

BULLETIN

January/February 2008 • Number 906

For Some, The Price is Right

by Bridget Behe and Tom Dudek

Pricing products has the appearance of being cost-based and somewhat mathematical until you realize the art involved in finding the right price. When is the price right? When you not only cover all of the costs involved, but you also generate your profit goal.

The cost is one part of the equation, but not the only part. Knowing your costs (of production, transportation, marketing, overhead, etc) is the first step to finding the right price. Many horticultural professionals don't make the time to develop systems to help them calculate costs on a regular basis. And it is a system that is needed, since costs change about as often as gasoline prices.

Often, retailers will mark-up items using a standard percentage to identify the retail price of the item. A simple mark-up on cost formula uses a set percentage and multiplies that by the item's cost. If the standard percentage mark-up on cost for a 4-inch container is 200 percent, and a pot is \$1.29, then the retail price is calculated by:

$$\begin{aligned} \$2.00 \text{ (or 200\%)} &= (\text{retail price} - \$1.29)/\$1.29 \\ \$2.58 &= (\text{retail price} - \$1.29) \\ \$3.87 &= \text{retail price} \end{aligned}$$

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Correcting pH-Related Nutritional Problems

by Bill Argo and Paul Fisher

Preventing pH-related problems is better than trying to correct them. With iron-inefficient plants (like petunias), that means maintaining the media-pH in the range of 5.4 to 6.2. With iron-efficient plants (like geraniums), the acceptable range is higher, 6.0 to 6.6. If the crop is managed within these acceptable ranges, then pH-induced nutritional problems usually don't occur. Outside of these acceptable pH ranges, problems are likely. With iron-inefficient plants, the most common nutritional problem is high-pH induced iron deficiency, whereas with iron-efficient crops, the most common problem is low-pH induced iron/manganese toxicity. Once symptoms appear, then steps must be taken to correct the problem or the plants may be unsaleable.

Use Caution When Correcting pH-Related Problems

It is important to remember there is some risk associated with the handling or application of any chemical in the greenhouse or nursery. It is up to you to balance the risk of applying caustic chemicals to yourself or to the crop against the potential for damage caused by high or low media-pH. The proper handling, mixing, and storage of chemicals are the responsibility of the individual grower.

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OFA Mission Statement

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

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OFA Bulletin

January/February 2008
NUMBER 906

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Published Bimonthly

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ofa Forum



Strategy – More than Just “Planning”

by Bobby Barnitz, OFA President

In our floriculture business operations, consider how little time we spend on “strategic planning,” let alone thinking about our businesses strategically. I would guess as business owners, operators, and employees, we often give less time to this than other obvious activities. At OFA, we’ve spent a great deal of time on strategy over the last 18 months.

Of course, most discussions about strategy seem to center around words on paper that we commonly refer to as a “strategic plan.” While this document is an important part of strategy development, as we’ve learned at OFA, it is only a part of a bigger process that includes strategic thinking, visioning, debating, and asking lots of questions.

In February 2006, the OFA Board of Directors, as our elected leaders, representatives, and governing body, made a very thoughtful and conscious decision to take a more active role in the organization’s strategy development. We invested in ourselves by hiring association experts to lead us through the training and process of strategy development.

Initially, we learned that in order to develop strategy, we needed background information on what OFA is today and its place in the floriculture industry landscape before we could decide what we want OFA to be tomorrow. This information was

gathered from member, Short Course attendee and exhibitor surveys, financial data, industry data, first-hand assessments of the business climate, and a variety of other sources. It also came from asking ourselves serious, “big picture” questions that challenged our perceptions of the status quo and allowed for healthy, informed debate among the board, the Strategic Planning Committee, committee chairs, and staff.

In February and October 2007, we addressed four of those “big picture” or “mega issue” questions to help in our information-gathering and self-assessment. Those four questions were, in no particular order:

- What role (event planning, education, advocacy, etc.) should OFA play in relation to other national associations?
- How will OFA respond to the service needs of industry-related groups and/or events?
- What is the impact of “membership” on OFA and its activities?
- What is the relevance of OFA’s current segments?

While many of our responses to these questions supported and confirmed our current activities (we learned confirming investments of time and/or money in current activities was as important as seeking new opportunities), we also ventured into new opportunities for OFA growth.

In a quick summary, we agreed that:

- OFA is an industry leader in event planning and implementation, and education development and delivery.
- OFA should continue to support efforts to collaborate with other non-profit and for-profit national, regional, and state organizations to provide quality events and education.
- OFA should continue our advocacy relationships with the American Nursery





& Landscape Association (ANLA) and Society of American Florists (SAF) rather than create our own advocacy program.

- OFA should continue to financially support the research efforts of the American Floral Endowment (AFE) and the Horticultural Research Institute (HRI).
- America in Bloom (AIB), as the only national, consumer-oriented program communicating the importance of overall community beautification, should remain a top OFA priority and investment.
- While the OFA Short Course is very much the “main attraction” for many of our stakeholders, representing 80 percent of our revenues and time, membership is still an important aspect of complete OFA participation, and we should continue our current efforts to serve that loyal base.
- OFA should pursue management of other industry-related events and organizations to broaden our base, build on our event and association management expertise, and diversify our activities and revenues.
- Despite the fact growers and garden centers make up the overwhelming core of OFA’s stakeholders, we still support our broad definition of floriculture that includes florists and interior plantscapers – as long as those segments show a willingness to support themselves and their participation in OFA.

As you read, we covered a great deal of ground identifying what OFA is and what we want it to be. As I explained, this process of assessment and strategic “thinking” is all part of a strategy development process. The next step is to review our current strategic plan (available online at www.ofa.org) and determine what updates or other revisions are necessary to move us forward.

Aside from all the information and insights gleaned over the last 18 months, the most important is that we cannot be static in our vision or goals for the future. The current business climate is ever changing, and it is imperative that OFA have the resources (human, financial, leadership) and nimbleness to positively adjust to a world often out of our control.

I appreciate your continued support of OFA, and if you have any thoughts on its future, please feel free to share those at ofa@ofa.org.

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ofa Garden Center

For Some, The Price is Right

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The mark-up on cost percentage may vary by product line. For example, the mark-up on fertilizer might be 150 percent, the mark-up on annuals might be 300 percent, and the mark-up on perennials might be 250 percent. But how do you know if that is the right price?

Another way to determine if the price is right is by the product life cycle. Products, like plants and people, go through distinctive phases of growth in sales and profits (Figure 1). In the introduction stage, sales are slow and profits are negative due to high initial costs of product development. Prices are often high, since little competition exists and the real product innovators are excited to buy the new product, even at a high price. Once more people buy the product, sales grow rapidly in the growth phase of the product life cycle. Pressure from an increasing number of competitors drives prices down, the pace of which is set by how many competitors come in and how quickly they speed up their production. This is the phase in which most profits are made for most businesses, since they can keep prices relatively high and glean profits before too many competitors enter the market. In the mature stage of the product life cycle,

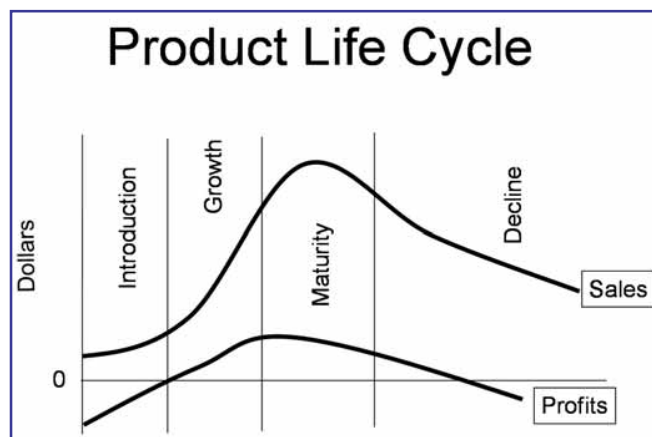


Figure 1. Graph of the product life cycle showing sales and profits over time.

sales growth slows and profits dry up, largely due to the overproduction of the product which drove prices down so low that they’re no longer profitable (Figure 1).

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Pricing Affects Everyone

Prices can be higher earlier in the product life cycle, but we all know in which direction they'll go. Profits need to be made early, or they can only be made by selling a tremendous volume of the product. We know the pattern of sales and profits, but the unknown is the length of time the product will be on the market. It is that unknown that makes pricing like a game of chess.

We looked at a practical way to see whether the price was right by surveying prices of five common annual plant container sizes in spring 2007. Prices were obtained through a convenience sample of 79 businesses in a six-county area of Western Michigan, primarily Grand Rapids, and represents 98 percent of the businesses asked for prices. All businesses were independent retailers; no chain or box stores were included. Prices were from the first week of May, 2007.

One goal of the investigation was to show retailers how some pricing strategies are detrimental to everyone, including their own business. Another objective was to show retailers the upper end of possible prices, giving them some objective information on which to base next year's pricing decisions.

Figure 2 shows the price range for a 4-inch single species container. Retail prices ranged from \$1.50 to \$4.99 with an average or mean retail price of \$2.83. What can account for a \$3.50 range in retail prices? Cost of production cannot account for all of that difference. Neither can geography since the retailers were all within a 25-mile radius of a point in Western Michigan. There were 19 businesses with a retail price higher than the mean. How could those businesses charge a higher retail price? They likely have the customers who are willing to pay those premium prices. A more important question might be asked of the 35 business that sold 4-inch containers below \$2.83. Could they be leaving some profits on the table at such a low price, especially the two businesses with retail prices at \$1.49?

For a 36-count flat (Figure 3), prices ranged from \$5.29 to \$12.29 or a \$7 range. The average price for a 36-count flat was \$9.02. There was a similar range in prices for a 48-count flat (Figure 4). Those prices ranged from \$5.99 to \$12.00 with an

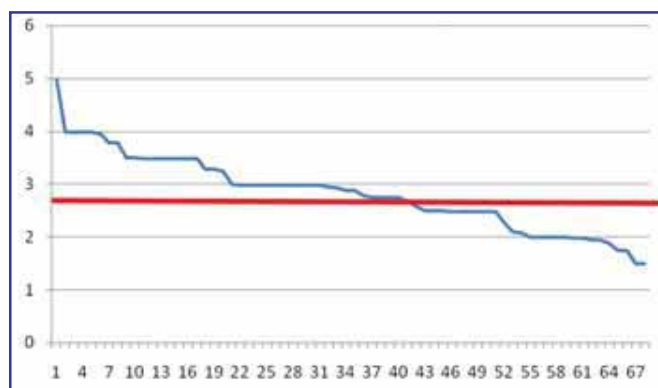


Figure 2. Prices in spring 2007 for 4-inch container of annuals (single species) in western Michigan. Line shows the average or mean price, which was \$2.83.

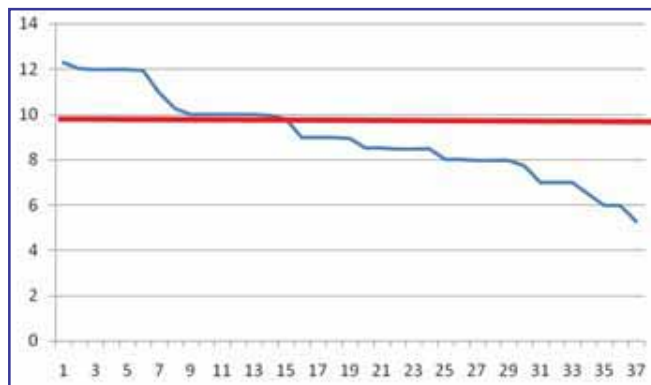


Figure 3. Prices in spring 2007 for 36-cell flats in western Michigan. Line shows the average or mean price, which was \$9.03.

