

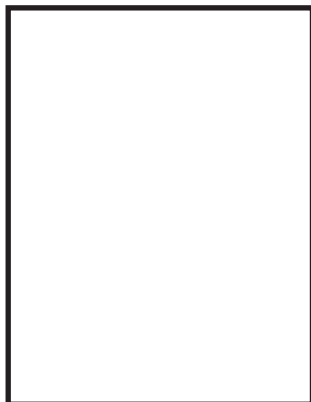


Bulletin

The Information Source for the Floriculture Industry Since 1929

CIRCULATE

Winter's Coming



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Here we go again, another winter of opportunity. We are a unique bunch in this industry. I've observed, with some chagrin, that we hold trade shows in Chicago in January, and Florida and Texas in August. We grow plants at household temperatures in the most thermally inefficient structures (regardless of how good the covering) ever devised by man, in the coldest months of winter, and then shut them down during the warm months. But, the fuel companies love us (and so do the heating companies).

How can you optimize your energy efficiency this winter to preserve the profits you labor so hard to earn? It's all been said before, but following is a simple check-

list to serve as a reminder of what you can do to maximize your energy efficiency this winter.

Walk the greenhouses with a task pad noting any holes, cracks, or leaks to create a daily schedule to get coverings sealed and/or replaced.

Check curtain system closure to make certain that they close tightly against the truss or gutter line to minimize the flow of air up into the "attic."

Confirm that roof and side-wall vents and doors

close completely and seal tightly against the frame or jamb. A 1-inch gap in the vent on a 96-foot house is the equivalent of more than a 10-inch hole in your covering. Replace or install brush strips or some other form of seal where vent racks penetrate side walls or roll-up/drop walls meet the columns. Check that louvers are straight and close evenly against each other, and consider sealing those louvers with tape or a sheet of poly if you do not use them for ventilation during the winter months.

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WHEN MANAGERS BECOME KEY PEOPLE WITHIN A FAMILY BUSINESS

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Did you ever see a turtle sitting on a fence post? If so, there is only one thing that is certain – the turtle didn't get there by himself. None of us are turtles, and even if we are turtle-like in our reaction to change, we did not get into the position where we are in our businesses today without help. To go into business, to stay in business, and to grow in a business, we have to work smart, think smart, and act smart in a timely manner on timely issues – and have people assisting us who add their own special value to our business.

Most of us have families, and many of us have family members who are involved in the business. It is often our greatest hope that our children will be even more excited about what we are doing in the family business than we are. We dream that they will bring knowledge and experience – along with common sense – to the business, so that the business and the next generation can grow even more. Every successful employee should be adding to that mix, as well.

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OFA

An Association of Floriculture Professionals

Our mission is to assist the floriculture industry in being competitive, profitable, and responsive to its needs.

(As adopted by the OFA Board of Directors 2/18/01)



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FIRST

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FIRST, Floriculture Industry Research and Scholarship Trust ... brings together two established charitable organizations to consolidate research and scholarship funding. This industry-wide effort invites other organizations with research and scholarship funds to join as well. FIRST funds a wide range of research projects and administers a variety of scholarship funds named and designated for the full spectrum of floriculture interests.

Both BPF (Bedding Plants Foundation Inc.) and OFF (Ohio Floriculture Foundation) have been funding research in the floriculture industry for more than 20 years. More recently, BPF has been funding scholarships with the support of organizations including OFF. OFF was traditionally supported by OFA and its members. BPF was traditionally supported by BPI and its members.

WHY MAKE THIS CHANGE?

This change will put more money into the hands of researchers and students and less money into the paperwork and processes required to receive and distribute the funds. With the two separate organizations, there was duplication

of effort in the research funding process. Researchers would apply to both organizations and often be partially funded by both. There was also duplication among contributors to the two organizations.

Leaders of both groups saw this duplication of effort. They saw that demand for scholarships, and the needs of the industry for workers had grown beyond what any individual trade association should have to support. They realized that an industry-wide effort was needed, and developed a plan to join forces. In doing so, they hope to create an attractive environment for other industry organizations with research and scholarship funds to join as well.

WHAT'S IN A NAME?

The name was an issue for both organizations: BPF contributors were funding scholarships that were more wide-ranging than just for bedding plants – such as international floriculture marketing, public gardening, container plant production – yet the name implied that BPF's interests were limited to bedding plants. The OFF name implied that their support and their efforts existed only within Ohio, when in fact their funding went toward research programs across the United States and Canada. The new name, FIRST (Floriculture Industry Research and Scholarship Trust), more accurately describes the beneficiaries and activities of the organization. It applies to both previously established foundations equally well. But most importantly, the name FIRST signifies a neutral, independent organization in which scholarship and research funds from any industry group or segment may be comfortably invested and professionally managed for the best interests of the industry.

The 12-member board is remaining intact as BPFI transitions its name to FIRST, and keeps its existing staff. I've served as the executive director of BPFI for eight years, and look forward to bringing the expertise that I've gained to the entire floriculture industry. The OFF trustees are joining FIRST committees in key positions. The assets of both foundations will be invested in FIRST, and all previous donor restrictions will continue to be honored. As an independent organization, FIRST will have industry-wide appeal and support from all industry segments. FIRST will serve the research and scholarship interests of all industry organizations, funding a wide range of research projects and administering a variety of scholarship funds named and designated for the full spectrum of floriculture interests.

WHAT'S IN THIS FOR OFA MEMBERS?

Judging from the response at the Short Course this year, this is a welcome change for OFA members. The excitement generated by the combination of OFF and BPFI into FIRST has been overwhelming. Industry-sponsored events to raise funds for our mission were at an all-time high. The traditional



reverse raffle conducted by the OFF trustees had an amazing outcome. The Dramm/OFA 5K relay and the D.S. Cole Growers "Hockey in Columbus" events generated new excitement for the Short

Course and awareness for FIRST.

A Gator raffle conducted by *Greenhouse Grower Magazine* and sponsored by Proven Selections and Premier Pro-Mix provided excitement! The support from these companies shows that they care about OFA members and the future of the floriculture industry.

There are opportunities for involvement in FIRST at many levels. Contributors are listed in an annual report of support for the industry. We need over 100 volunteers each year to fill positions on our board, committees, and review teams for research grants and scholarships.

Contributor categories begin at only \$50 per year and are fully tax deductible as charitable contributions to the extent provided by law. Research results are sent to all contributors. Applications for scholarships or research funding may

Pesticide Resistance – What's a Grower to Do?

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Pesticide resistance has been recognized to be a problem from the early days of large-scale production of manmade pesticides nearly 60 years ago. If you are involved in a typical commercial greenhouse operation, your pest control practices have certainly been affected by this phenomenon.

Resistance is by no means limited to insecticides. Many fungal and bacterial diseases, as well as some weeds, have all shown resistance to one or more chemicals. Have you ever

wondered why your doctor switches you from one antibiotic to another? You guessed it; he or she is working to minimize resistance to our valuable continuing of disease fighting medicines.

There are several ways we know that populations of organisms develop resistance to pesticides, and probably more ways yet to be uncovered. Some contain proteins that bind up pesticides; others use enzymes to detoxify them. Genetic variation within a population makes it possible that a few individuals in any given population may contain the needed attributes to start the process towards resistance. Whenever we treat a pest population with a pesticide there is a chance that a few of the pests contain

some ability to deal with the given treatment. If they survive with a few others that have a similar ability to cope, we have the beginnings of a breeding group that may lead to resistance over time.

Growers love systemic pesticides with long residual control, and why not? After all, the longer the period of control the less we need to spray. While this is true, as the amount of chemical slowly reduces in the plant tissue, it eventually falls to a level that is sub-lethal to the target pest. The end result is an extended period of time when pests are subject to less than a full dose of the pesticide. Pests with some degree of "built in" genetic resistance may survive contact with the reduced level of pesticide and breed with others that have the same.

