

# BULLETIN

## Fusarium, Ethylene, and Tulips

by William Miller, Ph.D.

**Editor's Note:** This is the content of Dr. Miller's presentation during the Research Summaries at the 2005 OFA Short Course in July. For an audio CD of this presentation and others at the OFA Short Course, visit the OFA Web site at [www.ofa.org](http://www.ofa.org).

Many long-time tulip forcers are familiar with this very important advice: ventilate non-precooled tulips upon arrival! There are several reasons for this, but the major one is to eliminate ethylene from the atmosphere immediately surrounding the bulbs. Ethylene sources can be external (internal combustion engines, ripening fruit or vegetables, etc.); or ethylene may arise from Fusarium-infected bulbs. The Fusarium fungi that attack tulips produce large quantities of ethylene that can cause quality loss in nearby, healthy bulbs as a result of the ethylene.

### Recognizing Fusarium Infection

The most common Fusarium in tulips is *Fusarium oxysporum* Schlecht. f. sp. *tulipae*, and this fungus is a problem wherever tulip bulbs are produced. Tulip bulbs infected with Fusarium are easily recognized by the tan to light brown areas on the bulb. Another easy way to detect Fusarium is to smell the bulbs. Infected bulbs have a distinct sour smell. Infected bulbs may also have white mycelium (mold) growing on the surface, usually concentrated on the basal part of the bulb. Still other bulbs may be very lightweight, as a result of the starches and other scale components being consumed by the fungus. Bulbs with a severe infection might show a

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## OFA Short Course Idea Exchanges Yielded Many New Tactics to Try "At Home"

by Bill McCurry & Gary Hudson

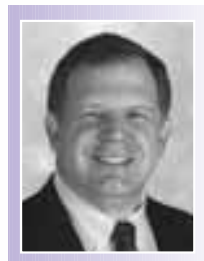
Increased efficiency from every inch, every person, and every product – that was the recurring theme from several 2005 OFA Short Course Idea Exchanges (garden center, management, marketing). For hours, industry veterans Gary Hudson and Bill McCurry facilitated discussions among Short Course attendees while they exchanged real-world, functioning ideas during informally structured roundtable sessions.

"We'll be back next year," said Lisa Campbell (Danville Gardens, Danville, Illinois). "We get 'overloaded' with good ideas."

"We've been to Columbus for a number of years now and always have something to take back home with us that we can put to use," reported Lynne Hess (Hess Greenhouses, Harrisonburg, Virginia).

Information from Point of Sale (POS) and related systems have made effective decisions easier. One idea exchanged came from Mike Berns (Bern's Garden Center, Middletown, Ohio) who told how he evaluated his garden center by each display area – focusing on gross margin dollars generated per square foot. Mike also studied

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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 Forum

## OFA's Role in the Green Industry

by Doug Cole, OFA President

Many of us would describe ourselves as "greenhouse industry" businesses, but I believe we are also an integral part of a larger "green industry." I also believe that working together as an industry is more important than ever. Growing, selling, and promoting the use of flowers is a beautiful way to make a living; but we also work in a challenging environment, and we face many obstacles in our efforts to get flowers in consumers' hands.

If you read trade journals, you know you are not alone if you feel profit margins are shrinking. Our supply/demand balance has tightened up. The greenhouse industry in Europe has experienced an oversupplied market for some time and has seen many consolidations due to this challenge. Natural disasters, such as the hurricanes along the Gulf Coast this fall, add a whole other element to the supply/demand chain.

In the last 20 years, we have also seen a huge change in how we are expected to run our businesses. We are more accountable to federal and local government rules and regulations. Besides labor and environmental requirements, many growers face the challenge of local growth directly abutting their facilities. Finding workers to labor in your facility is also a challenge. It doesn't matter which part of the flower chain you're involved with, you have your fair share of "situations" to negotiate each day.

However, I don't mean to sound all "gloom and doom" – these are simply the challenges of running almost any business, anywhere. And I think there's a very positive side to all this – you have to look outside yourself to find answers. There's a tremendous

strength in numbers, as folks work together, combine efforts, share ideas, and think of solutions together.

In our case, we're lucky – we have OFA, which gathers the best and brightest of our industry. This is a direct benefit for business owners, and it gets our newer and younger employees onto a leadership tract to keep our businesses professional and on the cutting edge. Being part of OFA is the first step in making your business stronger and more informed.

Whether it's through the OFA Short Course, regional outreach education programs, or simply the network of professionals connected via OFA membership, OFA works continually to improve the knowledge base of floriculture.

Conference calls and e-mail are great, but there is still tremendous value in face-to-face engagement. The OFA Short Course has become our industry's largest venue for in-person meetings. The trend of holding meetings and receptions during Short Course has expanded in recent years. OFA is here for the industry. If this is what works and keeps the exchange of ideas flowing, then OFA will adapt its event to allow for these agendas.

### Maintaining Our Vision

OFA's mission is to support and promote floriculture professionals through lifelong learning, career enhancement, and public awareness. We must maintain a clear vision of our purpose at all times.

There is a constant need for current information, for all parts of your business, and we realize that. OFA is committed to remaining your connection to literally thousands of ways to improve what you're doing. It's

an exciting challenge – OFA members come from many locations, business sizes, areas of interest, and skill levels.

Tomorrow's successful trade organization will embrace its successful past and also envision the future needs of its membership. Our job is to remember our history and to combine that with the vision that our members would like to follow. What do our members want for outreach? What do they want for activities at Short Course? How do we define a member? Is the status quo acceptable?

As a member of OFA, you're already a valuable part of our team. You know that the network of your peers, the educational opportunities, and the access to industry information provided through OFA are worth far more than your membership dues ever cost. And we will continue finding ways to make floriculture work for you.

### Room for Everyone

The more I learn about all of the associations within the green industry, the more I find there is to learn about their roles and relationships. It is important for our members that OFA stays abreast of the happenings of other associations. Nothing says that we need to mirror these groups, but we certainly can benefit from knowing what they are doing and why. We all gain by seeing each other's successes and failures.

All of these associations have a mission. The question is – in what ways can associations help each other by working together and sharing projects and information? This is true for associations that have different constituencies, as well as those with different purposes. For example, OFA does not lobby, but we work with groups such as ANLA and SAF to present all green industry members' needs to legislators. OFA members can add their influences pertaining to the direction of these two groups.

If floriculture is your profession, you belong at OFA – and we will make sure that you are connected to not only your peers, but also to the other outlets from which you need information.

I am so pleased to be part of OFA, and I'm proud to represent the interests of you and other floriculture professionals in OFA's activities.

**Editor's Note:** Doug Cole most recently served as the OFA treasurer, and he's been active on several committees. Doug gives back to the industry in a variety of other ways as well – as a FIRST board member, America in Bloom supporter, New Hampshire Agriculture advisory board member, All-America Selections display garden site, former vice president of New Hampshire Farm Bureau, and a member of the international organization Fleuroselect, to name a few. As general manager of D.S. Cole Growers, a young plant and pot plant producer, Doug oversees new product development and business planning. He started the business in 1987.

## Fusarium, Ethylene, and Tulips

Continued from page 1

somewhat opened bulb tip, with the protruding leaves dried out. Multiple fungi can be present on a tulip infected with Fusarium – for example, Penicillium. This fungus is distinguishable from Fusarium, because it is a bluish-green fungus. With only superficial growth on the bulb's surface, Penicillium is not a major problem.

### Field and Production Factors

Infection of tulip bulbs by Fusarium is more likely during growing seasons with high soil temperatures from the period of flowering (i.e. early May) until digging in late June to mid-July. Thus, Fusarium is exacerbated in warmer growing seasons. Past research has indicated that later digging tends to increase Fusarium infection, due to the normal increase in soil temperature in late spring. On the other hand, early harvesting to avoid warm soil temperatures is not an answer, because bulbs are not properly mature with early digging. In the case of Dutch production, there are many suggestions about the sudden increase in Fusarium over the recent few seasons, including changes in farming practices and bulb handling equipment, Dutch regulatory changes affecting fungicide availability, buildup of spore and inoculum in

the soil, and possibly the appearance of one or more "new" Fusarium strains that could be more resistant to fungicides and/or generally more aggressive in their infection and spread.

### Fusarium, Gummosis, and Ethylene

Aside from direct effects of the fungus on a bulb, a much larger problem comes from the fact that the Fusarium fungus produces a large quantity of the plant hormone, ethylene. This ethylene can have several negative effects or consequences, including: flower abortion; uneven, stunted growth; reduced rooting; and gummosis (external or internal blobs of a clear to brownish-tan substance that ultimately hardens like peanut brittle (without the peanuts, of course...)). In severe cases, the external "gum" can cement numerous bulbs together into a cluster. Often the gummosis is only produced inside the bulb ("internal gummosis"), filling up the spaces between the bulb scales. The bulb must be cut open to see internal gummosis.

Another confounding factor in the diagnosis of ethylene problems is the timing of ethylene exposure.

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## Fusarium, Ethylene, and Tulips

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Gummosis is more commonly expressed in tulips exposed to ethylene shortly after digging, that is, in mid- to late July. The same cultivars exposed to ethylene late in the season (for example, after shipment to the United States) will often not develop any gummosis at all, but may still show 100 percent flower abortion upon forcing.

While most of the symptoms of tulip ethylene exposure are deleterious (e.g. flower abortion), others (e.g. gummosis) are not specifically problematic. If the flower of a tulip cultivar aborts due to ethylene exposure, the bulb is obviously worthless. On the other hand, the presence of some gummosis is not an indication the shipment should be refused. Cultivars vary in their sensitivity to ethylene and their expression of gummosis symptoms. For example, certain tulip cultivars may exhibit gummosis after ethylene exposure, but be somewhat immune to ethylene-induced flower abortion. Thus, the presence of gummosis in a cultivar in a shipment only indicates that **that cultivar** was exposed to ethylene (which probably occurred well before shipment), but it does not **specifically** indicate that the **entire shipment** was exposed; nor does it **specifically** mean that the affected bulbs will show problems upon forcing.

Our recent research at Cornell has looked into cultivar differences in terms of their ability to support ethylene production. It is important to realize that it is **the fungus that makes the ethylene, not the bulb itself**. We have found that cultivars vary tremendously in their ability to support ethylene production. Some cultivars we have examined appear to produce almost no ethylene after infection by *Fusarium*, whereas others produce extremely large quantities of ethylene per day. In some cultivars, we have measured ethylene production rates that are more than seven times greater than the "standard" ethylene production rates established several decades ago in Holland.

Due to the complex interaction of cultivar, symptom expression, and varying times after digging when these problems can occur, you should immediately contact your supplier if you receive a shipment with a substantial proportion of *Fusarium*- or gummosis-affected tulips. Long-standing advice has been to seriously consider discarding the lot if more than 10 percent of the bulbs are infected by *Fusarium*. This is, again, due to injury from the large quantity of ethylene that can be produced from the infected bulbs.

The Dutch industry is very aware of *Fusarium*, and is very concerned about the quality issues that arise with *Fusarium* infections. New technologies are being tested – for example, machines that detect infected bulbs and remove them during sorting. Other procedures are simpler: delaying shipment as long as possible to allow additional inspection and removal of infected bulbs. Still other remedies, for example 1-MCP (EthylBloc, and other trade names), may or may not have a future role with the Dutch tulip industry.

### What To Do?

Since *Fusarium*-infected bulbs continue to produce ethylene after planting, such bulbs can injure bulbs within a pot or a cut flower forcing crate. Thus, the old adage that one bad apple spoils the batch applies perfectly to planted tulips. For non-cooled bulbs, ventilate upon arrival. Do not allow temperature to rise above 63°F unless specifically recommended by your supplier (higher temperatures allow greater ethylene production and increase sensitivity to ethylene). Once bulbs are put into "cold" temperature (48°F or lower), ethylene production is practically nil, and the bulbs no longer perceive it.

Upon arrival and during planting operations, bulbs should be inspected; and bulbs showing any signs of *Fusarium* infection should be discarded. A pot with five healthy bulbs and one infected bulb will be a loss and must be discarded, or laboriously "patched" before sale. Also discard any bulbs that are "light" (having been consumed already by the fungus), and any with a sour smell (sure evidence of *Fusarium* actively working on the bulb). It cannot be emphasized how important this step can be to help with uniformity of the pot or cut flower crate during forcing. As stated before, the presence of gummosis should be immediately discussed with your supplier – this is a sure sign of ethylene exposure, but it may or may not cause a forcing problem. The usefulness of dipping or drenching with *Fusarium* fungicides by forcers is questionable, because the injury resulting from ethylene exposure has already mainly occurred.