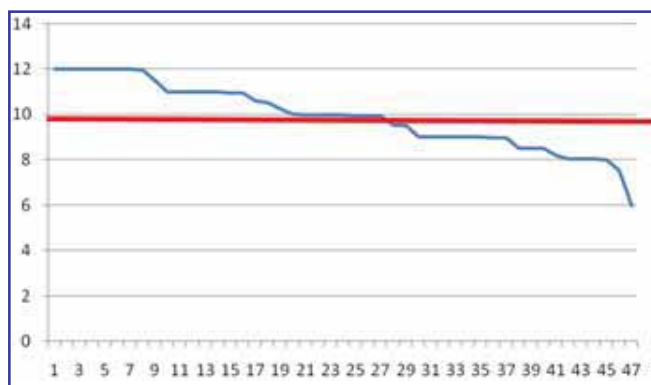


Figure 4. Prices in spring 2007 for 48-cell flats in western Michigan. Line shows the average or mean price, which was \$9.90.

average of \$9.90. Some retailers are likely selling flats at below-cost prices. What does this strategy do to the entire market?

It is difficult for some customers to differentiate between products. When they can't tell a big difference between Behe's flats and Dudek's flats, they will differentiate purely on price. Our inability as an industry to differentiate between products is exaggerated by retailers who do sell at or below cost. It only pushes everyone closer to the mature stage of the product life cycle where profits only exist to those who sell massive quantities.

We saw an even greater range in the price of a 10-inch hanging basket (Figure 5). Prices ranged from \$5.98 to \$21.95 or a \$15.97 retail price range. For the 12-inch hanging basket (Figure 6), prices ranged from \$12.00 to \$25.99, with an average of \$19.46. Again, cost of production cannot account for the entire \$14 to \$16 price differential.

Discounts

One more pricing component is discounts. What happens when a retailer discounts prices? Psychologically, we teach some customers to expect this again next year. Nearly every American who buys Christmas gift wrap does so in the days after Christmas because we expect the price to be heavily

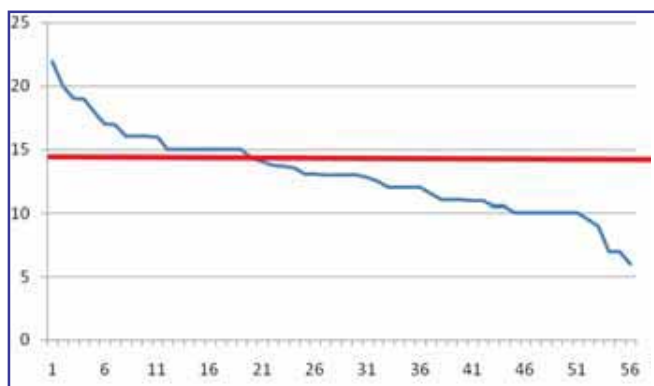


Figure 5. Prices in spring 2007 for 10-inch hanging basket in western Michigan. Line shows the average or mean price, which was \$13.06.

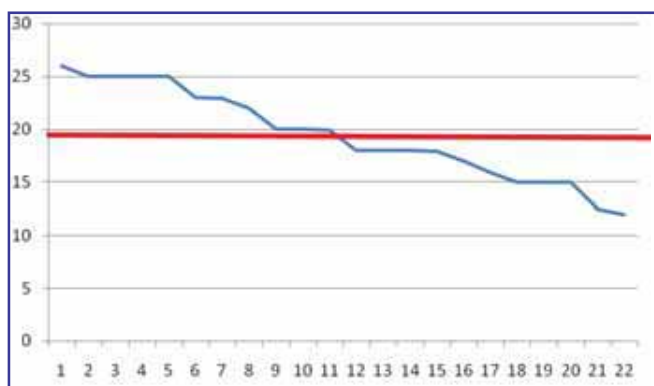


Figure 6. Prices in spring 2007 for 12-inch hanging basket in western Michigan. Line shows the average or mean price, which was \$19.46.

What revenue is possible at that price? If all 500 plants were sold, total revenue would be $500 \times \$4.99 = \$2,495$. This gives the retailer a profit of \$1,850 or $\$2,495 - \$645 = \$1,850$. If the target profit goal was \$1,600, the retailer would only need to sell 450 units. Calculate that by adding \$1,600 to \$645 cost (\$2,245) and dividing it by the price (\$4.99).

Let's imagine the retailer wants to discount price by 10 percent to \$4.49. Typically 10 percent off isn't enough to stimulate much more demand, but it's something to consider. The break-even point goes up to 144 units at this new lower price, meaning they have to sell 15 more plants before total costs are recovered, but they would achieve a \$1,600 profit goal at this price selling all 500 plants. Consider next a 20 percent discount to \$3.99. This price moves the break-even point up 33 plants to 162 plants and changes both sales and profits. If the retailer wanted to achieve \$1,600 in profits at this price, one must have to sell 63 more plants than at \$4.49! Discounting even more takes a greater toll on profits. At a 25 percent price reduction, they would have to sell 100 more plants to achieve the profit goal of \$1,600. At a 30 percent reduction, they have to sell 643 plants, not 500 to achieve a profit of \$1,600. And at 50 percent the number of units doubles to achieve the same profit goal.

Who has the right price? The grower or retailer who can cover all of the costs of production and generate sufficient profit to sustain the business is the one with the right prices. If you sell out of product too quickly, did you set the price high enough? If there is a surplus on the market, do you have a competitive price to move enough units to make this item profitable? With all of your costs on the rise, have you taken a long, hard look at your prices? Maybe it's time to devote some new energy this winter so that come spring your customers will say (and buy to show) that the price is right!

Table 1. Effect of discounting on profits generated and the number of units needed to be sold to achieve a specified profit goal.

Retail Price (cost=\$1.29)	Units available for sale	Break-even units (total cost \$645)	Sales revenue generated if all 500 were sold	Profit generated if all 500 were sold (sales-cost \$645)	How many units do I need to sell to achieve \$1,600 in profit?
\$4.99	500	129	\$2,495	\$1,850	450
\$4.49 (10% off)	500	144	\$2,245	\$1,600	500
\$3.99 (20% off)	500	162	\$1,995	\$1,350	563
\$3.74 (25% off)	500	172	\$1,870	\$1,225	600
\$3.49 (30% off)	500	185	\$1,745	\$1,100	643
\$2.49 (50% off)	500	259	\$1,245	\$600	901

discounted. Why would we buy at any other time? Table 1 shows the effect heavy discounting can have on profits. If a retailer has 500 4-inch containers to sell (with a cost of \$1.29 each) and is considering a \$4.99 price point, what is the break-even point? Total cost is \$645 and break-even is calculated by dividing total cost by the price of \$4.99. So, the retailer literally breaks-even when the 129th unit is sold, and profits will be generated on the 130th unit sold.

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Postcards From a Friend

by Frank Zaunscherb

zmi provides strategic marketing, creative design and communications and project management services, specializing in the green industry

As welcome as receiving a postcard from vacationing friends, your customers will appreciate one from your business. After all, they added their name to your database because they trust you, like your plants, products, and services, and want to keep informed about what's new at your store. Reaching out with timely messages using direct mail is an excellent way to nurture that business relationship and build sales. In today's competitive business environment it's not enough to just grow and sell quality plants. Connecting with customers is more important than ever before.

Direct mail postcards offer excellent advantages as part of your overall marketing and advertising mix (Figure 1). Unlike flyers or regular mail, a postcard is already "open," and offers split-second reader impact. Nothing gets more attention than beautiful, colorful flowers, especially when timed to arrive in advance of the season. Letting your customers know you have early season pansies just when the spring weather is about to break heightens attention and creates demand! A simply-worded back containing a call to action generates a higher response rate, especially when your customers discover an exclusive special offer is included.

Postcards are inexpensive to produce and mail, allowing greater frequency throughout the year. On average, direct mail marketing will yield \$10 in sales for each \$1 spent – twice the return of a television ad.¹ It's not surprising that over half of OFA members in a recent marketing survey indicated they use postcards in their mix.

To help make the most of your advertising dollars, OFA commissioned the design of a series of direct mail postcards with seasonal themes that you can customize online to fit your needs. Choose from a growing library of beautiful full color designs. Add your logo. Feature a promotion. Add a special offer. And order printing directly online at special OFA member-only rates. It's easy, economical, and effective.



Figure 1. OFA Member Local Publicity Postcard front and back. One of a series.

Visit myOFA to Learn How to Create Your Own Postcards

Visit myOFA, the Members Only section on www.ofa.org. The downloadable Powerpoint tutorial (see Figure 2 on opposite page) walks you through each simple step:

- 1 Logging-on
- 2 User ID and password
- 3 Reviewing the catalog of postcards
- 4 Creating your design
- 5 Proofing your design online
- 6 Placing your order



Figure 2. OFA Print Portal Tutorial.

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Correcting pH-Related Nutritional Problems

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The following recommendations for raising or lowering media-pH are intended for crops already under severe stress. These actions are intended for crops that could not be sold without some type of intervention.

When applying any chemical to a plant, the authors advise a test application on a small number of plants to check for phytotoxicity before applying to the entire crop. When plants are already stressed, it may not be possible to correct problems and produce a marketable crop, even after taking these or any other recommended actions. Phew! Now let's continue...

Correcting High-pH Induced Iron Deficiency

Iron deficiency is a common nutritional problem, particularly with iron-inefficient crops like calibrachoa (Figure 1). Iron deficiency starts as a yellowing or chlorosis in the growing tip. As the problem gets worse, the chlorosis at the growing tip progresses to a clear yellow color then to white. Death of the growing tip follows.

Iron deficiency can be corrected if steps are taken before the tissue is damaged. There are two approaches for correcting iron deficiency: One is to lower the media-pH, making the iron contained in the media more available to the plant. The second is to apply additional iron to the plant with a supplemental drench.

Lowering media-pH

The most effective (and safest) method of lowering media-pH is to use a fertilizer high in ammoniacal (acidic) nitrogen. Check with your fertilizer manufacturer to select the fertilizer with highest levels of ammoniacal nitrogen available (e.g. 9-45-15 or 21-7-7). Apply the fertilizer solution at a rate of 200 to



Figure 1. Iron deficiency in calibrachoa.

300 ppm N with generous leaching, followed immediately by washing of foliage to avoid leaf spotting.

If you have the necessary equipment and alkalinity is less than 80 ppm, acidify the irrigation water to a pH of around pH 4.5 to 5.0 (which gives near-zero alkalinity). Since alkalinity is the acid neutralizing capacity of water, reducing the alkalinity will allow more of the acidity from the fertilizer to react in lowering the media-pH. Continue with the application of high ammoniacal fertilizer and low alkalinity water until media-pH is back within the target range. For the appropriate acid rate for your water source, see www.ces.ncsu.edu/depts/hort/floriculture/software/alk.html. As a guideline for the commonly-used acids, use the information from Table 1 as a guideline for lowering the pH of irrigation water to 4.5 with different starting alkalinities.

Table 1. Approximate amount of acid (in fluid ounces per 100 gallons) required to neutralize alkalinity in the irrigation water and bring pH of irrigation water down to approximately 4.5. Make sure to check the pH of the solution coming out of the hose. Be extremely careful about using irrigation water with a pH below 4.5 because of phytotoxicity on plants. If alkalinity is already below 50 ppm, acidification is unnecessary when using highly acidic fertilizers to correct high media-pH.

