OFA Bulletin

The Information Source for the Floriculture Industry Since 1929

OFA – an Association of Floriculture Professionals

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Spring Bedding Plant and Plug Production: Pest Management

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Bedding plant and plug production season is always a busy time of year as greenhouse managers concentrate on growing and selling the crop. During these times, pest management is generally not a top priority. However, by incorporating pest management into the daily schedule, greenhouse managers will have a better handle on the insect and mite pests attacking bedding plants and plugs – thus avoiding having to deal with high insect and mite populations later.

The key insect and mite pests of bedding plants and plugs are aphids, thrips, fungus gnats, shoreflies, whiteflies, and spider mites. This article will focus specifically on the primary insect pests that are generally a problem in the production of bedding plants and plugs. This includes aphids, thrips (Western flower thrips), fungus gnats, shoreflies, and whiteflies. In addition, this article will highlight specific management strategies that are useful in avoiding problems with these insect pests.

APHIDS

Aphids are approximately 1/25- to 1/10-inch long, soft-bodied insects that possess tubes on the ends of their abdomen (hind-end). They vary in color from green, black, yellow, to pink. Aphids do not have to mate to reproduce, and each young female aphid nymph has the potential to produce 100 offspring (young).

Because of their rapid reproductive ability, they can create tremendous population explosions within a short period of time, which results in aphids spreading quickly among bedding plants and plugs. This will occur more rapidly if plants are spaced close together.

Aphids use their piercing-sucking mouthparts to

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MAGIC: CUSTOMER SERVICE MAKES MONEY

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Editor's Note: *Bill McCurry presented a session at the 2002 Short Course called "Good Shop/Bad Shop: The Art of Customer Service." McCurry and Gary Hudson, Hudson Associates, collaborated on research for the presentation. The following is Part I of a series of articles based on their research findings.*

Picture seeing a billboard that reads, "How Mad Is She? We Can Help!" Witness the magic of win-win customer service. The customer comes to the florist with a problem. The florist solves it. Here come the profits! If the florist rushes through a transaction, the customer's problem isn't always *identified* or *solved*, and the florist loses not only the profit from a potential sale, but also loses valuable repeat and referral business. My research for the 2002 OFA Short Course showed the most common "customer service" question asked by florists was, "How much do you intend to spend?" Asking customers the

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ANUARY / FEBRUARY 2003

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OFA Mission Statement

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

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OFA BULLETIN

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NUMBER 876

WE'RE WORKING WITH YOU AND FOR YOU

Michelle Gaston
OFA Bulletin Editor
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Greetings. We hope that you found many of the articles in the 2002 *Bulletin* issues to be very beneficial. OFA is all about education, and we dedicate a lot of time and energy to making sure the *Bulletin* includes timely topics that will assist you and your business.

First, I want to provide a little background, and then I have the pleasure of updating you on the exciting things that are going to be happening in the OFA publications/communications department this year.

OFA – AN ASSOCIATION OF FLORICULTURE PROFESSIONALS

You have probably read somewhere, either from OFA or in an industry magazine, that the Ohio Florists' Association is pursuing a new image. We are stepping into the 21st century. At the 2002 Short Course, the Association's Board of Directors voted to "re-brand" the Ohio Florists' Association's external image to "OFA – an Association of Floriculture Professionals."

The re-branding is intended to more accurately reflect the national scope of our professional floriculture membership. Currently, 77 percent of OFA's members are from outside Ohio and represent all aspects of the floriculture industry. The new branding should open new educational and marketing opportunities for OFA.

The re-branding decision also gave OFA the opportunity to recommit itself to a mission of providing the best in continuing education and professional development for those dedicated to a career in floriculture. In order to meet your educational and professional needs, we are revamping some of OFA's programs and member benefits. The intent is to better meet the needs of our current members and plan for the needs of future OFA members.

ELECTRONIC COMMUNICATION

By re-allocating resources, we will be able to invest in upgrading OFA's web site and electronic communications. We are still very much in the planning stages of our upgrades, but a few items include:

Implementing links from *Bulletin* articles to OFA's web site. These links will provide additional information and pictures on the topic. For those of you not using the Internet yet, in this issue on page 6 we have included a very basic article about what you need to know to get started.

A more interactive web site. Our dream is to have all our members opening their browsers each day to www.ofa.org and then using our site as the springboard to the Internet.

Electronic newsletters. These will serve to supplement the printed *Bulletin* and keep you up-to-date on OFA activities.

WWW.OFA.ORG

Check out our web site today and see what we do have to offer you. Currently, the web site provides you a great opportunity to get to know OFA better. Did you know that there is a "Members Only" section? Access to this area is in the lower left-hand corner of the opening page. You can enter this section by typing in your membership identification number (located on your membership card and *Bulletin* label) and your password which is the first letter of your first name and then your last name (mine, for example, would be mgaston).

In this section, among other things, you can view *OFA Bulletin* issues and easily locate fellow OFA members by name, company, and city. Hopefully you will find this information a benefit to your OFA membership.

Please help us by checking to see if all the information on your membership record is correct. More importantly, in order for us to begin sending electronic communications to you to enhance your membership, please be sure that we have your current e-mail address.

THE *OFA BULLETIN*

One of the projects we are fine-tuning is the *OFA Bulletin*. At OFA's fall meetings, several committees recommended, and the Board approved, to publish the *Bulletin* on a bi-monthly basis. This allows us to not only enhance the size and look of the *Bulletin*, but also make the investments previously described.

The "new" *Bulletin*, printed every other month, will expand from 16 to 24 pages of the type of articles that you've come to expect from OFA. We also plan to add additional articles, providing a wider variety of floriculture topics in each issue.

We've recently added an OFA calendar listing and other OFA announcements to each *Bulletin*. We will continue to do this throughout the year to keep you up-to-date on OFA's activities.

We're excited that we'll be able to debut our new logo soon. Within the next couple of issues, we plan to update the entire layout of the *Bulletin* with a fresh new look.

THE PUBLICATIONS COMMITTEE

The OFA publications committee meets at least once a year to provide guidance by planning and critiquing OFA's publications. Those dedicated committee members are Bridget Behe, Kathy Benken, Ali Cybulski, David Hale, Susan Hamilton, Debbie Hamrick, Nona Koivula, David Kuack, Delilah Onofrey, Josh Schneider, David Schuster, and Kim Williams. These committee members represent all segments of the floriculture industry.

We hope that you will be pleased with the enhancements we are implementing to make your OFA membership even more beneficial to you and your business. If at anytime during the year you have suggestions for the *Bulletin* or other OFA publications, please contact us at ofa@ofa.org, phone: 614-487-1117 or fax: 614-487-1216. **OFA**

A note from the American Floral Endowment

Dear OFA Member:

It has been several months since the OFA Short Course and the first fund-raising activities for the Paul Ecke, Jr. Fellowship Fund. With the help of fellow industry leaders like you, we are hopeful of reaching our goal of raising $1M to be distributed through a scholarship program at the Endowment to individuals interested in pursuing a Masters or Ph.D. in floriculture or a closely related field.

The kick-off dinner at the Short Course started the campaign, and I am happy to report to you that the total amount raised for the fund to date is approaching $250,000. In an attempt to reach our goal, we are asking for your pledge.

Paul Ecke, Jr. was a friend to many people throughout the industry and across the world. His personal quest to provide educational opportunities to young people helping to attract the "Best and the Brightest" individuals to our industry, as well as his efforts to advance research, will not be forgotten but has made a life-long impression in the floriculture industry!

Please contact Steve Martinez at the Endowment office to obtain a pledge card. He may be reached at phone: 618-692-0045, fax: 618-692-4045, or afe@endowment.org. Join us in continuing Paul's legacy.

Sincerely,

Jim Leider, American Floral Endowment Board Member and Ecke Fellowship Fund Committee Chair

How to Determine When to Irrigate Automatically

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Water management is generally considered the most important aspect of plant production. Irrigation water replenishes physiological water requirements for photosynthesis and cell growth, acts as the delivery medium for fertilizer and pesticide, and provides supplemental cooling. Precise control of water delivery to crops optimizes production quality, while minimizing inputs to and discharges out of the system. Overwatering crops is not only inefficient in terms of water use, but it also leads to higher expenses in pumping energy and treatments required for pest management caused by damp conditions.

Watering is an important part of integrated pest management strategy to prevent diseases. By controlling the amount of water in the root zone and canopy surface, it is possible to reduce fungal spore mobility and spore germination rate. For example, reducing root zone moisture saturation duration is an effective method to reduce root diseases such as Pythium root rot. By keeping the plant canopy surface dry, it is possible to reduce fungal diseases such as powdery mildew and Botrytis – which are two of the most common diseases in the greenhouse.

Fertigation (irrigation with nutrient solutions) is a common practice in greenhouse operation; however, excessive fertigation leads to cultural problems as well as environmental concerns. Salt buildup in the root zone, especially for long-term crops, can damage root systems. Although leaching to wash out extra salt in the root zone is a common practice, it requires extra labor, water, and handling of nutrient-rich drainage. Chemical discharge from overfertigation into the environment is a serious social concern in most developed countries. Environmental regulations that demand zero run-off from greenhouse operations provide an extra incentive for tightly controlled fertigation operations. Efficient irrigation management can significantly reduce plant production costs.

Using water to suppress plant height is another technique used for chemical-free plant growth regulation. Experienced growers can judge a plant's water status visually: light soil surface color, dull leaf color, or slight wilting of the canopy are indicators that watering is needed. A small amount of water is then supplied to keep plants from further dehydration, yet not enough for cell growth.

The method is scientifically sound and can be effectively applied. The approach is very labor intensive, however, and can only be done by the most experienced growers. It is desirable to have an objective methodology to determine how much and when to water to automate the irrigation decision process.

Sensing technologies are being used for greenhouse irrigation management. A number of sensors are available for assessing water supply, demand, and even a plant's response to water directly. A tensiometer is an instrument designed for measuring soil water tension. A pyrometer measures total solar radiation. Temperature and relative humidity information are the bases of vapor pressure deficit (VPD) calculation. An infrared thermometer can be used to measure plant canopy temperature as an indicator that irrigation is needed based on a plant's water status directly. Figure 1 shows irrigation decisions can be made based on 1) aerial environment water demand, 2) root zone water supply, and 3) the balance between demand and supply.

