your job and employer.
2. Seek opportunities to learn so that you are competent at your job. Do well at whatever it is you are doing. Accept the fact that the knowledge, skills, and abilities you have this year are less than what will be necessary to do your job well in future years. Your training and learning will never be finished.
3. Ask questions when you don't understand instructions or need more information about your responsibilities. Pretending to understand rarely solves a problem. Asking good questions is a strength, not a weakness.
4. Understand your employer's organizational structure. Know who reports to whom. Understand the job descriptions of your co-workers as well as people above you and below you in the organization.
5. Admit your mistakes. Any mistakes are likely to soon be known by your employer in spite of your efforts to blame someone else or pretend the mistakes never happened.
6. Expand your job. Find opportunities to do more than the minimum. Worry more about what you can do that will help your employer and less about what you were hired to do. Work with open eyes and ears. See what needs to be done without being told.
7. Be honest. If you wouldn't want to tell a "60 Minutes" audience on national TV what you are about to do, don't do it.

8. "Read" your employer's subtle and indirect signals about you and your performance. Look for important messages that come nonverbally. A smile, a frown, the slamming of a door, a nod of the head, or lack of the usual "good morning" can be as powerful as a message in writing.

9. Choose to be happy even though some people around you are unhappy. Yes, you can choose between being happy and being unhappy! Employers have a strong preference for employees who see beyond the day's frustrations, setbacks, and inconveniences. Employers have many of their own reasons to be unhappy. You gain little by adding your unhappiness to theirs.

10. Practice consistency in mood, humor, temperament, and cheerfulness. Make your motto: "What you see is what you get."

The first 10 suggestions cover the basics. They are the foundation on which you build relationships with your employer and co-workers. The following suggestions add to the basics.

1. Accept responsibility. Career advancement requires ever-increasing levels of responsibility. Resisting responsibility strains relations with your employer and robs you of opportunities to grow through new challenges.
2. Show pride in your employer. Wear a company hat or jacket with pride. Let your friends, neighbors, and relatives know the good things about your employer.
3. Welcome new employees. Work hard to be friendly to new employees. Help make them feel welcome. Offer to mentor them. Patiently answer their simple questions without poking fun

at them. Remember what it was like to be a new employee.

4. Learn about the floriculture industry. You are part of a changing and dynamic industry that offers many opportunities. Learn where your employer fits into the industry, how the industry is changing, and the most important problems the industry will be confronting during the next five years. Subscribe to and read the leading periodicals aimed at your particular part of the industry.

5. Prepare for your next position. Be ready for opportunity when it comes. Better yet, create opportunity by showing your employer you have outgrown your current job duties and responsibilities. Attend professional meetings. Enroll in short courses and seminars. Get to know leaders and key people in the industry.

6. Recruit people to apply when your employer has positions to fill. Hiring is likely a major challenge for your employer. Help by getting your qualified friends and acquaintances to apply.

What Not to Do

In addition to the positive steps, there are negative actions that you should carefully avoid. These negatives may sometimes be quite appealing, especially when they offer you the opportunity to gain the favor of another person or take what seems to be an easy shortcut. Keep your bigger objective in focus – becoming an MVP. Don't do any of the following:

1. Don't make the same mistake twice. Everyone makes mistakes. Making the same mistake twice because a lesson was not learned the first time is foolish.
2. Don't blame co-workers for your own shortcomings. Trying to fool your employer at the expense of your co-workers wins the disfavor of both co-workers and your employer.
3. Don't bad-mouth your employer. Bad-mouthing your employer is like bad-



mouth yourself. Why suggest to anyone that the best employer you can find is the very one you are condemning?

4. Don't gossip. Gossip often seems harmless, even fun. In fact, gossip erodes confidence in your judgment. If you gossip about one person, you will be expected to gossip about everyone. Gossip erodes trust in you, the very thing you are trying to build.

5. Don't bring your petty personal problems to work. Family and best friends can help with these problems. Co-workers and employers quickly grow tired of hearing about one's personal problems. Save the help of co-workers and your employer for tragedies in your life such as death, divorce, or a serious injury to a family member.

6. Don't gain the favor of your co-workers by backstabbing your employer. Problems with your employer should be discussed directly with the employer. The employer is unlikely to want to hear about your complaints through the grapevine.

7. Don't join a group of negative co-workers. This may gain you their favor and provide you with quick and easy friends. However, neither your employer nor happy co-workers will respect you for your shortcut to being accepted.

8. Don't allow more experienced or older co-workers to intimidate you. Remember that you were hired for a reason. You are there because you deserve to be there.

9. Don't "show up" long-term employees. As a "new person on the block," it is sometimes tempting to show senior employees how much you

know and can do. What an easy way to lose their support!

10. Don't gain the favor of one manager at the expense of another, i.e. don't take sides in squabbles among members of the management team. Let the management team work out their problems without your involvement. It is highly unlikely that you will have all the necessary information to wisely choose sides.

11. Don't abuse the authority and power delegated to you by your employer. Abuse of authority and power will likely cause your employer to either reduce your authority or be hesitant to give you additional authority in the future.

12. Don't ask your employer for loans and pay advances. Your employer is not a banker. Asking for loans and pay advances suggests that you cannot manage your finances. Such a negative evaluation of your personal management abilities may threaten future career advancement.

And Now?

You may react by saying, "You are asking a lot of me." Yes, because becoming an MVP requires going well beyond the average, the easy, and what you would do "naturally." The payoff to you is increased income, job satisfaction, happiness, and opportunities for career advancement. **The choice is yours!**

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Managing Diseases on Herbaceous Perennials

Continued from page 1

from among the fungicides mentioned under anthracnoses (see labels for registered uses). **Bacterial leaf spots** are rarely a problem. *Pseudomonas cichorii* can be problematic on mums and coreopsis. Beware of *Xanthomonas* leaf spots on hardy geraniums, because this same pathogen causes a devastating disease on the florist's geranium (*Pelargonium*). Treatments with copper materials such as Kocide, Phyton 27, and Junction may help to suppress bacterial diseases, but be careful to manage leaf wetness so the environment doesn't favor disease.

Anthracnoses

Several perennials, including heuchera, bergenia, and lupine, are susceptible to diseases within the anthracnose group of fungal leaf diseases. Fungi including *Colletotrichum* and *Gloeosporium* species belong to this group, which is characterized by having sticky spore masses and spores which are splashed from plant to plant. These diseases typically begin in spring, but can continue into warmer weather. Lupine anthracnose, which is spread on seed, can be a problem from plug production all the way through to the finished crop. The leaf spots, which are ¼-inch to ½-inch across and round, may appear as semicircles at the leaf edge; these tend to have a purple border. Infections at the base of leaflets cause them to flop over, dry, and die, hanging down from the petioles. Infected petioles may be oddly twisted. Rogue out infected seedlings to prevent disease management complications later. Utilize fungicides with protectant or systemic action against anthracnoses, such as Daconil/PathGuard/Concorde, Compass, Dithane/Protect, Heritage, Systhane, or combinations that include chlorothalonil or mancozeb. See labels for registered uses. Reduction of leaf wetness periods is the critical cultural control for these diseases.

Powdery Mildew

Powdery mildew is probably the most obvious of the disease problems facing the perennial grower. Identification of the disease is usually easy, except for the atypical look of symptoms on plants such as columbine and sedum. Look closely at bruised-looking areas or scabby spots on plants to be sure that these aren't a response to powdery mildew growth – a hand lens will help you see the fungus strands on the plant. On *Phlox paniculata* and monarda, symptoms are far from subtle. Check the undersurface of lower leaves for early indications of powdery mildew onset. Weekly applications of bicarbonate materials (e.g. Armicarb, First Step, Kaligreen, MilStop) or horticultural spray oil will suppress powdery mildew on a wide range of perennials. With any oil or bicarbonate treatment, test on a few plants of each species to determine plant safety. For efficacy at a longer spray interval, growers may utilize products such as the sterol biosynthesis inhibitors Systhane, Terraguard, Strike, and BannerMAXX, or the new strobilurins Compass, Heritage, and Cygnus. See labels for registered uses.

Adequate spacing between plants will help to keep powdery mildew in check, but cultural control alone is not sufficient for disease management on susceptible species. Make an effort to locate more disease-resistant cultivars of each of these. Although powdery mildews tend to look alike, the disease on any given plant is likely to be host-specific, thus likely to be exchanged only with other very closely-related plants.