Alkalinity	Sulfuric		Nitric		Phosphoric	
	35%	93%	61%	67%	75%	85%
50	1.4	0.4	0.9	0.8	1.0	0.9
100	2.8	0.7	1.9	1.7	2.1	1.7
200	5.6	1.4	3.8	3.4	4.2	3.4
300	8.4	2.1	5.7	5.1	6.2	5.1
400	11.2	2.8	7.5	6.8	8.3	6.8

The effect of ammoniacal nitrogen on lowering media-pH can sometimes be slow (more than one to two weeks), especially in cool, wet conditions, with small plants growing in large containers, or when small volumes of fertilizer solution are applied to the pot to keep the plant from being overwatered. Also, be careful of repeated applications of ammoniacal fertilizers in cool, dark conditions because of the risk of ammonium toxicity.

Other methods exist for rapid acidification of the root medium but they tend to be less predictable and more likely to

cause damage to the crop. For example, iron sulfate heptahydrate (FeSO₄·7H₂O) at rates up to 2 pounds per 100 gallons (240 grams/100 liters) will lower media-pH within several days, but phytotoxicity is likely and the potential for causing iron toxicity is greatly increased if you overshoot the acceptable pH range. For this reason, iron sulfate should never be used on iron-efficient crops (e.g. geraniums).

Sulfuric acid can be injected directly into the water, but high rates (solution pH of 1.5 to 2.0) are necessary to get the same acidification effect as ammoniacal nitrogen fertilizers. The advantage over iron sulfate is that sulfuric acid does not add iron. However, high concentrations of sulfuric acid are highly caustic to people and plants and therefore are not commonly recommended.

Aluminum sulfate should only be used to lower media-pH for hydrangeas, because otherwise it can cause severe nutrient imbalances. Flowable or elemental sulfur is sometimes used to lower pH in the nursery trade, but tends to cause a gradual reduction in media-pH over time that is difficult to stop once initiated (because microbial action is needed for the sulfur to be effective).

Iron drenches to correct iron deficiency

Iron comes in different forms that vary in solubility at high pH. Best to worst in terms of effectiveness as a drench at high pH are: Iron-EDDHA > Iron-DTPA > Iron-EDTA > Iron sulfate (Table 2). The recommended application rate for an iron drench is 5 ounces per 100 gallons of either Iron-EDDHA (provides 22.5 ppm iron), or Iron-DTPA (37.5 ppm iron) (Figure 2). Iron-EDTA is not recommended for drench applications. Apply the drench solution with generous leaching, followed immediately by washing of foliage to avoid leaf spotting.

Foliar sprays can also be effective, especially if iron chlorosis is mild or the plant does not have any active roots. However, phytotoxicity is likely. Apply foliar sprays to a test group and wait three days to check for damage before applying to the entire crop. Suggested iron sprays are Iron-EDTA (60 ppm iron, equals 6.1 ounces per 100 gallons) or Iron-DTPA at 60 ppm iron (8 ounces per 100 gallons). Repeat applications are likely to be needed every five days because the iron is not transported to new leaves, and the plant can grow out of a foliar spray.

Table 2. Commercially-available forms of iron.		
Form	% Iron	Other Names
Iron sulfate	20.5% Fe	Ferrous sulfate heptahydrate
Iron EDTA	13% Fe	Sequestrene Fe Dissolvine EFe13
Iron DTPA	10-11% Fe	Sequestrene 330 Sprint 330 Dissolvine DFe11
Iron EDDHA	6% Fe	Sequestrene 138 Sprint 138 Dissolvine QFe6

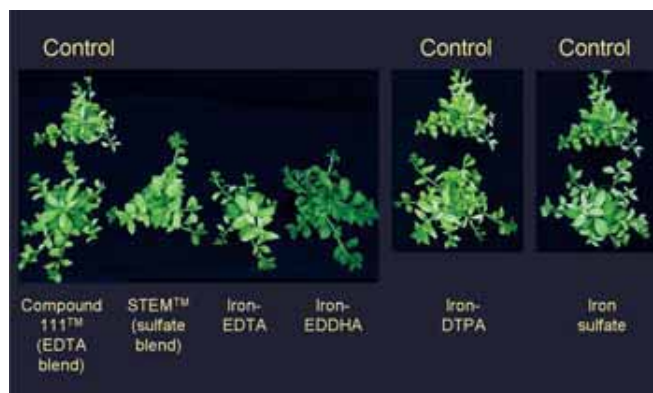


Figure 2. The effect of different iron forms on correcting a high-pH induced iron deficiency with calibrachoa. The pH of the substrate was 7.3, and all forms of iron were applied at a concentration of 37.5 ppm Fe as a drench. The control for the experiment was an application of reverse osmosis purified water containing no iron. Research by Paul Fisher and Bill Argo.

Tips for Maximum Effectiveness of Foliar Sprays

- Include an organosilicone surfactant (e.g. Capsil™ at 13 ounces per 100 gallons).
- Apply in early morning on cool, cloudy days for gradual drying of leaves in order to increase uptake and reduce spotting.
- Spray both sides of leaves because penetration may be better on the underside of leaves where the cuticle is thinner.

Masking the symptoms of high pH with supplemental iron drenches can be very effective for keeping plants alive and healthy when grown under high media-pH conditions. However, unless your customers continue the iron sprays or drenches, or transplant the plants soon after receiving them, quality will suffer. Always use a tissue analysis to test which nutrient is deficient. Although iron deficiency is most common, if a different nutrient (e.g. manganese) is limiting, then application of iron may worsen the problem because of antagonistic effects.

Correcting Low Media-pH Induced Iron/Manganese Toxicity

Iron/manganese toxicity is a common problem with iron-efficient crops (geraniums, marigolds). Iron/manganese toxicity starts as a bronzing on the older (lower) leaves (Figure 3 page 10). As the problem progresses, necrotic spots form, and eventually the leaf will die.

Iron/manganese toxicity is different from iron deficiency in that once the damage has occurred, it cannot be corrected. Your best choice is to raise the pH back to an acceptable level before damage has occurred. Once damage has occurred, your best choice is to raise pH so that the new unaffected growth can cover the damaged tissue.

Raising media-pH

When pH falls below the optimum range, the first steps are to 1) stop acidifying water if acid is being injected, and 2) shift to a nitrate-based fertilizer (e.g. 13-2-13 or 15-0-15). Further action is needed if pH has not risen within a week and plants are becoming stressed, especially for a species in the iron-efficient group when pH is below 6.0, or other crops below pH 5.4.

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Correcting pH-Related Nutritional Problems

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Figure 3. Iron/manganese toxicity deficiency in marigold.

To rapidly increase media-pH, consider soil drenches with either flowable lime or potassium bicarbonate. Both materials are incompatible with all types of water-soluble fertilizer and other chemicals, and need to be applied by themselves as a soil drench. Other options (hydrated lime or potassium hydroxide) may have special uses but are less reliable and predictable as a corrective liming material.

Both flowable lime and potassium bicarbonate are fast acting liming materials and will show most of their effect on media-pH within one day. Several factors affect the choice between flowable lime versus potassium bicarbonate. Flowable lime has the more predictable and stable effect on media-pH, without increasing medium-EC. Flowable lime will also leave some residual lime behind and therefore will help hold the pH up after the application. However, flowable lime is a suspension and should not be used where insoluble materials can cause problems (e.g. drippers). Flowable lime also will not be taken up by the pot with subirrigation and will remain as a residue on the floor or bench.

In comparison, potassium bicarbonate is more soluble and is the choice for using on a flood floors or when applied through drippers. However, potassium bicarbonate leaves no residual and therefore will not help hold the media-pH up after the application. In addition, the application of potassium bicarbonate will significantly increase the EC of the media because of the high concentration of potassium in the solution.

To minimize phytotoxicity from flowable lime or potassium bicarbonate, apply in cool weather so the material does not dry quickly on foliage; avoid splashing of foliage during application; immediately rinse foliage with a fine spray, and apply with generous leaching to maximize the effect at low concentration.

Applying Flowable Lime

- Apply flowable lime at 2 to 4 quarts per 100 gallons (0.5 to 1 L per 100 liters). Higher rates are sometimes applied (up to a 1:50 dilution), but increasing concentrations are harder to keep in suspension and clogging of equipment can be a problem.

- An injector can be used to dilute the stock solution, but the lime particles will settle if the stock tank is not continually agitated. Many growers pump directly from a tank rather than use an injector.
- Wash the flowable lime off the leaf surface as soon as possible. Once dry, it is permanent (Figure 4).
- The lime particles can be very abrasive. Immediately clean equipment after application.
- Do not apply through drippers or on flood floors because it will clog equipment and leave residue.
- One day after application, apply a basic fertilizer (e.g. 13-2-13) with moderate leaching to reestablish nutrient balance.



Figure 4. Residue from flowable lime that has been allowed to dry on the leaf surface without being washed off. Once dried, the residue is more or less permanent. Research by Paul Fisher and Bill Argo.

Applying Potassium Bicarbonate

- Apply potassium bicarbonate at 2 pounds per 100 gals (240 grams per 100 liters).
- Potassium bicarbonate is completely soluble at the above rate and can be delivered through emitters or on flood floors.
- Wash the potassium bicarbonate off the leaf surface as soon as possible. Once dry, it can cause significant leaf distortion or phytotoxicity (Figure 5).
- One day after application, apply a basic fertilizer (e.g. 13-2-13) with high leaching rates to wash out the excess potassium and to reestablish nutrient balance.
- It is likely that repeat applications may be needed.

Prevention Is Better Than A Cure

As a final note, remember that media-pH problems should never cause crop losses if you:

- 1) Set up a sensible nutrient management program that is suited to your crop types and water source.
- 2) Establish a regular monitoring regime.
- 3) Develop strategies that will keep pH and EC on track before you need extreme “rescue” measures.



Figure 5. Leaf distortion caused by the application of potassium bicarbonate that has been allowed to dry on the leaf surface without being washed off. Other problems can include burning or necrosis. Research by Paul Fisher and Bill Argo.

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ofa™ Legislative Update

Report From Washington: What's On the 2008 Agenda?

by Lin Schmale

As I write this article, the Farm Bill has been stalled in the Senate for over a week. AgJOBS, one of the floral and nursery industry's most important legislative priorities in many years, remains blocked by the intransigent and highly vocal anti-immigrant movement. Even though Fiscal Year 2008 began on October 1, Congress has yet to finalize the appropriations bills which fund the federal government for the coming year, and conventional wisdom says that we will be faced with yet another "Continuing Resolution" – simply authorizing the government to move forward at last year's funding levels. Because federal agencies were also funded by a continuing resolution *last* year, the real effect of Congressional inaction will be that most of the federal government will be operating at 2006 funding levels, creating some real difficulties for programs of importance to our industry, like the Floriculture & Nursery Research Initiative. Is there any good news from Washington, DC?

AgJOBS is Still Alive and Well

Senator Dianne Feinstein (D-CA) continues her strong and valuable support for passage of AgJOBS, the bill which offers agriculture's only real hope of escaping from the current labor

shortage. After the Senate failed to pass comprehensive immigration reform last summer, Senator Feinstein reaffirmed her commitment to see AgJOBS, arguably the most urgent component of immigration reform, pass either in 2007 or early in 2008. She said, "Bottom line: I am committed to moving AgJOBS in whatever way that I can this year. We will not give up this fight."