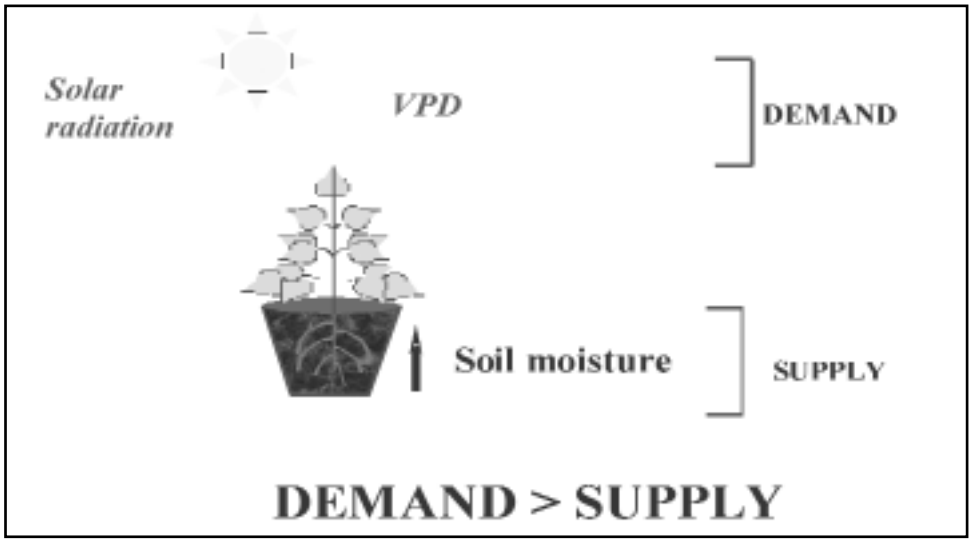

Figure 1. Irrigation decisions are most commonly made by judging soil moistness (supply), and temperature and humidity of air (demand) in greenhouses. A precise irrigation decision is best made by considering the balance between demand and supply of water in plants. Watering may not be necessary in low-demand situations, even though soil moisture level is low.

Growers water more under sunny, dry conditions than cloudy, humid conditions. Using sensors to measure total solar radiation and VPD for irrigation, on the other hand, is an approach that helps growers make irrigation decisions based on more precise and objective environmental data. An automated irrigation system can trigger irrigation events as soon as total solar radiation or VPD over time exceeds grower-specified threshold values. Adjustment of how much to water is a reflection of environmental demands on water usage by plants.

Evapotranspiration (ET) calculation is a more comprehensive, accurate approach for estimating plant water usage than the previous approaches. In addition to solar radiation and VPD information, more plant-related information such as how many leaf layers a typical crop has (indicated by leaf area index (LAI)) and the difference between high-light and low-light plants (indicated by stomatal resistance) are taken into account for plant water usage estimates. Irrigation management strategy of this type is available using advanced computer-based environmental control packages. Growers do have options to select crop-specific characteristics to maximize their irrigation effectiveness and efficiency.

A tensiometer measures how much water is available to plants by measuring water tension in growing media. Higher tension indicates plants will have to work harder to extract water from the growing media. Tensiometers are commercially available for plant production of row crops or potted plants that have a container size no smaller than 4 inches. To use it properly, a tensiometer has to be inserted into the root zone in a single motion to ensure a tight interface between the sensing tip and the growing media. Wiggling of the sensor in the root zone may create undesirable air pockets between the sensor and its surrounding media that would cause an erroneous reading. Tension of the growing media can be read from a dial indicator to help growers make irrigation decisions. Some models do have electrical outputs that can be connected to electrical relays to turn on or off irrigation pumps for automated irrigation. The irrigation decision is based on available water supply in the root zone.

Using an infrared thermometer to measure plant canopy temperature to determine if plants need water is a relatively new concept. The idea behind measuring canopy temperature is that while sun heats plants, transpiration is a major cooling mechanism to help plants to keep themselves cool. Just like misting is used in greenhouses to cool air, plants transpire to release water to cool the plant canopy. As water becomes limited transpiration decreases, canopy temperature rises as a result of lower transpiration.

Therefore, a warmer canopy temperature could be used as an indicator for early drought stress detection. This approach helps one make irrigation decisions based on plant canopy temperatures in response to the balance of water demand and supply.

The horticultural engineering program at The Ohio State University has a long history of developing the ET model for irrigation management of greenhouse crops. Recently, with funding support from The Floriculture Industry Research & Scholarship Trust (FIRST) and the Ohio Agricultural Research and Development Center, a portable irrigation management system for greenhouse plant production was developed. The system uses non-contact sensing technology such as infrared thermometry to measure canopy temperature as an indication of plant water status. The system was evaluated and performed well for automated irrigation in New Guinea impatien production. The system also was found effective for suppressing plant height by imposing mild drought stress to the plants automatically. **OFA**

HOW TO USE A WALL OF VALUE

***John Stanley**, John Stanley Associates, info@johnstanley.cc*

The "wall of value" concept is used in a number of mass merchandise stores, and it is a great way of getting a price value strategy across. Most stores mail out a flier promoting a wide range of products sold on price. Once customers arrive at the store, they will find the wall of value at the rear of the store with the promoted products lined up next to each other.

1. Ensure only wall products are promoted in the flier.

To make the concept acceptable to the buying public, it is important that the fliers promote only those products on the wall of value, and the wall must contain only those products advertised on the leaflet.

2. Locate more profitable products on the way to the wall.

Make sure customers, on the way to the wall of value, pass similar products which have a higher gross profit. This is the real key to success, for the aim is not to sell from the wall, but to offer a more profitable substitute for the store on the way to the wall.

3. Make the wall of value work.

Keep in mind the following points:

• The "wall" is a true description. Products literally cover the wall, and a typical display of one product may be as wide as 9 feet and stacked up to the ceiling.

• It is important the wall is kept full of products to give the impression it is providing value.

• If customers prefer the wall products to the ones on the way to the wall, then you still have the opportunity to increase your sales as they leave the store.

The above is an article from John Stanley's book *Just About Everything a Retail Manager Needs to Know*. You may visit his web site at www.johnstanley.cc. **OFA**

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INTERNET 101

Okay, so everyone but you is talking about the Internet and spending countless hours each day sending e-mail messages. Don't worry, there's still hope. It's never too late to jump on board the "Information Superhighway," and this article will help you learn how.

Actually, you're not alone. Many OFA members are still not connected to the Internet. They may not have Internet access, or a web site, or even a computer in their business. Lucky for you, getting connected is not only easier nowadays, it's also better than it was just a few years ago.

So before we talk about what you need to "get connected," let's take a quick look at the Internet, including a brief history about how it all began.

WHAT IS THE INTERNET AND WHERE DID IT COME FROM?

Did you know that the Internet has been around since the mid-1960s? It actually took root during the Cold War out of a need to develop a solid-state, bomb-proof communications system for the United States military. The concept was to decentralize information processing by developing a network of computers linked throughout the country. Thus, if one or more locations were attacked, the remaining computers could keep the network running.

At first, only government "think tanks" and large universities were linked, and the Internet served as an emergency military communication systems. The operation was coordinated by the Department of Defense's Advanced Research Project Agency (ARPA) and was referred to as ARPANET.

Over time, the Internet transformed from a military pipeline to a communication and research tool for scientists and scholars. For most of the 1970s and 1980s, the Internet was nothing more than a cryptic system of interconnected computers. To use it, you would have to enter text commands; there was no "user-friendly" interface.

The 1980s brought the advent of the personal computer (PC). More and more businesses and individuals were becoming computer literate. As the general public began using computers, two key companies locked onto the idea of making computers easier to use: Apple and Microsoft.

Apple's Macintosh® computer system, released in 1984, was the first mass-produced system to offer a "user-friendly" visual interface. Then Microsoft followed suit just a few years later with the Windows® operating system.

With computers becoming easier to use and more people using them, it was just a matter of time before people would want to connect to the Internet – in particular, those at colleges and universities who were already using large mainframe computers to connect.

WHAT'S THE DIFFERENCE BETWEEN THE "WEB" AND THE "INTERNET"?

Think of the World Wide Web (WWW) as the *illustrated* version of the Internet. It began in the late 1980s, when physicist Dr. Berners-Lee wrote a small computer program for his own personal use. This program allowed pages within his computer to be linked together using keywords. It soon became possible to link documents in different computers, as long as they were connected to the Internet. The document formatting language used to link documents is called HyperText Markup Language (HTML).

The Web remained primarily text based until 1992. That year, Marc Andreesen developed a new computer program called the NCSA Mosaic (National Center for Supercomputing Applications at the University of Illinois) and gave it away! The NCSA Mosaic was the first web browser. The browser made it easier to access the different website pages that had started to appear. Soon, people around the world were sharing documents and adding millions of new pages each day.

By the early 1990s, the growth of websites and pages on the Internet was remarkable. But what really brought mainstream America onto the Internet was a host of new programs and online services that made it easy and affordable to get connected.

LET'S GET CONNECTED!

So now that you have a little background on the Internet, let's review how to get connected. I often find metaphors helpful to illustrate a new or complex topic, so I'll use one here to help you make sense of everything. For purposes of this discussion, I'll assume that you already have a personal computer. If you do not, the folks at Dell and Gateway are standing by to help!

You can think of the **Internet**, literally, as a highway. It's truly an *information* highway that connects computers around the world. The roads of this highway are comprised of communication lines that run underground, aboveground, and through the air. Many of them are the same ones used to provide telephone or cable television service. And, just like highways, some can handle more traffic than others – allowing you to travel faster.

In order for you to get connected to this highway, you need to find the nearest **on-ramp**. (At this point I should mention that our highway isn't a "freeway" – rather, it's a toll road.) The on-ramp is synonymous with the term "Internet Service Provider," or ISP for short. You need to have someone provide you with a means for getting on the Internet, and an ISP does precisely that.

Put simply, an ISP provides the communication line that connects your personal computer to the Internet. This is typically either a phone line, cable line, or satellite connection. And, as you might imagine, your local telephone and cable service providers are eager to help you get connected.

So what are the pros and cons of each type of connection? See Table 1 for a snapshot.

Which ISP you choose depends on your preference, budget, and product availability. If you're on a super-tight budget and plan to use the Internet for personal or occasional use, dial-up access may be the choice to begin with, even though it is the slowest and most tedious means of connecting.

If you plan to use the Internet for business, DSL or cable access would be a better alternative. DSL is typically as expensive, with roughly the same speed. But our experience has biased us toward cable access, because of its excellent track record of reliability. You may not have to weigh each of these options, because many areas still do not have cable modem access. Call your cable or satellite television provider to find out.

Now back to our metaphor.

Once you've picked the right "on-ramp" to get on the information superhighway, now you need a **vehicle** to make the journey. In this case, our vehicle is the software program that you use on your computer to travel from point to point. This program is called a **web browser**. The good news is that web browsers are free and are typically preinstalled on your computer. The top three web browsers are: Microsoft Internet Explorer®, also referred to as simply "IE"; Netscape Navigator®, typically referred to as "Netscape"; and America Online®, which has a built-in web browser software.

When you sign-up for the America Online® service, they provide their own proprietary software and also serve as your ISP (they provide the connection). This is one reason why their popularity exploded in the 1990s. For all other services, you had to first purchase the monthly Internet connection and then assemble the software necessary to connect to and browse the Internet.

OFA

But we've come a long way. Now you can purchase an Internet connection, and all the software that you need comes installed on your system. That includes web browsing software as well as e-mail software. So before we end our journey, let's talk briefly about e-mail.

HOW DO I SEND AND RECEIVE EMAIL?

You can send and receive electronic mail using the Internet. Much like a web browser, e-mail software is free and typically preinstalled on your computer. When you sign-up for internet service from an ISP, they will give you an e-mail box that is stored on one of their computer systems (a.k.a. "mail servers").