Thank you to the USDA-ARS Floriculture Research Initiative, and to SAF and its members who work so hard in Washington to garner support for floriculture research. Thanks are also extended to the Royal Dutch Exporters' Association for Flowerbulbs and the Nursery Stock (KBGBB), Hillegom, Holland and Floralife Co. for financial and material assistance with this work.

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A small version of the 'ofa' logo, consisting of the lowercase letters 'ofa' in a stylized font with a green leaf-like shape above the 'a'.

# Varying Application Practices of Flurprimidol Pre-Plant Bulb Soaks

by Brian A. Krug, Brian E. Whipker, Ingram McCall, and John M. Dole  
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**Editor's Note:** At the recent SNA Research Conference, held in conjunction with the 2005 SNA Trade Show, Brian Krug gave a talk summarizing some of his research done with Brian Whipker, Ingram McCall, and John Dole at North Carolina State University. The written version is being presented here with very little modification, for two reasons. First, it provides very practical information for the effective use of a new, very promising plant growth regulator, soon to be released. Second, it is a good example of the "bounty that can be harvested" from the program. During the two-day Research Conference, academics and grad students from around the country present seven-minute summaries of some of their efforts in any of a number of categories, including: container-grown plant production, field production, entomology, pathology and nematology, economics and marketing, engineering, structures and innovations, growth regulators, propagation, weed control, landscape, water management, plant breeding and evaluation, and floriculture. There are few venues that offer growers and other industry professionals a similar opportunity to stay abreast of the latest in ornamental horticulture research; so, mark August 9 and 10 on your 2006 calendar and plan to attend next year. Admission is included with SNA trade show registration. You can also review papers that have been presented at past SNA Research Conferences (1992-2004) at: <http://www.sna.org/research/researchproceedings.shtml>

This article is reprinted from the 2005 SNA Research Conference Proceedings with the permission of SNA and the senior author, Brian Krug. Permission to edit a few of the units of measurement was granted by Brian.

## Significance to Industry

The results of these experiments suggest that the use of flurprimidol pre-plant bulb soaks is a suitable height-control option to prevent postharvest stretch of hyacinths. Growers have the flexibility of treating either the day of or up to seven days in advance of potting; they can soak the bulbs from 2 and 40 minutes; they can re-use one liter of solution with at least 100 bulbs (at which time the solution will need to be replenished) and still achieve a similar degree of height control. Furthermore, the problem of disposing with the residual soak solution can be overcome by applying the solution as a substrate drench on another crop (3). Flurprimidol pre-plant bulb soaks offer growers an alternative treatment method with flexibility for height control on bulb crops.

## Nature of Work

Plant growth regulators (PGRs) are often needed to control greenhouse and postharvest height of hyacinths (*Hyacinthus orientalis*). Pre-plant bulb dips have advantages over other application methods including

time and labor savings, accurate dosages, and reasonable costs. Extensive research has been conducted to determine the optimal duration and timing of pre-plant bulb soaks of lilies (*Lilium* hybrids) using ancymidol. This information is not available for applying other PGRs as pre-plant bulb soaks to most other bulb crops. Preliminary trials indicate that flurprimidol pre-plant bulb soaks are effective at controlling height of hyacinths as well as many other crops (4, 5, 6, 8). However, unanswered questions remain pertaining to the application practices involved with flurprimidol pre-plant bulb soaks. The objective of this study was to determine the optimal timing, duration, and the efficacy over repeated use of flurprimidol pre-plant bulb soaks.

One un-cooled hyacinth 'Pink Pearl' bulb was planted per 10.2-cm (4-inch) round plastic pot with a volume of 575 ml (1.2 pints), on 24 October 2003. The root substrate was Berger BM 6 (Berger Peat Moss, St. Modeste, Que.), which contained 75 percent to 80 percent Canadian sphagnum peat and 20 percent to 25 percent perlite. For 10 weeks, the cooler temperature set point was 5.0°C (41°F). On 5 January 2004, the cooler temperature set point was reduced to 1.1°C (34°F) until 4 February 2004, when the bulbs were removed from the cooler and allowed to acclimate overnight. Greenhouse forcing began on 5 February with day/night set points of 20.0°/18.3°C (68°/65°F). Plants were forced under natural daylength. Pre-plant growth regulator treatments were unique for each experiment as listed below.

### Experiment 1 – Determining advanced soak timing.

'Pink Pearl' hyacinth bulbs were soaked for 10 minutes in 20 mg·L<sup>-1</sup> (= 20 ppm) flurprimidol seven (17 October), one (23 October), or zero (24 October) days before potting. An untreated control was also included. The experiment was a completely randomized design with four single plant replications of the four treatments.

**Experiment 2 – Determining soak duration.** 'Pink Pearl' hyacinth bulbs were soaked in a flurprimidol solution (20 ppm) for 1, 5, 10, 20, or 40 minutes before potting. An untreated control was also included. The experiment was a completely randomized design, with four single plant replications of six treatments.

**Experiment 3 – Determining flurprimidol solution efficacy with repeated use.** Twenty batches of four 'Pink Pearl' hyacinth bulbs were soaked, one batch at a time, for 10 minutes in 800 ml (27.1 fl oz) of flurprimidol (20 ppm).

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## Varying Application Practices of Flurprimidol Pre-plant Bulb Soaks

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An untreated control was also included. The soak solution volume was measured after each batch was soaked to determine the amount of solution utilized by the bulbs. The experiment was a completely randomized design with four single plant replications of 21 treatment batches.

**Postharvest** – Plants from each experiment were placed in a growth chamber at 20.0°C (68°F) after anthesis (one floret completely open). Fluorescent bulbs provided light at 24 to 75  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$  for 12 hours per day. Plant height was recorded 10 days after anthesis.

**Data analysis.** Data were tested by analysis of variance (ANOVA) using a general linear model (SAS Institute, Cary, N.C.). Postharvest plant height values were regressed using PROC REG procedure to determine the best-fit (linear or quadratic) model. Terms of the model were evaluated for significance based on a comparison of F values at  $\alpha = 0.05$ . PROC NLIN in SAS, as modified by Cox (1), was used to calculate linear-plateau functions (model IV) relating postharvest plant height to flurprimidol pre-plant soak durations. The quadratic and the linear-plateau models were compared to determine the best-fit based on  $r^2$  values. Mean comparisons were also done using orthogonal contrasts.

### Results and Discussion

#### Experiment 1 – Determining advanced soak timing.

The height of 'Pink Pearl' hyacinths were similar when pre-plant bulb soaks of 20 ppm flurprimidol were applied

the day of potting or one day or seven days before potting (Table 1). An application window of up to seven days would be advantageous to growers by offering flexibility in scheduling PGR treatment. This flexibility allows growers to treat a large amount of hyacinth bulbs at one time and plant as labor is available over a seven-day period.

**Experiment 2 – Determining soak duration.** 'Pink Pearl' hyacinth plant heights were significantly shorter than the untreated control using flurprimidol pre-plant bulb soaks (20 ppm) at any duration trialed (1, 5, 10, 20, and 40 minutes) (Figure 1). Soaks at any duration, with the exception of one minute compared to five minutes, were not significantly different from each other (data not shown). Based on regression analysis, plants were 18.7 cm (7.4 inches) tall, which were 24.7 percent shorter than the untreated control, when soaked for 1.3 minutes. No further increases in height control occurred at longer soak durations  $\geq 1.3$  minutes (Figure 1). According to Krug et al. (6), 25 ppm flurprimidol soaks for 10 minutes were recommended for hyacinth. With shorter soak durations providing suitable height control, growers will be able to save time in the application of flurprimidol pre-plant bulb soaks. Growers should conduct on-site trials to determine the optimal soak duration for individual species.

**Experiment 3 – Determining flurprimidol solution efficacy with repeated use.** Hyacinth 'Pink Pearl' bulbs were

**Table 1.** 'Pink Pearl' hyacinth plant heights at postharvest (13 days after anthesis) when treated with a 20 ppm flurprimidol pre-plant bulb soak the same day of potting or one day or seven days before potting.

| Bulb Treatment                      | Plant Height (cm) Postharvest |
|-------------------------------------|-------------------------------|
| Control                             | 25.0 <sup>z</sup>             |
| Same day                            | 20.8                          |
| 1 day                               | 20.9                          |
| 7 days                              | 20.8                          |
| <b>Contrasts</b>                    |                               |
| Control (0 soak) vs any soak timing | *** <sup>y</sup>              |
| Same day vs. 1 day                  | NS                            |
| Same day vs. 7 days                 | NS                            |

<sup>z</sup> Values are means of four replicates (plants).

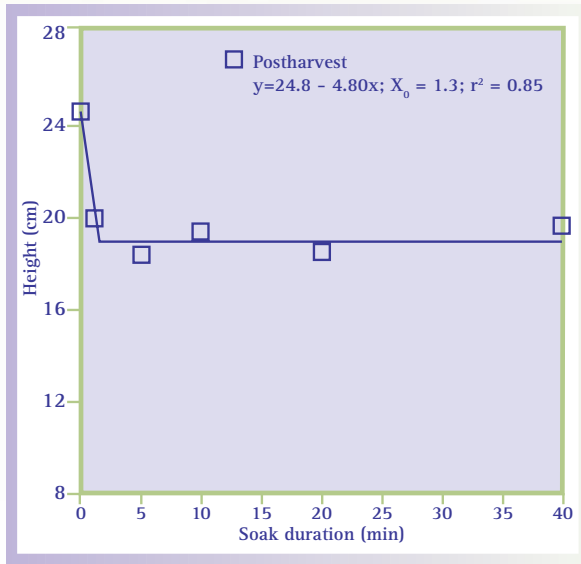
<sup>y</sup> NS, \*, \*\*\* Not significant or significant at  $P < 0.05$  or 0.001, respectively.

**Table 2.** 'Pink Pearl' hyacinth plant heights at postharvest (13 days after anthesis) when batches of four bulbs were treated with a 20 ppm flurprimidol pre-plant bulb soak sequentially in 1 L of solution.

| Contrasts                    |                  |
|------------------------------|------------------|
| Control (0 soak) vs. any PGR | ** <sup>yz</sup> |
| Batch 1 vs. B5               | NS               |
| Batch 1 vs. B10              | NS               |
| Batch 1 vs. B15              | NS               |
| Batch 1 vs. B20              | NS               |

<sup>z</sup> NS, \*, Not significant or significant at  $P < 0.05$

<sup>y</sup> with exceptions of batches 13 and 18



**Figure 1.** 'Pink Pearl' hyacinth plant heights at postharvest (13 days after anthesis) when treated with a 20 ppm flurprimidol pre-plant bulb soak for 1, 5, 10, 20, or 40 minutes (values are means of four replicates).

significantly shorter than the untreated control as a result of soaking batches of bulbs over time (Table 2), with the exception of bulb batches 13 and 18. It is unclear why these two batches were not significantly different than the untreated control. The soak solution utilized by each batch ranged from 16 to 32 ml (4 to 8 ml per bulb). Batches 13 and 18 absorbed 28 and 24 ml (7 to 6 ml per bulb) of solution respectively, so the absence of control in those batches was not due to lack of PGR utilization. Removal of tulip bulb tunics during storage increases respiration (2). From this information, it could be deduced that the presence of a tunic could limit uptake of a PGR solution. Although the hyacinth tunics were not inspected, the bulbs in batches 13 and 18 may have possessed thicker tunic layers which hindered PGR uptake. Regardless, plant height was no different between first- and last-soaked bulbs (Table 2). The repeated use of 800 ml of flurprimidol solution over 20 batches of hyacinth bulbs did not diminish the efficacy of the solution. Each batch of four bulbs used on average

24.4 ml of solution (data not shown). At this rate of utilization, only 312 ml of solution were remaining at the end of the 20<sup>th</sup> batch, which was the minimum volume needed to completely submerge four bulbs. Therefore, due to utilization by the bulbs, the solution would need to be replenished prior to any possible loss of efficacy. Similar findings were found when hybrid lilies were repeatedly soaked in paclobutrazol (7). This utilization of the PGR soak solution also decreases the amount of residual solution requiring disposal.

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# ofa Marketing

## OFA Short Course Idea Exchanges Yielded Many New Tactics to Try "At Home"

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traffic patterns throughout the center to determine the highest impact areas.