The original hope was that Senator Feinstein would be able to attach the AgJOBS legislation as an amendment to the Senate Farm Bill. However, Feinstein wisely decided, after extensive consultations with key Democrats and members of the Senate leadership, "not to endanger broad support for AgJOBS by taking a non-representative vote [during] the Farm Bill." The Farm Bill has, subsequently, proven to be so controversial in its own right that linking AgJOBS to it could have brought about a vote not really representative of its broad support – hence, the decision to wait was likely the best.

It is possible that by the time you read this, AgJOBS will have been passed by the Senate. But whatever the timing, it is

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Report From Washington: What's On the 2008 Agenda?

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critically important that the industry continue its strong support for the principles of the bill: a short-term and long-term solution to the increasingly desperate shortage of workers willing to work in agriculture. Specifically, the bill will allow our trained and trusted work force to earn the right to remain in the United States, so long as they make certain commitments, including continued work in agriculture for a set period of time and payment of fines, back taxes, and other requirements. The bill is not "amnesty," and it is important for members of the industry to continue to explain that to their Senators, Representatives, and to members of their communities.

The talk show hosts and other anti-immigrant forces have spread so much misinformation about immigration reform that responsible business owners must speak out whenever the opportunity affords itself – in civic organizations like Rotary and Chamber of Commerce (the national Chamber continues its strong support for the bill), in churches, and, of course, by continuing to let Congress know of our industry's support.

AgJOBS also streamlines and makes usable the 50-year-old guestworker program to provide a long-term solution to agriculture's labor needs through a workable, seasonal labor program. Go to www.safnow.org and click on "Write to Congress," or to the new web site, www.saveUSfarms.org, the site sponsored by the Agriculture Coalition for Immigration Reform, the very broad-based coalition, including SAF, the American Nursery & Landscape Association, OFA, and over 100 other agriculture and other organizations.

Estate Tax Reform and Other Tax Issues

The Senate Finance Committee is holding hearings on the problems the estate tax creates for small businesses and family farmers. The first hearing, November 14, dealt with the tax itself and the major accounting and financial planning problems it creates. The second, to be held in December or early January 2008, will focus on possible solutions.

Under current law, the estate tax exemption is \$2 million through 2008 and will increase to \$3.5 million in 2009. In 2010, it is completely repealed. But, in 2011, it will revert to 2001 levels. Similarly, the maximum tax rate is 45 percent between 2007 and 2009, but in 2011, it will revert to the 2001 maximum level of 55 percent.

Again, members of the green industry need to continue to tell their stories. The estate tax, as it now exists, creates tremendous uncertainty in business planning, and diverts otherwise useful financial resources into legal and financial planning requirements. Keep telling your Congressional members about what the "Death Tax" does to your ability to create jobs, invest in needed capital improvements to your business, and continue supporting your local economy.

The other big tax effort at present centers around efforts to repeal the Alternative Minimum Tax (AMT). The AMT was created in 1969 and was originally designed to prevent the very wealthy from using legal deductions and credits to avoid all taxes. The tax, unfortunately, has never been indexed for inflation. Thus,

unless Congress acts, about 25 million people will be forced to pay it in 2007, according to the U.S. Treasury Department.

Efforts to fix this situation are complicated because Congress has adopted the "pay-go" rules, which require that every tax cut must be "paid for" with an equivalent spending cut or tax increase. House Ways & Means Committee Chairman Charlie Rangel (D-NY) has proposed a new surtax, and would raise additional taxes by allowing the 2011 expiration of current tax rates. The Rangel bill is unlikely to go far, but it does give a look at what the arguments are going to be over the coming year or two. The green industry must continue to find its voice and be heard.

Floriculture & Nursery Research Initiative

The Initiative continues to support some \$6.25 million in USDA-Agricultural Research Service funding of research that is very important and specific to the needs of floriculture and nursery growers. Just some of the highlights of the research ongoing with Initiative support include studies on *Ralstonia solanacearum* and geranium production, purifying irrigation water to prevent the spread of *Phytophthora ramorum* (sudden oak death) in nurseries, reintroduction of fragrance into floral crops, increasing cut flower life, the economically important "root rot" and other diseases, and research which continues to help avert potential regulatory crises on the new Q-biotype whitefly.

The coming year's lobbying effort will be tremendously important, because once again, our industry must try to increase the amount of money available to researchers who are studying problems of increasing importance to U.S. growers. Stay tuned for information on how you can help.

Come to Capitol Hill and Lobby in February!

SAF's Congressional Action Days (CAD) will be held in Washington February 25-26, 2008. Congress can't hear the voices of floral and nursery businesses unless those voices speak out! CAD is a great opportunity to make an impact with your lawmakers – as many OFA members have experienced! This year is an election year, and many competing voices will be in town, so the green industry's collective voice must be louder than ever before. For a copy of the program and the interesting (and informative) speakers, go to www.safnow.org and click on the link to Congressional Action Days. It's important for your business – and it's important for our industry!

It's All About You...

No matter how discouraging or difficult it might seem to influence these and many more issues potentially impacting your business, remember that being a part of OFA, SAF, and ANLA gives you and your industry a stronger voice. Don't give up ... working together, we can make a difference!

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OFA Fact Sheet: Cutting Propagation

by Roberto G. Lopez



In an ideal propagation greenhouse, a grower is able to provide adequate moisture, minimize environmental stresses, prevent diseases and insects, and rapidly root cuttings in well-drained media. If appropriate cultural and environmental factors are maintained, most annual and perennial unrooted cuttings (URCs) can become fully rooted liners within two to four weeks. The critical environmental factors to manage during rooting are:

- Light intensity
- Air and media temperatures
- Misting and relative humidity
- Air flow around leaves

These five factors are all essential for preventing cuttings from drying out, rapidly elongating, and promoting rapid, uniform, and complete rooting into the liner cells. Growers often find that it is difficult to keep these conditions in balance because of extreme external environmental factors or inadequate propagation facilities or controls. For example, on very cold and cloudy days growers may opt to use their shade or energy curtains during the day to help maintain warm air and media temperatures leading to excessively low light levels in their propagation houses. The following information will help you manage and keep environmental parameters in balance to ensure rooting success.

Light Management

Vegetative cuttings require a minimum quantity of light to provide the energy for root initiation and development. Light intensities below this minimum result in arrested root development, leading to a delayed crop or rooting failure. Conversely, too much light can reduce root formation due to excessive stress on the cuttings, and lead to bleached or scorched leaves.

Photoperiod

Photoperiod is often not controlled during the propagation of vegetative annual or perennial URCs. In certain annual plants, flowering is promoted by certain photoperiods (i.e. long days for petunia and *Argyranthemum*), and should be managed to prevent premature flower induction during propagation or finishing. A photoperiod of 12 to 13 hours is recommended for the propagation of most annuals, especially for long-day plants such as petunia.

Light Intensity

Desirable levels of light vary, depending primarily on the stage of root development. The following is a guideline to manage light intensity for most herbaceous crops during propagation.

Stage 1: Stick to callus formation. During the early stages of propagation (from stick to callus formation), maximum recommended light intensity is between 100 to 200 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ (500 to 1,000 footcandles) to provide enough energy for callus formation and root initiation without causing desiccation. In addition, light transmission through the propagation house should be indirect or diffuse. White wash or exterior shade in combination with retractable shade curtains can provide a good system for light modulation, especially in the spring and summer. Automatic or manually operated retractable shade curtains alone can be an effective way to modulate light transmission, as they can remain open on cloudy days or in the morning and late afternoon on sunny days. Curtains should be closed during the brightest hours of the day to prevent excessively high light levels.

Stage 2: After root initiation. Once roots have initiated and are visible (generally 5 to 12 days after stick), maximum light intensity can be increased to 200 to 400 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ (1,000 to 2,000 footcandles). Again, the light should be diffuse.

Stage 3: After roots fill half the plug. Once roots fill about half of the plug cell (generally 10 to 16 days after stick), maximum light levels can be increased to 500 to 800 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ (2,500 to 4,000 footcandles). This higher intensity helps acclimate plants to the post-propagation environment.

Temperature Management

Air temperature and especially medium temperature are important for callus and root development. A desirable medium temperature for most species during Stage 1 is 73 to 77°F (23 to 25°C), which usually requires bench heating. Air temperature should be maintained between 68 to 73°F (20 to 23°C) when bottom heat is utilized. However, if bottom heat is not available, air temperature should be increased to 77 to 80°F (25 to 27°C) so that medium temperature is adequate. Maintaining air temperature lower than medium temperature retards shoot growth and promotes root development. During Stage 2 and 3, temperatures can be slightly lowered: air temperatures of 66 to 70°F (19 to 21°C) and media temperatures of 72 to 75°F (22 to 24°C).

Mist, Humidity, and Airflow Management

The most common watering system used in propagating URCs is intermittent mist. Efforts should be made to root cuttings with the least amount of mist possible to minimize disease pressure, leaching of nutrients, and water-logged media. The following is a good rule of thumb to follow: mist should be applied often

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OFA Fact Sheet: Cutting Propagation

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enough to prevent URCs from wilting and long enough so water evenly coats the leaf surface but does not drip off.

Maintain relative humidity in a propagation house according to your air temperature set point as follows:

- >70% relative humidity at 68°F (20°C)
- >75% relative humidity at 73°F (23°C)
- >80% relative humidity at 78°F (26°C)

This can be done with steam or fog delivered by either high pressure or a fan-driven water atomizer. If environmental conditions are ideal (i.e. warm medium temperature, humid still air, and adequate light intensity), requirements for misting should be minimal and frequency can be low. Properly managing the

electrical conductivity, pH, and hardness of your water is essential when using these systems.

Air movement or air exchanges should be limited during propagation; however air movement is sometimes necessary to balance high light levels, temperature, and moisture in summer months.

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Sustainable...Green...Eco Friendly...Organic... How Do We Fit In?

by Brian Krug

There has been a lot of buzz in our industry around the words “sustainable,” “green,” “eco friendly,” and “organic.” If you haven’t heard much about them yet, you will. For example, an entire seminar track at this year’s “Greenhouse Experience,” hosted by Ball Publishing and OFA, was dedicated to organic growing.

What does it mean to you, the grower, to be sustainable, green, or organic? Growing and marketing a crop as *organic* requires certification by a USDA-accredited agency. To be termed organic crops must be grown without the use of conventional pesticides, synthetically produced fertilizers, or bioengineered plants. On the flipside, there is no universal definition or policy that regulates what can be considered *sustainable*, *green*, or *eco friendly*. Wikipedia has this definition: “Sustainable agriculture integrates three main goals: environmental stewardship, farm profitability, and prosperous farming communities. These goals have been defined by a variety of disciplines and may be looked at from the vantage point of the farmer or the consumer.” Looking at the goals of sustainability from these different vantage points gives you a variety of views. The recent movement toward sustainability in the greenhouse industry offers us the advantage of shaping what sustainability means to our industry.

To investigate the sustainability certification process I had the privilege of being included in a meeting hosted by Doug Cole, of D.S. Cole Growers in Loudon, New Hampshire to learn about a European grower certification program. Other attendees included

Noah Schwartz of Matterhorn Nursery in Spring Valley, New York, Henry Huntington of Pleasant View Gardens in Loudon, New Hampshire, and Chris Schlegel, also of D.S. Cole Growers.