We all know that it is illegal to use more pesticide than the label allows, but did you know it is also illegal to use less than the label calls for? Doing so subjects more pests to sub-lethal doses thereby adding to resistance potential.

What can a grower do to minimize the risk of contributing to pesticide resistance? It has long been agreed that we need to rotate pesticides, but the way we go about this is important. While there is some difference of opinion on the following points, there is good agreement on the major issues:

- Understand what chemical classes are represented by the products available to control a certain pest. Often you will find that

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PESTICIDE RESISTANCE – WHAT'S A GROWER TO DO?

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potential rotational products are actually in the same class of chemistry, making them poor choices. Cross-resistance to a certain chemical mode of action is common. Two different classes of chemistry can even share a similar mode of action, as is the case with organo-phosphates (Orthene, Duraguard, etc) and carbamates (Mesurol, Closure, etc), pyrethroids (Astro, Decathlon, Talstar, etc) and organochlorines (Thiodan, Kelthane). Even insect growth regulators get in on this game, with Distance, Enstar II, and Precision/Preclude sharing the same mode of action. So it's not just a matter of rotating chemical classes, but rotating among different modes of action. All of this makes proper pesticide selection a complicated process. Enlist the help of your crop advisor to help you through this maze.

- Rotation intervals for insects and mites should be based on the life cycle of the pest. The goal is to treat one generation with only one chemical or tank mix before rotating so we are not encouraging resistance to multiple products. For exam-

ple, much of the year the life cycle of thrips is around 21 days, so we do not want to rotate to another class of chemicals until after 21 days of treatment. Growers who rotate modes of action with each pesticide application run the risk of passing on increased resistance to several classes of chemicals with each generation. Note: many products now contain resistance management language on their labels, which must be heeded. Remember, the label is the law!

- Tank mixing: good or bad for resistance management? Tank mixes can improve the effectiveness of a spray program but there is concern about whether this hastens resistance. For maximum benefit with the least resistance potential, consider never tank mixing more than two products at a time, and rotate to another product or tank mix that is a different chemical class than either of the products in the original tank mix. If one of the tank mix components has a general mode of action (e.g. insecticidal soaps or oils), there will be a lower chance of resistance development. Observing the rotation by generation concept will

also help avoid resistance buildup.

Utilize Integrated Pest Management practices to make sure that you use no more chemicals than necessary to control pests. Understanding the life cycle of the pest and life stage(s) the selected pesticide is effective against can avoid wasted applications. There is no point in applying an adulticide to a crop that is primarily infested with immature stages of a pest. Scouting provides valuable information when making the decision whether or not to apply pesticides in the first place. Spraying when pest levels are below reasonable thresholds creates unnecessary resistance pressure. There are a couple of exceptions to this threshold matter. Insect growth regulators (e.g. Distance), microbial pesticides (e.g. Botanigard or Naturalis), and systemic insecticides (e.g. Marathon G or WP) need to be applied when pest populations are at low levels – or at the proper plant growth stage – to be most effective.

According to Gary Thompson of Dow AgroSciences, it takes 7 to 10 years and \$40 to \$100 million to bring a new plant protection product to market. In his estimation, it takes about 10 years for a successful product to pay off the accumulated debt needed to launch it. No wonder most new pesticides contain resistance management language such as: "Make no more than three applications of this product before rotating to another class of chemistry" It makes good sense from a resistance management standpoint and a long effective life for the chemical is crucial to insure chemical companies have time to make a reasonable return on their investments. If plant protection products for our industry are not profitable, the incentive to produce new and safer products will dry up.

The author gratefully acknowledges Dr. Richard Lindquist for his help in preparing this article. OFA

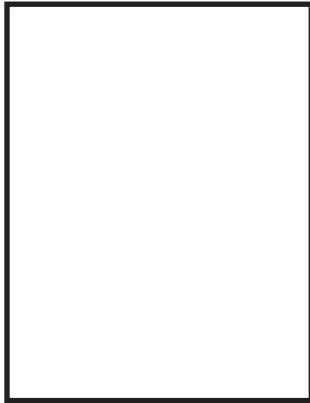


OFAS RELEASES TWO NEW BOOKS

Tips on Regulating Growth of Floriculture Crops is a comprehensive handling of growth regulation that extends beyond chemical products. This book not only covers the typical crops like bedding plants and poinsettias, but also includes popular crops like perennials, specialty vegetative, and fall crops. This edition includes explanations of the greenhouse environment's influence on crop growth and development with sections on non-chemical growth regulation, such as temperature, nutrition, light, water, and mechanical stimulation. Industry professionals and academicians authored the book. It is a full color, 124-page book, which includes 38 tables and 140 photographs and illustrations. The book is \$22 for OFA members plus \$5 shipping and handling. Ohio residents must include 5.75% sales tax.

Tips on Managing Problems in Interior Plantscapes covers various aspects of problems encountered in interior plantscapes. It includes information on general cultural and environmental issues, pesticide application, insect and mite pests, diseases, and biological controls. Appendices include information on pest control material available, biological control agents, and a diagnostic guide. The full color, 41-page text contains 4 illustrations and 48 photographs. It is authored by several academicians who saw the need for an interior plantscape manual. The book comes at an appropriate time, as the industry has seen increased growth and importance in the last few years. The book is \$15 for OFA members plus \$5 for shipping and handling. Ohio residents must include 5.75% sales tax.

Wholesale to Retail



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Change in business can be inevitable. To be profitable in business today, change is a necessity.

As a 5-acre, family-run wholesale grower we found that the necessary change we needed to consider was with the profitability of our business, not the increase of gross sales. As we reviewed our business growth, we recognized that we were effective in selling our products in the wholesale market; however, we did not see the same rate of growth in our bottom line. An opportunity was presented where we could purchase land adjacent to our current facility and build additional production space. We also needed to decide what to do with existing greenhouses that were outdated and no longer efficient for producing our current crops.

It was during this time that we realized bigger was not necessarily better and that we wanted the main focus of our business to reflect our quality, not just produce quantity.

There are some benefits to selling our products at wholesale: shorter selling season, dealing in truckload quantities, and limited advertising costs, just to name a few. If you have a strong customer base with a long-term commitment, these benefits can be adequate to the success of your business.

Even though we were in a long-standing relationship with a locally-owned supermarket chain, there were some warning signs that started to appear. The head-purchasing agent for this customer was getting close to retirement. The business was also being acquired by a national supermarket and would be phasing out the family ownership within the next five years.

There was an expressed interest by the national chain to continue working with us in providing bedding plants to some of their locations; however, a few red flags arose when we realized that we would have to deal with several levels of management versus a single purchasing agent.

Because we are considered a small- to medium-size grower, we realized that we did not have the purchasing leverage or manpower to deal successfully with a national chain in such a way that would offer us the profit margins to keep our company viable in the future.

The time had come for us to reconsider our business focus. Many things needed to be considered, like location, product lines, employees, etc. We decided to include retail into our current business structure.

We started working with a marketing specialist who addressed some of our concerns. One of the first aspects we needed to consider was that our location was not in a high traffic area; therefore, marketing and advertising of our products and services would have to be a main focus.

We decided against the purchase of the adjacent land for more production area. And as a result, we felt that we needed to upgrade our current facility to offer the retail experience that we were looking for.

The construction of a new 13,000 square foot range gave us the retail space we needed. The design was simple yet flexible enough for us to use as a growing area during the off-season.

The next consideration was our product line. We wanted to offer quality products and service in our retail center. It was decided that the majority of our product line would be only those items about which we were knowledgeable. Therefore, we would offer bedding and potted plants that we grew in our greenhouses.

This decision allowed us to focus on selling our own products and not tie up available cash or space with inventory of hard goods or gift items for which we were not sure we had a market. We emphasized the fact that our retail store was not located on a major road; therefore, having excess inventory of items did not fit into our short-term goals.

Once we were comfortable with our facility and

product line, we needed to decide on our hours of operation. As a wholesale grower we were able to have shorter days and limited weekend hours. Now that we were in the retail business we had to cater to the end consumer and be available to them with longer days and weekends.