By observing and listening to customers, Mike found that roses generally weren't bought on impulse. Customers knew they wanted roses before they left home. Like many garden centers, Mike had placed his rose selections right inside his front gate. This left a non-impulse product occupying hundreds of square feet in his highest traffic area.

Mike relocated the roses to a back section of the garden center and filled the high-traffic, high-visibility front entrance with large containers, some selling for hundreds of dollars. The rose department had zero change in volume, while the gross margin from the relocated container section skyrocketed.

"We're margin controllers," Mike reported. "Don't overlook your ability to adjust pricing in the middle of the day. I'll look at a new delivery coming in, and if the product looks exceptionally spectacular, I'll raise the price before it's off the truck. That could add \$500 or \$1,000 in gross margin. We used to be quick to take a markdown and never consider a markup. Now we adjust pricing both ways depending on conditions.

"We changed our "4 fer" pricing this year. Last year we sold four "Super Bloomers" for \$20; we needed to recoup higher costs, so this year we went to four for \$25. We watched it almost daily through the season, and our unit sales stayed level – so that means our dollar volume went up 25 percent, which was all added margin."

Perhaps the most non-traditional decision was that Mike "fired" his bird department. Analysis of space, investment, and time showed that the returns from bird seed and related products were nil. The space was given over to more profitable products that were easier to handle and maintain.

Tom Smith (Four Star Greenhouse, Carleton, Michigan) caused many people to wonder with the end-of-season offering he made to his customers. "Order four and we'll give you the fifth one free – if you return one of your bad-looking plants." Tom's point was to challenge garden centers to look at their "bad" inventory and replace it with fresh stock. Tom's perspective is that bad-looking plant material will discourage customers from buying the good stuff that's next to it. Tom said there's only one thing to do: get rid of the bad stuff. To help lessen the financial pain, Tom replaces "bad stuff" for his



**Figure 1.** Mike Berns of Berns Garden Center (Middletown, Ohio) relocated his rose department from the high-traffic front area to the farthest back section of the property, based on gross margin dollars generated by square feet. Berns made sure his rose customers could find the new rose section with highly visible signage. The rose section volume stayed level while the new large container section, which went into the now-vacant high-traffic area, increased 25 percent in gross margin dollar generation. The impulse items were immediately picked up by customers. Gross margin started climbing before the relocation was complete.

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**Figure 2.** When Mike Berns relocated his rose department to the rear of the garden center property, he made sure the signage was easy to spot, the department was inviting, and the product first-class. Mike did not lose any sales volume while relocating the roses from the highest traffic/visibility area to the lowest.

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**Figure 3.** "We're margin controllers." That's what Idea Exchange participants heard about Berns Garden Center. Mike Berns felt his product was so good this year, he could increase his retail price on "Super Bloomers" from four for \$20 to four for \$25. The result was the same unit sales that translated into a 25 percent increase in dollars collected, with all of the increase being pure gross margin.

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customers, regardless of what product it is or where it came from. Tom has found he gets valuable market information by looking at what comes back from his customers. In addition, his customers' stores look better, sell more, and reorder more often. Tom's challenge to us all is to look at our display space as a resource and maximize the results from every square inch of space. Either make sure all our product looks beautiful, or don't have it on display.

### More Take-Home Information is Available

Audience members suggested that the ideas offered be transcribed and available to OFA members in small pieces throughout the year. Volunteer scribes took notes, which you can have e-mailed to you via [www.ideaexchanges.com](http://www.ideaexchanges.com). You can also view archives of past e-mails. Use these ideas

to hone your marketing and management skills – and don't forget to mark your calendars for next year's OFA Short Course, July 8-11, 2006. The 2006 Idea Exchanges are on Sunday evening, July 9.

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## Energy Market Situation and Outlook

by Matthew C Roberts, Ph.D.

Although much attention lately has been devoted to the effects of Hurricanes Katrina and Rita on the U.S. energy infrastructure, these price spikes are effects – not causes – of the fundamental supply/demand imbalance in the global energy market. Strong economic growth in the United States and developing countries has increased the demand for energy. Production capacity, long neglected in many oil-producing nations, has expanded much less quickly. Global oil consumption is now hovering near production capacity, making crude oil prices much more sensitive to supply shocks. The domestic natural gas market is even tighter, as the high cost of liquefaction and transportation has discouraged the construction of LNG (liquefied natural gas) import terminals in the United States – forcing the United States to rely on domestically produced natural gas to meet its growing demand. This has made natural gas prices even more sensitive to supply shocks than crude oil, exemplified by the doubling of winter natural gas prices from late 2004 to late 2005.

The crude oil market is the best place to start discussions of the energy complex. The driving factors behind the strong demand for oil are the strong economic growth of the United States, as well as the strong growth in the developing world, especially China and India. While the economies of the developing world are smaller than the United States, a much greater percentage of their growth has been in relatively energy-intensive manufacturing. The relationship between global growth and global oil consumption is clear in Figure 1 (page 10). A telling statistic about the increase in Chinese demand for oil is that in 1990, China was a net exporter of oil; it is now the world's second-largest importer of oil. Because

developing nations are dependent on manufacturing, their oil consumption should decline more sharply in response to high prices than that of the United States, which derives much of its growth from services and technology.

The United States is currently in the midst of the fourth major price increase in oil prices since 1970. Unlike the three previous shocks, in which OPEC (Organization of Petroleum Exporting Countries) turned off the taps (1973, 1980) and the first Gulf War ended Kuwaiti and Iraqi exports (1990), this rise is driven by demand. In fact, OPEC is currently producing more oil than at any time since its inception. Analysts generally agree that there is effectively very little unused production capacity left in the world, and that which remains is for *sour* crude – crude with high levels of sulfur, which is more difficult to refine because most current refineries were constructed to process *sweet* (low-sulfur) oil.

As in any market, when demand continues to rise and a capacity constraint is encountered in production, a virtual 'bidding war' erupts between demanders to ration the limited supply. When supply shocks do occur, no matter how small, their significance is greatly magnified by this process. This is the case with the recent hurricanes in the Gulf of Mexico.

While the devastation that Hurricanes Katrina and Rita wrought on the Gulf Coast is clearly very real and major, the actual long-term impact on the energy market is much less than one might believe, given the observed price response. If these hurricanes had struck even five years ago, the reaction would have been a climb in oil prices of \$5 or \$6 per barrel, not a climb to the highest

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## Energy Market Situation and Outlook

Continued from page 9

real prices since 1980. We must remember that the Gulf of Mexico is no stranger to hurricanes. Platforms are routinely evacuated this time of year, but this is the most memorable season (from an energy perspective) precisely because the oil market is already so tight.

Hurricanes are not the only source of short-run supply shocks. Careful observers will notice that oil riches have not historically been strongly correlated with political stability. The tightness of the market ensures that every disruption in Iraqi, Nigerian, and Venezuelan output is felt in the global oil market.

### Crude Oil Products

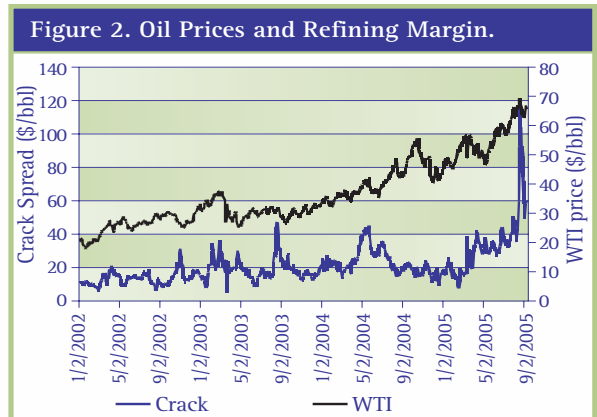
The refining industry is, from an economist's point of view, very simple. One commodity is purchased and transformed into a number of other commodities for sale. While refineries actually produce dozens of products from crude oil, futures are traded on only two – gasoline and heating oil. These two and their close kin (heating oil, diesel, kerosene, and jet fuel are all extremely similar) make up much of the output and can be used to compute the *crack spread*, the refiners' margin.

Another driving factor in the current state of the energy market is that the high fuel prices are driven not just by increased input (oil) costs, but also by increased margins during the summer of 2005 due to sharply higher demand for gasoline. While U.S. average gasoline prices were about 75 cents higher in 2005 than 2004, consumption actually *increased* by more than 3 percent. In Figure 2, the increase in the crack spread this past summer is clearly visible. In the same figure, notice also that the crack spread has not significantly increased over the past three years (it hasn't significantly increased in the last 10 years). This belies the constant chorus of those who believe that the United States needs to increase refining capacity. We can import products just as easily as we can import oil. This graph also shows the spike in the crack spread when Katrina hit, temporarily shuttering 30 percent of refining capacity. As

of September 23, approximately 7 percent of U.S. refining capacity remained out of service due to Katrina, and another approximately 28 percent was closed in anticipation of Rita. These disruptions have sent the crack soaring, from about \$10 per barrel in early 2005, to more than \$100 per barrel in the week after Katrina struck. While the crack does remain elevated, the high price of gasoline in the United States (in the weeks following Katrina, the United States had the highest wholesale gasoline price in the world) has bid large amounts of gasoline into the U.S. market.

At present, U.S. gasoline stocks are the lowest that they have been in the last five years (in nominal terms). Luckily, the end of the U.S. driving season reduces the emphasis on gasoline stocks. The high rate of imports should offset most of the losses due to Katrina and Rita, but it may be difficult to offset all of them until more of the refineries return to operation in coming weeks. This likely means that U.S. national average gasoline prices will hover just below \$3 for much of October. Distillate stocks – distillates comprise heating oil, diesel, kerosene, and jet fuel – are the highest in five years; but as winter approaches and concerns increase about the ability of U.S. refineries to replenish the stocks quickly in a cold snap, prices have not declined as much as might have been expected. In the coming months, gasoline prices should return to levels seen prior to the past summer – i.e. national average prices of ~\$2.35 to \$2.50. However, without a clear demonstration that higher prices will induce lower consumption among U.S. consumers, next summer promises just as much volatility in prices.

The fundamental tightness in the global market for crude oil likewise shows no signs of abating. Without a severe global economic slowdown or a large rise in the value of the U.S. dollar, I see no reasonable scenario that pushes oil prices back below \$40 per barrel in the coming years. In fact, without a remarkably warm winter, it is difficult to see a scenario of prices below \$55 per barrel in the next nine months. The good news is that, contrary to all previous expectations, such high prices have had remarkably little adverse impact on economic growth.



# ofa Grower

This is precisely because we are seeing a demand-driven rally. At the point at which prices become high enough, the quantity of oil demanded will abate enough to bring the market back to a sustainable equilibrium.

## Natural Gas

While oil is the primary focus of any analysis of the energy markets, natural gas plays perhaps a more important role for agricultural production. Natural gas is the ultimate feedstock for almost all nitrogen fertilizers. One can summarize the situation in the natural gas market by observing the tightness in the crude oil market and multiplying by four.

Domestic demand for natural gas has been growing strongly for the past two decades. Because natural gas burns cleaner than oil or coal, permits for natural gas (NG)-fired power plants have been relatively easy to obtain. Further, until the past eight or so years, the United States was judged to have ample domestic supplies. Therefore, the use of NG was encouraged to reduce U.S. reliance on imported crude oil. The explosion in "peak generation" power plants, i.e. plants that only run at times of extreme demand, has now stretched U.S. production to its limits and has created a second seasonal demand spike (to power air conditioning in the summer, in addition to space heating in the winter months). In recent years, U.S. consumption of natural gas has been increasing at a rate of approximately 3 percent per year, while capacity has been increasing at 1 percent to 1.5 percent per year.

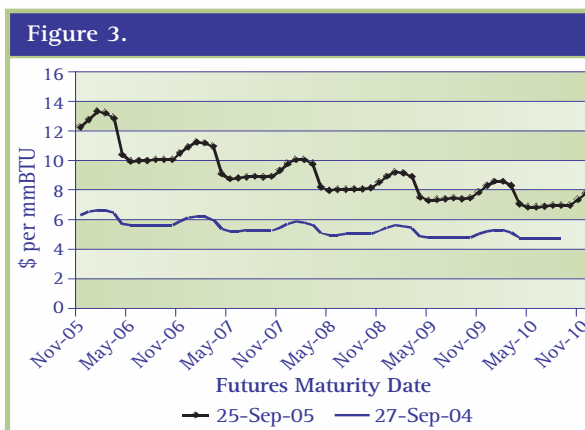
The results have been striking. Until 2000, well-head prices only approached \$4 per million BTUs once, and typically averaged around \$2 per million BTUs. (1 million BTUs is roughly 1.06 thousand cubic feet). Since then, prices have skyrocketed. Currently, Katrina- and Rita-

boosted futures prices are \$14 per million BTUs for February delivery. As Figure 3 shows, even in 2010, prices are still expected to remain above \$6.