Theo de Groot, director of MPS (Milieu Project Sierteelt), gave us a little background on the Dutch certification program. MPS is translated into English as Environmental Program Floriculture. It was established in conjunction by the Dutch flower auctions and the Dutch growers’ associations in 1994 and one year later was officially founded. It was accredited by the Dutch Accreditation Council in 1999. As a not-for-profit organization, MPS has a worldwide network with 11 foreign offices and over 4,000 growers under their certification. This proliferation has enabled MPS to develop the world’s largest database for floriculture production information. The goal of MPS is to use registration, certification, innovations, and marketing to strengthen the position of growers, packers, retailers, etc. as responsible and reliable companies.

MPS has over 10 certificates available depending on the needs of your company. Theo explained four certifications in detail: MPS-ABC, MPS-GAP, MPS-SQ, and MPS-Quality. The first, MPS-ABC, is an environmental score card for your company. It issues you a rating of either A, B, or C depending on your inputs. MPS-GAP (Good Agricultural Practices) looks at the performance of your company, specifically related to workplace safety, hygiene, and worker training. MPS-ABC and MPS-GAP together make the



cornerstone of the program and must be obtained together. Growers can also choose to participate in the other certificate programs. MPS-SQ (Social Quality) focuses on ethical principles like labor and wage. MPS-Quality looks into customer relations management, sales, and delivery. The bottom line for each of these certificates is the reliability of your company.

So what does it mean to get an environmental score card? The score is split into five different categories: crop protection, total energy, nitrogen, phosphorus, and waste. Crop protection, or simply pesticide use, is further classified into green, amber, and red categories. Each represents the risk involved with using specific pesticides in your location. Factors taken into account for assessing the risk include the product being applied, the depth of your water table, distance from surface water, and soil type around your greenhouse. Total energy, nitrogen, and phosphorus simply track the amount of each of these inputs used to produce your crop(s). The waste category evaluates not only how much waste you create, but more importantly, how well you can manage your waste instead of having a third party dispose of it for you (i.e. send it to a landfill). The higher the score (up to 100), the better your company is doing at being a steward of the environment. Each category is given a range for the upper and lower limits of consumption; it is possible to get a negative score in a category if you go over the upper limit. Your total score dictates which certificate you receive: A (the highest), B, or C level. MPS will create an environmental score card every quarter so performance improvements can be tracked.

How do upper and lower limits of consumption get set? This is where that world's largest floriculture database comes in. MPS has been collecting production inputs from participating growers since 1994; it uses this information to establish reasonable ranges of inputs. They cluster crops together and take into account the climate conditions you grow in. This means that if you are a liner producer, inevitably with high inputs, your input ranges would differ from a grower producing garden mums. Or, if you are a poinsettia grower in New England, you would have different energy input ranges than a poinsettia grower in Florida. Currently, MPS does not have adequate information for growing conditions in the United States specifically, but they can match input ranges and standards for your growing situation with similar European operations for which they have data. Standards can become more fine tuned as growers from different parts of the U.S. contribute data. The goal of MPS is to set realistic standards in order to have 50 percent of enrolled growers be certified at the A level.

How is MPS getting this information from you? You provide your inputs each month. At the end of each month you total up the amount of pesticides, fuel oil, electricity, natural gas, and wastes; these totals then get entered into a web site that you log into with a username and password. This may seem like a daunting task, but you can look at your monthly bills to see the consumption of electricity or heating fuel, and keeping track of pesticide and fertilizer use is something we should be doing already. Theo says that growers who are involved with MPS-ABC spend only about one hour each month, cumulatively, to collect and report the needed information. Two Dutch growers told Doug Cole that reporting takes them about 15 minutes a month.

If the individual grower is reporting his or her own inputs, how does MPS know they are reporting truthfully? MPS reserves the right to conduct audits which can be done in a number of ways. Desk-audits occur by matching recorded use of pesticides, fuel, etc. with invoices of purchase to make sure what you report equals what you have bought. MPS may also visit your facility to check if you are complying with what you report. Finally, samples may be taken from your greenhouse and/or the retailer to be tested. These audits are simply to ensure accurate record keeping and proper use of your certification. Any sanctions imposed, mostly due to improper reporting, can range from verbal or written warnings to having your certification revoked until corrective measures are taken.

Certification Advantages

What is the advantage of being certified by MPS or another company? You begin to understand the inputs of your production and are given a benchmark of where they should be; this is a great decision-making tool to increase your bottom line. From 1996 to 2006 MPS has been able to track a 25 percent decrease in crop protection agents used and a 25 percent decrease in energy consumption, while also observing a 33 percent increase in production for growers participating in the certification program. Your environmental impact also decreases – something desired by more and more growers and consumers. Speaking of the consumer, MPS offers a point-of-sale label called FFP (Fair Flower Fair Plants) designed to market your certification to consumers.

Are there any disadvantages to being certified? Of course with a new venture a company has to assess both the advantages and the disadvantages. There will be fees associated with participating in any certification process and these will most likely vary with the size of your operation and what certifications you want to obtain. Henry Huntington of Pleasant View Gardens sums up his perspective, "Given the consumer direction toward more sustainable products I can't really see any downside. From a business owner perspective it will be all about how committed you are to achieve certification." Henry brings up a good point here – your commitment means everything. If you aren't committed to keeping the required records and taking full advantage of the certification process, you probably will not see the benefit of being certified.

Sustainable production can be a benefit by decreasing inputs and costs. It also could prove to give growers a marketing edge over products not grown in a sustainable production system. One possible route to do this could be the use of sustainability certifications. The process of becoming certified by other agencies, such as Veriflora, will be covered in following issues of the *OFA Bulletin* as well as updates and articles discussing sustainability in the floriculture industry.

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Competing with the Grocery Stores: Strengths of the Retail Florist

by Stan Pohmer

As I was reflecting on this topic it became apparent that the entire floral industry is being challenged from many different sides.

Most retail florists originally built their business and operations models on catering to gift and occasion sales, fulfilling orders for the wire services, and sympathy sales. For many years, retail florists looked at the supermarkets as their primary competitor, with these mass marketers “stealing” customers away from them by offering low quality flowers at low prices – something the retail florists couldn’t or wouldn’t compete against.

But the reality is that, while the florists built their businesses on design and services such as delivery, product quality, and product uniqueness, the supermarket strategy was built on limited selection and impulse sales for self-consumption. After all, the supermarkets already had foot traffic walking through their front doors, so all they had to do was convert some of that existing traffic to flower purchases.

Many florists have expressed concern that the supermarkets have lowered the consumers’ perception of flowers and made them a commodity. By the way, a product becomes a commodity simply when the supply exceeds the demand, and it becomes widely available in multiple retail venues; therefore, the state of our industry has made the flowers a commodity, not the supermarkets. More correctly, the florists were faced with new competition and they no longer had an exclusive right as the only retail venue able to sell flowers. But in reality, supermarkets are selling products at prices that the retail florists’ business models can’t accommodate and positioning themselves in different ways (impulse vs. gift/special occasion), so are they really your competition? That said, there are clear and distinct differences in the business strategies of florists and supermarkets.

Looking outside our industry for an example, there are several similarities when we compare the state of the floral retail channel competition with the food service industry. There are fast food operators and upscale restaurants offering food but each catering to very different customer expectations. The fast food retailers focus on good product quality, speed, and convenience, offering a good price/value relationship for what they provide to the consumer. On the other hand, the upscale restaurants offer superior quality and product presentation, a much broader selection from which the consumer can choose, and a much enhanced overall experience. Granted, the upscale restaurant is more expensive than the fast food operator, but the consumer measures the cost/benefit ratio on a completely

different scale when the key differentiating factor is experiential in nature. Both retailers meet their customers’ expectations, but these expectations are very different for each channel retailer.

I’m sure the high end restaurant is concerned about new fast food competition opening up in his/her trade area because it means that the existing disposable spending power will be diluted, and they may lose some customers or purchase frequency from their existing customers to the competition. Faced with this, they have two basic choices: lower their standards to compete with the fast food retailer on price without offering all of the extra benefits, or do a better job communicating the differences between them and marketing the benefits they can offer.

Most retail florists are destination locations; they normally do not have a lot of casual walk-in traffic where people just come in to browse without a definite intent to purchase. The challenge, then, is how to position your business to the consumer, how you communicate the differences and value you provide, and then how to effectively market this to the consumer population to increase traffic with a high intent to purchase and/or to be top of mind when the consumer is ready to order electronically (telephone or Internet).

Let’s start by considering some of the key areas where florists traditionally feel they have an advantage over the mass market: product assortment/product quality, cold chain distribution, design work/artistry, and services.

Florist Advantages

One of the key advantages that florists had in the past was product quality, but this isn’t the advantage it once was. In many cases the product for the retail florist and the supermarket are grown on the same farms, so the initial quality is largely identical. However, because supermarkets focus on impulse sales, with pre-made bouquets/bunches as their assortment mainstays, this presents an opportunity for florists to demonstrate their breadth of assortment and uniqueness as a differentiated strength.

Florists have often viewed themselves as having better maintained product with better cold chain distribution and superior care and handling protocols. However, supermarkets have a lot of experience handling perishable merchandise and many have their own climate-controlled distribution; in many cases, the distribution logistics of the florists and the supermarkets are very similar, so there’s no longer a clear cut advantage for the florist in this area.

There may be some advantage for the florist with in-shop/store care and handling, though the supermarkets have



dramatically improved in this area. While the supermarkets do maintain some product on the sales floor outside of coolers, the high traffic allows them to rotate their inventory much faster than most florists, getting the product into the consumers' hands faster.

One of the greatest strengths of the retail florist is the ability to create designs specifically to match the needs of each individual customer, taking a customized approach to design. However, it's important that the florist not dictate his/her style preferences on the customer, but rather apply their artistry to create the solution for the customer.

And lastly, services are a key advantage for the florist, especially delivery and the ability to coordinate flowers for remote delivery through other florists, either directly or through a wire service network. Further, the ability to provide special event services such as wedding design and sympathy tributes are areas where most supermarkets cannot compete.

So on the surface, the key differentiated advantages between the retail florist and the supermarket are product assortment and uniqueness, design/artistry, and services.

The Real Competition

In my view, however, the challenge retail florists need to recognize is that the supermarkets are a relatively minor competitor for them. Gifts and special occasion business drive most florists' sales, and these are areas where the supermarket is not dominant. The real competition for the florist are other non-floral categories outside our industry that are competing directly with the florist for the gift and occasion business, categories such as higher end restaurants, jewelry, the hospitality industry (spas and hotels), apparel and lingerie, fragrances, and more. Some florists may say that the reason that these other choices are succeeding at the expense of florists is the effectiveness of these other industry marketing communication efforts, but I think it's more fundamental than that. I believe that these alternative product choices and venues have become more relevant to the consumer than flowers are. I also believe that it's the responsibility of the individual florist to develop relevancy within his/her own community and to develop relationships with their customers in their own markets that create loyalty. To build or re-ignite this relevancy, I challenge florists to:

Re-Think Your Business Strategy

Supermarkets sell flowers at a price most florists can't compete with to maintain sustained profitability. What florists really sell are emotion, romance, experiences, smiles, design expertise/artistry, and sentiments; flowers become the means to deliver these, not an end unto themselves. If positioned and communicated well, the best part of this approach is that you can't put a comparable value price on these attributes, so if you market these, you establish their value, your competition doesn't. Granted, there still has to be a reasonable price/value relationship, but you're more in control determining what this value proposition is than your competitors.