Even as a wholesale grower, we were familiar with peak seasons and long days. The weekends, however, gave us a little more flexibility to catch our breath and plan for the week ahead. Now that we were in the retail market, our weekends were no longer free for planning. We needed to be available to the retail customer and offer the service for which we wanted to have our business known.

Because our wholesale division was still an important part of our business, we realized that we could not be two places at once! Keeping both our retail and wholesale customers happy was another challenge. The "quality" employee was what we needed to focus on next. In order to keep the business running efficiently in both areas, ambitious and dependable employees were a must.

Fortunately, we had several of these quality employees, so the next step was to train them on how to deal with the retail customer.

This is probably one of the most important considerations when deciding to enter into the retail market. A staff that is well-trained in answering customers questions, knowledgeable about the products you offer, and committed to the organiza-

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WHOLESALE TO RETAIL

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tion are of great value to any organization.

With all of these major aspects in place we were ready to begin our new retail venture. Fortunately, I can say that our efforts resulted in sales that were beyond our expectations. We even realized that dealing directly with the end consumer has some additional benefits. We now also take into consideration the needs of the final consumer when planning and scheduling our product line.

As we look back on this experience, we feel fortu-

nate to have made the decision to diversify our company. With increased heating costs and cool May temperatures, the retail center provided us with the increased sales we needed. The hours are long and the answers to customer questions can seem repetitive; however, the lessons we have learned are invaluable.

Because of this change, we are also rethinking our product lines. We are looking for more consumer-friendly, rather than just container-friendly, plants. Watering, fertilization, and growing conditions of the



plants we sell are more important in our planning decisions also. We want the repeat customer; therefore, we need to pay close attention to their needs.

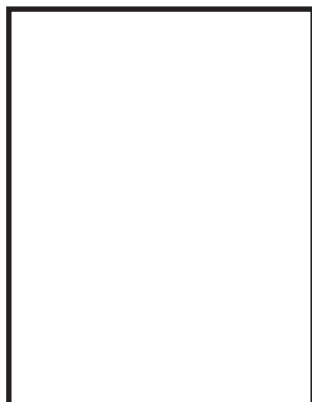
The decision to include retail within our company has proven to be beneficial to our business. With the constant changes occurring in our industry, the need to diversify is becoming more apparent.

Each individual company can only determine what these changes will include. Change may not always be easy, but a good plan can be extremely beneficial. Many times we get into a comfort zone that won't allow us to make the necessary changes we need to continue to grow in our industry.

OFA

HOW TO DECIDE WHAT TO SELL AT THE GARDEN CENTER

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Eney, meaney, miney, moe ... Isn't that the best way to decide product mix? Some days, I feel that I would be better off with this method.

What does your customer expect to see at your garden center? Of course the usual tools, fertilizers, and other staples, and the good old standbys in plants. What about new varieties? What about the plant featured in the latest gardening magazine? Where will they find all these new things? Hopefully, with a little research, the right new items are in your product mix, and your customer will go home content with their little treasures.

So many new products every year, how does one choose? Space is a problem, and then there is always the

budget. It is very easy to let inventory get out of control. When operating on borrowed money, inventory must be managed closely.

The first step is to research the product. Is it hardy for your area? Is it unique, yet will mix with other product you carry? What about labels, POP, convenient shipping, guaranteed sale? Do you have too many plants of that color already? So many questions – yet with experience, many of these questions become easier to answer.

Sometimes, it is possible to get new product on consignment. Most salesmen are reluctant to offer this up front, but with a little wrangling you might be surprised at the number of things that can be offered this way. Look for local crafts people and suppliers that may offer unique items such as stepping stones, bird houses, etc., and are willing to collect their money after they are sold.

What are consumers looking to buy? It is an endless question because the answer is always changing. At this time, consumers still want things easy, such as plants, that don't require much care. Young homeowners are probably remembering hours of hot sweaty work trimming hedges and weeding vegetable gardens. Plus, they lead very busy lives.

They want color. Sophisticated consumers have come to appreciate colored leaves as a supplement to their blooms, but beginners expect to find plants that will have 16 weeks of non-stop blooming, come back next year, never change in size, and definitely not die. Their gardening expectations are

the same as with interior decorating. When they put up curtains, they look the same day after day. When they plant a perennial garden, it should look the same in three months as it did

the first day, full grown and picture perfect.

Consumers look to their yard and gardens as a way to relax and reduce the stresses of the day. It is amazing the products on the market that help with relaxation, from hammocks and patio furniture to tools that make their work easier so they have more time to relax. That seems to be our lifestyle – hurry up so we can relax.

Expectations for our products have become higher. Staying ahead of box stores and changing with our customers is a tough order to fill. Look at some of the lines you carry now to see what can be improved. Any daylily that reblooms is probably a safe bet. After all, they provide plenty of color. A garden spray that will take care of all insects and diseases, yet be environmentally friendly, should go well in any garden center. Dwarf shrubs (with color, of course) don't need pruning so there is less work and more time for relaxation. It is a non-stop quest to find just the right plants and products, yet offer choices in addition.

Everyone likes to try something new. There is excitement in the unknown, the conquering of new challenges. After all, look at the buzzing about at the New Varieties Display at the OFA Short Course. Will the new varieties perform better, or are they just more of the same?

Sometimes companies are too quick to present new products. Are they being tested thoroughly enough before being released? Or, are we being asked to be the guinea pigs? Each year, I excitedly try new items on the market, only to be disappointed too much of the time. When choosing new releases, expect some failure; however, doing some research on your own should help eliminate some of the disappointments. Keep in mind, many other aspects of business are trial and error, too.

Yes, everyone likes to try something new, but good old standbys are okay, too. Try setting a goal of only a certain percentage of new items each year knowing that some will be dogs and some will be winners. We use 10 percent. If we as an industry had not tried some things when they were new, we would not be experiencing the revolutionary market that we are today. Look at what the vegetative petunias have done. What about introductions from marketing companies like Proven Winners and Flower Fields? Add the perennial and woody markets, and we have a multi-billion dollar market, all because these items cater to what consumers want to buy – easy, colorful, and different.

Do the products fit your business image? Know your market and to whom you are selling. Check the final selling price before you buy to avoid costly mistakes later. Is the price going to send the wrong message? How affluent the community is usually dictates to what degree high end product will sell. Garden art works well with upscale garden centers. Native plants sell well in environmentally conscious markets. Pet supplies go well with businesses owned by animal lovers. Where there is a passion, related products generally sell well. Choose product lines that tie in to your interests, or possibly those of key staff.

OFA Garden Center

As product mix changes, so will the business image. Avoid changing product lines drastically without good reason. This can send a message to the public that the business is in trouble.

As mentioned earlier, the one most important step in buying product is research. On-going and never ending product mix must be viewed from several different angles. The following are excellent resources for researching product lines.

Trade Magazines – Ads and articles about product for our industry make up the bulk of floriculture trade magazines. New products and twists on the old products are big news, something these publications are clamoring for. Plus, these products are being promoted by people within our own industry, which should add some credibility.

Consumer Magazines – Who sets the trends for our consumers? Magazines like *Southern Living*, *Martha Stewart*, and *Fine Gardening* all introduce ideas into the readers' heads, which in turn creates a demand. When a plant is featured that fills a need, such as a long-blooming perennial without the deadheading, requests for that plant abound. The trick is to anticipate which articles will trip the buying trigger of your customers for that year so you can stock your shelves accordingly.

Gardening practices, colors, hard goods, and plant varieties are all featured through articles and ads, all intended to make gardening look easy, picture perfect every day of the year, and elegant, all without a drop of sweat.

Trade Shows – A chance to get the inside scoop from others within our industry, trade shows also offer chances for networking with other buyers, often with similar situations as our own. Usually new products are at the shows but not always in the forefront. It may be necessary to really scour the booths to find what will work best for you.