Other people can send mail to you even when you are not connected, because your mailbox at your ISP is always online. Think of it like having a post office box. While you are "away," mail collects in your post office box. Then, at your convenience, you can pick up the mail at any time. This is precisely how your e-mail works. When you sit down at your computer and connect to the Internet, you use an e-mail program to check your online post office box. If new messages are present, the e-mail software downloads the messages to your computer. You can then read and respond to the messages using the e-mail software on your computer. It's that simple!

Remember, it wasn't easy the first time you got behind the wheel of a vehicle, so don't expect to master the Internet, web browsing, and e-mail all at once. But it's a great view, so enjoy the drive.

Lisa is vice president of marketing at TCS Software Inc., a software and web site development company based in Columbus, Ohio. Visit www.associationsoftware.com.

Table 1. Pros and cons of Internet service providers.

Service (example)	Communication Method	Pros	Cons
Dial-up America Online® Earthlink®	Uses ordinary phone line	Very affordable; typically under $25/month	Slow connection speed; may not be able to connect during busy times; may take awhile to connect; requires use of a phone line while you are connected
DSL Ameritech DSL®	Uses ordinary phone line	Faster than dial-up; claims to be as fast or faster than cable; typically $30-$50/month	Like phone service, it can be unreliable
Cable RoadRunner®	Uses the same line as your cable television service	Very fast; never busy signal; instant connection; "always on" connection; doesn't require separate phone line	Most expensive alternative; not available in all areas; typically $45+/month
Satellite DirecTV®	Uses the same signal as your satellite television service	Reasonably fast but somewhat limited speed; good for remote locations; priced similarly to DSL	Storms can interfere with signal

MAGIC: CUSTOMER SERVICE MAKES MONEY

Continued from page 1

"How much?" question will almost always lead you down the wrong path. My audiences are used to hearing me say, "Business is an art, not a science. There are very few absolutes in the marketing world." However, this is one of those absolutes. Never, ever, ask the customer how much he or she wants to spend.

Instead, focus on making the customer successful. Unfortunately, the price-oriented shopper screams so loud we begin to believe everyone is focused on what it's going to cost. That's not the case. Let's go beyond the price-shopper, and think about what it is your customer really wants to accomplish. Why is he or she coming to you?

The cornerstone of sales and marketing is the "Latin term" WIIFM? – translated as "What's In It For Me?" WIIFM? is the basis of effective customer service and profitable retail operations: Making sure your customers get what they came to you for.

Few customers in our industry buy "flowers." They buy what the flowers will do for them. It's like the old hardware story. No one buys a drill, they buy holes. They just need the drill to make the holes. When you know why your customers are coming to you for every specific purchase, it will yield higher profits, along with unbelievable repeat and referral business.

Let's examine the normal transaction my 2002 Short Course research encountered.

Customer (on phone): I'd like to send flowers to someone in Topeka.

Florist: How much do you want to spend?

Customer: Ummm ... I don't know, I guess $29.

Result: A dead-end conversation about price, and a customer who likely won't get the result he or she wanted the flowers to accomplish.

Now, let's have a conversation in which the florist focuses on giving the customer what he or she really wants:

Customer (on phone): I'd like to send flowers to someone in Topeka.

Florist: Wonderful, we can do that. Is there a special occasion, or is it just that you're thinking of them? (This plants the seed that it's okay to send flowers for no special reason, and tells the customer that other people send flowers "just because." This expands your future business at no cost!)

Customer: My best client is moving into a new office. I wanted to send some flowers they could put in their reception area.

Florist: Tell me something about your client.

Customer: They are a large trade organization. They are very important to me, but I'm small potatoes to them. I want to send flowers so they know I'm thinking of them, and also so they will also remember me.

Florist: That's a wise choice. (Reinforce the customer's decision. The customer is coming to you because of your expertise. Let them know you understand and support them.) Would you like an arrangement for the reception area or were you thinking about a living plant that would be in their office for a long time?

Customer: I was thinking of something to go on the receptionist's counter.

Florist: Good idea. So you'd like something that isn't too big at the base, but that's tall, bright and colorful, right?

Customer: Exactly! The receptionist is a key contact for me, and so it would help my relationship with her, as well as all the other people there.

Florist: Do you know if the receptionist has any favorite flowers – or should we focus on color? (Always give the customer options and a way to defer to your judgment.)

Customer: No, I guess color is the best way to go.

Result: You can see how this conversation is going. The order is larger. The customer is thrilled. The customer's client is delighted. Remember, the customer didn't come to the florist for a cheap arrangement. There was a need to create a favorable and lasting impression with the customer's client. The florist who fills that need will generate repeat business and a stream of referrals.

"I constantly have to remind myself and my employees to think for our customers," said Polly Agle of Hazel's Flowers and Gifts in South Charleston, Ohio. "The 2002 Short Course session, Good Shop/Bad Shop, really drove home the point that we can't remind ourselves too often of the need to 'aggressively listen' to our customers.

"I couldn't wait to get back from Columbus and start targeting all our team's energies toward focusing on why our customers really come to us. This is critical with our newer people as well. They ask how much the customer wants to spend because they think it speeds up the call. It does, but it doesn't give the customer what they really want. Plus, once the customer has set a price, it's difficult to ask them for more money. That actually makes the call take longer and ends up more frustrating. If we talk about what the flowers will do for the customer, then the price becomes secondary," Polly said.

This is especially critical for infrequent buyers, new customers, or that large group of floral-impaired people known as "the male of the species." Many men – and a large number of women – have no clear cut idea what price flowers should be. They see lots of ads for low prices, but they really don't know what to expect. If you ask them what they want to spend, they will blurt out some low number as a guess. Once that number is on the table, it's like the pink elephant in the living room. It's impossible to ignore it, and it's difficult to raise that low-ball price high enough to accomplish the customer's goal or to create a profitable relationship.

In a discussion at the 2002 Short Course, Kathleen Benken from HJ Benken Florist & Greenhouse in Cincinnati, Ohio, said, "We need to constantly look at making our customers successful. It's too easy for us to concentrate on our daily tasks that have to be done and forget our most important task. We're really here to help each of our customers use our product to convey their feelings to someone. When we truly stay focused on our customers, we make more money, have more fun, and see the customers come back. This year's Short Course has reminded me of that, and recharged my batteries to go home and do it."

Customer service means focusing on mutual success – success for your customer means success for you. It's magic!

Part II in this series, "How To Help Your Customers Succeed Without Asking 'How Much Do You Want to Spend?'" will be appear in the next *OFA Bulletin*. **OFA**

You can order an audiotape of Bill McCurry's "Good Shop/Bad Shop – The Art of Customer Service" from the 2002 OFA Short Course by calling 800-347-2902 or e-mailing info@mac-av.com. Please ask for tape #120. With your OFA member discount, your investment is only $8.75 plus $2 shipping.

Bedding Plant Nutrient Management

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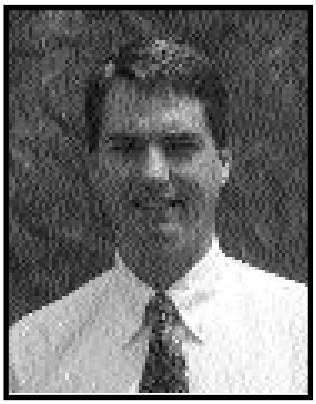

The first things that come to mind when I hear "nutrient management" are fertilizer rates, pH, and electrical conductivity (EC); however, it is important to consider other things that affect nutrient management decisions. Let's first take a look at what might affect the type of fertilizer chosen.

WATER QUALITY

Water quality is probably the most important factor to consider, and alkalinity is the component of water quality that is generally the most influential. Alkalinity is the measure of water's ability to counteract (neutralize) acids. High alkalinity can cause substrate pH levels to rise too high and cause nutrient disorders such as boron and iron deficiency. When you submit a water sample for testing, the alkalinity is generally reported in parts per million (ppm) calcium carbonate ($CaCO_3$).

Alkalinity can be combated by choosing an acidic fertilizer such as 20-10-20 or similar product; however, if alkalinity levels are too high (>200 ppm $CaCO_3$) consider acid injection (type of acid and rates can be determined from the alkalinity calculator located at www.floriculture-info.com; follow the links to floriculture software). In plug production, the maximum threshold may be even lower (~ 100 ppm $CaCO_3$).

Low alkalinity can also be a factor in nutrient management. When alkalinity values are below 75 ppm $CaCO_3$, substrate acidification can occur rapidly. Acidification causes pH to drop too low, which can cause iron and manganese toxicity. Consider using a basic fertilizer such as 13-2-13 or 15-5-15, which tends to increase substrate pH and counteract the acidification. If persistent low pH problems are not easily solved by fertilizer choice, investigate the use of liquid lime or potassium bicarbonate to prevent pH drop. Also, a common practice used is the rotation of an acidic (i.e. 20-10-20) and a basic (13-2-13) fertilizer on a weekly basis. This rotation is also beneficial in providing an extra boost of calcium, which generally is found in basic fertilizers.

Another component of water quality is EC. This is a measure of the total concentration of salts (the good and bad) in the water. Salt concentration is important because too much salt can inhibit plant growth. High EC irrigation water can be handled by growing more salt-tolerant crops, increasing the leaching fraction (more on that later), using periodic "clear" watering, or installing a reverse osmosis system to purify the water.

Micronutrient levels can also cause problems in bedding plant nutrition. Keep in mind that nutrients in your water (be it municipal, surface, or well) can change, and adapting a biannual testing system may prevent nutrient problems. Knowing the micronutrient levels in the water is important because micronutrient toxicities can be enhanced from a complete fertilizer (which has additional micronutrients) or supplemental micronutrient applications. Many micronutrient supplements contain multiple nutrients; use caution not to create a toxicity of "micronutrient A" when trying to correct a deficiency of "micronutrient B." Keep in mind that most micronutrient disorders are caused by improper pH. Checking the substrate pH should be the first step when a micronutrient disorder is suspected.

FERTILIZER COMPONENTS

Generally a "complete" fertilizer helps to ensure a quality crop. A complete fertilizer contains the macronutrients: nitrogen, phosphorus, potassium, and others as well as the micronutrients: iron, manganese, copper, boron, and zinc – in short everything nutritionally a plant needs to survive – almost.

I have already mentioned the acidic fertilizer 20-10-20. Most acidic fertilizers don't contain calcium, and plants need calcium to survive. A common problem in greenhouses that have low alkaline water is that calcium deficiency occurs when crops are produced that tend to push up the substrate pH (such as pansy and vinca). Why? Generally, low alkaline water has little calcium; therefore, when an acidic fertilizer is used to combat high media pH, plants are not supplied sufficient calcium from the fertilizer or water. This is where using acid injection to keep the pH low, and a basic fertilizer with calcium to push up the pH, may be preferential.

Other considerations should be made for the nitrate (NO_3) to ammoniacal (NH_4 or urea) ratio. A good rule of thumb is no more than 30 percent of the nitrogen should come from an ammoniacal source. Excessive ammoniacal nitrogen can damage roots, cause distorted growth, and inhibit flowering, especially during cloudy and cool conditions.