Downy Mildews

These diseases are caused by a *Phytophthora* relative. The downy mildews produce spores on tiny stalks that protrude from stomata on the undersurface of leaves when humidity is high, causing patches of white, gray, or violet fuzz that aid in identification. The symptoms of downy mildew are hard to identify because the sporulation may be absent or sparse. Identification

Some Suggestions for Mildew-Resistant Phlox and Monarda

(Based on trials at White Flower Farm, Connecticut, 1986; Vermont (Leonard Perry) 1991-92; Long Island, New York 1991-92; Chicago Botanic Garden (Richard Hawke), 1996.

Phlox paniculata

David (white)
Orange Perfection (dark salmon)
Prime Minister (white, red eye)
Starfire (red)

Monarda didyma (These should outperform Croftway Pink, e.g.)
Blue Stocking (purple)
Marshall's Delight (pink)
Violet Queen (purple)

is critical, however, because treatments made for other diseases will be ineffective. Symptoms typically appear as straight-sided patches of yellowish or reddish discoloration in leaves. Check with a diagnostic lab if symptoms such as these are noted. Geum, coreopsis, lamium, potentilla, rosemary, and veronica are all susceptible to downy mildew diseases. Foliar sprays with a mancozeb-containing material (Dithane, Protect, Pentathlon, and combinations) will prevent new infections on ornamentals. Stature is a new downy mildew control containing a mancozeb as well as a systemic ingredient. See labels for registered uses.

Foliar Nematodes

Although many plant-pathogenic nematodes attack roots (causing lesions, stunting, or galls), others are able to crawl up onto plants after rain or irrigation, enter the stomates, and feed. The symptoms are hard to diagnose – oddly, they closely resemble downy mildew symptoms. A diagnostic lab should be consulted for confirmation if foliar nematode is suspected. Clean stock should be sought any time foliar nematodes are encountered. Foliar nematodes are seen in perennials such as aquilegia, hosta, bergenia,

chrysanthemum, creeping phlox, and heuchera – and many other hosts are possible. Recently, Pylon has been shown to give some control.

Viruses

Outdoor-grown perennials have not been much troubled by the thrips-borne tospoviruses, but Impatiens Necrotic Spot Virus (INSV) and Tomato Spotted Wilt Virus (TSWV) are seen from time to time. Perennials started in greenhouses are especially vulnerable to INSV, while outdoor-grown perennials may suffer from TSWV spread from weed hosts by thrips. Symptoms of INSV and TSWV include stunting, chlorotic and necrotic spots, browning along veins, and yellow or brown ring spots. Infected plant material should not be used for stock. The only available control measures are roguing out the diseased plants and keeping the thrips population under strict control.



Root Rots

Perennials are occasionally injured by root-rotting organisms such as *Pythium*, *Rhizoctonia*, *Fusarium*, or *Thielaviopsis*. Practice good general sanitation and use a well-drained container mix. Avoid deep planting or mulching. In special cases where fungicide use is indicated, utilize materials such as Aliette, Banol, SubdueMAXX, or Truban/Terrazole for *Pythium* and *Phytophthora* control. For *Rhizoctonia* suppression, use Cleary's 3336/Fungo, Medallion, Terraclor/Defend, or Terraguard. Banrot contains ingredients effective against both *Pythium* and *Rhizoctonia* species.

Reminder

Consult and follow product labels for registered use. Some materials are registered for greenhouse use only, some for outdoor use only; some have geographic restrictions. The mention of particular plant disease control products here is for educational purposes only, and is not to be considered an endorsement of those products over other similar products not mentioned.

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American Floral Endowment Consumer Tracking Study Available for the First Time

The American Floral Endowment (AFE) Consumer Tracking Study is a summary of flower and foliage purchasing trends from 1992-2002. Monthly and annual data cover a wide range of demographic and geographic classes. Several report forms are available. The National Report compares and contrasts floral consumer purchases trends from across the United States. Regional reports are divided into census regions and include multi-state comparisons of floral consumer purchase trends. Metropolitan/State Reports are consumer floral reports that reflect purchase behaviors from a specific geographical city.

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Supplemental Lighting

Continued from page 1

to 700 nm). For example, the daily light integrals measured during an 11-year period (1980-1990) for Columbus, Ohio are shown in Figure 1 [1 kWh/(m_d) = 7.49 mol/(m_d)]. Unfortunately, greenhouses transmit less than 100 percent of the available solar radiation due to absorption and reflection by structural elements. For typical greenhouses, on average approximately 50 percent to 70 percent of the outside solar radiation is available to the crops inside.

For comparison, a graph similar to the one in Figure 1 is shown for Tucson, Arizona (Figure 2). Such graphs can be used to evaluate how much (i.e. the duration of supplemental lighting) and during which periods of the year it is likely a grower needs to use supplemental lighting to maintain sufficient crop production. Note that some summer days can be almost as dark as some winter days and that the average light conditions in Tucson, Arizona, are much more favorable for greenhouse crop production compared to Columbus, Ohio.

Amount of Light Delivered

Some greenhouse operators install supplemental lighting systems that can provide light intensities up to 150 to 200 $\mu\text{mol}/(\text{m}_s)$, but these higher intensities require a lot of lamps, which would further reduce the amount of solar radiation reaching the crop. Figure 3 shows the amount of light increase that can be realized by adding supplemental lighting at three different intensities (50, 100, and 150 $\mu\text{mol}/(\text{m}^2\text{s})$), while operating the lamps for 18 hours per day during January, 18 hours per day during February, 11 hours per day during March, 2 hours per day during April, 2 hours per day during September, 12 hours per day during October, 18 hours per day during November, and 18 hours per day during December, for a total of 2,993 hours per year. As shown in Figure 3 for Newark, New Jersey, using this lighting schedule and an intensity of

150 $\mu\text{mol}/(\text{m}^2\text{s})$ results in significantly smaller reduction in light integral during the darkest months of the year.

How Many Lamps Do You Need?

An important question a grower is faced with is: "How many lamps are needed to improve plant production?" And what light intensity should be provided by the supplemental lighting system? Most commercial supplemental

lighting systems provide between 50 and 100 $\mu\text{mol}/(\text{m}^2\text{s})$ (395 and 790 footcandles, assuming the system uses HPS lamps). A 1-acre greenhouse (assuming an available mounting height of 8 feet) would need approximately 383 400-watt HPS lamps for a uniform light intensity of 49 $\mu\text{mol}/(\text{m}^2\text{s})$ and 786 lamps for an intensity of 100 $\mu\text{mol}/(\text{m}^2\text{s})$. Additional calculations are shown in Table 1. The

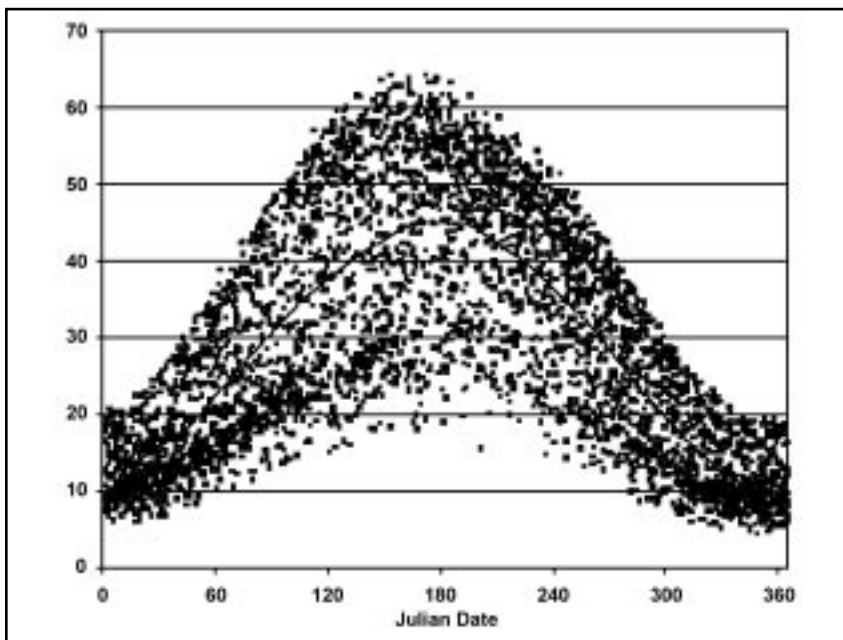


Figure 1. Daily light integrals (solid dots) for Columbus, Ohio (1980-1990), and a solid line indicating the monthly averages (Source: NREL, Golden, CO).