Think about the advertising that jewelry retailers and hotels do for holidays. At the end of the day, they are selling baubles and rooms. But their advertising messages almost never mention price, and many of them don't get specific about product. What

you do hear and read about is the experience of giving and receiving, the emotions that will be delivered, perceived, and received. No product on earth has the emotional power that a flower does; we just need to focus on communicating this power, not just flowers at a price.

Re-Create Your Business Model

Once you accept and embrace the fact that you're not in the flower business but in the emotions business, this can fundamentally change your entire approach to the market and to all facets of your business. This can change the way you talk to and interact with your customers, the way you market and advertise, the way you merchandise and display, and the messages you send to potential and existing customers.

Commit yourself to developing relationships with your customers all year long, not just on the traditional floral holidays and special calendar occasions such as birthdays and anniversaries. Utilize a regular e-newsletter, not just to suggest specific products but to educate and to communicate the benefits of flowers (such as the Harvard University study results that conclusively demonstrate the positive power of flowers on human behavior; go to www.flowerwellness.com or www.safnow.com for more information).

Take the time to really understand who your customer is and who you need to develop as customers to be successful in the long term. The latest market data available shows that only 9 percent of U.S. households are buying cut flowers at a retail florist, and are purchasing only 2.3 times per year. Both of these numbers have been trending down over time. There's a tremendous opportunity to reach more customers and to increase the frequency of purchase through florists, but we need to change our approach and who we market to, as it's apparent we're currently heading in the wrong direction.

Re-Energize Your Business

It's a normal tendency that, when the business climate is tough and we're not achieving the results we want, we hunker down, get back to the things we feel comfortable with, and focus on operations and cost cutting (the "if we can't get the top line sales, manage the bottom line" mentality). Most of us don't like change under any circumstances, and dislike it even more when business conditions are deteriorating. But, in truth, this is when we really need to think about implementing change. Planned and considered change, though scary, can be highly motivating and energizing.

Above all, florists are passionate about what they do ... their artistry and design and the product they deal with. A personal observation: most florists never share this passion with their customers. If you could share just a little of your emotional connection with your customers, they'd better understand the true power of flowers. Commit to reaching out in your community, whether it's to school classes or scout groups, your Rotary or Main Street Merchant's Association, to look for the opportunities to share your passion.

Yes, supermarkets are competition to retail florists, and you have some major advantages (and disadvantages) to them that

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Competing with the Grocery Stores: Strengths of the Retail Florist

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can and should be leveraged in your communications with your customers. But your real competitors are other non-floral categories and retailers that are aggressively taking gift and special occasion market share from you. Without fundamentally changing the way we position ourselves and the message we communicate to the consumer population, we'll continue to stagnate. Maybe it's time to consider rethinking, recreating and reenergizing the florists' business models and approaches to start developing more relevancy and relationships with our customers (and potential customers) to even the competitive playing field

and gain back that market share from the non-floral competition.

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Vegetables Are Hot Again!

by Jayson Force

Industry suppliers have seen a consistent upward trend in vegetable sales over the past three years, with growers and retailers also experiencing increased sales to consumers. For many of these companies, vegetables are becoming an important part of their product mix. Overall, vegetable gardening among consumers is on the way up, a supposition that is supported by national consumer surveys conducted by the Garden Writers Association in 2007. Thirty-four percent of the gardening consumers surveyed expected to add vegetable gardens to their properties this year, and 12 percent planned to add an herb garden. The surveys also showed that vegetable gardening is an important area of interest for consumers, with 25 percent indicating they would like more information on the topic. But what's creating this demand?

While more and more consumers are growing their own vegetables, they aren't doing it for the same reasons – or the same way – that their parents or grandparents did. The undeniable movement in support of sustainable or organic products and practices plays a role here; consumers can reduce their impact on the environment by growing vegetables at home rather than purchasing products at the grocery store that may have been trucked in from far distances, and they can control the amount of chemicals used in growing their own produce. In anticipation of this trend, we've recently added an organic seed line of more than 60 varieties of vegetables and herbs, including 10 of the best-known heirloom tomatoes, to help growers provide these in-demand types of products.

The popularity of television cooking shows may also provide an explanation, as more viewers learn how to cook with fresh

herbs and vegetables and may be inspired to try the new or unusual produce they see TV chefs use. Oftentimes, these unique varieties are not readily available in the store, but can be grown at home. Consumers are interested in growing the vegetables and herbs used on their favorite cooking shows or served in their favorite restaurants.

The proliferation of interesting hybrid vegetable varieties has also helped vegetable gardening grow; these hybrids help the home gardener to be more successful by providing important traits such as disease and insect resistance, weather tolerance, and higher yields per plant. In many cases, the new varieties also offer a new look for the vegetable garden that appeals to consumers, whether it's a purple carrot, a distinctively shaped squash, or an orange cauliflower. Vegetable breeders continue to offer innovative varieties each year with never-before-seen characteristics, and this keeps something as "traditional" as vegetable gardening fresh and interesting. At Ball, we're looking forward to introducing a seedless tomato for 2009, a unique advancement in breeding that provides a new benefit without sacrificing a bit of great taste.

Container-grown vegetables have taken off as well, as people with small suburban spaces or urban balcony gardens grow more of their own vegetables. There are many "patio vegetables" on the market now that are well-suited to this type of use, and make it possible for more people to experience the benefits of growing some of their own food. An interesting trend that may illustrate this new way of vegetable gardening is that more vegetables are being sold in pots rather than flats. According to the USDA National Agricultural Statistics Service, the market for





potted vegetable plants grew steadily in dollars through 2005. Consumers are spending more money to buy larger vegetable plants, especially tomatoes and peppers with fruit already on the plants at point of sale. What consumers are seeking, growers are accommodating by growing more vegetables in larger and larger pots rather than flats.

A final factor that's helping vegetable gardening gain in popularity is what many call the "ornamental edible" trend. Consumers are responding to the idea of plants that not only provide home harvest produce but also beauty. It's gardening for function as well as fashion, and more and more consumer gardening magazines are exploring this topic and providing ideas and inspiration to their readers. The old rules of gardening – vegetables in the veggie patch and flowers in the flower bed – are falling by the wayside as people use herbs, vegetables, annuals, perennials, and even shrubs in the same space, creating unique mixed containers or garden beds that bring all types of plants together. Beets can now be border plants; basil can provide the foliage element of a mixed container; peppers can provide spots of color in the garden. Anything goes, and the result is that vegetable gardening has become more approachable for consumers.

A Look at Some Innovative Vegetables

With added benefits for home gardeners as well as the growers and retailers who sell them, Figures 1-7 illustrate some of the newer, more interesting varieties on the market.



Figure 1. Cauliflower Cheddar: This unique orange cauliflower is a great choice for cooking or eating raw. The orange color comes with 25 percent more beta carotene than standard white types, and is an excellent source of Vitamin A.



Figure 2. Cucumber Pearl: It's an eye-catching look for a cucumber: ivory-green fruit that grows 6 to 7 inches long. These vigorous, productive plants are widely adapted and resistant to Downy Mildew.



Figure 3. Eggplant Hansel: This 2008 All-America Selections Vegetable Winner is a true miniature, providing clusters of three to six small fruits that should be harvested when they are 3 to 6 inches long. The non-bitter fruits stay tender. The plant itself grows about 3 feet tall.

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Vegetables Are Hot Again!

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Figure 4. Pepper Pritivit: A sweet pepper with a “cute” look, Pritivit produces deep-ribbed fruits that measure about 2.5 inches tall and 4 inches wide. The dark red peppers resemble tomatoes but are sweet and crisp. They’re perfect for cooking, stuffing, or eating fresh.



Figure 5. Squash Portofino: Portofino is a romanesco (Italian) type summer squash with a nutty flavor. The fruits are dark green with light green ridges and a distinctive shape; when cut crosswise they look like stars.



Figure 6. Pretty in Pink: Pretting in Pink is a bright green-leaved, everbearing plant that produces large, pink flowers and sweet, mid-sized, deep red berries



Figure 7. Pretty in Rose: Pretty in Rose is a new companion variety with deep rose, semi-double blooms, and many sweet, red berries. Both are hardy to USDA Zone 5 and can be sold in flower in 3.5- to 5-inch pots for gardens and containers.



Figure 8. Tomato Bush Champion: This variety was selected for the Ball Centennial Collection, which commemorated Ball Horticultural Company's 100th anniversary in 2005. The plants are extra-early and compact, growing about 24 inches tall, and yield big, meaty fruit with a mouth-watering taste. This variety is a great selection for large containers or small space gardens.



Figure 9. Tomato Tomande: Tomande offers the best of both worlds: the great taste and semi-ribbed dark shoulders of an heirloom with the productivity and disease-resistance of a hybrid. The fruits are sweet, well-textured, and weigh about 6.5 ounces. The plants are high-yielding and continue to produce fruit over a long period of time.

These and many other unique vegetable and herb varieties are changing the way consumers – and growers – think about home-grown produce. Not only is vegetable gardening becoming more popular with consumers, but there are more options than ever for varieties that combine excellent performance and great taste with an attractive look that adds an interesting, new element to the ornamental garden.

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Production of Programmed Vegetative Liners

by Mel Sawaya

A programmed vegetative liner is a liner that is grown in such a way as to achieve a pre-determined target. Below are factors that affect this target.

Finished pot size. Knowing the finished pot size is necessary to properly schedule liner production. Programming a liner for a 4-inch pot is completely different than producing a liner for 12-inch patio pots or large hanging baskets. To produce a 4-inch pot with salable plant showing color, a bushy well-branched liner full of buds is necessary for quick production (Figure 1). Liners for large pots must be in the vegetative stage and not showing flower buds. A few examples are bacopa, New Guinea impatiens, and fuchsia. Liners produced for combination plantings differ in scheduling and treatment as the plants have to compliment each other rather than compete.



Figure 1. A Dahlia cutting that was pre-budded before planting.

Sales date. Knowing the sales date, as simple as that seems, is one of the most important factors to producing a programmable liner.

Season. Programmable liner production is adjusted to fit the season. Liners produced for early spring production are completely different than liners produced for summer production.

Geographic retail location. Many liners are produced for a particular geographic location. Liners for northern states are different than those produced for southern states.

Finishing environment. Knowing the greenhouse environment of the finishing container will also cause the programming of the liner to vary.

Cultural practices. The cultural practices or how growers finish their crops vary; to program a liner properly, we must

know those practices. For example, wet versus dry growers; type of fertilizer used; some growers use growth regulators freely while others do not.

Transplant method. Plug media selection and plug configuration are both heavily influenced by the method of transplant – machine vs. manual. Understanding these interacting factors will allow the liner producer to program the liner toward a specific target.