Gift Shows – An opportunity to see trends in color and lifestyle, gift shows seems to be on the cutting edge of what is to come. Even store buyers that do not carry a gift line should go to these shows just to see the trends. Usually garden gift lines are offered, which ties in with the plant choices gardeners want today.

Salesmen – What a resource! Who knows the product better and to whom it should be sold. Salesmen can be a wealth of knowledge.

Visit Other Shops – Seeing product in other garden centers, even in other unrelated shops, indicates trends in consumer habits and desires. A lot can be learned by how product is merchandised, where it is located, and what product mix is being used. A word of caution, large elaborate displays don't always mean that it is a good selling product. It may be a mistake some buyer is trying to blunder through. Look for product displays that have obviously been shopped.

Try stores in other communities, large and small. Sounds like a great opportunity for a field trip to me.

Focus Groups – Consider holding a focus group of people that may or may not be your customers. They can tell you

WHEN MANAGERS BECOME KEY PEOPLE WITHIN A FAMILY BUSINESS

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As we grow, we need to add more people. Many are stuck with people who are working **for** us, rather than **with** us. But when we find people who want to work with us, they become even more valuable when we allow them to become excited about their value to us, become well paid, and just as importantly become appreciated. When they do, they become key.

We often have employees who contribute more than any of the family members, even beyond what we add ourselves. We need to acknowledge those and protect those relationships as well. Yes, it can be a "tender," trying moment explaining to our children that there are employees who are more valuable than they are just now, and maybe forever. Whenever that is the case, such a discussion needs to be handled with respect and reverence – the sooner, the fairer to all.

Every business needs a leader. A leader works **on** the system – setting goals and standards and improving situations and opportunities, while getting the most out of others. Every business needs a manager. A manager works **in** the system – takes orders, meets deadlines and goals, evaluates associates, and gets the most out of him or herself. Sometimes an owner must be both, but when an employee becomes a great manager, his or her value skyrockets.

Key employees are those whom we would find it very difficult to do without. We can often protect ourselves against their premature death or disability by owning insurance to cover part of such a loss of key personnel. But what if they leave and go to work for a competitor? How can we make up for that loss? The truth is we cannot. We can only be rewarded for what prudent action we take before such opportunity is offered them from outsiders.

Several years ago, the labor unions paid for extensive studies to learn why membership was waning. Much to the old-line union bosses' surprise, they found that the number one desire of their membership was to be appreciated – not money. Number two was to be given increased responsibility. Number three was a chance to grow, gain education, and be involved in evaluating new ideas and better ways of doing their jobs – making better products and/or providing better services. Number four was to be trusted and be asked for feedback. Somewhere down the list was security – to be financially rewarded, have stable employment, and have substantial vacation time.

We all need to have employees who are not only respectful of us, but ones we can respect as employees when they meet our customers face-to-face, over the telephone, or communicate via the Internet. They are the image of who we are in the customers' eyes. If we are having trouble keeping the good employees, then we need to look into the mirror, for their attitudes and actions may simply be reflections of us.

When we find that exceptional employee, we need to respond not only to his or her needs but also to their wants as described by the union study above. One of the best ways to show appreciation to a key employee is to put in writing the promises which are to be upheld.

Even if we are only sole proprietors, we cannot only verbally communicate our pleasure in having them in our employ, but also put in writing our promises. This promise could include to someday be guaranteed a percentage of ownership. I've yet to meet more than a half-dozen really super employees who did not someday want a piece of the action

(ownership). Often they have a goal to be in business for themselves, so making them an owner can fulfill more for everyone now and later!

One of the key ideas is to allow the key employee(s) to see your business/estate plan, which shows that the employee

can have ownership by being able to buy into the business at a discounted rate or even by bequest as an inheritance. If an employee is as important to the success of your business as any of your children, he or she should someday be rewarded equitably with business assets. And no one – children in the business or valuable employees – should have to pay twice for any value they helped preserve or create.

Besides providing health and disability income protection, employees could also be bonused so they could create an IRA (Individual Retirement Account). Or if it fits, a Simplified Employee Pension plan (SEP) can be implemented. Sometimes the employer can contribute more – depending on the employee's income – than the bonus IRA, which may be a "tax wash" for the employee. But anti-discrimination rules for a SEP must be met, which means almost every employee will be eligible.

If you have a more formalized organization, such as an S-corporation, a limited partnership, a limited liability company (LLC), or a full-blown, tax-paying C-corporation, you can do more, hopefully, for yourself as an owner, and also give more perks to the key employees.

A relatively new and hot idea is issuing to such important associates "phantom stock." This stock has no vote, but does have equal value to any others if dividends are paid or if the company is sold. Obviously real stock can be issued or sold – hopefully at a discounted rate – to such key supporters.

But heed this warning! Be certain that a buy/sell agreement is in place and if in place that it says what it needs to say to protect you and the business, before diluting your voting power and control. Too often attorneys are only too happy to do the incorporation, but too often fail to insist that the buy/sell agreement be completed. Why put a buy/sell agreement at

the beginning? Because everyone involved is usually closer to being on the same page in the book of common ideas. If one waits until after the business is up and going, with stock in the hands of several, trying to work out the terms of such an agreement will have the same success as "herding cats."

When the business is formalized, the retirement plans available can become more sophisticated, as well as have larger percentages of earnings eligible to be sheltered by the employee and/or contributed by the employer. These include pension plans, profit-sharing plans, and 401(k) plans.

Deferred compensation ideas could include bonus income to be delayed until after retirement and split-dollar life insurance. Split-dollar life insurance provides employees' families with income tax-free cash payout of the net risk in the case of

a premature death. (The payout is the face amount of the policy less the cash value.) The corporation pays the premium and the employee pays only the income tax on the cost of the insurance as determined by the IRS (a minimal amount – like annual renewable term costs – now called the "economic benefit.") The corporation owns the cash value of the policy which is returned upon death or surrender.

There are other perks, such as medical reimbursement. Again this is subject to anti-discrimination rules. **Please confer with your tax and legal counsel as to how these plans might complement your goals and then your employees' needs and wants.**

The bottom line to owner-key employee relationships is that every one of us wants to be told we are wonderful. If we

How to Prepare Your Staff for the Holiday Rush

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Christmas is one of the most important trading periods of the retail year in the Western World. The impact it has on sales will vary with each retail sector, but whichever sector you belong to, it is critical that you maximize the sales potential of this peak festive season. One of the keys to success is to have your staff trained and ready to handle the extra demands of this exciting time for retailers.

MOTIVATE THE TEAM

Christmas should be an exciting time for your team even though it is one of their busiest work periods. To maximize your success over the Christmas period you must involve the team in the planning stages. Have a Christmas planning meeting well before the Christmas sales period when you can discuss your plans, their involvement, and their ideas.

Be objective in terms of precise goals-targeted total sales, average sale per customer, number of items per transaction, and conversion rate. Compare the anticipated targets with last year's results and discuss how this year's target will be achieved, recorded, and measured.

IMPLEMENT A HOLIDAY COUNTDOWN CAMPAIGN

Have a Christmas countdown in which everyone each day can compare results against target. Daily progress could be entered on a whiteboard summary chart in the staff room as part of the motivational strategy.

REDUCE STRESS IN THE TEAM

Many people find the lead up to Christmas a stressful period. Your objective is to reduce this stress. Consider these strategies offered by Jurek Leon of Terrific Trading in his Christmas ideas newsletter:

- Employ someone to keep the lunch room looking fresh and tidy during the Christmas period
- Place a VCR in the staff room and rent some humorous videos
- Hire a masseuse to give complimentary massages to customers and staff
- Have a "joke-a-day" competition
- Give staff time off to do their own Christmas shopping

FOCUS ON STAFF EMPLOYMENT NEEDS

Your team will get exhausted during this period, so you may need to change rosters and hire temporary staff.

Sign up temporary team members well before

December. Contact local colleges and retail training providers who may have trainees requiring retail experience over Christmas. Hire special staff to answer your phones and free up your sales team to sell. Deal with poor performance as it occurs. If you leave it until after Christmas your high performers may well be disillusioned with those staff members who aren't pulling their weight during this rush period.