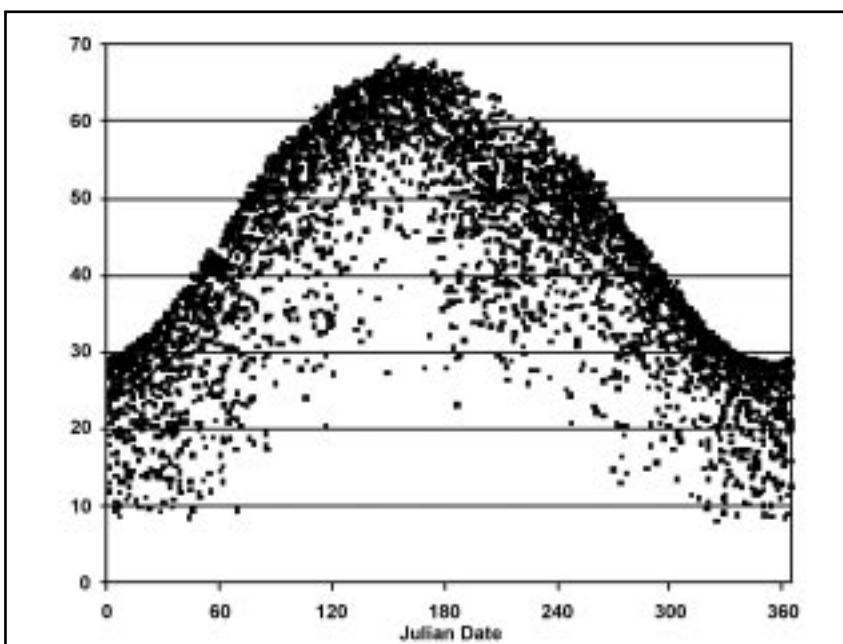


Figure 2. Daily light integrals (solid dots) for Tucson, Arizona (1980-1990), and a solid line indicating the monthly averages (Source: NREL, Golden, CO).

mounting height is the distance between the bottom of the lamp and the top of the plant canopy. Keep in mind that, although the average light intensity does not change much once the lamp density is determined (Table 1), light uniformity significantly improves as mounting height increases.

Selected References

Albright, L.D., A.J. Both, and A.J.

Chiu. 2000. Controlling greenhouse light to a consistent daily integral. Transactions of the ASAE 43(2):421-431.

Both, A.J., D.E. Ciolkosz, and L.D. Albright. 2002. Evaluation of light uniformity under-neath supplemental lighting systems. Acta Horticulturae 580:183-190.

Both, A.J., L.D. Albright, and R.W. Langhans. 1998. Coordinated management of daily PAR integral

and carbon dioxide for hydroponic lettuce production. Acta Horticulturae 456:45-51.

Ciolkosz, D.E., A.J. Both, and L.D. Albright. 2001. Selection and placement of greenhouse luminaires for uniformity. Applied Engineering in Agriculture 17(6):875-882.

Spaargaren, J.J. 2001. Supplemental Lighting for Greenhouse Crops. Published by P.L. Light Systems, Inc., Beamsville, Ontario, Canada. 178 pp.

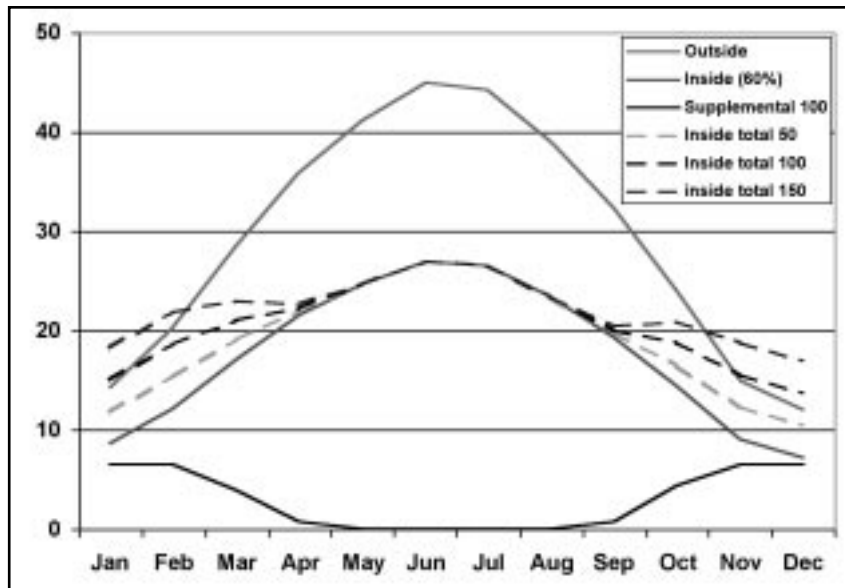


Figure 3. Monthly average outside and inside solar radiation (assuming 60 percent transmission) for Newark, New Jersey. The dashed lines indicate the inside light integrals after operating a supplemental lighting system at three different light intensities (50, 100, and 150 $\mu\text{mol}/(\text{m}^2\text{s})$) for different periods of time (see text for lighting system operating times).

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Table 1. Estimated average light intensities at the top of the plant canopy (in $\mu\text{mol}/(\text{m}^2\text{s})$) throughout a 1-acre greenhouse (10 gutter-connected bays of 24 feet wide by 180 feet long) for four different mounting heights and 400-watt HPS lamps. Note 1: These average light intensities are estimates without including edge effects (i.e. a drop in light intensity toward the outside walls). Note 2: these light intensities are estimates only; always consult with a trained lighting designer for an accurate calculation of expected light intensities in greenhouses.

Number of Lamps per bay (per row)	Floor Area/Lamp (sq. feet)	Mounting Height of 8'	Mounting Height of 7'	Mounting Height of 6'	Mounting Height of 5'
38 (13-12-13)	113.7	49 $\mu\text{mol}/(\text{m}^2\text{s})$	50 $\mu\text{mol}/(\text{m}^2\text{s})$	51 $\mu\text{mol}/(\text{m}^2\text{s})$	52 $\mu\text{mol}/(\text{m}^2\text{s})$
58 (15-14-15-14)	74.5	75 $\mu\text{mol}/(\text{m}^2\text{s})$	77 $\mu\text{mol}/(\text{m}^2\text{s})$	79 $\mu\text{mol}/(\text{m}^2\text{s})$	80 $\mu\text{mol}/(\text{m}^2\text{s})$
78 (16-15-16-15-16)	55.4	100 $\mu\text{mol}/(\text{m}^2\text{s})$	103 $\mu\text{mol}/(\text{m}^2\text{s})$	105 $\mu\text{mol}/(\text{m}^2\text{s})$	107 $\mu\text{mol}/(\text{m}^2\text{s})$
123 (21-20-21-20-21-20)	35.1	149 $\mu\text{mol}/(\text{m}^2\text{s})$	154 $\mu\text{mol}/(\text{m}^2\text{s})$	158 $\mu\text{mol}/(\text{m}^2\text{s})$	162 $\mu\text{mol}/(\text{m}^2\text{s})$
158 (23-22-23-22-23-22-23)	27.3	202 $\mu\text{mol}/(\text{m}^2\text{s})$	206 $\mu\text{mol}/(\text{m}^2\text{s})$	210 $\mu\text{mol}/(\text{m}^2\text{s})$	213 $\mu\text{mol}/(\text{m}^2\text{s})$

A Look at the Flowerbulb Research Program at Cornell University



by William B. Miller

Floriculture at Cornell

When one thinks of Cornell University, the traditions and contributions of many of the greats in floriculture come to mind. Through the leadership of Cornell faculty, including Ken Post, Wat Dimmock, Bill Blauvelt, John Seeley, Jim Boodley, and Bob Langhans, Cornell University was one of the major academic forces shaping the greenhouse industry from the 1930s to the 1980s. Today, the tradition of interdisciplinary collaboration and cooperation continues within the Cornell floriculture program. A major, new component of Cornell floriculture is the five-year-old Flowerbulb Research Program, which is highlighted in this article.

History and Goals of the Flowerbulb Research Program

On September 24, 1998, the Royal Dutch Wholesalers' Association for Flowerbulbs and Nursery Stock (the "Exporters Association") and Cornell University signed a contract formally establishing a bulb research program at Cornell University, with me as the program leader.