Natural gas has reacted more strongly to the tighter supply/demand balance, because the United States has very little ability to import LNG to meet U.S. demand. There is no global shortage of NG. At many oil wells, NG is simply burned off into the atmosphere because it is too costly to transport. While large LNG export terminals do exist in the Persian Gulf, along with huge NG reserves, the United States has only three LNG import terminals. The current Department of Energy forecasts rely on LNG imports to fill the gap in the coming years, but glosses over the current shortage (and continuing difficulty in building) LNG import terminals. Three primary factors have prevented LNG terminals from being built: (1) they are incredibly costly, perhaps \$2-3 billion per terminal, (2) nobody likes to sit on the veranda of their beach house and watch tankers unload – NIMBYism (Not in My Backyard) at its finest, and (3) imagine how much of a target a big, slow ship full of LNG would make for terrorists, which compounds the NIMBY factor.

The other potential source of NG for the United States is to build pipelines to carry NG from Alaska and/or Canada, or to open new areas for drilling. While the pipeline option is the most feasible, as existing wells can supply large amounts of NG to the lower 48 states, the Alaskan pipeline approved by Congress in 2004 won't carry its first NG until 2012. Any future Canadian pipelines would be unlikely to go into earlier service. The final option would be to open up more areas in the lower 48 states for drilling. The most promising areas are off the Gulf Coast of Florida and off the Californian coast – and neither of those locations are politically feasible.

This leaves the United States in the unhappy circumstance of having little option but to grin and bear it in the natural gas market for years to come. While the current level of prices is elevated due to the recent hurricane activity, NG prices below \$6 seem very unlikely in the next few years. In the next months, NG prices will be determined by the speed with which hurricane-damaged production resumes and the severity of the winter. Luckily, the hurricanes have yet to significantly alter the stock building that occurs in the fall. If production resumes quickly and October is mild, February and March prices could move back below \$10 in a matter of weeks.



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ofa

# Managing Customer Service: How to Ensure Your Team Members Are Customer-Friendly

by John Stanley



Customers, or should I say potential customers, are demanding more and more service. This means that staff employed in dealing with them need more and more training.

We all believe we provide good service and that it is the competition who are at fault. Unfortunately, this is not the case. We all need to be more customer-friendly.

A recent Australian survey asked the public what concerned and bothered them most. The prime concern was the disease AIDS, followed by nuclear war and bombs. The third concern was rudeness by shop assistants. Seemingly, the public do not believe we do a good job in Australia.

A *Time* magazine survey found that 85 percent of customers felt service could be improved, while a book written by Bob Ansett and John McManamy called *The Customer* condemns service policies and suggests ways of improving.

If we accept all the criticism, we need to ask what we are going to do about it.

## 1. Train Your Team to be Customer-Friendly

We need to ensure that all team members who face or talk to our customers are trained in the skills of selling. Some companies will do this training in-house, while others can use outside agencies. Any training should include all of the team members. We often forget that the most important person in the team is the checkout operator, because he or she sees every customer. The training should also include topics such as:

- The use of body language in retailing
- How to use open, closed, and leading questions
- How to be a good host, consultant, and seller
- The skills of benefits selling
- The use of pre-close and close questions

## 2. Following Up Your Training

Unfortunately, many companies put people in training courses and assume that is it. Training is only the start. The follow-up is more important. If team members go to training courses and see no changes, they often get disillusioned. Once people have been trained, they need continual appraising to see how they are improving.

Table 1 is a suggested staff appraisal form that could be used to measure the selling skills of your staff at least once a year.

## 3. Selling Skills Appraisal Techniques

The way to fill in such a form is to hand it to the person being appraised, and ask them to fill it in as they

see themselves. Then, before the supervisor receives it back, the supervisor should also fill one in on how they believe the person is performing.

Then, both parties must sit down and compare scores. If the employee believes his or her selling attitude is excellent and you believe it is poor, you obviously have a topic for conversation and need to agree on how the decision was made and what action should be taken.

## 4. Do You Have a Service Policy?

Part of this training must be for the company to draw up a service policy so the team knows where the company stands.

Remember, customers consume service at the time it is created – with no time to correct mistakes. It is also worth remembering that letters of complaint are nearly always about quality or manufacturing faults and rarely about service faults. This, however, is the most common area where faults occur.

## 5. Writing a Service Policy

If you do not have a service policy, you should write one. It should cover the following areas:

- **Service Strategy.** Where do you fit into the marketplace? What level of excellence do you stand for?
- **Customer Communications.** How do you communicate your strategy to your customers?
- **Clear Standards.** Write down your quality standards, courtesy standards, and speed of delivery.
- **Deliveries.** Design a customer-friendly system.
- **Employee Communications.** Tell all employees what your standards are, and reprimand them when they drop below those standards.
- Chase errors to reach zero defects in your policy.

## Management Memo

Is your store customer-friendly?

The following questions can be used to determine if your business is customer-friendly. Does your business have:

- a service strategy clearly defined in terms of benefits to the customers?
- a clearly communicated service strategy which includes both the inside and outside of your business?
- systems and procedures tuned toward the customer?
- measurable quality standards for all service areas?
- communication channels to all members of the company?
- recruiting, training, and promotion systems oriented toward customer service?



# Management

- reward systems for staff who do something really special for customers?
- methods for handling letters of complaint or praise rapidly and to the customer's satisfaction?
- a quality circle for handling errors and setting standards?

*Ref Intl Management Feb 1987*

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**Table 1. Selling Skills Appraisal Form. Use this form to measure the selling skills of your staff.**

|  | Excellent | Good | Average | Poor |
|--|-----------|------|---------|------|
| <b>Sales Impression</b><br>Appearance and approach (e.g. alert, poised, at ease, pleasant)                 |           |      |         |      |
| <b>Selling Attitude</b><br>Enthusiastic, convincing, socially positive, mature, sincere, humour            |           |      |         |      |
| <b>Speech</b><br>Vocabulary, voice, speed of talk, grammar, pronunciation                                  |           |      |         |      |
| <b>Questions</b><br>Use of open, closed, and leading questions   |           |      |         |      |
| <b>Listening for Needs</b><br>Posture, attention, showing or understanding, identifying needs and/or wants |           |      |         |      |
| <b>Knowledge of Subject</b><br>Facts, information, personal tips based on experience                       |           |      |         |      |
| <b>Reasons for Buying</b><br>Benefits, advantages to customer  |           |      |         |      |
| <b>Objections</b><br>Recognized, handled tactfully, assurance given converted into reasons for buying      |           |      |         |      |
| <b>Use of Sales Aids</b><br>Use of product, quality, and ingenuity of sales                                |           |      |         |      |
| <b>Organization</b><br>Opening, development, specific answers, close of sale                               |           |      |         |      |
| <b>Alternative Products</b><br>Use of similar items and/or alternative products                            |           |      |         |      |



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## Motivating Employees Is Key to A Successful Safety Program

One of the most important aspects of any safety program is developing the proper attitude toward safety. Attitude greatly influences behavior, and safe work behavior is the most critical factor to a successful safety program. Changing employee safety behavior is a difficult task.

To change attitude, employees must be motivated to desire change. The following guidelines can assist employers in motivating employees to participate in a safety program:

**Lead by Example** – Employees observe supervisors' behavior, and consequently, supervisors must set a good example. Nothing irritates employees more than rules applied selectively.

**Set High Safety Standards and Goals** – Companies with successful safety programs always set their standards and expectations high and work hard to achieve them. Hold supervisors and employees accountable for safety performance with the same intensity as production, sales, quality, and other important management functions.

**Get Employees Involved in the Process** – Ask employees for suggestions, ideas, and opinions concerning the safety program. Follow up on these, and incorporate their ideas.

**Do Not Blame Employees for Accidents** – Remember that accidents are usually caused by more than one factor. Identify all reasons, and then correct their causes. If employee behavior is one of the causes, this should be addressed in a positive manner.

**Provide Proper Tools and Equipment** – Providing employees with the proper tools and equipment shows employees that the company is serious about their safety.

**Provide a Safe Work Environment** – Check work areas frequently and take actions to correct unsafe conditions. Stress proper housekeeping at all times.

**Provide Proper and Adequate Safety Training** – Proper safety training is a critical aspect of a successful safety program. The goal of safety training should not only be to convey necessary work knowledge, but also to develop the proper attitude toward safety and to establish safe work practices.

**Reward and Recognize** – People like to be rewarded and recognized. Establish safety goals with input from your employees and a method to reward and recognize positive behavior.

**Do Not Quit** – Companies often implement an effective safety program by involving employees and establishing a reward system. However, after the company is successful in reducing accidents, intensity decreases. Keep the program alive and continue to keep the employees involved and excited. Advertise your success, and do not take it for granted. Safety is an ongoing process. If companies discontinue successful steps to safety, employees will soon recognize this and lose their interest and belief in the program.

Information provided by American Safety & Health Management Consultants – 800-356-1274.

A background image showing a busy trade show or conference with various booths, displays, and people.

**Mark Your Calendar**  
for the  
**2006 OFA Short Course**  
July 8 to 11  
Program & registration available in April.

# Bedding Plant Pest Management

by Raymond A. Cloyd, Ph.D.

**B**edding plant season is always a busy time of year as greenhouse managers concentrate on growing and selling the crop. As a result, pest management is generally not a top priority. However, if greenhouse managers incorporate pest management into their daily schedule, they will have a better handle on the insect and mite pests attacking bedding plants – thus avoiding having to deal with high insect and mite populations later on. The key insect and mite pests of bedding plants 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. This includes aphids, thrips (Western flower thrips), fungus gnats, shoreflies, and whiteflies. In addition, this article will provide general information on specific management strategies that are useful in avoiding problems with these insect pests.

## Aphids

Aphids are 1/25- to 1/10-inch-long, soft-bodied insects that possess tubes (cornicles) on the ends of their abdomen or 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. Their rapid reproductive ability can result in tremendous population explosions within a short period of time, which is why aphids can spread quickly among bedding plants. This will occur even more rapidly if plants are spaced close together.

Aphids use their piercing-sucking mouthparts to remove plant fluids 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, the primary thrips found in greenhouses, are less than 1/13-inch long with 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 and normally feed on flowers.

The life cycle 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 (INSV).

## 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 are 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 they live from 7 to 10 days. Adult shoreflies resemble houseflies. They are 1/8-inch long, deep black in color. Each wing usually has at least five white or light-colored spots. The antennae and legs are short. The life cycle 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 soil-borne pathogens. Fungus gnats are mainly a problem of bedding plants 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 media or other areas in the greenhouse where the conditions are conducive for algal growth. The larvae don't directly feed on plant roots. Shorefly adults are more of a concern during bedding plant 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 affect the plant's aesthetic quality. Like fungus gnats, shoreflies are primarily a problem under extreme moist conditions.

## Whiteflies

Whitefly adults are white to slightly yellowish in color, narrow shaped, and approximately 1/13 to 1/9 inches long. Whitefly adult females lay spindle-shaped 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, plant wilting, and

Continued on page 16



## Bedding Plant Pest Management

Continued from page 15

possibly plant 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. An adult 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 saleability. Whiteflies are also capable of transmitting viruses.

### Controlling Pest Problems

Insects can be troublesome, primarily due to a number of basic plant operational procedures that occur during bedding plant production. First, bedding plants 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 relative 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 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-based fertilizers, results in the production of succulent growth and increases susceptibility to aphids and whiteflies. This is because the higher levels of amino acids, the primary food source utilized by insects, increases their reproductive capacity. In addition, too much fertilizer 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.

Particular growing media, such as those containing coir (coconut husk fibers), where the top 1 to 2 inches can dry down without rewetting problems, 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 weeds into the greenhouse or migrating from outside onto bedding plants. Many weeds are also a potential inoculum source for viruses vectored by thrips and aphids (for more information refer to the weed management chapter in the OFA *Tips On Managing Floriculture Crop Problems* publication – now available via [www.ofa.org](http://www.ofa.org) or [www.ballbookshelf.com](http://www.ballbookshelf.com)).