TRAIN THE TEAM

Every team member needs to be on the ball for Christmas, so a short training program will prove beneficial:

1. Provide adequate training based on the 10 most commonly asked questions over the Christmas period.
 - Does it come equipped with batteries?
 - Can I return it if it is not suitable?
 - Will it work overseas?
 - Have you a follow up service?
 - What happens if it is the wrong size?
 - Is it guaranteed?
 - What instructions are provided?
 - Can the recipient change it for another color after Christmas if they don't like the color?
 - Do you have other sizes if it must be changed later?
 - Do you gift wrap?
2. Train the team on how to remain calm and collected in times of stress. At this time of year, they must

act like Santa's helpers even when there is a line of frustrated shoppers demanding VIP treatment. Even simple advice, like doing deep breathing exercises on the job, will help them at this time.

3. Conduct an induction program for new casuals so that they quickly become a part of the team.

4. Clever sales assistants should be able to be quick off the mark with gift suggestions for the hard-to-please relative or friend who has everything. Have you provided your team with lists of such suggestions?

KEEP YOUR STAFF ON THEIR TOES

Christmas is a time when your team should be order makers, not order takers, (i.e. approach the customer and do not wait for the customer to approach them.) This means your staff must be well-drilled in the basics of Christmas selling.

- Welcome the customer with a Christmas greeting
- Use open questions
- Sell during busy periods
- Add-on sell
- Ask for the sale

MANAGEMENT MEMO

If you have a large Jewish clientele, you should consider Chanukah decorations, a candelabra, and signs saying Happy Chanukah. For a Muslim customer base, Idhul Fitri is the major annual celebration.

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WINTER'S COMING

Continued from page 1

☐ Clean heat exchangers in unit heaters and boilers so they are free of chemical deposits and dirt. While you're cleaning them, verify that they are free of cracks and pinhole leaks.

☐ Check the gas pressure at every heating appliance such as unit heaters and boilers. It is important that all of the gas-fired units on a gas meter are firing simultaneously while doing this. Check the pressure on the inlet side of the appliance, after the gas regulator, not at the meter or line running to the appliance. Make sure that it meets the manufacturer's specification for gas pressure and make sure the pressure for each unit is recorded. Don't rely on the local gas man telling you "it's enough," as their version of "enough" may not match the manufacturer's requirement.

☐ Check the combustion air supply to every heating unit to make certain it is clear of debris and able to supply adequate combustion air. For atmospheric heaters and boilers (using air from around the unit), the American Gas Association requirement for combustion air is one square inch of open vent area for every 1,000 BTUs of input. For induced draft and separated combustion heaters, make sure the air inlet vent is clear of debris and restrictions. Sweep or vacuum accumulated dust from around the units to assure a clean air supply.

☐ Check the velocity of the stack (chimney) of any heating appliance to make sure that the products of combustion and spent fuel get up and out rather than lingering in the vent piping. The products of combustion

are highly corrosive and potentially poisonous. Poor venting accounts for a huge percentage of the trouble growers have with heating equipment each year.

☐ Install separated combustion modules on your unit heaters and boilers, if the manufacturer offers that option, or replace them with units that have that option. Providing cool, clean outdoor air for combustion not only increases the combustion efficiency of the unit but also reduces air infiltration into the greenhouses and increases the life-span of the heating unit. Some growers have reported improved growth characteristics resulting from better air quality in the greenhouses.

☐ **REPLACE ALL "GRAVITY STACK" UNIT HEATERS!** This is capitalized, bold, and underlined because it's possibly the most pronounced area of fuel waste in our industry. Understand that "cheap" unit heaters are not cheap. If you aren't installing induced draft style heaters, you are letting 10 percent to 13 percent of your fuel dollars escape ... wasted from your vent piping. A typical unit heater will consume two to three times its cost in fuel annually. Why would anyone buy the least efficient heater because it costs less initially? It absolutely makes no sense – even for a Spring-only grower. While you're at it, consider too that the further upgrade to unit heaters with combustion air separators can shave another 5 percent to 10 percent of your fuel use.

☐ Stock up on miscellaneous spare parts so that when the heaters fails at 2 a.m. on Thanksgiving eve with a house full of

Poinsettias you can fix it and keep things running.

☐ Replace inefficient or unreliable unit heaters and boilers to take advantage of the increased efficiency of modern technology.

☐ Contract for your winter's fuel supply now, if you haven't already, to get the lowest likely cost. The prices probably won't be any lower later. Look into transport gas contracts or co-ops with other growers or local businesses that also use a lot of gas. If you use LPG, check into a transport tank to replace your small tanks. Often the gas company is willing to provide the tank at little or no cost, if you have a place to put it, and offer lower fuel costs.

☐ Check thermostats and control system sensors for accuracy and recalibrate them if required. Just a 1- or 2-degree variance will cost a bundle in excess fuel use. Replace analogue thermostats with electronic units for greater accuracy and responsiveness, because the fuel savings will pay for the new unit in less than one season. Consider installing computer controls for your facility. The appropriate computer control system will pay for itself in less than two seasons and often in just one.

☐ Have a professional energy audit completed to identify the efficiency of your facility and spot problem areas that need special attention.

☐ Build a germination chamber instead of germinating on the bench. Concentrating the heat and humidity in a small chamber is much more efficient than heating a large greenhouse. A simple germination chamber can be built quite cheaply using marine plywood and/or poly to enclose an area inside the greenhouse

or in the head house. You can always upgrade it later to a fancier model.

☐ Install conductive microclimate bottom heat on the few benches needed for propagation and/or germination that must be done in the greenhouse, and section off this area with a temporary poly wall. The microclimate heating allows you to maintain much cooler air temperatures and heat a much smaller volume of air in the house while maintaining adequate soil and leaf temperatures. A side benefit is less condensation and disease.

☐ Reconsider your materials movement plan to take advantage of the most efficient houses in the coldest months, moving into less efficient houses as spring approaches. Invest in newer heating technologies in these winter houses to maximize your efficiency.

☐ Add a super efficient boiler in line with less efficient boiler(s) to pick up the small partial loads common in greenhouses during the day and warmer nights. The less efficient boilers can then be brought on line at night during the lowest temperatures. This is an innovative way of improving your overall efficiency dramatically without investing in a complete new heating plant. This can also be applied to unit heaters by replacing the first stage of unit heaters with more efficient separated combustion units with induced draft burners.

☐ Examine your crop mix to maximize the advantage of cool growing varieties. Many of the most popular perennials are cool growing and fetch the best prices.

☐ Separate houses into more climate zones using poly barriers to group crops

together into common temperature regimes. This requires some investment into modifying the electrical connections and controls, but the payback can be significant by reducing overall heating requirements and added growing flexibility.

□ Remember that you are in the business of growing beautiful plants, not innovating heating efficiency or developing alternative fuels. Don't turn down the

temperatures a few degrees to reduce your fuel costs at the expense of missing your market window or turning out poor quality. Many growers have found that turning down the temperatures is a very costly alternative.

□ Pray for a mild winter and a bright sunny spring where every weekend is a gardening weekend and everyone decides that this is the year to beautify their homes.

OFA



A PASSION FOR SAFETY

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Recently I read an article in one of the safety magazines I receive each month on what it takes to have a successful Safety Program. The article interviewed several safety directors who worked hard developing successful safety programs, sold senior management on the importance of safety, and got their full commitment in supporting the company's program. At the same time, they interviewed several other safety directors who also worked hard, believed in the importance of safety, but just could not seem to get senior management to buy into the program and get their full commitment. As a result, they were not achieving the same level of success and were very frustrated at the results.

Fortunately, I have always been in the first category. I have been successful in getting senior management to buy into and support the safety program at the companies I have worked. Today, as a consultant, our company has been successful in achieving these same results. I have come to the conclusion that the big difference between the safety professionals who are successful and those who are not is passion. I believe that to be successful in anything, there must be an unrelenting, never-ending passion for success. That passion has to be clearly seen by everyone else, and it has to be transmitted

to other people who, in turn, buy in and support the individual that possesses this passion.