A low-phosphorus fertilizer can help prevent plant stretch and is environmentally friendly. In most situa-

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BEDDING PLANT NUTRIENT MANAGEMENT

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tions, we are trying to avoid plant stretch (hence PGRs and HID lighting). Several researchers have noted that less than 10 ppm phosphorus (saturated media extract test) is needed for healthy plant growth. So, if a 20-10-20 fertilizer at 100 ppm nitrogen is used, more than 20 ppm phosphorus is being supplied (remember the amount of phosphorus is the middle number x 0.44), which is much more than a typical bedding plant needs. With this in mind, fertilizers such as 20-20-20 and 15-16-17 are not the most efficient due to the nutrient balance.

But remember when choosing a fertilizer, first consider if it is acidic or basic. A product like 13-2-13 has very good attributes (low ammoniacal-nitrogen and phosphorus), but may not be suitable if you have high alkaline water (unless acid injection is used).

CROPS

Most growers in the United States don't have the luxury of growing just a few crops. Our markets demand diversity. So how does one go about managing the multitude of nutritional requirements? I suggest grouping crops by pH and EC requirements. Divide crops into high, moderate, and low categories for each pH and EC and make a table (Table 1). This visual tool can help plan production and eliminate some of the guesswork.

The values and crops that I selected for Table 1 are not magical. I used my experience along with information from textbooks and production guidelines provided by the seed and cutting companies. The truth is that you know your production system better than anyone else, so tailor the concept to best fit your needs.

PLANT GROWTH

Besides knowing the target EC and pH values for crops, think about the crop development stage. When plants are young, they need only a small amount of nutrition. The nutrient requirement then increases during the stage of "rapid vegetative growth" and generally decreases once the reproductive stage of growth (flowering) has started (Figure 1). Following a low-high-low fertility regime can prevent disorders, save fertilizer and water, and increase postharvest life. Generally, when a fertility rate or EC is recommended, this is for the rapid vegetative growth stage, so consider this while designing a nutrient management strategy.

IRRIGATION

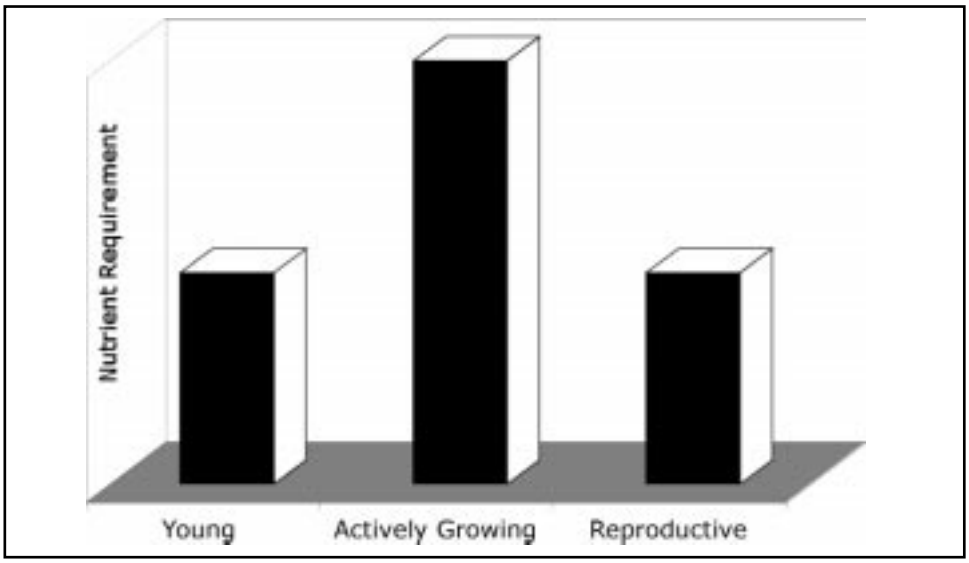
Irrigation systems should also be a factor when deciding how to manage plant nutrition. It has been suggested to reduce the fertilizer rate approximately 30 percent if using subirrigation versus overhead. This is because subirrigation does not facilitate the flushing of excess salts that build up in a container. This can also occur with drip-tube irrigation, depending upon your substrate and rate / volume of water supplied to the container.

When using drip-tube or overhead watering, monitor the leaching fraction. Leaching fraction is a term used to describe the amount of water that is leached out of the bottom of the container as a percentage of what was added to the top. Generally, a 10 percent to 20 percent leaching-to-input volume is recommended. This amount helps flush out salts that may have built up in the substrate.

Table 1. Divide crops by pH and EC requirements to help categorize them by nutrient requirements and simplify nutrient managment.

	Low pH (5.7-6.0)	**Moderate pH (6.0-6.3)**	**High pH (6.3-6.6)**
Low feed	coleus, lantana, pansy, snaps, vinca	ageratum, begonia, celosia, impatiens, New Guinea impatiens	calendula
Moderate feed	evovulus, portulaca, salvia, scaevola	bracteantha, dianthus, heliotrope, verbena	argyranthemum, campanula, geranium, marigold, pepper, sunflower, tomato
Heavy feed	petunia		

Figure 1. Relative nutrient requirements at three growth stages.



If the leaching fraction exceeds 20 percent, fertilizer and water are likely being wasted. If leaching frequently to keep EC values acceptable, then consider lowering the fertilizer rate or periodically using clear water. One can lower the fertilizer rate and leaching fraction simultaneously and still produce a healthy crop.

When switching irrigation systems, reevaluate the nutrient management program. Switching to labor-saving methods such as drip-tubes and subirrigation is practical, financially rewarding, and advantageous to the environment. But, keep in mind that different irrigation methods require different nutrient management strategies. If recapturing runoff, remember recaptured water must be monitored carefully for pesticide and PGR contaminants as well as pH and EC values.

OTHER FACTORS

Container size affects nutrient management. The smaller the container, the more difficult it becomes to manage watering and fertilizing. The small substrate volume has a lower buffering capacity and holds less water, so pH, EC, and water contents may fluctuate rapidly.

Controlled release fertilizers (CRF) for bedding plants are generally not economical. However, if profit margins are sufficient, some "value added" large bedding plants (such as 6-inch pansies or geraniums) may accommodate the added cost and labor associated with CRF applications. If using CRF, remember to reduce the liquid feed concentration so the EC does not get too high.

TESTING

There are many dynamics to nutrient management, and it is very likely that what works for one situation may not work for another. So, the only way to know what will work for you and your crops is to test nutrient parameters. It is wise to occasionally send tissue and substrate samples to a lab for complete analysis; however, routine on-site pH and EC testing is an easy way to monitor crop performance. Proper pH and EC management (yes, just these two factors) can eliminate approximately 90 percent of nutritional disorders that occur in floriculture production. **OFA**

DISEASES OF BEDDING PLANTS

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As a grower of greenhouse bedding plants, one of your major concerns is the management of diseases. Plant pathogenic fungi, bacteria, and viruses are all microorganisms that are responsible for causing a variety of diseases in greenhouse bedding plants. Diseases caused by fungi are the most common but not necessarily the most important, and depending on the host, other pathogens such as bacteria and viruses have the potential to cause some of the most economically important diseases.

The purpose of this article is to familiarize the reader with some of the most common diseases associated with bedding plant production and provide the reader with information on methods used to control/manage these diseases in an economically equitable manner. The diseases will be covered based on the part of the plant they affect.

PLUG DISEASES

Diseases of plugs or seedlings can be divided into two types, preemergence diseases and postemergence diseases. Preemergence diseases occur prior to or at the time of seed germination. The most obvious symptom of this disease is that the seedlings never break the surface of the growing medium and you have bare spots. Postemergence disease occurs after the seedling has grown above the medium surface and the seedlings have produced cotyledons or immature true leaves. The most obvious symptom associated with postemergence damping-off is that the seedlings wilt and subsequently collapse onto the growing media. In most cases, preemergence damping-off is caused by the same three plant pathogenic fungi: *Pythium* sp., *Rhizoctonia* sp., and *Thielaviopsis* sp. Many of the environmental conditions that favor the development of preemergence damping-off are similar for all three fungi.

Postemergence damping-off is usually caused by *Pythium* sp., *Rhizoctonia* sp., and *Botrytis* sp. Like preemergence damping-off, the environmental conditions that favor these pathogens are very similar.

Since all of the diseases that affect plugs also affect plants in the grow-on stage, we will cover them in detail as grow-on diseases. However, the control strategies apply to plugs as well.

ROOT AND CROWN ROTS

PYTHIUM ROOT ROT

This is one of the most common diseases in the greenhouse. It is caused by the fungus *Pythium* sp. The fungus infects the root tips of the host, and if environmental conditions favorable for disease continue, the fungus moves progressively up the root and can cause a rot in the crown and the stem. Symptoms associated with Pythium root rot include wilt, lack of vigor, and nutrient deficiencies. Affected roots appear brown and mushy; in later stages, the whole root mass will be brown. Once the fungus has spread to the crown and into the stem, it may appear black in color and soft to the touch. Pythium stem infection is called black leg and indicates advanced stages of root rot. Growing plants in a well-drained medium that inhibits saturated conditions goes a long way in

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DISEASES OF BEDDING PLANTS

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controlling this disease. Chemicals such as mefenoxam and the trifloxystrobin are some of the best in controlling this disease.

BLACK ROOT ROT

Black root rot is caused by the fungus *Thielaviopsis* sp. Some bedding plant species are more prone to be affected by black root rot than others. Bedding plants such as viola, pansy, vinca, and petunia are very prone to black root rot if grown under adverse environmental conditions. Plants infected with black root rot are stunted and sickly looking. Leaf yellowing is a common symptom. Infected roots will appear black and mushy. Plants stressed by pH and a salt imbalance are more prone to infection. Products containing thiophanate-methyl and triflumizole offer excellent control.

RHIZOCTONIA CROWN ROT

Crown rot of bedding plants caused by *Rhizoctonia* sp. is another disease associated with bedding plant production. This disease starts at the crown of the plant and works its way up the stem. The stem becomes soft and mushy, and the plant starts to wilt.

Eventually, the fungus completely encircles the stem and the plant dies. In most plants, the roots still appear healthy, but the crown will be rotted. Saturated media helps promote this disease. Chemicals such as azoxystrobin and thiophanate-methyl can control this disease.

VASCULAR WILTS

Vascular wilt diseases in bedding plants are caused by a variety of plant pathogens. The most common of these are the fungi *Fusarium* sp. and *Verticillium* sp., and the bacterium *Xanthomonas* campestris pv. *pelargonii* (Xcp). Fusarium and Verticillium infect a wide variety of bedding plants hosts, while Xcp infects only geraniums. Symptoms associated with vascular wilt diseases are very similar. Infected plants wilt under conditions of moisture stress, primarily during the heat of the day. If symptomatic plant stems are cut open to expose the vascular tissue, it will appear dark in color. This symptom is diagnostic for all of the vascular wilt diseases. Fusarium wilt is a common disease on cyclamen.

The incidence of Fusarium and Verticillium wilt is relatively low when compared to other bedding plant diseases, and they usually do not lead to a major economic disaster. Prevention is the best way to control vascular wilt diseases. Fludioxinil works well to control vascular wilt in cyclamen.