Scouting is very helpful in determining 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 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 population trends during the growing season.

Pest control materials are still generally used to manage pest populations on bedding plants (Table 1). Always read the label directions prior to using any pest control material. Effective control is maximized when plants are small, because it is easier to obtain 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 include coverage, timing, pH, and frequency of application.

Poor coverage, especially when using short-residual contact insecticides, will often result in 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 to ensure adequate kill.

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

| Pest         | Pest Control Material     |                                  | Pest                      | Pest Control Material                     |                         |
|--------------|---------------------------|----------------------------------|---------------------------|---|-------------------------|
|              | Common Name               | Trade Name                       |                           | Common Name                               | Trade Name              |
| Aphids       | acephate                  | Orthene                          | Fungus Gnats              | azadirachtin                              | Azatin/Ornazin (larvae) |
|              | acetamiprid               | TriStar                          |                           | <i>Bacillus thuringiensis israelensis</i> | Gnatrol (larvae)        |
|              | azadirachtin              | Azatin/Ornazin                   |                           | bifenthrin                                | Talstar (adults)        |
|              | <i>Beauveria bassiana</i> | Botanigard/Naturalis             |                           | chlorfenapyr                              | Pylon (larvae)          |
|              | bifenthrin                | Talstar                          |                           | chlorpyrifos                              | Duraguard (larvae)      |
|              | chlorpyrifos              |                                  |                           | cyfluthrin                                | Decathlon (adults)      |
|              | + cyfluthrin              | Duraplex                         |                           | cyromazine                                | Citation (larvae)       |
|              | clothianidin              | Celero                           |                           | diflubenzuron                             | Adept (larvae)          |
|              | cyfluthrin                | Decathlon                        |                           | horticultural oil                         | UltraFine Oil (adults)  |
|              | dinotefuran               | Safari                           |                           | kinoprene                                 | Enstar II (larvae)      |
|              | endosulfan                | Thiodan                          |                           | permethrin                                | Astro (adults)          |
|              | fenpropathrin             | Tame                             |                           | pyriproxyfen                              | Distance (larvae)       |
|              | flonicamid                | Aria                             |                           |   |                         |
|              | imidacloprid              | Marathon                         |                           |   |                         |
|              | insecticidal soap         | M-Pede/Olympic Insecticidal Soap |                           |   |                         |
| kinoprene    | Enstar II                 | Shoreflies                       | azadirachtin              | Azatin/Ornazin (larvae)                   |                         |
| neem oil     | Triact 70                 |                                  | cyromazine                | Citation (larvae)                         |                         |
| permethrin   | Astro                     |                                  | diflubenzuron             | Adept (larvae)                            |                         |
| pymetrozine  | Endeavor                  |                                  | pyriproxyfen              | Distance (larvae)                         |                         |
| thiamethoxam | Flagship                  | Whiteflies                       | acephate                  | Orthene                                   |                         |
|              |                           |                                  | acetamiprid               | TriStar                                   |                         |
|              |                           |                                  | <i>Beauveria bassiana</i> | Botanigard/Naturalis                      |                         |
|              |                           |                                  | bifenthrin                | Talstar                                   |                         |
|              |                           |                                  | clothianidin              | Celero                                    |                         |
|              |                           |                                  | cyfluthrin                | Decathlon                                 |                         |
|              |                           |                                  | dinotefuran               | Safari                                    |                         |
|              |                           |                                  | endosulfan                | Thiodan                                   |                         |
|              |                           |                                  | fenpropathrin             | Tame                                      |                         |
|              |                           |                                  | flonicamid                | Aria                                      |                         |
|              |                           |                                  | horticultural oil         | UltraFine Oil                             |                         |
|              |                           |                                  | imidacloprid              | Marathon                                  |                         |
|              |                           |                                  | insecticidal soap         | M-Pede/Olympic Insecticidal Soap          |                         |
|              |                           |                                  | kinoprene                 | Enstar II                                 |                         |
|              |                           |                                  | pymetrozine               | Endeavor                                  |                         |
|              |                           | pyridaben                        | Sanmite                   |   |                         |
|              |                           | pyriproxyfen                     | Distance                  |   |                         |
|              |                           | spiromesifen                     | Judo                      |   |                         |
|              |                           | thiamethoxam                     | Flagship                  |   |                         |
| Thrips       | abamectin                 | Avid                             |                           |   |                         |
|              | acephate                  | Orthene                          |                           |   |                         |
|              | bifenthrin                | Talstar                          |                           |   |                         |
|              | cyfluthrin                | Decathlon                        |                           |   |                         |
|              | fluvalinate               | Mavrik                           |                           |   |                         |
|              | methiocarb                | Mesuro                           |                           |   |                         |
|              | spinosad                  | Conserve                         |                           |   |                         |
|              |                           |                                  |                           |   |                         |

Improper timing of pest control material applications also 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, this will more than likely result in inadequate 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 insecticidal properties. This is referred to as alkaline hydrolysis. Many pest control materials are susceptible to breakdown if the

pH of the water is not within an acceptable range. The acceptable range for most pest control materials is 5.5 to 6.3. However, be sure to consult the label to determine the appropriate pH for specific pest control materials.

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 (i.e. 10 days), then this will most likely lead to inadequate insect control, especially when dealing with overlapping generations. This means 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 the most

**Continued on page 18**

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

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

susceptible life stages – the larvae and adults that were previously in the egg and/or pupae stages.

The use of biological control (natural enemies) is another option in dealing with bedding plant pests. However, this may not always be feasible because bedding plants are typically sold or moved too rapidly, which may not give the natural enemies (parasitoids and predators) enough time to establish and provide adequate control. Natural enemies for aphids, thrips, fungus gnats, and whiteflies are listed in Table 2.

It is also possible to use pest control materials such as Botanigard or Naturalis, and Gnatrol early in bedding plant production. 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; they will not provide quick knockdown if insect populations are excessive.

Although the bedding plant season is a busy time of year, it is less costly to prevent problems from insects by implementing proper cultural and sanitation practices, scouting plants on a regular basis, and understanding the factors that may influence the performance of a pest control material. Remember the old adage: “An ounce of prevention is worth a pound of cure.”

For more information, consult the following publications:  
*Tips On Managing Floriculture Crop Problems*. OFA Services, Inc., Columbus, OH. 140 pages.  
*Ball Redbook Crop Production*, Volume 2, 17th Edition. Ball Publishing, Batavia, IL. 724 pages.  
*Integrated Pest Management For Floriculture And Nurseries*. Statewide Integrated Pest Management Project, University of California Division of Agriculture and Natural Resources, Publication 3402. 422 pages.

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# A Review of Research

by Stephen A. Carver, Ph.D. – OFA

Those of you with any growing experience know firsthand how pernicious *Botrytis* can be – causing major loss, seemingly overnight. Sanitation, plant spacing, and humidity control can be critical for reining in the pathogen. Even so, fungicide use is often required to minimize *Botrytis* problems, especially during periods of low light and high humidity. The fungus has another irritating habit – it has developed resistance to a number of fungicides that once controlled it. With this and the increasing governmental and consumer awareness of and antagonism to pesticides, some researchers have been looking for alternatives. The authors of the manuscript summarized here investigated the potential for using one microorganism (a fungus) to control or manage *Botrytis cinerea* (another fungus) problems on begonia.

In the November 2005 issue of *Plant Disease* published by the American Phytopathological Society (APS), L.E. Horst, J. Locke, C.R. Krause, R.W. McMahon, L.V. Madden, and H.A.J. Hoitink published the article “Suppression of Botrytis Blight of Begonia by *Trichoderma hamatum* 382 in Peat and Compost-Amended Potting Mixes” (pages 1,195 to 1,200).

When I think of biological pest management, I typically think of the numerous predators, parasites, and pathogens that can be effectively used to manage insect and mite problems. A number of greenhouse operations have or are learning to use them, alone or in combination with biorational pesticides or targeted “traditional” pesticide applications – both effectively and economically. The number of “biological fungicides,” especially those that go after soilborne pathogens, is smaller but significant.

Unfortunately, there are several reasons why commercial development of products containing biological organisms to manage foliar diseases has lagged. One is that the phyllosphere (the area immediately surrounding individual leaves) typically does not provide as hospitable a habitat for the colonization or spread of microbial biocontrol organisms as does the rhizosphere (the area immediately surrounding individual roots).

Another “disadvantage of topical treatments is that the introduced biocontrol agent most likely will come in direct contact with fungicides applied to the foliage. This implies that it would have to be resistant to such compounds.” The authors’ proposed solution “to this potential problem is the use of rhizosphere microorganisms that induce systemic resistance (ISR) in plants and thus provide control of root as well as foliar diseases.” What is ISR? You probably remember from one of your plant pathology or biology courses at school, that researchers have learned how to use some beneficial microorganisms to manage others that cause plant

diseases. They discovered that beneficials could provide this protection through a number of means, including: physically out-competing the pathogens and providing a barrier; parasitizing the pathogens; producing compounds that act as antibiotics to the pathogens; or even by passing genetic bits of themselves to the disease-causing organism, effectively “pulling the pathogen’s fangs.”

Often, a combination of mechanisms is involved. More recently, researchers have begun working with another protection mechanism that some beneficial microorganisms have. Plants have no immune system like animals do, but work has shown that some microorganisms and chemicals, when applied to one part of a plant, can induce or trigger biochemical pathways within the plant that increase disease resistance in untreated portions of the plant. The level and duration of this induced disease resistance or ISR from a topical application varies, but is typically neither complete nor lasts a crop cycle. But, what if you could find an organism that was both very ISR-active and would readily colonize growing media – would that improve the level of resistance and/or extend the duration of protection?

That is just what the authors set out to do using the fungus *Trichoderma hamatum* 382 (T382). Their objectives “were to determine whether: 1) inoculation of T382 into a light sphagnum peat or a compost-amended potting mix can reduce the severity of Botrytis blight of begonia; 2) amendment of the light sphagnum peat potting mix with compost affects efficacy of T382 in control of Botrytis blight; and 3) the effect induced by T382 is systemic in nature.”

A key to the relative success in meeting the objectives was the use of a growing medium that supports the growth of biocontrol agents, including *Trichoderma*. Work by the authors and others has shown that a light fibrous sphagnum peat moss (H<sub>2-3</sub> on the Von Post decomposition scale) and mixes containing some types of compost will support the growth of microorganisms that are antagonistic to many root rot pathogens. For this study, the authors prepared two media, one composed of a light sphagnum/perlite mix and a second based on the first, but amended with composted cow manure.

## So what did the authors find?

- “The degree of control of Botrytis blight provided by inoculation of the light peat mix with T382 was comparable to weekly sprays with the fungicide chlorothalonil (Daconil).” In some cases, dry weight and crop saleability of begonias grown in the light peat inoculated with T382 were higher than plants

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## A Review of Research

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receiving Daconil sprays or plants grown in the same media without T382.

- There were very few differences in disease severity, plant dry weight, or crop saleability of begonias grown in the compost-amended mix among the Daconil, T382, and control treatments. The level of disease suppression for all begonias grown in compost was comparable to the level for begonias grown in the light peat inoculated with T382. A natural implication is that the media amended with the composted cow manure was already supporting ISR-active biocontrol organisms. The level of control offered by the uninoculated compost media was a surprise, because common practice has shown that ISR-active microbes don't often naturally colonize compost.

So in short, this study offers the hope that in the near future, some commercially formulated growing media may provide another weapon in a grower's arsenal to combat plant pathogens – especially those that attack the top portion of the plant.

The authors conclude by saying that, "opportunities for natural colonization of composts by ISR-active biocontrol agents under commercial conditions are limited. Thus, in order for composts that are widely available on a commercial scale today to induce systemic resistance in plants consistently, compost-amended potting mixes will need to be inoculated with ISR-active biocontrol agents such as T382, particularly because these microorganisms are rare in natural environments." T382 is not yet registered with the US EPA (Environmental Protection Agency). However, registered strains of *Trichoderma* are available in the United States that may be as effective as T382. Thus, growers should test these strains.

Want to know more? You can find a summary of this research on the APS website at: <http://www.apsnet.org/pd/summaries/dno05sum.asp#Horst>. More information and/or a copy of the article can be obtained from the senior author, Dr. Harry Hoitink at [hoitink.1@osu.edu](mailto:hoitink.1@osu.edu).