Prior to my or Cornell's involvement, the program was led since 1966 by Gus De Hertogh, initially at Michigan State and later, North Carolina State University. As his retirement was

looming, the exporters undertook a process to internally determine if they wanted to continue with the program. After a comprehensive discussion, the decision was positive, and the question became one of university location and person to lead the program. In January 1997, representatives of the Exporters Association, the Dutch Flowerbulb Research Center in Lisse, and the North American Flowerbulb Wholesalers' Association (NAFWA) toured five U.S. land grant universities that were essentially "finalists" in the "competition." The group spent a day at each of the universities (Cornell, Ohio State, Michigan State, Colorado State and UC-Davis) and heard many in-depth presentations about departments, programs, resources, and facilities. To make a long story short, Cornell and the Exporters' Association signed a cooperative agreement in September 1998.

The major goals of the program are to discover and communicate new information about flowerbulb physiology, growth, and development, especially in the important areas of forcing and dry sale use/handling. The main audiences for the information are members of the Dutch Exporters Association, North American importers, North American greenhouse growers, and indeed, any industry professional who is interested in our work. Inherent in the program is the communication of this information, especially to the domestic industry, where it is used to produce higher quality and, hopefully, more profitable crops.

How Does the Program Operate?

Research topics are suggested by ourselves, domestic growers, our research steering committee (members of the Dutch export industry and research community), and a representative of the NAFWA (Andrew Lee of

the Fred C. Gloeckner Company in 1998-2002, and now John Vandenberg).

We meet as a group two to three times per year in Ithaca, New York or the Netherlands. The Exporters Association provides staff and logistical support. One of the committee members, Neil Zonneveld, organizes the main shipment of bulbs to Cornell each fall. To give a sense of scale, we imported last year about 65,000 tulips, 7,000 hyacinths, 3,000 daffodils, more than 10,000 miscellaneous or "special" bulbs, and about 15,000 hybrid lilies.

Since the inception, we have divided our work into four major areas:

- Greenhouse horticulture (forcing)
- Quality of retail bulbs ("dry sales")
- Use and/or adaptation of flowerbulbs in the landscape
- Perennials

Personnel

At Cornell, 15 to 20 people (faculty, graduate students, and undergraduate students) are directly involved with the research program, depending on the time of year. In spring 2003, this included: myself; Dr. Anil Ranwala (research associate); Dr. Alex Chang (post-doc); Dr. Damayanthi Ranwala (post-doc); Garry Legnani, Susan Liou, and Amy Arquiza (Ph.D. students); Rose Ogutu and Allison Mayer (M.S. students); Dr. Chris Watkins (post-harvest physiology support); Barbara Stewart (research technician and overall support); Dr. John Sanderson and K.C. Bennett (entomology support, and development of pesticide information); Dr. Mark Bridgen, Dr. Margery Daughtrey, and Maria Tobiasz (support and collaboration on Long Island); Dr. Paul Curtis and Gwen Curtis (deer research), Angelica Hammer (administrative support); Rob de Groot (this

year's Dutch intern), and two to three Cornell undergraduate students.

Support

As any land grant faculty member can attest, developing and sustaining support for research, teaching, and Extension programs is extraordinarily difficult and is only getting more and more difficult. We are very fortunate and grateful for the long-term support from the Dutch export industry, which provides an excellent base for our work. We are also grateful to receive funding from a range of industry sources and several non-profit and governmental organizations, notably the Fred C. Gloeckner Foundation, the Ohio Floriculture Foundation (now part of FIRST), the ARS Floral and Nursery Crops Research Initiative (itself a product of countless hours of dedicated work by many floriculture personalities), and especially SAF.

Facilities

Since early 1999, we have demolished and rebuilt two new research greenhouses (totaling approximately 5,600 square feet of growing area), remodeled a laboratory dedicated to carbohydrate and enzyme analysis and support for postharvest physiology research, and installed three state-of-the-art walk-in coolers for bulb temperature control. Each cooler is about 12 feet by 18 feet; all are capable of freezing to 26°F, and one can be heated and ventilated. Two more greenhouses will be demolished and new ones built in 2004. These units open into the main greenhouse corridor, giving easy access to the greenhouse and support areas.

Research Topics

In our program, we are conducting work in the broad areas that bulbs are used, namely forcing, dry sales, and landscaping. A little-known fact is that two out of three bulbs imported to the United States are used for dry sales (retail sales) and/or landscape (technically, this is also "dry sales," but perhaps more focused on the commercial landscape industry). While our



efforts do not parallel the exact distribution of bulbs in the United States, many interesting research areas can be found in "dry sales," and we are actively working in this area. We also conduct research on bare-root perennials, as they are a major product for a number of "bulb" export companies. Some major areas of work are:

Forcing

Topics include standard forcing work on a range of crops, especially spring bulbs and lilies. Cultivar evaluation, growth regulation, adoption of new technologies (e.g. hydroponic forcing), and postharvest concerns are all considered. An especially important product of our work at Cornell (led by Anil Ranwala) is the recent registration of Valent USA's gibberellin₄₊₇ and benzyladenine product, Fascination™. Our work with this product (and that of Royal Heins and Susan Han) has clearly demonstrated its effects as an anti-senescent agent for Easter and hybrid lilies.

Other current forcing topics:

- A number of solutions for "Upper Leaf Necrosis" on 'Star Gazer' and other oriental hybrid lilies have been developed by Alex Chang (Ph.D. student and now post-doc). Alex has shown that this disorder is a calcium deficiency, occurs early in the crop (when the plants are about 12 inches tall), and can be largely eliminated by blowing air on the tops of the plants. Calcium sprays, while potentially effective, are not recommended, as we have found *daily* sprays are needed for a two- to three-week period.

- Evaluation of hybrid lily cultivars for response to Bonzi, Sumagic, or Topflor bulb dips. Currently, we are evaluating 28 cultivars. This work has an immediate practical benefit, as the

results can be applied by any grower interested in producing pot hybrid lilies. Amy Bestic, a Cornell undergraduate, has been handling this experiment, which has more than 1,600 plants.

- Damayanthi Ranwala has found that Bonzi and Sumagic dip solution remains fully effective for at least 20 dipping cycles, making lily PGR bulb dips very economically feasible.

- Forcing of new and existing tulip and hyacinth cultivars, with varying numbers of cold weeks and Bonzi drenches for height control.

- 'Tete-a-Tete' postharvest stretch. Over the last three years, we have seen excellent results on the use of Bonzi as a means of reducing postharvest stretching of 'Tete-a-Tete.' We have had success by dipping bulbs in Bonzi before planting or drenching the soil before or after cooling. Typically, there is very little effect on flowering height in the greenhouse, but there is excellent control of stretch during shipping and in the consumer environment. Interestingly, Sumagic (at similar economic rates) has almost no effect on 'Tete-a-Tete.'

- Fusarium, ethylene, and heat in tulips. Susan Liou (Ph.D. student) has been looking into these problems as they relate to tulips. In 2002, she conducted a large trial screening of 45 tulip cultivars for resistance to ethylene (applied late November/early December for 10 days at 8 to 9 ppm) or heat (34°C, applied four days *before* cooling [early Nov] or applied after three weeks of precooling [late Nov]). Enormous differences in cultivar response were seen; some tulips were devastated by the ethylene; others were totally unaffected. In many cases, the same cultivars showing ethylene

Continued on page 14

A Look at the Flowerbulb Research Program at Cornell University

Continued from page 13

sensitivity also showed heat injury in the heating experiment. Susan is now beginning to apply molecular biology tools to this problem, and is looking for genes that are up- or down-regulated by these stresses.

Dry Sales

Our main effort in this area is an investigation into the causes and controls of sprouting of lily bulbs in dry sale packages (e.g. for late spring retail sales). Garry Legnani (Ph.D. student) has been looking into a number of techniques, including modification of the gaseous environment in which the bulbs are held. Garry has developed techniques that inhibit stem growth, at room temperatures, for four or more weeks, with acceptable to minimal negative effects on subsequent growth.

Landscape

Here, the major topics to date have been studies on bulb perennialization and evaluation of deer and vole damage in the landscape. In the perennialization work, we have evaluated 200 bulb cultivars and types in Ithaca, New York (Zone 5: cold winter, cool summer); Riverhead, Long Island, New York (Zone 6: cold winter, mild to hot summer); and Clemson, South Carolina (Zone 7: very mild winter and very hot summer). The study has included 80 kinds of tulips, 60 daffodils, 17 hyacinths, and 43 kinds of special bulbs (crocus, iris, etc.). We have been very fortunate to have excellent support and enthusiasm from our

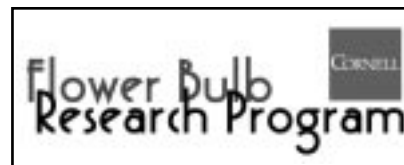
colleagues in Riverhead (Maria Tobiasz, Margery Daughtrey, and more recently Mark Bridgen) and in Clemson (Jim Faust and Kelly Lewis).