FOLIAR DISEASES

BOTRYTIS LEAF BLIGHT

Botrytis leaf blight or gray mold is the most common disease in the greenhouse. Botrytis blight is caused by the fungus *Botrytis cinerea*. It has a very wide host range, and can persist in the greenhouse year-round. The fungus produces a large amount of spores that move throughout the greenhouse via air currents. Under the right environmental conditions, the spores land on the plant surface, germinate, and penetrate the host plant. The optimum temperature for spore germination is 72 to 77°F. Germinating spores rarely penetrate actively growing tissue directly. However, penetration of actively growing tissue can take place through wounds.

Symptoms of Botrytis blight vary depending on the host and the greenhouse environmental conditions. It is characterized by the production of leaf spots, flower blight, bud rot, stem canker, stem and crown rot, cutting rot, and damping-off. Fungal growth is characterized by the presence of fluffy, gray/brown mycelium that produces a cloud of spores if disturbed (Figure 1). Affected tissue is soft and brown, and sometimes has a water-soaked appearance. Maintaining an environment within the greenhouse that will not permit the fungus to grow and sporulate is essential. By keeping the relative humidity below 85 percent as well as maintaining good air circulation and adequate plant spacing, excellent control can be achieved. Fans should be used to provide good air movement above the canopy. Plants with wounds should be either protected with a fungicide or removed from the greenhouse, because a wound is the perfect opening for the fungus to initiate the infection process. Many fungicides are labeled for *Botrytis* sp. Products that contain azoxystrobin, chlorothalonil, enhexamid, and combination products such as thiophanate-methyl plus chlorothalonil all work well to control this disease.

POWDERY MILDEW

This disease is caused by a variety of different fungi. The disease is characterized by the white fluffy growth of the fungus on the leaves and stems of the plant. Powdery mildew is most prevalent when greenhouse conditions are cool and damp at night and sunny and warm in the day. If powdery mildew is a problem, change the environmental conditions to inhibit disease development. Good air movement and products containing azoxystrobin and piperalin work well to inhibit this disease.

BACTERIAL LEAF SPOT

Under conditions of high humidity and abundant moisture on leaf surfaces, bacterial leaf spot can be a problem. Most bedding plant bacterial leaf spots are caused by the bacterium *Pseudomonas* sp. Bacterial leaf spots are small, round, and water-soaked surrounded by a purple halo (Figure 2). If allowed to go unchecked, the leaf spots will coalesce and whole leaves will appear water-soaked and rotted. Disease spread can be inhibited by avoiding overhead watering or allowing the leaf surface to dry. Copper-based fungicides may slow down the spread of the bacteria from plant to plant.

LEAF ANTHRACNOSE

This common disease is caused by a variety of anthracnose-causing fungi, and it can be a significant problem on selected hosts. The disease is characterized by grayish to

black, target-like leaf spots primarily on older leaves. In many cases, these spots start at the margins of the leaves and move inward. Avoid extended periods of leaf moisture to help control anthracnose leaf spot. Products that contain mancozeb help control this disease.

VIRUSES

A wide variety of plant pathogenic viruses can infect bedding plants; however, only a few of them are of significant economic importance. Viruses such as tobacco mosaic virus (TMV), cucumber mosaic virus (CMV), and tobacco and tomato ringspot viruses (TRSV and ToRSV) are all viruses which can infect bedding plants – and depending on the host, can cause crop loss. Symptoms associated with these viruses include mosaic or yellow mottling, yellow ringspots, overall yellowing, and stunting of plants (Figure 3).

Of all of the plant viruses that infect bedding plants, the most severe are the viruses in the topso-virus group – impatiens necrotic spot virus (INSV) and tomato spotted wilt virus (TSWV). The host range of these two viruses is very wide and diverse. Symptoms associated with these viruses include, but are not limited to, yellow or necrotic (dead) leaf or stem spots, leaf mosaic, leaf and stem death, black leaf or stem spots, black ringspots, overall yellowing, severe stunting, and rapid death of some plants, particularly small plants (Figure 4).

INSV and TSWV are moved about the greenhouse by thrips, particularly Western flower thrips. If left unchecked, these two viruses can move rapidly through the greenhouse and cause severe damage. If thrips are a problem, they need to be controlled.

The best way to control INSV and TSWV is to exclude these viruses from the greenhouse. If you are planting seed or cuttings, or bringing in unfinished plants, be sure this material is purchased from a producer who can certify that the material is free from virus or disease. If you suspect that your plants are infected, be sure to have them tested.

Bedding plant disease control is a three-step process: prevention, detection, and control. If you rely on the first one, the other two may not be necessary.

Figure 1. Mass of Botrytis spores on wounded stem of geranium.

Figure 2. Bacterial leaf spot. Note halo.

Figure 3. Ringspots on geranium caused by tobacco ringspot virus.

Figure 4. Black ringspots on impatiens caused by impatiens necrotic spot virus.

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Keeping Customers in Tough Times

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"Due to our budget cuts, we are discontinuing plant services …;" "The area of potential cutbacks includes the plant maintenance contract …;" "Plants are an affordable luxury right now, and in this economy there are no luxuries …;" "How can we justify interior horticultural services when we are laying off people?"

Does this sound familiar lately? Have you gotten at least one call or letter similar to this in the past year? Due to the present economic situation, which some forecasters say may last until the end of the second quarter of 2003, what's an interior landscape contractor to do?

As an interior landscape contracting company, we are all fortunate to have horticultural service contracts that have recurring revenue. When clients are deciding not to spend capital dollars on new interior landscaping, sales for new plants and containers are also flat. The recurring revenue from monthly maintenance contracts keeps some cash flowing even in the slow times.

In a slower economy, we should be doing those things that are naturally part of our business. One of the most important is to know your customer! I mean really know your customers – what market segment they are in, how cyclical their business is, and what's important to them that is relevant to our services.

Determine what your clients' market segments are. Right now the health care, pharmaceutical, and security industries are very stable. But the high technology, dot.com, investment, and banking industries are very flat. Your client portfolio should be a good mix of industries to sustain any kind of economic flux. With a diverse client portfolio, you can balance your sales potential and capacity. Know the trends in the marketplace and be right there. The old cliché "don't put all your eggs in one basket" is so true for your client portfolio.

Know your customer type. For example, is your customer contact employed by the company (owner based), or is your customer contact part of a third party management firm (leasing and services administrator). An owner-based manager is interested in good value, aesthetics, customer service, and alignment with the company's mission and values. The third party management manager is very interested in price and getting more value at a lower cost to fit his or her budget needs. You are able to market your services more appropriately when you understand what's important to the end user and decision maker.

Know your customer so they know who you are and they are willing to discuss options with you. As the saying goes, "be in their face." Visit your clients, send newsletters and updates, call them frequently, e-mail them, and keep educating them about the value of plants and plant service. Ask your clients how you can be of assistance in cutting costs and saving them money. Be proactive and suggest alternative solutions – are they interested in longer term contracts with no consumer price index increases? Everyone talks about building relationships, and that is so true, so continue to build your client relationships. There is a recent trend with the new Generation X that "loyalty" isn't that important. Show your customers you are interested in them and want to work with them.

Every company should have a customer retention program with quarterly goals. It is much easier and more cost effective to sell an existing client than to find and sell new clients. Discuss with your clients the merit of keeping your services for the long haul. Remind them of the cyclical nature of the economy. Give them information about Plants at Work research and statistics. Stress how important plants are for health issues and productivity.

Go to your very satisfied clients and ask for referrals and obtain testimonials about your services. Be willing to negotiate with your customers – for example, reduce the monthly service amount by only keeping the plant service for high traffic and high visibility areas such as lobbies and cafeterias.

Most accounts can go to every two weeks for horticultural services through the use of some type of subirrigation and / or very good horticultural practices. If you are not already doing every-two-week accounts, suggest this to your client without increasing the client's monthly service amount. This is very cost efficient for both the client and the interior landscape contractor.

Sell enhancements, enhancements, and enhancements. Offer your customers some type of enhancement. For example, offer silk plantings to the client who absolutely has no monies for plant maintenance or for whom live plants are not applicable due to low lighting (i.e. cocktail lounges and restaurants). Offer silk floral arrangements instead of weekly live floral arrangements. Sell seasonal and / or holiday decorating for the interior space. Sell exterior containerized plantings for terraces and patios.

If you do get a discontinued service letter or call from your customer, be sure to thank them for their past

partnership and follow up in four to six weeks. Sometimes the lack of service and the slow downfall of the plant material can make the client reconsider their decision. Be right there to welcome them back!

CONCLUSION

These are just a few ideas and all of these can work only if you as a company are providing good horticultural services. Continue to educate the technicians and salespeople. Execute and take action. Some simple action items for you to begin with:

• Review your customer portfolio – market segment by industry

• Review the type of customers – owner-based versus third-party managed

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• Contact all your customers in some manner and do it frequently

• Establish a customer retention program

• Negotiate and offer alternative solutions

• Offer enhancements

• Provide good service

• Continue to educate your team of people

May the Green Force be with you! **OFA**

SPRING BEDDING PLANT AND PLUG PRODUCTION: PEST MANAGEMENT

Continued from page 1

remove plant sap from terminal growth and leaf undersides. Aphids may also inject toxins into plants. Their feeding causes leaf curling or distortion. In addition, aphids secrete a clear, sticky liquid called honeydew, which serves as a growing medium for black sooty mold fungi. This can reduce a plant's aesthetic appearance.

WESTERN FLOWER THRIPS

Western flower thrips, which are the primary thrips found in greenhouses, are less than 1/13-inch long insects and have piercing-sucking mouthparts. Adult females can live up to 45 days and lay anywhere from 150 to 250 eggs. Eggs hatch into nymphs, which feed on leaves and flowers. They are most attracted to bedding plants that have yellow or blue flowers. Thrips may pupate in flowers, leaf litter, or growing medium. Later, adults emerge, which normally feed on flowers.

The lifecycle from egg to adult generally takes two to three weeks, depending on temperature. Western flower thrips cause direct damage by feeding on flowers and leaves. Thrips feeding on developing flowers before they open can cause premature bud abortion or deformation of flowers. Thrips feeding on leaf buds before they open can result in leaf scarring. Flowers and leaves fed upon by thrips have a "silvery" appearance. Western flower thrips also cause indirect injury to bedding plants by vectoring impatiens necrotic spot virus.

FUNGUS GNATS AND SHOREFLIES

Fungus gnat larvae are white, transparent or slightly translucent, and legless. They are approximately 1/8 inch long. A characteristic diagnostic feature of fungus gnat larvae is the presence of a black head capsule that is absent in shorefly larvae. Shorefly larvae are opaque yellowish-brown, with no head capsule, and they 1/4 inch long. Fungus gnat adults are winged, 1/8 inch long, with long legs and antennae. Each wing has a "y-shaped" vein. They tend to fly around the growing medium, and live from 7 to 10 days. Adult shoreflies resemble houseflies. They are 1/8 inch long and deep black in color. Each wing usually has at least five white, light-colored spots. The antennae and legs are short. The lifecycle from egg to adult for both fungus gnats and shoreflies ranges from 15 to 28 days, depending on temperature.