## Extreme Makeover ...

### Create a great new look for your flower shop!

by Sharon McGukin

**Editor's Note:** Sharon McGukin, AIFD, PFCI is a floral communicator with 30+ years of experience. She enjoys sharing with retail florists the latest in floral design tips, trends, and techniques. This article contains highlights from McGukin's presentation at the 2005 OFA Short Course entitled "Extreme Makeover Floral Shop." For more information about this and other OFA Short Course sessions, visit [www.ofa.org](http://www.ofa.org).

Just surf your television channels and you'll experience one of America's newest pastimes – extreme makeovers. Creating a new you with your body, home, or business is all the rage. This is one trend from which traditional florists could really benefit.

Here's the challenge: take a good, hard look at your business with the eyes of a customer. *Are you a destination shop?* Would you drive out of your way to shop there? Do you provide *shoppertainment*? Savvy shoppers want to be entertained while spending their hard-earned dollars. Customers will pay more for an experience than for a

product. What type of shopping experience does your shop offer? Brainstorm with your employees, making a list of the characteristics that inspire you to go out of your way to visit a flower shop. If your shop doesn't fit that description, it may be time for an extreme makeover! Here are some ideas on how to start the process.

#### Clear the Clutter!

Determine what sells best, and concentrate on those products. If a product doesn't sell extremely well, get rid of it. Survey your own customers to find out what they want to buy, and sell it to them. Clean, organize, and redecorate seasonally, taking the opportunity to discard old merchandise that makes your shop look dated.

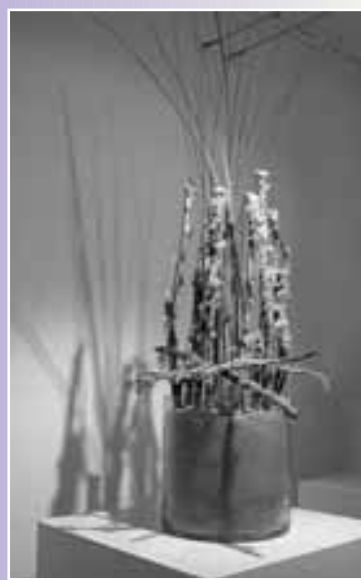
#### Create a Bold First Impression

Update your entrance to create the impression of entering a place that is very special. Utilize the sidewalk space if possible as a drawing card. As the customer

# ofa Retail Florist



**Figure 1.** Create a grand entrance to your shop to indicate that customers have arrived at a very special destination.



**Figure 2.** Display floral art on a pedestal in a highlighted area of your shop to introduce customers to new trends.



**Figure 3.** Utilize fresh flowers to create a pathway to the sales counter for customers.



**Figure 4.** Clear the clutter to enable your customers to shop more easily.



**Figure 5.** Keep a clean, clear, attractive sales area that encourages your customers to shop there.



**Figure 6.** Display floral art in your shop windows to communicate to your potential customers that you are a floral artist.

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## Extreme Makeover ...

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Figure 7. Display at Sharon McGukin's Short Course session.

enters the door, surround them with a unique shopping experience by appealing to all five senses. Use color to capture the eye and texture to add a touch of luxury to displays. Water, music, or caged birds can add relaxing sounds to the shop interior. Fragrance is easy to accomplish with a profusion of fresh flowers in the showroom. Complete the sensual experience by allowing customers to taste samples of edible products or by offering coffee, tea, or lemonade while they shop.

### Surround Customers with Flowers

Don't hide your beautiful flowers in the cooler; display them in the sales area to create impulse sales. Help your customers feel more knowledgeable by labeling flowers by name and price. Display floral artistry in the shop to create interest in new trends and teach customers to appreciate intricate design.

### Provide Shoppertainment

Be a destination shop! Plan in-store events monthly to lure your customers in more frequently. Strive to surprise them with new ideas and interesting items. Whenever possible, allow them to participate in an activity. Remember that appealing to the five senses will more completely surround them with a floral experience.

Table 1. Makeover checklist.

|                   |  |
|-------------------|--|
| Clean shelving    |  |
| Fresh Product     |  |
| Product labeled   |  |
| Visible pricing   |  |
| Signage in view   |  |
| Wow! windows      |  |
| Creative displays |  |
| Interesting items |  |
| Fun, trendy ideas |  |
| Good Lighting     |  |
| Energetic staff   |  |

### Be Enthusiastic About Your Product

Share your passion for flowers with your clientele. When you enjoy what you do, it shows; and enthusiasm is contagious. Consider your opportunity to please customers a pleasure instead of a chore, and they will respond to your kindness with continued patronage. Provide excellent service to your customers, and then ask for referrals. If your shop is fun to visit and provides great service they will be glad to tell their friends about you.

### Get Started Today

Create a checklist of items you want to review for your shop (Table 1 has a few basic suggestions). Commit yourself to tackling this project from a different perspective – put yourself in your customers' shoes. Ask what products, atmosphere, and experience THEY want at your shop. The appearance of your store, and the attitude of you and your employees will both impact the success of your business. Look around and see if you need to join the makeover trend today!

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*ofa*

# Ask the Doctor

Stephen A. Carver, Ph.D., OFA



“We have observed a recurring problem with calibrachoa baskets and pots – especially larger ones in which three or four (well-) rooted cuttings are planted. One to eight weeks after transplanting into the finished container, one of the plants dies – destroying the value of the whole container. All the plants in a given container are typically of the same cultivar from the same rooting station. The problem has been observed with calibrachoa cuttings from all the rooting stations with which we’ve worked, though there are times when there are perceived differences in incidence among cuttings from the different stations. Media chemistry issues have not been tied to the problem. Water molds have, on occasion, been isolated from the roots of dead or dying plants, but they appear to be opportunists rather than primary pathogens. What’s going on, and how can this be prevented in the future?” This problem, posed first in the July/August OFA Bulletin is unfortunately not unique to the person posing this question. Though the severity of occurrence varies, similar problems have been observed by a number of folks in a number of facilities. So, what is the problem, and is its cause the same in all these cases?

There is a puzzle each week in my local Sunday newspaper. The puzzle shows a limited-view, close-up picture of an entertainment personality’s face, showing only the eyes, nose, and mouth. Without the benefit of seeing the rest of the face, including the hair, ears, and much of the forehead, cheeks, and chin, the challenge is to name the star. Sometimes you can see something in the smile or the shape of the nose that triggers instant recognition; but as often as not, I’m left scratching my head. I may have a vague sense of recognition, but I just can’t see enough of the face to arrive at a “comfortable” guess.

So what does a “paparazzi’s” puzzle have to do with the calibrachoa problem described above? Just this, the vision a diagnostician has of a crop problem is restricted to the description the sender provides and to the information that can be gleaned from the sample submitted. Sometimes, the sample and description allow a diagnostician to see enough of the problem to spot telltale signs of the cause. At other times, the cause is obscure or at least outside the diagnostician’s angle of view, requiring additional investigation.

In this case, it seems apparent that the questioner has already done some additional research on his or her own, but has not yet found a cause that satisfactorily explains all the ambiguities and patterns exhibited by the problem. So where does that leave us? I asked that question of some well-known academics and industry professionals, including Dr. Todd Cavins, Oklahoma State University; Margery Daughtry, Cornell University; Dr. Karen Rane, Purdue University; Dr. Colleen Warfield, North Carolina State University; and Jack Williams, Ecke Ranch and Flower Fields. Some of the following questions will cover items already addressed, but they are designed to help us all step back from the close up

“paparazzi’s puzzle” image of the problem to take in the broader view to help us identify the cause or causes.

**What patterns are associated with the problem, and what hints can they provide regarding the source of the injury?**

The facts that there are a significant number of containers with typically just one of several cuttings dying back and that isolations have not consistently yielded a clear pathogen suggest (but don’t prove) that a disease organism(s) is NOT the principal culprit. Pathogens, whether soil-borne, airborne, or insect-vectored, usually don’t damage just one of several same-cultivar cuttings in such close proximity. However, calibrachoa are highly susceptible to *Thielaviopsis* or black root rot and the water molds *Pythium* and *Phytophthora*. To investigate their potential for causing problems, we would like to know:

- What are the symptoms exhibited by the cuttings from the time they first show signs of decline to the point of death? At what point on this continuum were the affected cuttings sampled? Dead or near-dead plants typically reveal fewer secrets than plants that are still in earlier stages of decline. That is because the severely weakened or dead plants are typically overrun by secondary organisms, often masking the principal culprits.
- Do the containers receive a regular fungicide drench? If so, what materials were used and at what frequency and rate? Had the containers received a fungicide drench prior to the cutting being removed or sampled? A fungicide drench made prior to sampling can hamper efforts to identify the culprit once the cutting arrives at the lab. A fungicide drench program can also arrest further spread of soilborne pathogens.
- What do the roots of declining cuttings look like? Are they white and healthy; or are they blackened or off-colored and water-soaked, readily disintegrating? How do they compare to those of the healthy cuttings in the same container? How extensively have the roots of the affected cuttings grown out into the surrounding media?
- How are the cuttings handled before and during transplanting? The occasional cutting that is injured at the crown or lower stem area, that is planted too deep, or that is damaged by fungus gnat larvae is much more vulnerable to pathogen attack.

**Is there any pattern of the orientation of the affected containers and cuttings with respect to:**

- Heating structures, or perhaps warm (sunny?) or cool surfaces?
- Pesticide or PGR spray or drench procedures? What materials and rates are being applied? What time of day and what state of vigor are the plants when the applications are made?
- The placement of drip tubes or other irrigation/fertigation application protocol. Depending on irrigation frequency and intensity, media composition, and soluble fertilizer levels, drip tube emitters placed next a particular cutting could result in a slight moisture and/or salt gradient in the container such that prolonged exposure to higher levels of either could weaken the cutting. It would be informative to have run a leaf tissue analysis on the declining cuttings to compare with leaf tissue from healthy cuttings.

While you might not expect clear-cut causes to emerge from this second group of questions under “normal” circumstances,

**Continued on page 27**

# Alternative Fuel Evaluation Aid

Fuel costs are on everyone's mind as we approach the "serious" part of the heating season. Both long-term (escalating oil use by China and other developing countries) and short-term (disrupted refinery function and speculation as the result of hurricanes Katrina and Rita) challenges have served to destabilize petroleum availability and drive up prices. Matthew Roberts' article (page 9) addresses some ways to purchase oil and gas that may help save money and ensure availability. Another option, especially if you already have the ability to use more than one type of fuel, is to consider alternative types of fuel.

Tables 1 and 2 are "snapshot" examples of the results that are generated by dynamic or working spreadsheets found on the University of Georgia Extension Web sites at either <http://www.tifton.uga.edu/sumweb/energy> or at <http://www.ugaengineering.org> under Publications. You are encouraged to visit either of these sites, because changes that you make to the live spreadsheets will help you appreciate the impact that changes in per-unit fuel cost and upgrades to your burner/boiler system will have on your bottom line.

The efficiency of fuel energy converting to heat energy can be modified. The efficiency values presented are suggested values. Your equipment may have higher or lower efficiency. The efficiency for a heat pump is the COP (coefficient of performance = the ratio of heat output to electrical power consumption) multiplied by 100. Typically, the COP is in the range of 2 to 4 for heat pumps.

Prepared by John Worley and Paul E. Sumner, Extension Engineers, University of Georgia, Cooperative Extension, College of Agricultural and Environmental Sciences.

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## Equivalent Fuel Cost

With the rising prices of energy, more and more people are questioning what is the best fuel for heating or drying purposes. One frequently asked question this year is: "Would it be cheaper for me to burn natural gas than LP gas?"

The equivalent fuel cost spreadsheet in Table 2 is used to easily compare the heating values available from any two energy sources. The input data used for developing each chart include the heat contents of the two energy sources being compared as well as the combustion efficiencies of the energy sources.

The efficiency of fuel energy converting to heat energy can be modified. The efficiency values presented are suggested values. Your equipment may have higher or lower efficiency. The efficiency for a heat pump is the COP (coefficient of performance = the ratio of heat output to electrical power consumption) multiplied by 100. Typically the COP is in the range of 2 to 4 for heat pumps.