Also underway are a range of studies exploring deer and rodent feeding on actual flowerbulbs (controlled indoor studies with meadow voles) or outdoors with wild deer and bulb plants foliage. This work is conducted in cooperation with Paul Curtis (natural resources) and George Good (horticulture) at Cornell, and has been supported by the ARS Floral and Nursery Crops Research Initiative.

Perennials

To date, our main focus has been on "regrowth problems" with bare-root Dutch perennials. It has been observed that "Dutch perennials" sometimes fail to adequately grow new roots and fail to perform after planting in the states. Since all imported perennials must be free of soil (by USDA-APHIS plant health regulations), and the washing process to free the plants of soil looks visually injurious, we hypothesized the washing process injures the plants.

With cooperation from Henk Guds of the "bulb lab," we commercially washed five species (*Helleborus orientalis*, *Phlox paniculata*, *Pulmonaria saccharata*, *Epimedium grandiflorum*, and *Anemone japonica*) up to eight times, and exported the plants to Cornell (with a similar set in Holland). In two separate experiments, upon planting and growth evaluation, it was clear the washing process caused no injury whatsoever. This is encouraging, as it can allow the industry to eliminate washing as a culprit in this issue, and allow focus on more relevant factors such as digging time and storage conditions.



Salute to Gus De Hertogh

Finally, with great pleasure I take this opportunity to salute Gus De Hertogh for his enormous contribution to the science and practice of bulb culture in the United States. Many of us were fortunate to be at the 8th International Flowerbulb Research Symposium in Cape Town, South Africa, as we toasted his career and retirement from North Carolina State University on August 31, 2000. Through his research findings and communication from the mid-'60s through the mid-'90s, Gus had an enormous impact on the use of bulbs in North America, and indeed, worldwide. Gus, I thank you for your support and friendship and wish you all the best in your retirement and future endeavors. I hope we can do credit to your legacy as we move forward.

For More Information:

See the Flowerbulb Research Program web site: <http://www.hort.cornell.edu/departement/faculty/wmiller/bulb/index.html>.

We also have a **Tulip-Cam** in the main greenhouse, where you can see us in action in real time (with a fast web connection): http://www.hort.cornell.edu/departement/faculty/wmiller/tulip_cam/index.html.

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Sanitation of Irrigation Water: A Review of Available Technologies

by Chuck Powell

Introduction

An article on sanitation was my assignment for the *OFA Bulletin*. My first reaction was that this was a huge topic with many rather boring, detailed points. Then I realized that there are two major sanitation issues facing our industry now. One is the need to sanitize irrigation water. The other is the issue of the healthfulness of plant material imported into the greenhouse. This article is on the need to sanitize irrigation water and how to do it correctly.

Water retention and reuse issues have produced concern about contamination of water with pathogens. The *Ralstonia* events have contributed to this concern. To assess the level of concern, I phoned several pathologists around the country, including Jim MacDonald, Chuan Hong, Gary Moorman, Mary Hausbeck, Sharon von Broembsen, Margery Daughtrey, Rob Wick, Bob McGovern, Larry Barnes, Steve Jeffers, Jim Strandburg, Dave Norman, Steve Nameth, and Karl Trellinger. My thanks to all of these scientists for their guidance and ideas.

Many plant pathologists are skeptical about the advisability of recommending a water retention and reuse system, especially ebb and flood systems. This puts them seriously out of step with the EPA, government water regulators, and many horticulturists.

There is no doubt that more stringent water conservation practices are rapidly approaching our industry. Water conservation will be done in several ways:

- Increasing the efficiency of any irrigations.
- Growing plants that take less water.

- Using water retention and return (water recycling) ponds.

- Using ebb and flood systems, water recycling again.

The last two of these practices are prone to contamination with plant pathogens.

Methods to deal with this problem would seem to be straightforward. They are not cheap, but straightforward. However, I have found that many of the methods suggested are filled with misinformation that creates financial waste on the part of growers. This is because: many methods do not work on plant pathogens; many are installed incorrectly; many are not practical in the real world; and research on efficacy is lacking for many of the methods.

First things first, is it a good investment to treat your water to clean it up? The basic premise of sanitation is “start clean – finish clean.” There are several areas to consider here. Are you already starting clean with your water? Consider these facts:

- Well water is clean through natural filtration.
- Reverse osmosis water is clean by definition. This has become a well-thought out and popular system for propagation facilities. It ensures not only clean water, but also good quality water. It is expensive, but relatively less expensive for a propagation facility.
- Rainwater, properly stored, is clean.

If you do feel you need water treatment, first consider “step ponds.” Step ponds can be set up to deliver reasonably clean water. You may not need “zero tolerance” of pathogens in the water. Integrated plant health management practices will control root health if inoculum levels are low in the water.

Step ponds are ponds set up in a

series. The major part of the inoculum remains in the first run-off pond. It slowly breaks down there. Water is drawn from the surface of this pond into a second (or even a third) pond. If not stored too long, this water is fairly clean when it goes back on the crops.

Unless you can clean a growing area reasonably well of pathogens before you begin a crop, cleaning up the water further may be a needless expense. Again, consider these facts:

- Old greenhouses are dirty; they cannot really be cleaned.
- Earthen or gravel floors, even in new greenhouses, cannot be cleaned properly or frequently enough.
- If the greenhouse has weeds growing in it, you cannot clean it properly.
- If the greenhouse has old plants that are just “hanging around,” you cannot clean it properly.
- Growing outside on ground beds usually means growing on contaminated surfaces that cannot be properly cleaned.

If you plan to sanitize irrigation water, you must take precautions to ensure that all plants coming into the greenhouse are free of pathogens. You will never reach zero tolerance on this point. Seed contamination exists. Cuttings with invisible infection can get into your greenhouses. Pre-finished plants with pathogen contamination are brought in. This generally always occurs.

Given all of the above, are you willing to install a truly efficacious system to clean your water? You need to do your homework. Now would be a good time to seek some outside help. Here are the “homework” points.

- Any particular system will work for some, but may not be practical for others.

Continued on page 16

Sanitation of Irrigation Water

Continued from page 15

- Costs of installation and maintenance will vary a lot. How much are you willing to spend?
- Sometimes, no well-suited method will be available. In such cases, Integrated Plant Health Management will have to be relied upon more heavily.

Physical methods, as opposed to chemical methods, are always the best way to clean up your water.

Physical water sanitation methods are called filtration methods. There are several such methods. They all have one serious drawback – the amount of water that can be run through them in a given amount of time is restricted. Filtering restricts the flow rate.

This makes these systems OK for smaller greenhouses, but not necessarily practical for large greenhouses. Still, they work so well that they deserve serious consideration by all growers who want to treat their water.

The best filtering method is through large sand towers. The method is called slow sand filtration. The towers are 8 to 10 feet high and six to eight feet across. Bacteria build up in the top part of the sand. These bacteria destroy pathogens in the water. In addition, the sand itself filters out pathogens.

For small greenhouses, up to a couple of acres, one tower is enough. For larger operations, more than one tower may be needed. Rough pre-filtering of the water is usually employed. Also, you can filter water into a holding tank for use the next day.

This water sanitation method is popular in Europe. Details on construction can be found on the Internet.

There are other kinds of filtration methods. For straight filtering of pathogens, you need very fine filters. You must set these up in series, starting with coarser filters. Even with high

pressure, the flow rate is very slow with these systems.

Systems that bombard the water with lethal light or energy work, but often are not practical. Worldwide, the most common method in this category is momentarily heating the water to 180°F and then cooling it back down. These heat exchangers come in large sizes for bigger greenhouses, or in smaller sizes. Their big advantages are that they are effective, do not alter the water, are relatively cheap to operate, and they require no holding tanks (see below).

These systems are popular in Europe, but rarely used here. I have been unable to find out why. In my opinion, they should be used more in this country. Here are some possible reasons why they are not in greater use in the United States:

- Since they have to be imported, the initial installation is expensive. When I inquired about the failure to produce them domestically, I was told that there was no call for them! This is a real catch-22. Besides, many of our U.S. growers learned a long time ago that European-manufactured equipment is beneficial and worth the investment.
- Hard water produces scale in the heaters. Acidifying the water first can solve this.
- They do not work as well with dirty water. Minimal pre-filtering helps a lot.