Fungus gnat larvae can damage plants by feeding on roots or burrowing into stems of bedding plants, which causes plant stunting and wilting. Fungus gnat larvae are also capable of transmitting soilborne diseases including Pythium and Thielaviopsis. In addition, the wounds created through feeding provide entry sites for secondary soilborne pathogens. Fungus gnats are mainly a problem of bedding plants and plugs under extreme moist conditions.

Shorefly adults are stronger fliers (and are more noticeable) than fungus gnats. Shorefly larvae primarily feed on algae located on the surface of growing medium or other areas in the greenhouse where the conditions are conducive for algae growth. The larvae don't directly feed on plant roots. Shorefly adults are more of a concern during bedding plant and plug production because they are more noticeable flying around. Adult shoreflies are generally considered a nuisance pest; however, they may leave black fecal deposits on plant leaves that may affect the plant's aesthetic quality. Similar to fungus gnats, shoreflies are primarily a problem under extremely moist conditions.

WHITEFLIES

Whitefly adults are white to slightly yellowish in color, narrow shaped, and approximately 1/13 to 1/9 inch long. Whitefly adult females lay their eggs on the undersides of mature leaves. Eggs hatch into crawlers or nymphs that insert their threadlike mouthparts into the lower leaf surface to feed on plant fluids. This may result in leaf yellowing, plant stunting, wilting, and possibly death (if populations are high enough). Crawlers eventually molt into scale-like nymphs that grow and molt a second and third time into a non-feeding stage called a pupa. Adults emerge about one month after eggs are laid. A female lives about four weeks and can lay up to 200 eggs. Whiteflies, like aphids, are capable of producing honeydew. If noticed too late, the presence of large numbers of adults may be a visual nuisance, which may reduce bedding plant salability. Whiteflies are also capable of transmitting viruses.

INSECT MANAGEMENT

Insects can be troublesome during bedding plant and plug production, primarily due to a number of basic plant operational procedures that occur during the production cycle. First, bedding plants and plugs

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SPRING BEDDING PLANT AND PLUG PRODUCTION: PEST MANAGEMENT

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are well fertilized, which provides an attractive food source for insects. Second, there is continuous production without a break, which means food is always available. Third, environmental conditions such as temperature, light, and humidity that are maintained to promote plant growth are also conducive for insect development. Fourth, not enough natural enemies such as parasitoids and predators are able to migrate into the greenhouse to suppress existing insect populations. Fifth, doors and vents are left open, which allows flying insects including thrips, whiteflies, and winged aphids to easily enter greenhouses. Sixth, air circulation fans, useful in reducing problems with foliar diseases such as Botrytis, can easily distribute insects such as thrips around the greenhouse; this is especially the case with insects in hanging baskets. Finally, movement of personnel or people along benches, especially those wearing yellow or blue clothing, can easily carry insects within or between greenhouses.

Cultural management strategies should always be the primary method of minimizing problems with insects even if pest control materials are used. Proper fertility can lead to fewer problems with insects. For example, overfertilizing plants, especially with nitrogen, results in the production of succulent growth and increases susceptibility to aphids and whiteflies. The reason for this is that the higher levels of amino acids, which is the primary food source utilized by insects, increases their reproductive ability. In addition, overfertility may cause the leaf cuticle to be thinner, making it easier for insects to penetrate with their mouthparts.

Reducing excess moisture by watering "only when needed" and repairing pipe leaks will minimize problems with fungus gnats and shoreflies. Both of these insects thrive under wet conditions. Furthermore, excess moisture can lead to algae buildup, which provides an ideal breeding environment for fungus gnats and shoreflies.

Growing media, such as those containing coir (coconut husk fibers), where the top 1 to 2 inches can dry down without having problems with rewetting, provide an unfavorable environment for fungus gnat females to lay their eggs. Eggs that are laid have a higher mortality rate, which reduces the number of potential damaging larvae.

Weed management inside and outside the greenhouse will reduce problems with insects moving off of weeds into the greenhouse or migrating from outside onto the main crop. Many weeds are also a potential inoculum source for viruses vectored by thrips and aphids.

Scouting is a very useful way to determine the status of the pest situation by either visually inspecting plants or using colored (yellow or blue) sticky cards. Early detection through scouting will minimize dealing with high insect populations. The entire greenhouse doesn't have to be

Table 1. Pest control materials recommended for managing aphids, thrips, fungus gnats, shoreflies, and whiteflies on bedding plants and plugs. Be sure to read pest control material labels carefully prior to making any application.

Pest	Pest Control Material Common Name	 Trade Name
Aphids	Acephate	Orthene
	Azadirachtin	Azatin / Ornazin
	Beauveria bassiana	Botanigard / Naturalis
	Bifenthrin	Talstar
	Chlorpyrifos + Cyfluthrin	Duraplex
	Cyfluthrin	Decathlon
	Endosulfan	Thiodan
	Fenpropathrin	Tame
	Insecticidal soap	M-Pede / Olympic Insecticidal Soap
	Kinoprene	Enstar II
	Neem oil	Triact 70
	Permethrin	Astro
	Pymetrozine	Endeavor
Thrips	Abamectin	Avid
	Acephate	Orthene
	Bifenthrin	Talstar
	Cyfluthrin	Decathlon
	Fluvalinate	Mavrik
	Methiocarb	Mesurol
	Spinosad	Conserve
Fungus Gnats	Azadirachtin	Azatin / Ornazin (larvae)
	Bacillus thuringiensis israelensis	Gnatrol (larvae)
	Bifenthrin	Talstar (adults)
	Chlorpyrifos	Duraguard (larvae)
	Cyfluthrin	Decathlon (adults)
	Cyromazine	Citation (larvae)
	Diflubenzuron	Adept (larvae)
	Horticultural oil	UltraFine Oil (adults)
	Permethrin	Astro (adults)
	Pyriproxyfen	Distance (larvae)
Shoreflies	Azadirachtin	Azatin / Ornazin (larvae)
	Cyromazine	Citation (larvae)
	Diflubenzuron	Adept (larvae)
	Pyriproxyfen	Distance (larvae)
Whiteflies	Acephate	Orthene
	Beauveria bassiana	Botanigard / Naturalis
	Bifenthrin	Talstar
	Cyfluthrin	Decathlon
	Endosulfan	Thiodan
	Fenpropathrin	Tame
	Horticultural oil	UltraFine Oil
	Imidacloprid	Marathon
	Insecticidal soap	M-Pede / Olympic Insecticidal Soap
	Kinoprene	Enstar II
	Pymetrozine	Endeavor
	Pyridaben	Sanmite
	Pyriproxyfen	Distance

scouted; however, selected areas near vents, doors, and along the edge of benches should be scouted because these are areas where insect infestations are most likely to start. Scouting can provide information on the effectiveness of your pest management program and track seasonal trends (winter vs. summer) of insect populations.

Pest control materials are still generally used to manage pest populations on bedding plants and plugs (Table 1). Effective control is maximized when plants are small, because it is easier to get coverage throughout the entire plant canopy including the upper and lower leaf surfaces. Despite your best efforts, it may appear that you are not getting adequate kill with a pest control material. Reasons for poor performance of pest control materials involve inadequate or inappropriate coverage, timing, pH, and frequency of application.

Poor coverage, especially when using short-residual contact insecticides, will lead to continued problems with insects. These materials are most effective only when the wet spray makes contact with the target pest. All plant parts must be thoroughly sprayed in order to ensure adequate kill.

Improper timing of pest control material applications generally results in poor control. Better control will be obtained when the most susceptible stage of the pest is present. In general, the egg and pupae stages are tolerant of most insecticides, whereas the larvae and adult stages are more susceptible. If the age structure of the target pest is primarily in the less susceptible pupae stage and an insecticide application is made, more than likely this will result in poor control.

The pH of the spray solution can significantly impact the effectiveness of an insecticide. A spray solution pH above 7 generally results in the breakdown of the active ingredient into molecules that have no insectidical properties. This process is referred to as alkaline hydrolysis.

The length of the spray interval or frequency of application also impacts the effectiveness of insecticide applications. If the time interval between spray applications is too long, for example 10 days, then this will most likely lead to inadequate insect control, especially when dealing with overlapping generations. This means that the insect population is at various stages of development (egg, larvae, pupae, and adult) at the same time. Spray intervals must be shortened in order to kill larvae and adults that were previously in the egg and pupae stages, respectively.

The use of biological control is another option in dealing with bedding plant and plugs pests. However, it may not always be feasible because the crop is sold or moved too rapidly, which may not give the biological control agents or natural enemies (parasitoids and predators) enough time to establish and provide adequate control. Biological control agents for aphids, thrips, fungus gnats, and whiteflies are listed in Table 2. It is also possible early in the bedding plant and plug production cycle to use pest control materials such as Botanigard or Naturalis, and Gnatrol. Both Botanigard and Naturalis contain the entomopathogenic fungus *Beauveria bassiana* as the active ingredient, which is registered for aphids, whiteflies, and thrips. Gnatrol is a microbially based pest control material, which contains the bacterium *Bacillus thuringiensis* var. *israelensis* as the active ingredient. This material only has activity on fungus gnat larvae. To maximize the effectiveness of Botanigard, Naturalis, and Gnatrol, it is recommended that these materials be used early in managing insect pests, because they will not provide quick knockdown if insect populations are high.

Although the bedding plant and plug production season is a busy time of year, it is important to prevent insect problems by using proper cultural practices, scouting plants on a regular basis, and understanding the factors that may influence the performance of pest control material. Remember the old adage: "An ounce of prevention is worth a pound of cure." **OFA**

Table 2. Biological control agents or natural enemies commercially available for managing aphids, thrips, fungus gnats, and whiteflies in bedding plant and plug production.

Pest	Biological Control Agents
Aphids	*Chrysoperla* spp. (Green Lacewing)
	Aphidoletes aphidimyza
	Aphidius colemani
	Aphidius matricariae
	Aphidius ervi
Thrips	*Amblyseius* (=*Neoseiulus*) *cucumeris*
	Amblyseius (=*Iphiseius*) *degenerans*
	Hypoaspis miles
	Orius insidiosus (Minute Pirate Bug)
Fungus Gnats	*Hypoaspis miles*
	Steinernema feltiae (Nemasys, Entonem, and Scanmask)
Whiteflies	*Delphastus pusillus*
	Encarsia formosa
	Eretmocerus eremicus

2002 OFA/OSU POINSETTIA TRIALS

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Wow, the holiday season just sped past faster than a "Blitzen" reindeer, and with it another round of poinsettia evaluations. Cultivar trials have been concluded at a number of universities including Colorado State University, University of Connecticut, University of Florida, North Carolina State University, and Purdue University. This season's OFA Grower Extension Committee/The Ohio State University (OSU), Department of Horticulture and Crop Science consumer poinsettia cultivar trial was conducted on December 6, 7, and 8, 2002. The continuing goal of this exercise is to expose growers to the newest cultivars available from the major poinsettia breeders/suppliers, and to give them a glimpse of consumer reaction to the cultivars.