Take a look at the great motivational speakers, the great ministers, generals, coaches, teachers, and business people. They almost all possess a passion for what they do and are

capable of communicating this passion to others and getting others to buy into it and support it. I have met numerous successful business executives during my career, and every one of them has a passion for what they do. I love sitting down and listening to these individuals as they talk about their companies and what they do. You can see the fire, drive, excitement, and love for what they do. It is contagious.

Unfortunately, most management individuals do not see safety as an area that generates passion. All too often, it is considered dull, boring, and mundane. I see it all the time. I conduct seminars and training classes, and it always amazes me when people come up to me afterwards and are genuinely surprised that they enjoyed the program format, found it interesting, and saw value in what they heard. The main reason for this surprise is the passion for safety that I try to bring to every meeting, every seminar, and every training class. Safety does not have to be dull, boring, or mundane. It should be exciting, dynamic, and motivating. After all, a good safety program contributes to the success, growth, and profit of every company that takes it seriously, and at the same time protects the company's most valuable assets. In other words, it's a true win-win situation.

Every successful safety professional that has heard this and has developed a true passion for safety, in turn successfully transmitted the passion to their company's senior management. If safety is going to truly be successful in achieving the above objective, there has to be passion for it. Everyone in the organization has to buy into it, and every employee must see it every day.

Does your company have the passion necessary to make your safety program successful? If not, it probably will never be as successful as it should. Do not assign the safety program to an individual that doesn't believe in it. Seek an individual that has passion for it and can communicate this effectively

WHY YOU SHOULD NEVER, EVER FORGET THE Q_{10} EFFECT

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On the heels of one of the Midwest's more miserable winters, compounded by the incredible heating cost increases, many growers found their crops were not performing as well as they had seen in years past. Despite their usual procedures, techniques, and tricks, things just did not look right. The e-mail below, describing poor crop growth and flowering delays, is but one example of a request for help. It is similar to many that Extension specialists have been addressing all over the country. In the following article, we will discuss this problem, why growers from Minnesota to Georgia have had the same symptoms, and how we can avoid this situation in the future.

Here's what one grower wrote.

March 13, 2001
Dr. Thomas,

And ... on top of that, many of my crops just don't seem to be growing at all, or seem smaller and the flowers are just not right. My ferns have weird, twisty, short, stubby leaves; my lantanas are going absolutely nowhere; and my begonias and impatiens are very late; however, my January and February crops of cyclamen, primula, calendula, and alyssum did great this year. My fertility programs are exactly the same as I used last year. Now,

I did buy different soil from a new vendor, but all my other suppliers are the same as last year. I had to cut back on my night-heating somewhat to save fuel this year; as costs were astronomical! I know my daytime temperatures were also not what they needed to be. I did not use any plant growth inhibitors or herbicides either. How can I get my ferns to start putting out long fronds again? Do you think it might be a gas leak? Should I approach my soil supplier? Should I send you some sample plants? Any Ideas? JBC

JBC's crops are not suffering from gas leaks, plant growth regulators, or even bad soil. They are victims of the Q_{10} effect! Before you put down this article in disgust over the prospect of yet another new science lingo term to learn, you may be interested to know you've been dealing with the Q_{10} effect as a grower all your professional life. The solution to JBC's problem is straightforward once we learn what Q_{10} is and how it works.

Let's start with something we all know about – epoxy glue. As you know, when we mix the resin with the hardener, the two materials interact and form that very tough glue we call epoxy. Have you ever tried to use epoxy outdoors on a cold day? It takes forever for the glue to set up. The

reverse is even more frustrating. Have you ever tried to use epoxy outdoors on a hot day? It reacts so fast you can hardly mix it and get it onto the repair surface before it hardens! That friends, is a perfect example of the Q_{10} effect.

Simply put, the Q_{10} effect is nothing more than a way to describe the observable fact that the warmer or colder the epoxy, the faster or slower the chemical reaction happens. We can actually measure how much faster the reactions go with any known increase in temperature, and in most cases, it is very predictable. That is why we have 5-Minute Epoxy! The chemical company manufactures the two products specifically to set up and bond at room temperature (25°C, 80°F) within five minutes. However, the reaction is much slower (half as fast) in colder rooms (15°C, 60°F) and much faster (twice as fast) in warmer situations (35°C, 95°F).

Technically, the Q_{10} value is the speed by which any chemical reaction rate increases or decreases when subjected to a 10°C temperature change. Some chemical reactions, and most biological reactions, proceed twice as fast when temperature is increased by 10°C. They have a Q_{10} value of 2.0 (the reaction rate is doubled). If a reaction rate triples when temperature is increased by 10°C, it has a Q_{10} value of 3.0 and so forth. The rate of some systems may only increase one and a half times, which is a

Q_{10} value of 1.5. Each chemical reaction has its own value, and there are books that publish entire lists of Q_{10} values for most chemical reactions.

Bottom Line #1.

Knowledgeable glue handlers use a hair dryer to raise the epoxy glue temperature (once mixed) when outdoors in the cold and to speed things up, or they pre-chill the epoxy in the refrigerator prior to using it outdoors in the heat, to slow things down. You're probably starting to wonder how we are going to tie skillful glue application and greenhouse profits together? We're getting to that ...

So far, we've learned that when temperatures go up, reactions go faster; and when temperatures go down, reactions go slower. What's important is to remember that temperature does not affect life in a linear fashion. Sometimes you get twice or three times the effect you expect! This is incredibly important when growing plants.

THE Q_{10} EFFECT WORKS IN PLANTS, TOO!

Every grower needs to know and record the temperature range each plant species grows best at, prior to growing the crop. As you may already know, cyclamen and primula evolved in a moderately cool, moist climate, and grow best in cool soils. It turns out that after millions of years, all of their chemical reactions, enzymes and cellular goings-on now work best in the range of five degrees above or below

15°C (60°F). Photosynthesis, respiration, and growth are well balanced in that narrow temperature range centered around 15°C. To a primula or cyclamen, those cool nights are just perfect (see Figure 1 below.) Are the ferns just as happy? NO! Fern's evolutionary journey took place in warmer climates, and enzymatic reactions that fuel normal fern growth proceed at higher temperatures. In the hubbub of turning great Cyclamen and Primula crops, while keeping your heating bill from eating up all your profits, you've inadvertently thrown your poor ferns on a new evolutionary path – one that may make them fit for the Arctic (or the dumpster, more likely)!

For a mental exercise, what will happen if we raise the night temperature from 15°C to 25°C? Yes, we know that it's silly thing to do with cyclamen or primula, as it will cause stems and flower peduncles to stretch, leaves to turn yellow, flowers to fade, shelf life to shorten, and you could lose the crop. But what causes such changes? The answer lies in a high-school biology text-

book and it has to do with the two fundamental processes of respiration and photosynthesis, the Yin and Yang of plant life.

Respiration creates cellular energy by using sugars and other metabolic products and releases carbon dioxide. Respiration releases chemical energy by breaking up the sugar molecules and using the energy stored in the chemical bonds. This energy runs the rest of the chemical reactions that result in plant growth. For example, let's look at a short "shopping list" for materials needed to produce a new leaf: cellulose for cell walls, pectins to hold cells together, proteins for chloroplasts, chlorophylls for photosynthesis, and energy. The respiration enzymes go to work and starch, fats, and oils are broken down to simpler molecules to provide building blocks for the new leaf tissues. Once the simpler molecules are available, other enzymes get busy linking them into more and more complex molecules and structures, until a new leaf is born. "Luxury" items, such as anthocyanin and carotenoid pigments, which

make flower and leaf color more intense and attractive, are produced with abundance of sugars.

In addition to putting energy into growing, the plant also needs fuel to keep existing leaves, stems, and roots in working order. This is called maintenance respiration. If the plant does not have enough stored sugars to build new leaves and roots, all energy will be used for maintaining what plant mass it already has. As you've surmised, respiration is a 24-hour job with no holidays or vacations!