Bombarding the water with ultraviolet (UV) light is often mentioned as a worthy water treatment method. To work properly, a very slow flow rate and a thin film of flowing water is a must. It is easy to kill some bacteria and fungi (Pseudomonads, Erwinia, zoospores of water molds) in this way, but hard to kill many fungal pathogens and other bacteria (Xanthomonads, Fusarium, Thielaviopsis).

Data from dairy farms and food handling facilities CANNOT be relied

upon for greenhouse use! Growers in Florida are using UV for killing of Erwinia in the water. This may be OK, because Erwinia is closely related to E. coli, a common dairy farm contaminant in milk. E. coli has been killed with UV irradiation for a long time.

A new “pulse UV system” is being researched now. This may work better because it gets much more UV energy into the water. Other energy-adding methods, such as gamma rays, have not been researched enough to be sure they work for greenhouses.

There are several methods for sanitizing water that add substances to the water.

These methods work well, but only if carried out precisely. Shortcutting the processes generally make them ineffective. Most work better when combined with a pre-filtering and acidification of the water. Almost all of them are holding tank technologies.

The most popular, and the most incorrectly designed, method in this category is chlorination of the water. Chlorination is a holding tank system. Construction of holding tanks is the key design element that most growers fail to do properly. The proper dose must be put into the water and held there for 30 minutes of oxidation time.

Many do not design holding tanks properly and get lateral flow of the water rather than mixing and holding. You cannot add water to the top of a tank while pulling it out the bottom. If you try this, the water will flow laterally down the side of the tank and out. You need to add water to the bottom of the tank and pull it out the top. This requires a pump with a backflow check valve. Fancy stirring devices and baffles in the tanks are not needed.

Many try to bypass the holding time with higher doses of chlorine. This invites phytotoxicity. It is my feeling, unsubstantiated to be sure, that incomplete oxidation of the organic matter in the water by the chlorine creates temporary molecules

that damage plants. I feel that this explains the disagreements as to what level of free chlorine in the water is safe for irrigating plants.

The dose of chlorine that must be added to the water is calculated by working backward. The dirtier the water, the higher will be the chlorine demand to clean it. Also, high pH water takes more chlorine. Therefore, prefiltering and buffering the water initially helps a lot. Adjust the dose so 1 to 2 ppm of free chlorine is left over at the hose end. This is similar to city water supplies where chlorine is used. Chlorine demand usually will change throughout the year. Automatic dosage devices help a lot here.

There are several types of chlorine that can be used. Granulated pool chlorine is the most popular. Chlorine as a pressurized gas is dangerous. There are now many government regulations that take effect if you want to use gaseous chlorine. Chlorine dioxide is starting to be used now. Its use is popular in Europe. The product is hard to find here. If you cannot prefilter, it will operate more efficiently in dirtier water because the compound attacks only sulfhydryl molecules, which are found only in living objects such as pathogens. Also, if there is no light present, the chlorine dioxide is more stable.

There is a new method of using electrolyzed water that breaks down sodium chloride into sodium hydroxide and hypochlorite that is being researched just now. It might be a cheap way to utilize chlorine. You need very clear water to make this work.

Ozone is widely added to water to sanitize it. This also is a holding tank method. However, the time required to hold water with ozone is shorter than with chlorine. Again, the method is popular in Europe. Many municipalities in this country now use ozone to sanitize the water.

Ozone generators usually work at relatively slow flow rates. However,



several can be set up in parallel to allow for fast water treatment. Make sure the dose is adequate. You need 1.5 mg per liter of water, held for 20 minutes. You can smell the ozone in the water. In addition, you will notice how ozone in the water kills algae.

Peroxides added to water are coming into wider use in this country now. You can use peroxide (peracetic acid) products or industrial grade hydrogen peroxide. Information on correct dose and phytotoxicity is scanty. Many feel that 200 ppm peroxide is needed and safe on plants.

Peroxide is not stable in air, so care must be used when calculating the dose and diluting the products. Always use fresh preparations. It is difficult to measure the actual amount of peroxide in a solution. Most growers assume, often incorrectly, that the peroxide concentration on the label is what they have. This is not so with old product.

The advantage of this method is that no holding time is needed. This may mean it is one of only two systems suited for ebb and flood irrigation facilities. Even here, it will be difficult to get the dose of peroxide high enough, given the rapid water flow rates in such systems. The other system that requires no holding time is the use of chlorine dioxide.

Many growers consider adding copper ions to water to clean it. These ions are generated from a copper electrode. While this may be a good idea for other reasons, I have seen no data on its efficacy in removing plant pathogens from the water. There is also some research going on with other copper products added to the water. The EPA now frowns upon

copper algaecides because they consider them water pollutants.

There is some research on adding soaps or wetting agents to water to destroy zoospores of *Pythium* and *Phytophthora*. The work was done on hydroponic growing systems with vegetables. However, it looks promising for ebb and flood irrigation systems that we have in our industry. With prefiltering, this also may be a good practice when drawing water out of a mud-bottomed retaining pond.

In conclusion, you can see that you generally have many ways to go about water sanitation. No one method fits all. If you cannot sanitize all the water you use, consider sanitizing at least the water used for propagation or for crops very susceptible to root rots. Also, you can use more than one sanitizing system in combination, such as filtering and chlorination or ozonation.

Most plant pathologists agree that ebb and flood irrigation systems that become contaminated are almost hopeless, aside from complete drainage and prophylactic rescue treatment. This involves thorough cleaning and sterilizing. Whereas ebb and flood seems to be great for the crops, it is a nightmare for plant health management.

Think through your needs to sanitize water. Choose a method that fits your greenhouses and install it correctly. Work with Extension agents or consultants to help you make the correct choices.

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Visual Merchandising: Simplify! Simplify!

by Judy Sharpton

Visual merchandising has taken the place of new plant selections as the most confusing topic in garden center development. When I thought there could be not even one more variety of zonal geraniums or one more verbena with an ever-so-slight difference in the color of the “eye,” attention shifted to just how many visual merchandising programs could be delivered by product suppliers and printing companies. And, after years of merchandising individual products, many suppliers and even some of the printing companies who offer generic banners and signage have embraced the concept of co-branding – actually placing the individual garden center’s name and logo on the merchandising materials. Hallelujah for that! It was in the pages of this very publication that I advocated the position that the garden center is the brand consumers select. Any merchandising materials supplied by the vendor or purchased by the garden center could only focus the customer’s attention on specific products, not “brand” any given product.

So now that we have this proliferation of merchandising materials, what do we do with them to avoid visual clutter? For just as the 80 percent of customers who are female and know very little about plants cannot distinguish the “eye” of a verbena or the intricacies of a zonal geranium leaf, they cannot (more accurately, will not) penetrate a jungle of signage and a clutter of products in order to make a buying decision.

So, what to do?

First of all, let’s remember the basics. The term is “visual merchandising” – implying something about seeing the product. Anything that detracts from that “seeing” defeats the purpose.

Keep in mind that from our earliest attempts as toddlers, feet follow eyes. That’s still true for female consumers. If I can see it, I’m much more likely to go toward it. Now we have used the visual merchandising material to create that all-important element of the store – customer-merchandise contact.

Being able to see any visual merchandising element is a factor of placement and lack of surrounding distractions. That means any signage must be placed in the consumer’s headlong path through the store in order to pull the customer toward it. It also means that the store cannot be filled with multiple visual attractions – all vying for the customer’s attention. That scenario creates a visual blur, and she’ll ignore the blur and products associated with it.

To enhance the potential for any visual merchandising to actually attract the customer’s attention, keep in mind the following simple guidelines.

- Eliminate structural clutter. Many garden centers are visually polluted with structural elements that distract from the merchandise. Get rid of anything – pipes, old banners, fans that don’t work, ancient electrical cords, empty hanging basket holders, worn peg board, tattered poly, sagging timbers or doors – that visually clutters the retail area. Such a cleanup will enhance your overall retail presentation and allow visual merchandising to actually be visible.

- Invest in professional retail fixtures – slat wall, benches, gondolas, sign holders, even matching shopping carts. These visual cues tell your customer she is in a retail environment, not a flea market. They also act as effective backdrops for products and merchandising programs. I guarantee you’ll sell more pottery from a profes-

sionally designed collection of matching fixtures or more hayracks from a slatwall unit. Such professional accessories also make your staff’s job easier.