Factors Involved in Producing a Programmed Liner Stock

Starting a vegetative programmed liner with a healthy cutting without flowering buds will help in successful rooting (Figure 2). A budded Dahlia cutting of the same cultivar will take up to two weeks extra to root versus a non-budded cutting. Fuchsia,



Figure 2. Some Dahlia cutting that set buds even before rooting.

nemesia, osteospermum, and scaevola are a few examples for this rule. Here are some steps stock producers take to avoid shipping budded cuttings:

- a) Know the photoperiod response for bud-setting and do the opposite to keep the stock vegetative. Give long days to dahlia and avoid long days for fuchsia.
- b) Although photoperiod can prevent bud-setting, if the stock is not harvested in a timely fashion, the cutting will often have buds due to age. Many poinsettia varieties set bud after 13 to 15 leaves of growth, as do chrysanthemum, dahlia, and osteospermum.
- c) Proper temperatures must be provided for minimizing budded cuttings. Many varieties will set bud even when photoperiod and timely harvesting have taken place. Osteospermum,

chrysanthemum, poinsettia, dahlia, and nemesia, if grown cool, will set buds. This is a negative characteristic for producing a successful programmed liner.

d) Many stock producers use Florel to keep cuttings growing vegetatively; although very effective, Florel can have negative side effects if not used properly. For example:

- Many varieties need a waiting period after treatment or rooting will be delayed drastically. For example, ivy geranium needs a three-week waiting period.
- The time between applying Florel and shipping should be taken into consideration. The normal risk of ethylene damage in shipping is high, and the use of Florel increases the risk.
- Florel will stress a plant, and the level of stress differs for different plant cultivars. A waiting period before harvesting, shipping, or sticking cuttings should be determined per cultivar.

Cutting

After the cuttings are harvested, all measures should be taken to ensure they do not become dehydrated. Shading the cuttings until they go into a temperature- and humidity-controlled room will help, but the time between taking the cutting and entering a proper storage room is more important. Whether cuttings are harvested at sticking site or have been shipped, dipping them in clean, disinfected water and storing them in a controlled (temperature and humidity) environment for at least four hours (or overnight) will get the cutting turgid and minimize the amount of mist to be applied at the rooting bench in the first two to three days. This is a major procedure to prevent *Erwinia* infections, especially in hot climates or during summer production in northern climates. Poinsettia is a typical example.

Rooting Media

Use media that drains well, is porous, and allows the easy movement of gases and liquids, aids fast-rooting, and improves rooting success. A peat-lite-based media without gel or other additives is preferable to hold the soil together. An Ellegard-type product is good as long as it contains a good rooting media. The use of rooting media in a cell pack or other rooting tray is good because the rooting material produces sufficient root mass to enable the pulling of the entire root ball for easy transplanting. The media should also have good water retention. This will reduce misting requirements and facilitate a healthier cutting with leaves that have not been leached of nutrients. This is more important in hot climates and seasons.

Propagation

For a quality liner to meet the predetermined sale date economically, some aspects have to be taken into consideration.

- Liners should be rooted in the shortest time possible to avoid nutrient depletion from the leaves.
- A healthy active root system is essential for rapid liner establishment after transplant (Figure 3).
- If possible, avoid using fungicides because they have a negative side effect on new roots – especially if the cuttings are not rooting in a timely fashion. Healthy, turgid cuttings with no shipment shock or dehydration, housed in a proper facility, and under correct procedures should never need a fungicide.



Figure 3. Healthy rooted cuttings ready for transplant.

- Cuttings need fertilizer at the first sign of rooting. Fertilized liners will branch better and take off better upon transplanting.

Production Treatments

Selecting the right variety for the targeted finished product is the easiest first step in achieving our goal in producing a programmed liner. At the same time, following the required treatments to attain the required end product will differentiate one grower from another and will definitely reflect on the end product. Here are some of the production treatments:

a) Photoperiod

Knowing the variety's photoperiod requirement and applying it will ensure the right product for the right target. By not lighting a tuberous begonia, the plants will form a tuber, and the plant's vigour will diminish drastically. At the same time, some petunia varieties will take much longer to flower if they don't get long days (by night interruption). Long days can be beneficial in speeding up flowering of many calibrachoa when using liners for 4-inch containers. However, if the liner is for 12-inch containers, then we don't want to provide long days because we want the plant to achieve a certain size without any flowers. A fuchsia intended for a 10-inch pot should not have any long-day treatment, or the cuttings will bud and growth will slow prematurely, resulting in an inferior crop. Fuchsia liners intended for 4-inch production require long-day treatment on a well-branched cutting.

b) Light Accumulation

Many crops will flower much earlier when high-intensity light is supplied because these plants flower by light accumulation. Many cultivars fit into this category. Petunias and geraniums can speed up flowering up to three weeks in northern climates and, although this is desirable on liners intended for mass production of 4-pots pots, it is not desirable for liners intended for larger containers.

c) Temperature

Like photoperiod, many cultivars have a facultative or mandatory temperature range for bud set. Depending on our target, the liner production temperature can be adjusted to get the optimum liner. For a 4-inch osteospermum liner a low

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Production of Programmed Vegetative Liners

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temperature of 50°F (10°C) is preferable and more economical to finish. However, if the same cultivar is intended for a 6-inch pot or larger, cool treatment should not be applied until after the liner is planted in the pot. Once it is established, pinched, and the new growth is 2 inches, a cool treatment becomes beneficial. If treatment is intended for 4-inch pot production and is planted in a 6-inch or larger pot, the end product will be too short and not desirable.

d) Pinching (Shearing)

If some cultivars don't branch naturally and chemical branching is either too slow, ineffective, or has some negative side effects, then pinching (or shearing) the cuttings is the only way to produce a bushy liner (Figure 4). Although numerous growth regulators can control the height of many cultivars, pinching can result in much nicer liners – especially when uniformity is required – and with the advancement of mechanical shearers, this phase of production is less labor intensive than in the past (Figure 5).



Figure 4. A calibrachoa line that has been sheared.



Figure 5. Mechanization of liner shearing.

e) Growth Regulators

Chemical growth regulators are an effective tool for adjusting the growth habit of many cultivars. The adjustment could be positive or negative, depending upon our knowledge and experience of the growth regulator, which is a legendary discussion on its own. The following are perhaps the most important considerations in using growth regulators to produce a liner:

- Some growth regulators speed up flowering while others delay it. Cycocel speeds flowering on geraniums while B-Nine delays the flowering of any crop. A-Rest can hasten flowering of almost every variety while Bonzi and Sumagic can delay the opening of the flower, especially if the plug is grown in cool temperatures immediately after treatment or within two weeks of treatment.
- Growth regulator rates vary drastically under different temperatures. Keeping in mind the liner's finishing temperature is very important. Bonzi and Sumagic are more critical than B-Nine and Cycocel when it comes to treatments and temperatures because they are effective for longer periods.
- Showering or heavily spraying Bonzi or Sumagic on a budded liner will delay the flowering much more than if these liners were sub-irrigated with the same rate of Sumagic or Bonzi. With many liners that are going into combinations and are vigorous varieties, the practice of sub-irrigation (dipping) is common (Figure 6). The whole liner tray is passed through a solution of Bonzi or Sumagic which "programs" the liner to have more turgor, and its growth will slow. This is especially important when these plants are combined with less vigorous plants that cannot handle Bonzi or Sumagic. The rates for sub-irrigation dip vary but, for a starting guideline, use 2ppm Bonzi or 1ppm Sumagic. These rates work well if crops are to be grown at an average temperature of 60 to 65°F and are an excellent tool when you get to know the varieties and their response to the dip-treatment.



Figure 6. A mechanized dipping trough.

- Another growth regulator that can play a huge part in producing a programmed liner is Florel. A liner can be set at zero date when sprayed with Florel and, as long as we know how long it takes from last spray to flowering, then programming the liner with the proper date and treatment will help ensure having the product to be ready on time. Different growers get different responses with the use of Florel.

Here are some suggestions for successful results when using Florel:

- Make sure the chemical is still active. Florel can deteriorate with time, especially if the container is left open. Florel activity can be checked by a simple test. Adjust your spray water to a pH of 6.0, then add 250ppm Florel and the water's pH should drop to 3.2-3.5. If it does not, then the chemical is deactivated.
- The longer the plants stay wet the more effective the spray is. Florel is very local in its activity so plants should be covered well; overspray volume is much better than under-spray. There are no negative side effects from overspray but there is definitely reduced activity with under-spray. Florel is more effective at 65°F than at 50°F. Only spray plant material that is not crowded because the spray won't be able to get into all parts of the plant, and if the sprayed parts of the plant are not exposed to light, leaves may yellow and fall off. It is very important to spray rooted liners as soon as they are turgid enough but still have some space among the cuttings.

f) Liner Size

Naturally, the larger the liner size the better the chance of producing a higher quality liner. More light, more branching, and chemical treatment are most effective. In addition, a larger liner will take less time to finish when planted. If producing smaller liners for use in 4-inch pots because smaller liners are more practical to plant, then spacing the smaller liners will give the same result as larger liners.

g) Disease and Insect-Free

If the liner is clean of disease and insects and goes into clean media and facilities, the chances of getting any disease or insect



Figure 7. Flowering bacopa liners can provide an excellent environment for Botrytis.

is greatly reduced. Any chemical treatments made to liners in production are much cheaper than those made after the liners have been transplanted (Figure 7).

h) Timing

By far, the most important factor in a programmed liner is the proper timing for the liner. This is a critical rule-of-thumb and encompasses the scheduled sticking of cuttings, pesticide and PGR treatments, and adjustments to other cultural practices and environmental conditions. Producing a programmed liner is like flying an airplane: 90 percent of the time we are off course, but we are always adjusting toward our destination. We must continuously adjust our culture and practices to meet our liner targets, and we can only do that if we know where the product is going to end up and the conditions under which it is to be finished.

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OFA Fact Sheet: Fungus Gnats

by Raymond Cloyd

Fungus gnats (*Bradysia* spp.) are one of the few greenhouse insect pests in which the primary damaging stage, in this case, the larvae, is located within the growing medium. Fungus gnats may be a problem in greenhouses for several reasons. First, large populations of adults flying around may affect crop salability. Second, both the adult and larval stages are capable of disseminating and transmitting disease-causing organisms such as *Pythium* spp., and *Thielaviopsis basicola*. Third, larvae feed on roots causing direct plant injury and create wounds that allow soilborne pathogens to enter. Finally, larvae may tunnel into the crown of a plant resulting in death.

Fungus gnat adults are winged, 4-millimeters (1/8 inch) in length, with long legs and antennae. In addition, they have a distinct “y-shaped” pattern on the forewings. In general, adults are “weak” fliers and tend to be located around the growing medium surface. Fungus gnat adults (both females and males) typically live for approximately 7 to 10 days. Although the adults are primarily a nuisance, causing minimal direct plant damage, the females lay eggs that hatch into larvae that are directly responsible for damaging plants. Females can deposit up to 200 eggs into cracks and crevices located in the growing medium. Growing media vary in their attractiveness to fungus gnat adults; with moist growing media and those containing high quantities of peat moss being the most attractive.

Eggs hatch into transparent or slightly translucent, legless larvae that will grow up to 6-millimeters (1/4 inch) long when mature. There are four larval instars. A characteristic diagnostic feature of fungus gnat larvae is the presence of a black head capsule. Larvae are generally located within the top 2.5 to 5-centimeters (1 to 2 inches) of the growing medium where they feed on plant roots. In addition, they will feed on plant leaves that are in contact with the growing medium surface. However, fungus gnat larvae may also be distributed throughout the growing medium and in the bottom of containers near drainage holes. The life cycle, from egg to adult, can be completed in 20 to 28 days, depending on ambient air temperature.

Proper sanitation such as removing weeds, old plant material, old growing medium, and algae will minimize potential problems associated with fungus gnat populations. Weeds growing under benches create a moist environment that is conducive for fungus gnat development. Hand pulling or using a post-emergent herbicide, labeled for greenhouses, will kill existing weeds. Avoid overwatering and overfertilizing plants as this creates conditions that promote algal growth. Keep floors, benches, and cooling pads free of algae by using disinfectants

that contain quaternary ammonium salts. Research has demonstrated that the use of diatomaceous earth, either incorporated into growing media or placed on growing medium surfaces, does not negatively affect fungus gnats.