The other side of the energy equation is photosynthesis. Photosynthesis is the true marvel of life. It takes energy from the sun and carbon dioxide from the air, and creates complex molecules such as sugars and amino acids that are necessary for plant growth. And just as a byproduct, it also makes oxygen, which allows us to breathe! Plants store the energy of the sun in the chemical bonds of sugars and other molecules.

You are now convinced that without plants we wouldn't make it for very

long. Our physiology runs on the same chemical fuel plants use. The only trouble is, photosynthesis only occurs when light is around. (Plants can use artificial light but we'll concentrate on the sunlight for now.) To stay alive, the plant must make more sugars during the day than it uses up at night. When all goes well and everything is in balance, at the end of the day there's still some sugar left to make new cells and grow. If things get out of balance, the plant can starve and even die.

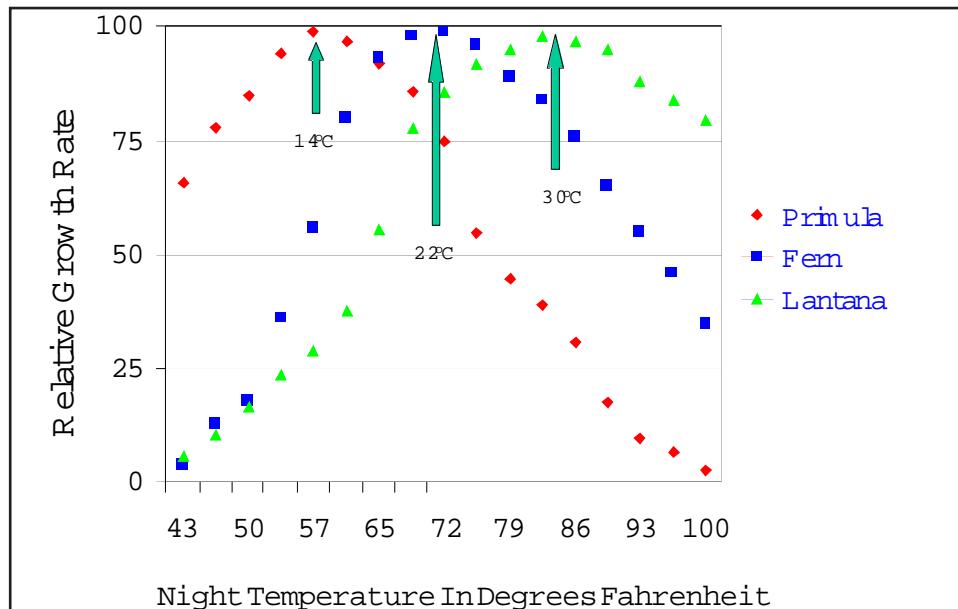
Now, what happens if we intentionally upset that balance, like when we raise the night temperature by 10°C? The respiration reactions at night would likely use up twice as much sugar than normal, and, unless we doubled photosynthesis somehow, the plant might be starving for sugars by the next morning. The plant would fall back on using stored sugars.

To make things worse, low temperatures adversely affect plant membranes, making them less fluid. In the morning when sunlight strikes the leaves, photosynthesis is slow to start because of this decrease in fluidity. One night of low temperatures may not be detrimental to the overall plant health, but what of several nights or even weeks? The plant will be relying more and more on stored reserves until they are depleted.

The one solution for the plant is to make more leaves that would photosynthesize and make sugars. But since sugars are being used for maintenance respiration, producing new leaves is not on the top of the plant's to-do list. And slowly but surely the plant will fall into a downward spiral of failing

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Figure 1.



WHY YOU SHOULD NEVER, EVER FORGET THE Q_{10} EFFECT

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health. It is then that we would see dying leaves and roots, poor growth, and prematurely aging flowers. This may happen many, many days after we set the wrong night temperature. In fact, both higher-than-normal, and lower-than-normal night temperatures can take weeks to affect a crop, depending on how well the plant is stocked up on sugars. So those Cyclamen might actually look rough 8 to 10 weeks after we set the wrong temperature! Most growers miss the connection because of the slow development of the symptoms. This scenario was only for exercise purposes and we don't advise anybody to grow primulas at 25°C nights.

Let us draw another example, this time a not-so-hypothetical scenario for ferns. We want to know what would happen to a Boston fern if we drop the night temperature by 10°C to save heating fuel and money? We know a few growers around the country who did exactly that this spring. Using our newly acquired knowledge, we reason that respiration may drop by as much as half, and the plant may not use nearly as much sugar during night respiration. However, low temperatures will also inhibit the maintenance respiration, which is vital for normal growth and development. It all goes back to the balance and evolution. Ferns grow best at a night temperature of 22°C (72°F, see Figure 1). Given the fern's metabolism is predisposed to work at a higher temperature, chilling down to 50°F nights is a staggering change for ferns to accommodate.

If the Q_{10} effect holds, 10°C (a 50°F night temperature) would drop metabolism by a factor of 4.0. Temperatures that are too low slow down chemical reactions so not enough energy is derived from stored sugars, and temperatures that are too high result in wasteful consumption of stored sugars. In addition to not liking low temperatures, ferns don't have fleshy roots to store lots of sugars. All cellular reactions are balanced when ferns are growing in warm, humid nights and warmer, humid days with sufficient diffuse sunshine. When the soil temperature drops below 15°C, fern growth slows or stops, leaves become erratically shaped and do not extend or form the pinnae normally. In a few weeks the new growth on the fern looks ghastly. Even if you raise the temperature, it takes a few weeks for the plant to return to its normal growth rate. It took five weeks for samples of chilled ferns collected from Virginia, Tennessee, and Georgia to recover in the warm and sunny University of Georgia greenhouses this spring. Soil temperatures in fuel-efficient greenhouses around the months of January and February had apparently dropped into the low 50°F and had stayed that way for weeks.

Hopefully you are once again convinced that growing ferns at night temperatures preferred by cyclamen is not likely to produce a healthy Boston fern crop. Lowering night temperatures on ferns to save money will affect fern growth adversely. Common sense dictates that growing ferns

and cyclamen in the same house is not a good idea. Each plant has a very narrow temperature range at which it grows best. Each plant has developed a delicate balance of reaction rates within that narrow temperature range. The farther outside of that narrow range you grow your crop, the greater the Q_{10} effect will be and the more your crops will suffer.

You cannot fool Mother Nature, even if the gas company is charging you more. Organize your crops by low and high temperature needs so you can run entire houses at the most efficient temperature ranges. Review the minimum and maximum temperatures for each crop, which are published in the many readily available books, and certainly in the many OFAS "Tips on Growing..." series! Despite the high fuel costs, if you wish to sell a good quality crop, you must not exceed any of your plants low or high temperature range limits. If you do, expect crop delays, smaller plants, fewer flowers, stretching, leaf loss, leaf malformation, increased disease, and much greater than normal amount of variability.

Bottom Line # 2. Don't lower your night temperatures excessively. Raise your asking price incrementally!

OTHER Q_{10} EFFECTS TO AVOID

Cold Water Spots: If you ever watered African violets with very cold water, you have quickly found out that this was not a smart thing to do, and you caused your plants to develop unsightly leaf spots. The Q_{10} effect is the culprit. It turns out that chlorophyll is synthesized and broken down very rapidly in the leaf. A chlorophyll molecule may only last 30 minutes in a warm leaf before it is degraded and

resynthesized. Cold water, as you now know, rapidly shuts down chemical reactions in the leaf. One of the results is that those chilled cells stop making chlorophyll, and on top of that, the existing chlorophyll is rapidly degraded once the cell warms up again. The cells appear to clear as no new chlorophyll is produced. Other cellular activities suffer as well and spotted leaves rarely recover and turn solid green again. This is one case where the Q_{10} effect can be seen within 24 hours.