- Create a floor plan of your entire store from parking lot to exit and map the desired route for customers to take while shopping. Only with this kind of plan can you determine the most visible locations for merchandising efforts. It hardly matters what a great sign or beautiful product display you put together if the customer never sees any of it.

- Utilize only one merchandising display at any given time in any department of your store. If you place two or three visual merchandising displays in the customer’s field of vision, you defeat the objective of focusing the customer’s attention. Don’t make her select between P. Allen Smith and the Audubon Collection. Don’t ask your time-starved consumer to create a glamorous garden room and protect the environment all in one weekend. Worse still, don’t make her choose between “Plants that Work” and a “Weekend Getaway.” That’s just too conflicted to be reassuring – the objective of each of these campaigns. Judicious selection makes each vendor’s products more effective and keeps your store cleaner.

- Use the visual merchandising aids supplied by your vendors. The programs currently available are well designed and well executed. Actual consumer research and in-store testing back up these programs. Inks don’t fade. Chloroplast and vinyl hold up. Many good merchandising programs waste away in the store manager’s office. I still believe a few cents worth of Velcro or a hanging kit added to the package would work miracles. But until your vendors start including such

niceties, do it for yourself. Give up on the excuse that you don't have time to put the materials up in your store.

- Store all merchandising aids – signs, banners, posters – so they will lie flat and stay dry. This applies to products you purchase outright and those that you purchase through the price of the product. Such a storage area means you can actually take merchandising aids down when they are no longer in use and reuse them at the appropriate time. After all, you are likely to sell some of the same products next season.

Bonus Visual Merchandising Idea

At OFA's all-day program on professional store design at the 2003 OFA Short Course, Ken Allen of England's Blooms of Bressingham (formerly of Jardinerie), mentioned this terrific merchandising idea – ladders as hanging basket display units. As many of you know, overhead displays of hanging baskets can be unwieldy for the consumer. First, visibility is impaired – visibility of the plant anyway. The bottom of the pot is right in full view. Even when customers can see the product, they often can't reach the product. If they can reach the product,



they risk a wet sleeve just retrieving a basket. Alternative methods include staff wielding retrieval tools. Drier for the customer, but a definite impediment to customer-merchandise contact. Even those stores who deploy an army of retrievers cannot gauge just how many customers defer a purchase because it's just too difficult or time-consuming to retrieve a basket.

From actual research in several garden centers, we know baskets sell better from a table or from an eye-level display unit. Several fixture companies offer differing versions of a freestanding display unit. The problem is that neither a table nor a freestanding holder can handle volume.

Enter the hanging basket wall. At several stores, we've created a multi-tiered wall hanging system with the two lowest horizontal hanging poles accessible to consumers and higher poles holding back stock. The army of basket retrievers is now employed

restocking the wall. The problem I've always had with this arrangement is that the galvanized poles are terribly clinical – not inviting at all. Enter Ken and his ladders. At Blooms, they have a hanging basket wall, but instead of basic galvanized pipe that looks more like a plumber's supply store than a retail display, they use galvanized ladders. The ladders are sturdy, cheap, and can be painted to create an architectural look to the hanging basket wall. Brilliant!

More importantly, the merchandise is visible and accessible – everything a good merchandising tool should accomplish. And, beyond that, it's simple. You have to like that.

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Employers Should Review Required Postings and New Hire Reporting

Mid American Ag and Hort Services (MAAHS) reminds employers to review the labor law posting requirements and new hire reporting procedure. These laws affect every employer.

A number of state and federal laws and regulations require employers to display posters and/or information for employees. Posting generally should be displayed in a central location where information is accessible to all employees. Many posters are available for free by downloading from the Internet or calling government agencies. Some required posting information is not addressed by companies that sell the traditional combined laminated posters. One new requirement is that employers of 11 or more people must post the OSHA Injury

& Illness Summary report (300A) from February to April for the preceding year's work-related illnesses and injuries.

New hire reporting is a required process by which employers report information on newly hired employees to a designated state agency shortly after the date of hire. States match new hire reports against their child support records to locate parents, establish an order, or enforce an existing order. In addition to matching within a state, states transmit the new hire reports to the National Directory of New Hires. State agencies operating employment security (unemployment insurance) and worker's compensation programs have access to their state new hire information to detect and prevent erroneous benefit payments.

Each state can also conduct matches between its own new hire database and other state programs to prevent unlawful or erroneous receipt of public assistance, including welfare and Medicaid payments and food stamps.

OFA is a sponsor member of MAAHS, a unique consortium of associations, organizations, and employers organized to meet the educational, compliance assistance and labor recruiting needs of agricultural and other employers in Ohio and Indiana. It provides educational materials, seminars, telephone consultation, guest worker recruiting programs, and more to its employer members. Contact MAAHS at 614-246-8286, labor@ofbf.org, or www.midamservices.org to learn more.

OFA MEMBERSHIP REPORT AS OF 6/30/03

Association Category	Ohio	Out of State	International	Total
Active: Grower (B, C, D)	349	1,226	102	1,677
Active: Non-grower (A)	258	663	117	1,038
Associate (AS)	231	559	36	826
Honorary Members (H) & Affiliates (AF)	8	18	0	26
Total	846 24%	2,466 69%	255 7%	3,567

Domestic Members	Totals
ALABAMA	17
ALASKA	3
ARIZONA	5
ARKANSAS	7
CALIFORNIA	164
COLORADO	45
CONNECTICUT	36
DELAWARE	7
DISTRICT OF COLUMBIA	2
FLORIDA	118
GEORGIA	40
HAWAII	13
IDAHO	8
ILLINOIS	217
INDIANA	129
IOWA	40
KANSAS	18
KENTUCKY	58
LOUISIANA	13
MAINE	9
MARYLAND	46
MASSACHUSETTS	58
MICHIGAN	257
MINNESOTA	77
MISSISSIPPI	8
MISSOURI	52
MONTANA	12
NEBRASKA	10
NEVADA	1
NEW HAMPSHIRE	26
NEW JERSEY	71
NEW MEXICO	5
NEW YORK	193
NORTH CAROLINA	51
NORTH DAKOTA	4
OHIO	846
OKLAHOMA	10
OREGON	48
PENNSYLVANIA	202
RHODE ISLAND	11
SOUTH CAROLINA	18
SOUTH DAKOTA	12
TENNESSEE	23
TEXAS	70
UTAH	10
VERMONT	6
VIRGINIA	60
WASHINGTON	47
WEST VIRGINIA	31
WISCONSIN	95
WYOMING	3
Total	3,312

International Members	Totals
ARGENTINA	1
AUSTRALIA	5
BELGIUM	1
CANADA	173
CHINA	2
COLOMBIA	1
COSTA RICA	1
DENMARK	2
DOMINICA	1
FRANCE	3
GERMANY	10
INDIA	2
INDONESIA	1
ISRAEL	3
ITALY	6
JAPAN	9
KENYA	1
MEXICO	3
NETHERLANDS	14
NEW ZEALAND	2
SINGAPORE	2
SOUTH AFRICA	2
SOUTH KOREA	2
THAILAND	1
UNITED KINGDOM	7
Total	255



2003 OFA Short Course. Kathy Benken, OFA president; P. Allen Smith, 2003 OFA Short Course keynote speaker; and Joe Boarini, OFA immediate past president pause after the Short Course keynote and OFA business meeting.



2003 OFA Short Course Trade Show overview. More than 560 companies exhibited at the trade show in 1,300+ booths. Floriculture professionals from around the world attended the trade show and educational seminars at the 2003 OFA Short Course.

2003 OFA Short Course is Well Received

The OFA Short Course once again showed its strength as the U.S. floriculture industry's leading educational and trade show event, with a strong showing of attendees from around the world and a great response from all sectors of the industry.

OFA has received many positive comments about the business conducted during the trade show, which featured more than 560 exhibiting companies in 1,300+ booths. The latest innovations in equipment, plant material, and products were on display.

OFA also received good reports about the content and structure of the educational programming, and many compliments on the quality of all areas of the OFA Short Course.

This year, OFA updated several things to keep the OFA Short Course exciting and fresh for attendees. OFA and Ball Publishing created a special convention bookstore in the main concourse of the convention center. OFA also relocated the New Varieties and New Products displays to allow attendees more space to browse and take notes.

The educational program provided a mix of seminars, hands-on workshops, tours, and interactive sessions for all segments of the industry. The retail design sessions were included this year as part of the general education program, and several retail hands-on design workshops focused on wedding, sympathy, and holiday table designs.