## Additional Expenses

You need to recognize that there are additional expenses associated with converting to an alternate fuel source. Additional expenses include burner purchase or

Table 1. Heating and drying cost comparisons for various fuels.

| Heating Fuel        | Estimated % Efficiency | Cost/Unit | Heat Value (BTU/Unit) | Cost/million BTU's produced |
|---------------------|------------------------|-----------|-----------------------|-----------------------------|
| LP Gas (gal)        | 80                     | \$1.50    | 91,690                | \$20.45                     |
| Coal (lb)           | 77                     | \$0.20    | 13,000                | \$19.98                     |
| Firewood (cord)     | 60                     | \$150.00  | 18,000,000            | \$13.89                     |
| Fuel Oil (gal)      |                        |           |                       |                             |
| #1                  | 83                     | \$2.25    | 135,000               | \$20.08                     |
| #2                  | 83                     | \$2.30    | 139,000               | \$19.94                     |
| #4                  | 83                     | \$2.35    | 146,000               | \$19.39                     |
| Natural Gas (therm) | 80                     | \$1.50    | 100,000               | \$18.75                     |
| Electricity (kWh)   | 100                    | \$0.09    | 3,413                 | \$26.37                     |
| Heat Pump (kWh)     | 200                    | \$0.09    | 3,413                 | \$13.18                     |



modifications, proper handling and storage facilities for the materials, and emission controls of combustion gases. These expenses must be considered before any plans are finalized to convert from one fuel to another. Check with the manufacturer of any burner, stove, boiler, or furnace before making any modifications.

Prepared by Paul E. Sumner and E. Jay Williams, Extension Engineers, University of Georgia, Cooperative Extension, College of Agricultural and Environmental Sciences

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Table 2. Equivalent fuel costs.

| Fuel       | Natural Gas | Liquid Propane | #2 Fuel Oil | Electricity | Heat pump | Fire Wood | Hard Coal |
|------------|-------------|----------------|-------------|-------------|-----------|-----------|-----------|
| Cost       | (\$/Therm)  | (\$/gallon)    | (\$/gallon) | (\$/kwh)    | (\$/kwh)  | (\$/cord) | (\$/lb)   |
| Efficiency | 80          | 80             | 83          | 100         | 200       | 60        | 77        |
|            | 0.00        | 0.00           | 0.00        | 0.000       | 0.000     | 0.00      | 0.00      |
|            | 0.08        | 0.07           | 0.12        | 0.003       | 0.007     | 10.80     | 0.01      |
|            | 0.16        | 0.15           | 0.23        | 0.007       | 0.014     | 21.60     | 0.02      |
|            | 0.24        | 0.22           | 0.35        | 0.010       | 0.020     | 32.40     | 0.03      |
|            | 0.32        | 0.29           | 0.46        | 0.014       | 0.027     | 43.20     | 0.04      |
|            | 0.40        | 0.37           | 0.58        | 0.017       | 0.034     | 54.00     | 0.05      |
|            | 0.48        | 0.44           | 0.69        | 0.020       | 0.041     | 64.80     | 0.06      |
|            | 0.56        | 0.52           | 0.81        | 0.024       | 0.048     | 75.60     | 0.07      |
|            | 0.64        | 0.59           | 0.92        | 0.027       | 0.055     | 86.40     | 0.08      |
|            | 0.72        | 0.66           | 1.04        | 0.031       | 0.061     | 97.20     | 0.09      |
|            | 0.80        | 0.74           | 1.15        | 0.034       | 0.068     | 108.00    | 0.10      |
|            | 0.88        | 0.81           | 1.27        | 0.038       | 0.075     | 118.80    | 0.11      |
|            | 0.96        | 0.88           | 1.38        | 0.041       | 0.082     | 129.60    | 0.12      |
|            | 1.04        | 0.96           | 1.50        | 0.044       | 0.089     | 140.40    | 0.13      |
|            | 1.12        | 1.03           | 1.62        | 0.048       | 0.096     | 151.20    | 0.14      |
|            | 1.20        | 1.10           | 1.73        | 0.051       | 0.102     | 162.00    | 0.15      |
|            | 1.28        | 1.18           | 1.85        | 0.055       | 0.109     | 172.80    | 0.16      |
|            | 1.36        | 1.25           | 1.96        | 0.058       | 0.116     | 183.60    | 0.17      |
|            | 1.44        | 1.32           | 2.08        | 0.061       | 0.123     | 194.40    | 0.18      |
|            | 1.52        | 1.40           | 2.19        | 0.065       | 0.130     | 205.20    | 0.19      |
|            | 1.60        | 1.47           | 2.31        | 0.068       | 0.137     | 216.00    | 0.20      |
|            | 1.68        | 1.55           | 2.42        | 0.072       | 0.143     | 226.80    | 0.21      |
|            | 1.76        | 1.62           | 2.54        | 0.075       | 0.150     | 237.60    | 0.22      |
|            | 1.84        | 1.69           | 2.65        | 0.078       | 0.157     | 248.40    | 0.23      |
|            | 1.92        | 1.77           | 2.77        | 0.082       | 0.164     | 259.20    | 0.24      |
|            | 2.00        | 1.84           | 2.88        | 0.085       | 0.171     | 270.00    | 0.25      |
|            | 2.08        | 1.91           | 3.00        | 0.089       | 0.177     | 280.80    | 0.26      |
|            | 2.16        | 1.99           | 3.11        | 0.092       | 0.184     | 291.60    | 0.27      |
|            | 2.24        | 2.06           | 3.23        | 0.096       | 0.191     | 302.40    | 0.28      |
|            | 2.32        | 2.13           | 3.35        | 0.099       | 0.198     | 313.20    | 0.29      |
|            | 2.40        | 2.21           | 3.46        | 0.102       | 0.205     | 324.00    | 0.30      |

# Mode of Action Chart and Pest Activity

by Raymond A. Cloyd, Ph.D.



Table 1. Mode of action chart and pest activity.

| Mode of Action                              | Pest Control Materials  | Pest Activity (based on label) |        |        |    |
|---|---|--------------------------------|--------|--------|----|
|   |   | WF                             | APHIDS | THRIPS | MB |
| Acetylcholine Esterase Inhibitors           | * Acephate (Orthene)  | X                              | X      | X      | X  |
|   | * Chlorpyrifos (DuraGuard)  |                                | X      | X      | X  |
|   | * Methiocarb (Mesurol)  |                                | X      | X      |    |
| GABA-Gated Chloride Channel Blockers        | * Endosulfan (Thiodan)  | X                              | X      |        |    |
| Sodium Channel Blockers                     | * Bifenthrin (Talstar/Attain)                                     | X                              | X      | X      | X  |
|   | * Cyfluthrin (Decathlon)  | X                              | X      | X      | X  |
|   | * Fenpropathrin (Tame)  | X                              | X      | X      | X  |
|   | * Fluvalinate (Mavrik)  | X                              | X      | X      |    |
|   | * Lambda-cyhalothrin (Scimitar)                                   | X                              | X      | X      | X  |
|   | * Permethrin (Astro)  | X                              | X      | X      | X  |
| Nicotinic Acetylcholine Receptor Disruptors | * Acetamiprid (TriStar)   | X                              | X      | X      | X  |
|   | * Clothianidin (Celero)   | X                              | X      |        | X  |
|   | * Dinotefuran (Safari)  | X                              | X      | X      | X  |
|   | * Imidacloprid (Marathon)   | X                              | X      | X      | X  |
|   | * Thiamethoxam (Flagship)   | X                              | X      |        | X  |
| Nicotinic Acetylcholine Receptor Agonist    | * Spinosad (Conserve)   |                                |        | X      |    |
| GABA Chloride Channel Activators            | * Abamectin (Avid)  | X                              | X      | X      |    |
| Juvenile Hormone Mimics                     | * Fenoxycarb (Preclude)   | X                              | X      | X      | X  |
|   | * Kinoprene (Enstar II)   | X                              | X      | X      | X  |
|   | * Pyriproxyfen (Distance)   | X                              | X      |        | X  |
| Chitin Synthesis Inhibitors                 | * Buprofezin (Talus)  | X                              |        |        | X  |
|   | * Diflubenzuron (Adept)   | X                              |        |        |    |
|   | * Etoxazole (TetraSan)  |                                |        |        |    |
|   | * Novaluron (Pedestal)  | X                              |        | X      |    |
| Growth and Embryogenesis Inhibitors         | * Clofentezine (Ovation)  |                                |        |        |    |
|   | * Hexythiazox (Hexygon)   |                                |        |        |    |
| Selective Feeding Blockers                  | * Flonicamid (Aria)   | X                              | X      | X      | X  |
|   | * Pymetrozine (Endeavor)  | X                              | X      |        |    |
| Disruptors of Insect Midgut Membranes       | * <i>Bacillus thuringiensis</i> var. <i>israelensis</i> (Gnatrol) |                                |        |        |    |
|   | * <i>Bacillus thuringiensis</i> var. <i>kurstaki</i> (Dipel)      |                                |        |        |    |
| Oxidative Phosphorylation Uncoupler         | * Chlorfenapyr (Pylon)  |                                |        |        |    |
| Oxidative Phosphorylation Inhibitor         | * Fenbutatin-oxide (Vendex)                                       |                                |        |        |    |
| Ecdysone Antagonist                         | * Cyromazine (Citation)   |                                |        |        |    |
|   | * Tebufenozide (Confirm)  |                                |        |        |    |
|   | * Azadirachtin (Azatin/Ornazin)                                   | X                              | X      | X      | X  |
| Mitochondria Electron Transport Inhibitors  | * Acequinocyl (Shuttle)   |                                |        |        |    |
|   | * Fenpyroximate (Akari)   |                                |        |        | X  |
|   | * Pyridaben (Sanmite)   | X                              |        |        |    |
| Desiccation or Membrane Disruptors          | * Neem oil (Triact)   | X                              | X      |        | X  |
|   | * Paraffinic oil (Ultra-Fine Oil)                                 | X                              | X      | X      | X  |
|   | * Potassium salts of fatty acids (Insecticidal Soap)              | X                              | X      | X      | X  |
| GABA-Gated Antagonist                       | * Bifenazate (Floramite)  |                                |        |        |    |
| Lipid Biosynthesis Inhibitor                | * Spiromesifen (Judo)   | X                              |        |        |    |

Chart Codes: WF=Whiteflies, MB=Mealybugs, SM=Spider Mites, FGS=Fungus Gnats, SF=Shoreflies, LM=Leafminers, CAT=Caterpillars



## Store Development Year-End Checkup

by Judy Sharpton



If your store has enjoyed increased customer count and increased average sales during the 2005 selling season, please turn the page. If, on the other hand, your store has experienced decreased or flat customer count mixed with flat average sales – even with equal or increased advertising dollars – it's time to evaluate the situation. Now's the time to examine your store's physical layout and product placement to find ways to entice your existing customer base to shop more often and spend more on each shopping trip. Let's abandon excuses for not attracting more customers and look for ways to target untapped markets.

First, go to an office supply store and get the following: graph paper with 1-inch squares – the biggest sheets you can find – pencils, an engineer's scale, a three-hole punch, and a half-inch white three-ring binder with a clear cover that will accommodate an insert. Charge up the digital camera or buy several throwaway cameras (you are documenting, not creating art). Create a cover insert that includes store name, date, and "Renovation Audit."

While you're gathering supplies, let's review the basic marketing principles underlying any store development project. Marketing is defined as any activity that increases the perceived value of your product in the eyes of your customers. Before you run out to look at your crop or call your grower to check quality, the "product" we're talking about now isn't plants or pots or garden gifts. The "product" is your store. As Paco Underhill says in his landmark book on customer buying habits, "The main function of a store is to foster customer merchandise contact ... an important medium for transmitting messages and closing sales is now the store ... that building, that place has become a great big three-dimensional advertisement for itself."

Since the store is the product whose perceived value you want to enhance, let's define store. We are not discussing the building that houses the gift department and the cash registers; we are referring to the entire area that the customer comes into contact with when visiting your store – from entrance to exit. Store includes interior and exterior shopping areas, parking lots, restrooms, seminar rooms, loading sheds, and driveways. It is this total experience that influences the customer's perceived value of your product. A dirty bathroom or a muddy shopping area can negate all the advertising dollars you have spent to get the customer to come to the store. As Jack Bigej of Al's Garden Center in Oregon says, "Spend your first promotion dollar on your store."