More than half of the 50 cultivars in this year's trial were new. As in past years' trials, we retired an equal number of cultivars that have been available to the industry for one or two years. The rooted poinsettia cuttings were generously supplied by Dummen USA/Plant Peddler, Cresco, Iowa; Paul Ecke Ranch, Encinitas, California; Fischer USA, Boulder, Colorado; Oglevee Ltd., Connellsville, Pennsylvania; and Selecta/HMA, Ashtabula, Ohio. The cuttings were grown at four wholesale/retail growers around Ohio: Barco Sons Inc., Medina; Bostdorff Greenhouse, Bowling Green; Deifenbacher's Greenhouse, Cincinnati; and Dill's Greenhouse in Columbus. The design of this year's trial is very similar to last year's (reported in the February 2001 *OFA Bulletin*), so we'll save the "gory details" for the end of this article.

THIS YEAR'S RESULTS

Red continues to rule. As in past years, at least two-thirds of the top-rated cultivars were reds; this year – nine of the top 12 were red. They include: 'Freedom Red' (included in the trial as a standard), 'Velveteen Red', 'Eternity Red', Mondial Red', 'Cortez Dark Red', 'Jester Red', 'SK 24', 'Christmas Dream', and 'Elegance Bright Red.' As in the last two years, 'Sonora White Glitter' was the top novelty selection; this year it was also the top-rated cultivar. 'Cortez Burgundy' and 'Santa Claus White' were the other two non-reds receiving top ratings.

Men seemed to be a little more critical than women of a number of pink, "pinkish" novelty, and near-red cultivars including: 'Cortez Burgundy', 'Festival Rose', 'Enduring Pink', 'Strawberry Punch', 'Early Joy Pink', 'Santa Claus Pink', 'Winterfest Pink', 'Winter Rose Deep Pink', 'Carrousel Pink', 'Strawberries & Cream', and 'Champagne.' This tendency was not observed last year.

Young consumers were generally more critical in their opinion of most cultivars than older consumers, especially the "over 65" group. A notable exception to this observation was for cultivars that exhibit a nontraditional bract shape. Young consumers rated 'Winter Rose Marble', 'Winter Rose Deep Pink', and 'Carrousel Pink' higher than older consumer groups. This tendency was also noted in last year's trial. Younger consumers also rated 'Cortez Burgundy', 'White Christmas', and 'Strawberry Punch' higher than their oldest compatriots.

It is interesting to note that although novelties and non-red cultivars, as a whole, fared more poorly in the general ratings than reds, they received far more of the silent-auction bids. 'Sonora White Glitter' received 22 bids, 'Cortez Burgundy' – 11, 'Chianti Red' – 7, 'Silverstar Marble' – 7, 'Carrousel Pink' – 7, 'Winter Rose Deep Pink' – 4, 'Premium White' – 4, and 'Avante Garde' – 4. Only the red cultivar 'Chianti Red' received more than three bids. Though the first two cultivars listed here were also highly rated, the rest fell in the bottom half of the ratings. They also had higher rating standard deviations, meaning people tended to rate them either very high or very low. What does all this mean? It suggests that though perhaps not as universally popular as the reds, new novelties and non-reds, as exemplified by these cultivars, have a definite niche. One that perhaps growers, especially retail growers, can take advantage of as they distinguish themselves from large discount retailers in both pricing and availability.

GORY DETAILS

As mentioned earlier, the design of the consumer evaluation is similar to that used for the last three years. It was held in conjunction with the poinsettia sale run by the horticulture honorary society Pi-Alpha-Xi (PAX) December 5-7. PAX customers typically are OSU faculty, staff, students, and university "friends." Perhaps 90 percent to 95 percent of those who walk through the door leave with at least one poinsettia. It was 252 of those poinsettia buyers that we asked to participate in our cultivar evaluation.

This year, we had a total of 50 new cultivars, including an older standard ('Freedom Red') for comparison. One plant from each of the four growers listed above was sent to OSU's Howlett Hall greenhouses one to five days prior to the evaluation. They were grown under similar conditions (the cultural specifics will be presented in a follow-up article). All plants of each cultivar were grouped together (no replication), with cultivars being numbered and randomized on the bench. No attempt was made to group cultivars by color or type. Because plants were not sleeved or boxed for more than a day, their handling more closely approximates that typical in a retail greenhouse than a box store.

We asked reviewers to walk through the greenhouse and rate each cultivar based on its overall appeal on a 5-point scale with "5" being the top score. We also asked participants this year to place a silent auction bid (if they so chose) on up to three cultivars (one plant per cultivar) that they would be willing to come back and purchase at the price they listed. We set the minimum bid at $10 which was PAX's price for the same size (6.5-inch) poinsettias they were selling. The evaluators were told that the proceeds of the auction would go to PAX.

As of December 16, 2002, about 80 percent of those with the highest bids came back to pay for and take home their poinsettia(s).

Well, that's a quick summary of this year's consumer trial. It is our hope that you can integrate it with your own experiences and results from other trials as you plan for your next year's crop. See the data from this trial on Table 1.

Scheduling Poinsettias for Optimum Results

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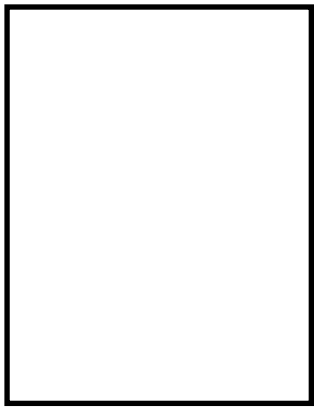


Scheduling crops is an ideal planning tool for producing high quality blooming poinsettias that meet desired height and flowering dates. Because so many of today's cultivars have such unique growth habits and timing, there is no other way that can be as effective for growers, and this process should be done before cuttings are even ordered from suppliers. The first step is often the hardest, and that is identifying the specifications for the crop to be produced. How tall do these poinsettias need to be? How many branches and bracts are required at time of sale? What pot size(s) will the crop be grown and sold in? How many plants per container are required? These are all questions that need answered before developing the schedule, and the answers will most likely not be uniform for all your customers.

Make note of what your customers expect and are willing to pay for, then design the product to fill those needs. Scheduling forms and some helpful charts have been included to provide a logical method of developing a formal production schedule for the poinsettia crops based on a whole range of factors.

Define the date(s) on which poinsettias should be ready for sale. This helps reduce credits or returns on product that are either too mature or immature at the time of delivery. Also, having plants ready to go at the proper time will maintain the quality, reducing the potential for problems to occur in your greenhouse (Botrytis, etc) and helping to reduce the risk of problems in the retail.

Cultivar choice is more than just personal preference by growers. It is important to factor in the growth habit and flowering response of each cultivar grown. These characteristics influence the amount of vegetative growth needed to achieve the desired finished height. The flowering response time also defines how early or late plants will be ready to sell. Manipulation of the daylength may be required, or a change in cultivars made, to hit the market date. Check with your supplier or the breeder of the cultivar/series being grown to understand the plant characteristics (response time, vigor, etc) and plan accordingly.

Determine the required flower initiation date for your crop by using the market or sale date required and count backward by the flowering response time of each cultivar used. In most regions, poinsettias initiate flower in late September (9/20-9/30) when nights become longer than days. The majority of today's poinsettias fall into this time frame, however if in doubt check with your supplier. The early blooming cultivars like 'Freedom', 'Orion', and 'Pepride' initiate earlier, generally around the September 15-20.

Keep in mind how your location and conditions may affect initiation. Later initiation may occur in regions where night temperatures are higher than 72°F. If this is the case, start dates can be later than in areas where temperatures are more moderate, or growers will be forced to use plant growth regulators to control the height of the poinsettias. In these same regions, the warm temperatures and higher light intensities cause a faster rate of flower development, allowing the crop to flower for normal sales.

If the flower initiation date does not fall within the dates outlined above, use of lighting or blackcloth may be required. If the schedule requires an initiation date prior to September 20, blackcloth may be required to create 14-hour long-night conditions. Exceptions to this would be the early blooming cultivars because they are able to initiate earlier than September 20. For these cultivars, use blackcloth only if the timing is absolutely critical or if even earlier dates are specified after planning the schedule. Likewise, if the initiation date is after September 30 (September 25 for early blooming cultivars), lighting is required to interrupt nights between 10 p.m. and 2 a.m., preventing plants from initiating flower until these lights are discontinued.

Attention to initiation dates is important because this influences how much growth can occur on the crop prior to the growth changes in reaction to the short days. This affects growth potential and finished height. This vegetative growth phase will ensure plants have enough time between pinch and flower initiation to form the desired leaf count on new shoots to achieve a desired finished height. This time is based on the two key factors, geographic location and vigor, of each cultivar. If a poinsettia is described as "short," additional time is required to compensate for the more compact growth habit. Likewise, if a cultivar is described as "tall," less growth time is needed to achieve the same finished height as a short cultivar. The geographic location influences temperatures on the crop, which in turn will affect how much growth regulator is needed – which can be minimized by a good production schedule. Growers in the North need to start to pinch crops earlier than growers in the South, so

factor this in as the schedule is developed (Tables 1 and 2).

Using the charts and the form provided, vegetative growth requirements can be calculated and a pinch date determined based on all the variables already discussed. This is determined by subtracting the vegetative growth requirements from the date of flower initiation. If growing non-pinched forms, the transplant date becomes the most critical factor to determine. Plants should not be started too far in advance, otherwise the risk of splitting or other physiological problems is likely to happen.

Before pinching poinsettias, it is advisable to have adequate root systems established. The size of growing container and volume of media influence how long it takes for rooted cuttings to develop adequate roots prior to pinching. Small pots with less soil volume take the least amount of time for root establishment, while large pots with more soil (and greater moisture holding capacity) will take longer.

The charts suggest the number of days typically needed to develop adequate root systems prior to pinching.

As a general guideline, plants are established when they no longer wilt or droop from the shock of transplanting, even during the warmest part of the day. Roots should be visible to the side and bottom of the pot. Using the number of days suggested in Table 3, work back from the number of days prior to pinch date to determine the optimum transplant date. Less time may cause sporadic branching and less uniform development. Excess time can also cause problems as stems harden, and branching becomes less uniform as a result.

If direct sticking rather than transplanting rooted cuttings, the amount of time required having cuttings sufficiently rooted and ready to pinch is usually five weeks. If cuttings are rooted in Jiffy® plugs, Oasis®, Rockwool® cubes, or other such media, the propagation period is approximately four weeks. Therefore, using the transplant date identified above, count backward another four weeks to determine optimum propagation date for the crop.

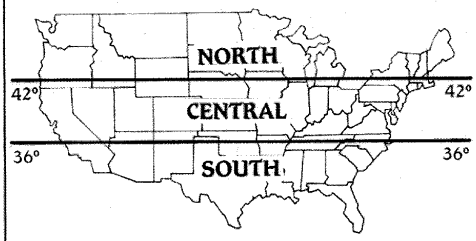
Using information outlined above and details on the cultivars used from breeders, it is possible to schedule and plan production for optimum results. Try it out on the worksheet (Figure 1, page 22) and compare it to what has been done historically in your own greenhouse; you may be surprised at the differences. Look at this as a way to fine-tune the crop and help increase the uniformity and consistency of the production.