For greenhouse growers, the educational program included sessions on vegetative annuals, perennial production, specialty crops, mixed containers, pest and disease management, and computerized climate control. The grower tour visited greenhouse operations, the Gateway Learning Garden, The Ohio State University Department of Horticulture and Crop Science, and the USDA Ornamental Plant Germplasm Center.

Garden center operators toured several Cleveland, Ohio garden centers, as well as attended educational sessions about store renovation, merchandising, traffic flow, product trends, diagnosing plant problems, and an idea exchange.

The interior plantscape tech workshop focused on paying attention to detail, diagnostics, pruning, and One-Minute Maintenance. A workshop for interior plantscape managers focused on holiday planning, relationship building, quality assurance, and employee longevity. Other sessions addressed the need for indoor plantings, marketing trends, and pricing.

Marketing and management topics included finance basics, customer service, evaluating business strengths and weaknesses, labor issues, branding, retailing vs. wholesaling, sales, and point-of-sale systems.

"Considering our deliberate focus on quality versus quantity, the fact that many locales have had several challenging spring seasons in a row, and the domestic/foreign issues that are increasingly competing for our attendees' priorities – OFA is very pleased with the results this year," John R. Holmes, CAE, OFA's executive director said.

OHIO FLORISTS' ASSOCIATION INC. AND O.F.A. SERVICES INC. CONSOLIDATED STATEMENT OF REVENUE AND EXPENSES FOR THE YEAR ENDED DECEMBER 31, 2002*

Revenue:

Trade Show	\$1,408,821
Short Course	442,887
Dues	255,165
Publications and advertising	83,132
Short Course reception sponsorship	21,100
Workers' compensation program	22,929
Rent	19,236
Sponsorship Income	13,500
Investment (loss) Income	(24,793)
Miscellaneous	2,483
Schools, tours and other educational meetings	3,166
Total Revenue	\$2,247,626

Expenses:

Short Course	\$669,890
Employee leasing	728,553
Trade Show	259,895
Contributions	60,620
Professional fees	74,422
Depreciation	47,813
Bulletin	39,923
Publication costs	40,345
Office equipment leases	38,428
Office maintenance	30,979
Building maintenance and taxes	37,129
Administrative meetings/functions	26,516
Public relations	32,239
Travel	35,579
Membership recruitment and correspondence	27,609
Credit card processing fees	20,610
Postage	11,609
Member newsletter	5,764
Miscellaneous	20,525
Office supplies	17,026
Telephone	11,343
Insurance	8,310
Dues and subscriptions	8,387
Total Expenses	\$2,253,514

Decrease In Net Assets

	\$(5,888)
Net Assets – Beginning of Year	\$1,032,362
Net Assets – End of Year	\$1,026,474

* Audited financial statements are available upon request. This document was transcribed from the Consolidated Financial Statements with the independent auditor's report of December 31, 2002.

2004 OFA Short Course

July 10-14, 2004
Columbus, Ohio

Celebrating our 75th Anniversary

2003 OFA Short Course Contributors

OFA SHORT COURSE 2 • 0 • 0 • 3

OFA thanks the following firms for providing products, services, and other contributions for the 2003 OFA Short Course workshops, seminars, tours, receptions, and decorations.

Diamond Level

Ball Publishing Co
Florists' Review
The Flower Fields
GMPro, Greenhouse Management & Production
Greenhouse Grower
Greenhouse Product News
Pride Garden Products
Summit Plastic Co
Syngenta

Ruby Level

FTD Inc
Cuthbert Greenhouse Inc
Hortica
Lawn & Garden Retailer
Nordlie's Inc
Teleflora

Platinum Level

Bench Systems LLC
Four Star Greenhouse
Landmark Plastic Corp
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Proven Winners
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SPS International

Gold Level

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Carolina Nurseries
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Syndicate Sales
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Hill Floral Products of Columbus
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Javo USA Inc
Nexus Corp
Ocean Breeze International
Ocean View Flowers
Pan American Seed
Poly-Tex
Possum Run Greenhouses
Roman J Claprod
Royal Van Zanten
Ruibal's Topiary Systems
& Ironworks
Valley Flowers Inc
Western Pulp Products
Yoder Brothers Inc

Bronze Level

Adopt A Plant
Advancing Alternatives
Agri-Starts Inc
AJ Rahn Greenhouses
Akro-Mils Lawn & Garden
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Armellini Express Lines
Austram Inc
Bates Sons & Daughters Inc
Belden Plastics
Berns Garden Center
Berwick Industries Inc
Bioworks
Blooms Direct
Bouldin & Lawson
Blooms of Bressingham
Bodger Seeds Ltd
Braun Horticulture
Bruce Jensen Nurseries Florida LLP
California Florida Plant Co
Claus Cutlery Co
Corso's Perennials
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Day Lily Nursery
Delhi Flower & Garden Centers
Design Master
Diamond Line Containers
Dickman Farms LLC
Diefenbacher Greenhouses
Dill's Greenhouse
Dramm Corp

Bronze Level continued

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 Dummen USA
 Eagle Creek Garden Center
 Eason Horticultural Resources
 Floralive
 Florigene Flowers
 Flortec Group-Ecuador
 Gallup & Stribling Orchids
 Gloeckner & Co Inc
 Goldsmith Seeds
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 Thorsen's Greenhouse
 Timbuk Farms Inc
 Tipper Tie-Net
 Tri-State Foliage
 WJ Cowee
 WaterWorks America Inc
 Wilson's Garden Center

Patron Level

Dongjin Plastics

2003 OFA Short Course Booth Awards

– presented by Branch-Smith Publishing

The approximately 9,600 people who attended the 74th OFA Short Course had the opportunity to visit more than 500 companies that presented their products in 1,300+ exhibit booths.

This is the fourth year Branch-Smith Publishing presented Best Booth Awards, selected by the show's attendees, to recognize exhibitors for their efforts to create outstanding displays. None of this year's winners had previously won the award.

Fischer USA. "Breathtaking" was one of the comments from an attendee who voted for Fischer USA, which took home Best Booth award for multiple booths, green goods.



Gilberg Farms. Shannon Weber and Christie Proctor of Gilberg Farms were very surprised when their company received the Best Booth Award for single booth, green goods. It was the first time the company had exhibited at the OFA Short Course.



SoilSoup. Ron Stakland and Todd Schaaf represented SoilSoup, which won the Best Booth Award for single booth, hard goods.



Cravo. Efforts by the crew at Cravo to hang umbrellas above its exhibit paid off with the company claiming Best Booth for multiple booths, hard goods.

For information on upcoming OFA events,
visit our Web site: www.ofa.org

OFA Board Makes Appointments

At its board meeting during the 2003 OFA Short Course, the OFA Board of Directors appointed Doug Cole, DS Cole Growers, Loudon, New Hampshire, as treasurer; appointed Marvin Miller, Ball Horticultural Co, West Chicago, Illinois, as Board liaison; and re-appointed John R. Holmes, CAE, as executive director.

Melinda Howells leaves OFA

Effective in early September, Melinda Howells has left the OFA staff for another position in the floriculture industry. She has worked with OFA in several capacities for more than 16 years, most recently as Manager – Marketing Services. OFA has always greatly appreciated Melinda's enthusiasm for floriculture, her dedication to the association, and her great working relationships with our members and other industry professionals. Melinda has joined McGregor Plant Sales as the sales representative for the Ohio Valley.

OFA Apparel Is Available

OFA now has OFA-branded apparel available for purchase. Several shirts, an apron, and a ball cap are featured with the new OFA logo embroidered on each. These items are available for a limited time only. Don't miss this opportunity to advertise your membership in OFA or your participation in the OFA Short Course. If you are interested in OFA apparel, contact Cheryl Cuthbert at 614-487-1117 or ccuthbert@ofa.org.

www.ofa.org

Upcoming OFA Outreach Educational Opportunities

- | | |
|--------------|---|
| October | "Getting Ready for the Holidays"
Retail Hands-On Workshop
– Cleveland Plant & Flower Co, Toledo, Ohio |
| October 15 | Interior Plantscape Workshop
(pesticide recertification credits available)
Engledow Group, Indianapolis, Indiana |
| October 15 | Garden Center Outreach Seminars
Indianapolis, Indiana |
| October 17 | Cleveland, Ohio |
| November 4 | Grower Seminar & Tour
"Technology, Automation, & Greenhouse Efficiency"
North Carolina |
| November 5 | Richmond, Virginia |
| January 2004 | Partnering for Profitability
Texas A&M University |



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