Perennial Dieback In Summer: Daylilies and many other perennials grown in nursery cans tend to grow very poorly during periods of prolonged heat. We're talking of an average mid-day temperature around 37°C, or 98°F, for two or more weeks. Landscapers in the South know how important mulch and mid-morning watering are to keeping soil temperatures down. Nursery pots, on the other hand, are rarely mulched, are usually black, and irrigation is sometimes only provided by drip tube. Predictably, as heat builds up in the pot and holds into the night, respiration increases significantly and sugars and amino acids are used up. Daylilies' leaves turn yellow and sometimes die. Whole plants that are without large storage roots may die, even if watered when needed. Growers in the South now use large shade structures to reduce heat buildup, and time their overhead misting (irrigation for short intervals) to cool pots, while still allowing them to dry before evening.

PRACTICAL APPLICATIONS FOR THE Q_{10} EFFECT

As we mentioned in the beginning of this article, you have likely been manipulating the Q_{10} effect for years

and hadn't realized it. Here are just a few standard greenhouse practices that utilize manipulation of temperature to control plant growth.

Decreasing Night Temperatures is Used to:

Improve Flower Color.

Assuming you don't live in the deep South, you may have noticed that as temperatures cool in late summer, bedding plant color intensifies. You also may have noticed petunias fade and salvias get shabby after long periods of heat. The reverse is true in fall. We can recall particular September week-ends in Chicago when the flower color was intense and near picture perfect, only to be destroyed by frost the next week. Here again, the soil temperatures are cooling off, allowing for more energy to be put into leaf and flower pigments. Many growers often cool down their greenhouse in the last stages of the crop cycle to intensify color. This is a common practice for poinsettias and pansies. If your local conditions permit, letting night temperatures drop a few degrees after the first blooms appear can also tone up bedding plants – just be careful to drop temperatures just a few degrees!

Slow Down Easter Lilies.

A perfect Easter lily crop depends on a carefully managed correlation of growth and temperature. Timing of the flowers is everything. Placing Easter lilies in a dark cooler at 35°F effectively slows plant respiration and growth. Happily, Easter lilies tolerate such temperatures, as they evolved in a cool climate. The Q_{10} effect works in our favor because the lilies are then much cooler than their preferred growing temperature. This equates to a plant growing at 25 percent of its normal rate. A grower can hold the plants

in suspended animation for almost 20 days this way. Growers in the South move the lilies mid and late season, to coolers for several days to slow them down. It's labor intensive, but when it's 98°F in the greenhouse in mid-March, what else are you going to do?

Increasing Night Temperature is Used to:

Speed Up Mum

Flowering. This is a common practice performed when a crop is late. Most mum growers know there is a fine line between warming things up and increasing maturation rate, and warming things up too far. Warmer night and day temperatures increase the speed of all enzymatic reactions that use cellular energy and result in plant growth. Flower development also speeds up, but so does sugar utilization. The downfall is that if a grower goes too far, too much sugar is used up to speed up the flowering. If so, overall mum quality and shelf life are reduced. Manipulating the Q_{10} effect by increasing temperature is very tricky, and should be done with great care and much scouting.

Control Stem Stretch.

Stem growth is a biological process involving hundreds of enzymes, plant organelles, and biochemical pathways. One key pathway is the biosynthesis of gibberellin, a hormone involved in cell elongation and growth. Anything that affects gibberellin synthesis should affect cell elongation and stem stretch. DIF is yet another tool we use that involves taking advantage of the fact that biochemical reactions adhere to the Q_{10} effect (for a brush-up on DIF and its applications, see *OFA Bulletin* No. 858, May 2001.)

What John Erwin and Royal Hems elucidated in



their research is that even relatively short, properly-timed changes in the temperature can significantly affect metabolic rates in plant tissues, and, as is hypothesized in the case of gibberellin biosynthesis, strongly affect the key systems involved in cell elongation. In terms of crops production, this was no small discovery.

The research mapped out that plant stems seem to elongate in the later stages of the night, in the hours just before morning. By applying the Q_{10} effect by dropping temperatures in those pre-dawn hours, the rate of metabolism is slowed, and plants can be efficiently shortened. It has yet to be proven, but the theory says that this pre-dawn period may also be the primary time for synthesis of gibberellin, in advance of the ensuing day's growth. DIF is also involved with the very complex "phytochrome system" which controls numerous plant functions and which perhaps we'll talk about in a future *OFA Bulletin*. Still, it's the Q_{10} effect that makes it all work at the cellular level and is a very powerful, environmentally-sound tool.

Not surprisingly, the greater the temperature decrease each morning, the faster the drop in temperature, and the more closely the temperature drop is timed to the sensitive stage of the plant, the more intense the growth reduction effect. Also not surprising is that many growers found that if they dropped

the temperature down too far, thus exceeding the "comfort" range of the plant, new growth was stunted, leaves were slightly abnormal, with some leaf yellowing, and bloom delays were observed. This was especially true during important stages of growth such as bud initiation in poinsettias. Recommendations given nowadays are that one should apply negative DIF carefully, slowly, and consistently over many days. The recommended temperature range is no more than a 7°F to 10°F difference, which is a 5°C reduction. This is classic advice for anyone attempting to manipulate growth using the Q_{10} effect as a management tool.

This brings us back to JBC's problem, dropping the night temperature too far, at the wrong time, to save money. Growers who lowered greenhouse night temperatures this past winter experienced first hand what a potent factor in plant growth the Q_{10} effect is. Hopefully, they also learned to respect it and use it to their advantage. With graphical tracking of growth and greenhouse temperature, a grower can truly grow a crop to a very precise size. When you are comfortable with the concept, controlling growth via management of greenhouse temperature will become an art form to be admired, rather than just a recipe to be followed.

Remember the Q_{10} effect. That term, and the relationship behind it, can save you a significant amount of money.

OFA

OFA ANNOUNCES NEW BOARD OF DIRECTORS MEMBERS

The Ohio Florists' Association announced at its July 15 annual meeting that for the next two years, the Association will run under the leadership of newly-elected President, **Joe Boarini**, owner of Grande Greenhouse in Indianapolis, Indiana. Boarini is the second OFA President from outside of Ohio to be elected to the position. He takes the presidential position after having served as the Association's vice president since 1999.

Kathleen Benken of HJ Benken Inc., Cincinnati, Ohio, was elected as Vice President of OFA. Benken has served as the OFA Board Ohio Retail Florist Director for the last three years. She is the first woman to be elected as the Association's vice president.

In addition, five Directors have been elected to the Board.

Jerry Dill, of Dill's Greenhouse in Groveport, Ohio, was elected to the Ohio Grower Director position.

Kirsten Molbak, Mercer Island, Washington was elected to the Garden Center At-Large position. She is a Director for Molbak's™.

Bill Swanekamp, Kube-Pak Corp in Allentown, New Jersey and **Lawrence Wenke**, Wenke Greenhouses, Kalamazoo, Michigan, were elected to fill the two Grower At-Large directorships.

OFA ALEX LAURIE AWARD WINNERS ANNOUNCED

Kimberly A. Williams, Kansas State University, and **Paul V. Nelson** and **Dean Hesterberg**, both of North Carolina State University, were named co-recipients of the Ohio Florists' Association's Alex Laurie Award.

The Alex Laurie Award is presented by the Ohio Florists' Association to the author(s) of the most outstanding floriculture research paper published in *HortScience*, *HortTechnology*, or the *Journal of the American Society for Horticultural Science* during a calendar year.

During OFA's business meeting, the researchers each were awarded plaques, a \$1,000 cash award, and an invitation to participate on the 2002 Short Course program.

This award was established in honor of the late Alex Laurie.

NEW OFAS BOOKS & SHORT COURSE SEMINAR TAPES

See page 4 of this *Bulletin* for the announcement of two new books available from OFAS. Look inside the next *Bulletin* for an updated brochure and order form with all the OFAS books.

Check out the insert in this *Bulletin* to order educational tapes from the 2001 Short Course seminars.



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