Continued on page 22

Table 1

Vegetative Growth Requirements

Number of days vegetative growth suggested between pinching and flower initiation as determined by product form and geographic location.



Product Form	Geographic Location South	Central	North
3''	0	3	5
4-4½'' 1 Plant Pinched	5	7	9
5½-6'' 1 Plant Pinched	9	12	15
6½'' 1 Plant Pinched	12	16	22
7'' 2 Plant Pinched	18	22	27
8'' 2-3 Plant Pinched	21	26	31
10'' 3-4 Plant Pinched	25	30	35

Table 2

Vegetative Growth Adjustments

Number of additional days vegetative growth suggested between pinching and flower initiation as determined by growth habit characteristics.

Product Form	Growth Habit Short	Medium	Tall
3''	5	0	0
4-4½'' 1 Plant Pinched	5	5	0
5½-6'' 1 Plant Pinched	10	5	0
6½'' 1 Plant Pinched	10	5	0
7'' 2 Plant Pinched	10	5	0
8'' 2-3 Plant Pinched	15	10	0
10'' 3-4 Plant Pinched	15	10	5

Table 3

Establishing Requirements

Number of days required to establish rooted cuttings into container prior to pinch.

Container Size	Number Cuttings per Container	Number of Days
3''	1	5
4-4½''	1	8
5½-6''	1-2	10-14
6½''	1-3	14
7''	1-5	14-17
8''	1-7	17-20
10''	1-10	20-25

Note: Exceptions to this guideline include: The production of tree forms that require extended growing prior to the initial pinch; the production of specific cultivars like Eckespoint Lilo and its color sports that require pinching within 10-14 days of transplant.

SCHEDULING POINSETTIAS FOR OPTIMUM RESULTS

Continued from page 21

Figure 1

Blooming Poinsettia Production Schedule

1. Product Form: _____

   Pot Size: _____ Finished Height: _____

   Plants per Pot: _____ Blooms per Plant: _____

2. Required Market Date: _____

3. Cultivar: _____

   Flowering Response Time: _____ Growth Habit: _____

4. Flower Initiation Date *(Market Date less Response Time):* _____

5. *If the date in Step #4 is before 9/20, blackclothing will be required. Start blackclothing on the Flower Initiation Date and continue until 10/15.*

   Blackcloth Start Date: _____

   If the date in Step #4 is after 9/30, lighting will be required. Start lighting on or around 9/10 and continue until the Flower Initiation Date.

   Lighting Stop Date: _____

6. Vegetative Growth Requirements will be influenced by the height characteristics of the cultivar being grown, by the geographic location, and by the product form being produced *(Refer to Tables 2 and 3).*

   A. Number of days required due to product and location (Table 2): _____

   B. Number of days required due to height characteristics (Table3): _____

   Total Vegetative Growth Required (A+B): _____

7. Pinch Date (Pinch Date = Flower Initiation Date less Vegetative Growth Required) _____

   Additional Pinch Dates: _____

8. Transplant date will be determined by the product form.

   Branched Plants = Pinch Date less approximate Establishing Time (See Table 4): _____

   Non-Branched Plants = Flower Initiation Date less Vegetative Growth Required: _____

   Specialty Product Forms (Example: Tree): _____

9. Propagation Date for Transplant: _____

   Propagation Date will be determined by propagation method. If rooting in a small container or root cube, allow a production period of 4 weeks to produce the cutting.

   Propagation Date for Direct Stick: _____

   If direct sticking into the finished container, allow a production period of 3 weeks to root the cutting.

CONGRATULATIONS AND BEWARE!

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Almost all horticultural and agricultural products are suffering from several problems and issues these days. The purpose of this article is to congratulate the horticultural industry, but warn you of several pitfalls that may confront your industry.

A LITTLE HORTICULTURAL / AGRICULTURAL HISTORY

In the late 1800s and early 1900s, input suppliers controlled what was happening. They were extremely large compared to growers / farmers. Many sold adulterated products, in terms of petroleum, transportation, plant stocks, fertilizer, etc. This was a period dominated by several "trusts" – the oil trust, the rail transportation, etc.

During the 1940s to about the mid-1980s, food manufacturers, processors, and brokers were in control. Again, they were large compared to their buyers and sellers. Many had brand names, extensive advertising, or a significance presence in the broker world.

Since about the mid-1980s, retailers have taken charge of the horticultural and agricultural industries. Again, their size, growth, and acquisitions have been major factors in their importance. However, retailers' primary competitive advantage is they know what is selling and what is not. This comes from their scanning data.

Since about the turn of the century, there has been a new change in market power. This is due to direct Internet purchasing. Just in the last year I have changed my own buying habits. Only a few years ago I never thought I would be buying much over the Internet, but within the last year I have purchased two computers, airline tickets, a used car, and tires via the Internet. The point is that power is now shifting to consumers, not through retailer surrogates, but directly. This factor may have less of an impact on the horticultural and food industries than other industries because of the perishable nature of our products.

TRENDS TO BE AWARE OF

Certainly this is not a comprehensive list of trends. However, they are my best guesses of issues that will increasingly impact the horticultural industry.

Excess Capacity. This is a major nemesis of almost every industry, especially the horticultural and agricultural industries. It boils down to too much production and processing capacity. Sometimes it is due to over-optimism. For example, five to seven years ago, both the apple and cranberry industries were doing extremely well. However, there were major over-plantings of both crops; and in the last year it was estimated that there was a 35 percent surplus production of both commodities.

It seems that whenever there is a profitable segment, competitors quickly discover it and will be there tomorrow. The excellent profits may be there for two to three years, but losses may follow as a result of too much capacity.

Another factor that causes excess capacity is technology improvements. New technology almost always adds to the capacity of an industry, because very little is taken out when new is added.

There are some mechanisms to reduce excess capacity, the most common being bankruptcy. There are other "kinder and gentler" methods currently available (i.e. better information), and I believe there are other alternatives yet to be explored. The general goal is to reduce excess capacity as soon and painlessly as possible.

Input Supply Consolidation. I plead ignorance when it comes to knowing what is happening in the horticultural industry. However, I am willing to guess there is as much, if not more, consolidation among the suppliers you buy your inputs (i.e. fertilizer, seeds, equipment, fuels) from as there is among retailers.

Your Big Volume Customers. We all know about the consolidation of retailers and the growth of big box stores. But other trends are even more dangerous.

First, I firmly believe that retailers just want to sell "real estate," that is, sell shelf space. And they want their suppliers to do everything else for them to service that real estate. That is, they want suppliers to provide the inventory and logistics to their outlets, keep their shelves full with the high quality product, and water it for them. This is known as supply chain and category management.

I am not yet aware of any retailer requiring suppliers to provide check-out personnel, but I can imagine it is not far off.

Centralized and More Sophisticated Buying. Several buyers have gone to one centralized buying office for all their operations; the "new" buyers may have an MBA. Also, they are probably rotated to another product 18 to 24 months after they started handling your product. You never get to know the person, and that is the purpose. Finally, these buyers are likely to be "buying off of spreadsheets" (i.e. looking at last year's prices and profits), rather than having any real knowledge of the supply and demand conditions in the industry that year. Call this the Wal-Mart model.

They now also use "pay by scan," so you only get paid for what goes over the scanner and when it goes over the scanner. This is a major disadvantage for the horticultural industry, which has such fragile and perishable products.

Supply and Pricing Changes. While some segments of the horticultural industry are very seasonal, do not be surprised if some of your buyers will require you to provide a 52-week supply of the different types of products they sell over the course of the year, even if you do not produce it. Also, they may insist that you enter into a fixed price contract for a portion of what you promise to deliver 12 months before you sell it and know what supply and demand conditions are.

Greater Distribution Outlets. One bright spot is that more types of store and distribution outlets are handling more types of products today. Ten years ago who would have thought that you could be buying the things we buy in drug stores, convenience stores, and discount retailers these days.

CONGRATULATIONS

At the beginning I wrote that the horticultural industry deserves congratulations, and you do. In general, you have been a growth sector for many years, and I expect that to continue for the foreseeable future.

In your sister agricultural industry, several commodities are suffering tremendously. I have already mentioned apples and cranberries. But others having trouble include sugar, almost all types of grains, dairy, cabbage, to name just a few. None of these are growth industries.

Some of the lack of growth is due to the governmental policy that caused excess capacity and did not require good marketing on the part of producers. The 2002 Farm Bill is predicted to cause even more havoc with greater production, but no additional demand.

SUMMARY

I firmly believe the secret to the horticultural industry's relative success has been that you have had to be very market driven, or you would not have survived. You will be able to deal with the trends and issues I have outlined here if you continue to be market oriented. Again, congratulations, but beware. **OFA**

PEST CONTROL FOR INTERIOR PLANTSCAPERS

A ONE-DAY RECERTIFICATION SEMINAR

Pest Control for Interior Plantscapers will be held January 31, 2003 at the Radisson Airport Hotel, Columbus, Ohio.

This unique program is developed exclusively for interior plantscapers who need to fulfill their recertification requirements to maintain their pesticide applicator license.

The speakers will focus on disease prevention, application safety, integrated pest management, environmental considerations, and diagnostics.

The following states are approving recertification credits:

Ohio – 1 hour of CORE credit and 5 hours of 6B commercial interior plant landscape credit

Indiana – 5 credits in 3a (Ornamental); 5 credits in LC (Interior Plantscape); 4 credits in RT (Registered Technician)

Kentucky – 2 specific credits & 3 general credits in Category 19 (Interior Plantscapes)

Michigan – 4 credits in Category COMM CORE, 7E

Pennsylvania – 2 credits in Category 00 (Core); 9 credits in Category 18 (Demonstration & Research); 9 credits in Category 22 (Interior Plantscape)

West Virginia – 11 credits in Category 4B (Indoor Ornamental)

For more information, visit the OFA web site at www.ofa.org.

2002 CENSUS OF AGRICULTURE

This month, the U.S. Department of Agriculure will mail the Census of Agriculture questionnaire to all U.S. growers and farmers in all types of agriculture. It is mandatory for growers to complete and return by February 3, 2003.

It is imperative that floriculture be recognized as a major player in U.S. agriculture. Then, when research monies are distributed, projects are funded, or policies made in Congress or elsewhere in the federal or state governments, floriculture will stand out where it belongs: as a leader in U.S. agriculture.

For assistance completing the forms, call the U.S. Department of Agriculture at 1-888-4AG-STAT.

OFA News

OFA – an Association of Floriculture Professionals
www.ofa.org

OFA EVENT CALENDAR

JANUARY 2003
Interior Plantscape Pest Control Seminar – January 31

FEBRUARY 2003
OFA Committee Meetings – February 21-22
OFA Board Meeting – February 23

JULY 2003
OFA Short Course – July 12-16
Greater Columbus Convention Center
Columbus, Ohio USA

OFA – an Association of Floriculture Professionals
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