With audit supplies in hand, let's begin. The first step in evaluating a store's layout and related product

placement issues is to map the store on paper and to scale – the whole store. Measure every space. Locate every door and window and place each on the drawing. Include all the "obstructures" – those parts of the store that may be in the way but can't be moved economically. These structures can include fertilizer injectors, loading docks, changes in elevation, coolers, asphalt, offices, electrical panels, and driveways. With map in hand, photograph the store starting at the point the customer can first see the store when driving past. Proceed to the parking area, entrance, and all possible walkways through the store. Photograph everything. Have prints made, or better still, a CD. Prepare to really "see" your store, perhaps for the first time.

Remember, you are not looking at plants or any other for-sale products; you are looking at the store, because your customer does. Clients often send me pictures of their store, invariably at the store's spring best. That's just a distraction. What does the store look like on a rainy Thursday the second week in November?

With store layout in hand, spend at least one full day watching customers as they enter, shop, check out, and leave the store. You are looking for customer behavior that reveals where the customer actually walks, where the customer seems confused or frustrated, what products are along the customer's path or paths that the customer actually sees, and what products are invisible. Observe what signs the customer reads and for how long, what products the customer actually handles, and what products the customer ignores. If you have read Underhill's *Why We Buy*, you will recognize yourself as a retail anthropologist. Record these patterns in your notebook.

Now, convene a staff meeting. Ask your staff where the problems are in the store: areas of congestion, areas where customers ask questions about product location, and areas that are difficult to stock or maintain. They may not have the solutions, but they know where the problems are.

After reviewing all of this information and staff input, refer to the Growing Places 11-point store renovation evaluation checklist (Figure 1). Your objective is to determine two areas of immediate concentration and two areas for one-year attention. You cannot do it all at once, but you can begin with two areas. My experience is that poor customer flow patterns and cash register congestion are often the first two areas of concentration. With your scale drawing, look for a single path through the entire store that you can make 8 to 10 feet wide. Once you've determined just where you'd like the customer to go, you can then determine how to create a store-penetrating aisle



# Garden Center

**Figure 1. Growing Places 11-point store renovation evaluation checklist.**  
*Rate your store on a scale of 1-10. 1 = We're in trouble. 10 = Got it covered.*

|                     |  |  |
|---------------------|--|--|
| Date of evaluation: |  |  |
| 1.                  | Material Handling: Product delivery area • Product storage • Stocking ease   |  |
| Action:             |  |  |
| 2.                  | Vehicular entrances • Parking • Streetside signage   |  |
| Action:             |  |  |
| 3.                  | Pedestrian entrances • Walking surfaces  |  |
| Action:             |  |  |
| 4.                  | Customer flow pattern to increase customer-merchandise contact   |  |
| Action:             |  |  |
| 5.                  | Merchandising displays   |  |
| Action:             |  |  |
| 6.                  | Impulse Areas: Placement and product mix   |  |
| Action:             |  |  |
| 7.                  | Signage: Consistency • Ease of preparation and use • Branding  |  |
| Action:             |  |  |
| 8.                  | Cash wraps: Placement • Ease of use for staff and customer • Technology  |  |
| Action:             |  |  |
| 9.                  | Amenities: Restroom • Store cleanliness • Product odor • Other amenities   |  |
| Action:             |  |  |
| 10.                 | Product mix and placement  |  |
| Action:             |  |  |
| 11.                 | Store Brand: Positioning statement • Logo • Staff dress<br>• Staff professional training – retail and product • Advertising • Promotions<br>• Store events • Store personality |  |
| Action:             |  |  |

Continued on page 30

**Figure 2. Growing Places Cash Register Checklist. *Wrapping up the sale – cash wraps that work.***

1. Place all merchandise for sale BEHIND the cash register area.
2. Group all registers at a single exit. What this really means is creating a distinct entrance and exit connected by a single store-penetrating aisle.
3. Install enough registers to handle customer flow. Here's where expansion and contraction come into play.
4. All traffic moves toward registers from a single direction. Here's where the store-penetrating main aisle comes into play in your layout.
5. All traffic moves PAST registers. When customers must approach a cash register and then make a 180-degree turn to leave the area, there is no way to avoid congestion. The only plus is that everyone gets to practice "excuse me" often.
6. Confine impulse sale items to the approach aisles. Now, if you haven't established that entrance/main aisle/exit pattern, you cannot even find the approach aisle.
7. Use exit signage to bend time. Anything the customer needs to know to make another trip to your store or anything the customer needs to buy to make that day's purchase more successful can be placed on the approach to the cash wrap – i.e. information sheets in a convenient kiosk; notices of upcoming events on dry-erase signs. Both can distract the customer from the wait in line.
8. Clear and clean the countertop. The only thing on the cash register countertop should be the customer's purchase and her pocketbook.
9. Clear and clean behind and under the countertop.
10. Create a service counter beyond the cash register.
11. Do not place merchandise in the "dead zone" beyond the cash register.

that will accommodate two carts (or a cart and a baby stroller) in a semi-circular path that leads from the entrance to the cash registers. From this main aisle, create loop aisles (as opposed to dead ends) that allow the customer to leave the cart and walk around adjacent merchandise.

Cash register placement is one of our industry's most difficult issues. Because our stores expand and contract to meet seasonal shopping demand, the tendency is to place cash registers in various and changing locations. Please make a decision to position your registers in one place and keep all merchandise behind the register. That single location may need to accommodate differing numbers of registers at any given season, but a single location is critical to both store layout and security. Multiple register locations mean multiple exits; that creates a security "sieve" that allows product to leak out without being captured at the register. We don't like to think our customers will steal from us, but if we invite theft, it will happen. Multiple register placement is an invitation. See the accompanying Growing Places cash register checklist (Figure 2) for more information on register placement.

Once you have created the main aisle in the store, determining register location gets easier. They are placed at the end of that main aisle – read: at the exit. If the exit is different from the entrance, placement is easy. If the entrance and exit are one, registers must be placed to the side of the double doorway so the entering customer does not walk head-on into the cash wrap.

Streetside anonymity can also be a top issue. If you still have customers who say, "I never knew you were here," you have a streetside problem. Look at the photos you took from the street. Ask a friend who has never visited your business to drive to your store and report to you just how easy or how difficult it is to see your entrance at the speed limit. Signage can often be a major zoning issue, but non-traditional "signage" like fences and plantings can compensate. Two cautions – fences should be visible (not quaint) and plantings should be billboards (not gardens). To accomplish these goals, use white resin fencing for high visibility and low maintenance, and create swaths of color with no more than three plant varieties. Consider using pot-in-pot in bermed plantings to be able to change streetside plantings seasonally.

If you can make yourself visible, increase customer access to product with a wide aisle, and make checkout easier, you are well on your way to improving your store's performance for next year.

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*ofa*



# ofa News

## Recent Retail Sales Pro Workshop – A Success

Ian Baldwin of Nursery Business Consultants, Elk Grove, California, presented this in-depth sales training program recently at the Atrium Garden Center in Lake Zurich, Illinois. The workshop taught participants how to create a more dynamic retail sales force.

## 2006 America in Bloom Registration is Now Open

Communities can now register for the 2006 America in Bloom (AIB) program. In its first four years, AIB has reached more than 20 million people in 112 communities. Find out more at [www.americainbloom.org](http://www.americainbloom.org).

## OFA Committee Members Provide Input

Recently, nearly 100 OFA committee members met in Indianapolis, Indiana to plan future OFA activities and OFA Short Course programs. Thanks to all the committee members who took time to be industry representatives and help us plan appropriate programs for OFA and the Short Course. Stay tuned to [www.ofa.org](http://www.ofa.org) as we begin confirming speakers and announcing the Short Course program.

## Ohio OFA Members can Save \$ on Workers' Comp Through Group Savings Plan

For every \$1 spent in fees to participate in a Compensation Consultants Inc. (CCI) group-rating program, the average participant saved \$16.15 in workers' comp premiums in 2004 – a 1,600 percent

return on investment. During the 2005-2006 rating year, 143 Ohio-enrolled members will save more than \$1.7 million in Bureau of Workers' Compensation (BWC) premiums. For more information on how Ohio OFA members can contract with CCI, contact CCI's Mara Manke at 216-696-1448 or visit the OFA Web site ([www.ofa.org](http://www.ofa.org)).

## 2006 OFA Short Course Planning is Underway!

Here's a sneak peek at what's on tap for the July OFA Short Course. OFA committee members just met, put pen to paper, and began formulating the educational program.

Based on your feedback, we are shaking up the educational program a little in 2006! Here are a few tweaks that we are making:

- The OFA Awards Program and Opening Session will be on Saturday 4-6 p.m. The general session will be "Consumer Buzz Live Presented by Green Profit Magazine." This is your opportunity to ask questions and hear what the consumer, your customer, is really thinking.
- On Sunday evening (5:30-7:30 p.m.) we will offer a choice of three educational networking opportunities: a grower town hall meeting, a retail idea exchange, and a management idea exchange.
- This year's sessions will be 60 and 75 minutes long.
- All sessions will start at 8 a.m. to allow you a little extra time to sleep (and rest your feet) before starting another education-packed day.

It's not too early to mark your calendar for some of these special activities and keep checking [www.ofa.org](http://www.ofa.org) for updates.

## OFA Member Benefits

- **Research Abstracts:** OFA is now providing a link on the OFA Web site ([www.ofa.org](http://www.ofa.org), Members-Only Access area) to the abstracts of research articles published in the three journals of the American Society of Horticultural Science. This research covers the entire range of crop production issues important to growers. These listings will also give authors, publication and issue, and a hot link to the ASHS Web site, where you can read a summary of the papers and more.
- OFA members receive a 20 percent discount on all *OFA Tips...* books, now available through the Ball Bookshelf, as well as a discount on all Ball Publishing titles. Visit [www.ofa.org](http://www.ofa.org) or [www.ballbookshelf.com](http://www.ballbookshelf.com) for more information. Proof of OFA membership is required. Your ID number is listed on your *OFA Bulletin* label. You will also need to use the special code "OFAMBR" to receive the discount.
- The *APPI Savings Solution Program* can reduce the costs of a company's energy, utility, and telecommunications services – including electricity, natural gas, water, recycling, waste removal, freight, credit card processing, and voice and data communications. APPI, an independent utility consulting firm, is compensated only when it delivers savings and/or refunds to OFA members. To get started, APPI will perform a free audit of your company's energy, utility, and telecommunications bills. For more information, call 800-520-6685, visit [www.appienergy.com](http://www.appienergy.com), or contact OFA.
- Ohio-based OFA members can participate in the **OFA worker's compensation group rating program**. This program is administered by Compensation Consultants Inc. (CCI). For more information or a no-cost, no-obligation quote, contact Cathy Bennett at CCI – 800-837-3200, ext. 7106; [cathy.bennett@ccitpa.com](mailto:cathy.bennett@ccitpa.com), or [www.cciworkerscomp.com](http://www.cciworkerscomp.com).
- *Florists' Review* magazine is available to OFA members for a reduced fee. Sign up through OFA and save nearly 30 percent on the subscription cost to *Florists' Review*.



## OFA Congratulates Two More Ohio Certified Florists (OCF)

Congratulations to Susan Huelsman, Nordlie Inc, Twinsburg, OH and Jody Spivey, Expressional Floral Design Studio, Columbus, OH for passing the Ohio Certified Florist Test that was offered in October. The self-study OCF certification program provides recognition for a standardized, professional level of knowledge and expertise in the retail florist industry.

To become an Ohio Certified Florist, individuals need to pass both written and hand-on portions of the exam. In the hands-on portion, participants must demonstrate the practical application of their knowledge in designing three arrangements. Topics covered in the written portion include: product identification, care and handling, floral design, display and visual merchandising, and sales and customer service.

[www.ofa.org](http://www.ofa.org)



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## OFA Event Calendar

February 17-19, 2006 **OFA Board & Committee Meetings**  
- Columbus, OH

July 8-11, 2006 **OFA Short Course**  
- Columbus, OH

## OFA Short Course Designer Wins National Contest

Christine Dillon, AIFD, of Bo-Ka Flowers & Gifts, Findlay, Ohio was named the National Alliance of Floral Associations' (NAFA) National Designer of the Year in October. Dillon was OFA's representative for NAFA's first annual national design contest. A total of nine designers competed. Each designer had to create three arrangements – a sympathy piece, a bridal bouquet, and a surprise package design, all within a 1.5-hour time frame. Teleflora sponsored the contest prize package, which included a \$1,000 cash prize and a Silver Cup for first place.



Remember to circulate the *OFA Bulletin* among your staff members. This information is designed to be valuable for all areas of your business.

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