Scouting for both adults and larvae will maximize the effectiveness of insecticide applications and use of biological control agents (= natural enemies). Fungus gnat adults may be monitored by placing yellow sticky cards horizontally on the surface of the growing medium or on the edges of containers or flats. Fungus gnat larvae may be detected by inserting 1/4-inch potato disks into the growing medium, and then, after 48 hours, removing the potato disks and checking the side that was inserted into the growing medium for the presence of larvae (look for the black head capsules).

Insecticides are commonly used to control fungus gnats; however, they must be used in conjunction with algae control. Don't rely solely on insecticides to control fungus gnats. A number of the insecticides registered for control of fungus gnats are insect growth regulators. Insect growth regulators are only effective on the larval stage, as they have no direct adult activity. Several conventional and microbially-based insecticides may be used against fungus gnats. Insecticides targeting fungus gnat larvae are applied as drenches or “sprenches” into containers or flats, or they are applied directly to gravel or soil floors. Adult fungus gnats may be controlled using conventional insecticide sprays or aerosols.

Biological control or the use of natural enemies is another option to manage fungus gnats in greenhouse production systems. Biological control agents that are commercially available and effective in controlling fungus gnats are the beneficial nematode (*Steinernema feltiae*), the soil-predatory mite (*Hypoaspis miles*), and the rove beetle (*Atheta coriaria*). All three biological control agents attack fungus gnat larvae. These natural enemies are applied to the growing medium or soil in the floor and must be applied early before fungus gnat populations reach damaging levels. Be sure to consult with biological control suppliers/distributors or an Extension entomologist prior to implementing a biological control program to manage fungus gnats.

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Nutrient Release from Controlled-Release Fertilizers in Nursery Production Systems

by Donald J. Merhaut, Eugene K. Blythe, Joseph P. Albano, and Julie P. Newman

Editors note: The work reported here is a sampling of the effort reported in four *HortScience* articles that won the 2007 OFA Alex Laurie Award.

Federal guidelines have been in place since 1972 to mitigate pollutants entering surface water bodies. The Federal Clean Water Act provides a list of chemicals that, at certain levels, are considered pollutants for different water body types (i.e. oceans, estuaries, and lakes). Two of these chemicals, nitrate and phosphate, are common fertilizers used in agriculture. Nitrate is the most likely to appear in runoff since it is applied in the greatest quantities relative to other nutrients. Also, nitrate is a negatively charged compound (anion) and, therefore, does not readily bind to the predominantly negatively charged surfaces of soil and substrate particles. Similarly, because phosphate is also an anion, it may leach readily from soil or growing media. Many state water agencies have now implemented regulations to mitigate nitrate and phosphate runoff from agricultural sites and urban greenbelts. Other essential plant nutrients, such as iron, manganese, copper and zinc, are also listed in the Clean Water Act. However, in most regions, these nutrients have not polluted (impaired) water bodies; therefore, regulations regarding these nutrients have not been needed.

Over the past 60 years, coated fertilizers have been developed that allow a slow release of nutrients into the planting medium throughout the period of crop growth. Most of these controlled-release fertilizers (CRFs) are coated with polymers which release nutrients at a rate that is positively correlated with increasing media temperatures, within a certain range of temperatures. Short-term (less than 4-month) studies have previously shown nutrient release characteristics under controlled environmental

conditions. In the following two studies, we monitored nutrient release characteristics from CRFs in a greenhouse environment and an outdoor environment during an 11-month production period, a time frame that is typical for production of many woody ornamental plants. Based on these studies, which we summarize below, there are several Best Management Practices (BMPs) that can be adopted when using CRFs so that growers can optimize nutrient uptake into crops while simultaneously minimizing the likelihood of nutrient leaching from the containers.

Experiments

Studies were conducted within a Riverside, California region experiencing rapid growth in wholesale nursery production. The desert climate has summer and winter high temperatures averaging in the high 90°Fs and upper 60°Fs/low 70°Fs, respectively. Rainfall occurs during the winter months. The studies were initiated in August and ended in June of the following year. Both experiments were conducted using growing media in 1-gallon black polyethylene pots. We tested four fertilizer brands: 1) Multicote 17-5-11 + minors, 2) Nutricote 18-6-8 Total, 3) Osmocote 24-4-9 plus the addition of Micromax, and 4) Polyon 17-5-11 + micros. All fertilizers were one-year release formulations; however, release rates of these CRFs are based on different temperature regimes: 80°F for Osmocote and Polyon, 70°F for Multicote, and 70 to 80°F for Nutricote. Elemental concentrations and compounds used in each fertilizer were different (Table 1). Since the percentage of nutrients contained in the four fertilizers varied, we normalized fertilizer applications so that all treatments received the same amount of nitrogen. No plants were used in these experiments so that all leachate that drained and was collected from the bottom of the pots would contain essentially all nutrients

Table 1. Amount (% by weight) of nitrogen (N), phosphorus (P) and potassium (K) in Multicote 17-5-11 + minors, Nutricote 18-6-8 total, Osmocote 24-4-9, and Polyon 17-5-11 + micros.

Fertilizer	Ammonium-N	Nitrate-N	Urea-N	Total N	Phosphorus	Potassium
Multicote	9.00	8.00	0.00	17.00	2.10	9.10
Nutricote	8.60	9.40	0.00	18.00	2.52	6.62
Osmocote	6.40	5.70	11.90	24.00	1.68	7.44
Polygon	7.30	9.70	0.00	17.00	2.02	8.85

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Nutrient Release from Controlled-Release Fertilizers in Nursery Production Systems

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released from the CRFs as well as some nutrients released from the growing medium as the medium broke down. Containers were irrigated by drip irrigation and leachate was collected immediately after each irrigation. Nutrient concentrations, electrical conductivity (EC), and pH of leachate were measured on a weekly basis.

Greenhouse Experiment

The indoor study was conducted in a ventilated, unheated greenhouse representing conditions typically used to grow ferns, azaleas, and camellias in southern California. An acid growing medium consisting of peat, pine bark, and sand was prepared with CRF fertilizer blended into the mix. Fertilizer was added at a low rate, 3.3 g nitrogen per 1-gallon pot, which is an average rate based on recommendations by the four fertilizer manufacturers for these crops, all of which have low nutrient requirements and low tolerance of high salt levels. Air temperatures ranged between 75 to 86°F from the beginning of August to mid-October and again from mid-April to the end of June. From mid-October until mid-April greenhouse temperatures averaged below 70°F (Figure 1).

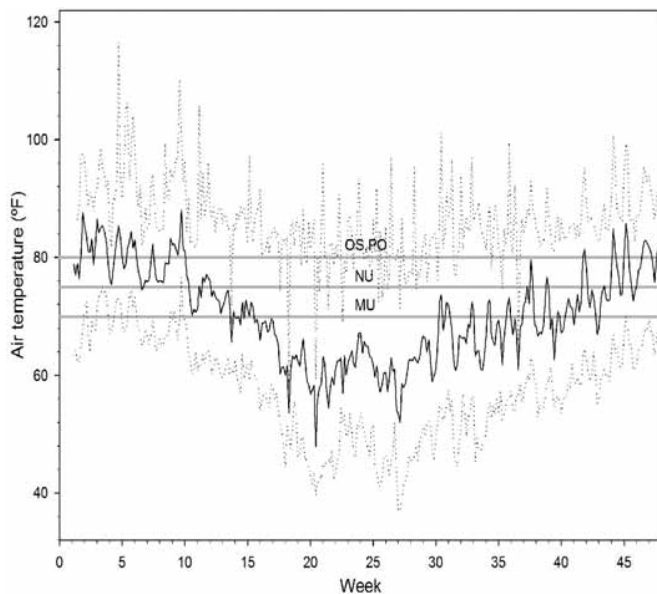


Figure 1. Greenhouse temperatures for duration of the trial.

Outdoor Experiment

The outdoor study was conducted on raised benches in full sun and ambient temperatures. A neutral-pH medium consisting of composted forest products, sand, and pine bark was prepared and fertilizer was added a higher rate, 6.6 g nitrogen per 1-gallon pot, an average rate based on recommendations by the four fertilizer manufacturers for plants that have higher nutrient demands. Outdoor air temperatures (data not shown) fluctuated in a manner similar to the greenhouse study, but outdoor summer highs and winter lows were more extreme.

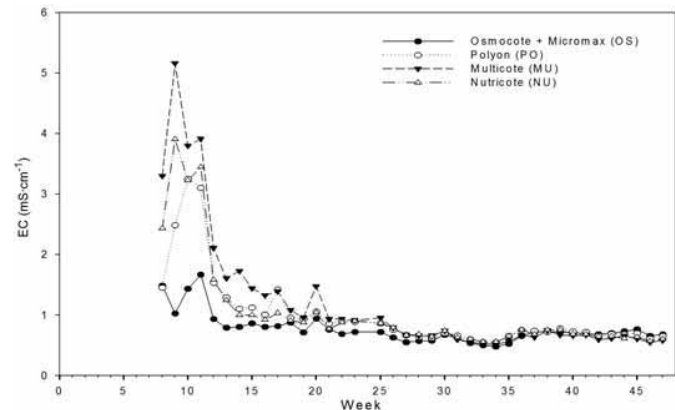


Figure 2. Electrical conductivity (EC) of irrigation leachates collected weekly during the study period from pots containing one of four different CRFs.

Results

Only data from the greenhouse study is presented, since trends were very similar. During the first 10 weeks of both studies, the EC was relatively high (Figure 2). EC was somewhat higher in the outdoor experiment since fertilizer rates were twice that of the greenhouse study. EC of leachates is associated with both the leaching of salts already present in the media and the release and leaching of nutrients from the fertilizer prills. The high EC during the first two months of the studies occurred during the period when air temperatures were relatively high, so one would expect a greater release of nutrients from the fertilizer prills since release characteristics are temperature dependent. Leachate concentrations of total inorganic nitrogen (ammonium and nitrate) (Figure 3) and total phosphorus (Figure 4) were relatively high and fluctuated somewhat during the first 20 weeks of the study. Nutrient concentrations of leachates then decreased and remained relatively stable throughout the last 27 weeks of both studies.

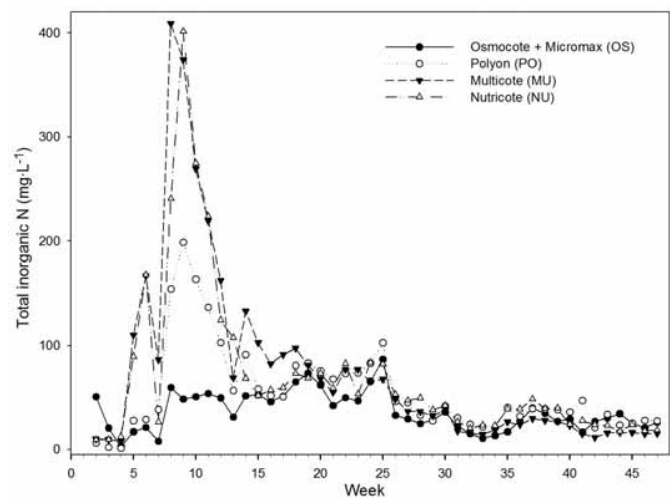


Figure 3. Inorganic nitrogen (nitrate + ammonium) concentrations in irrigation leachates collected from one gallon containers weekly during the experiment.

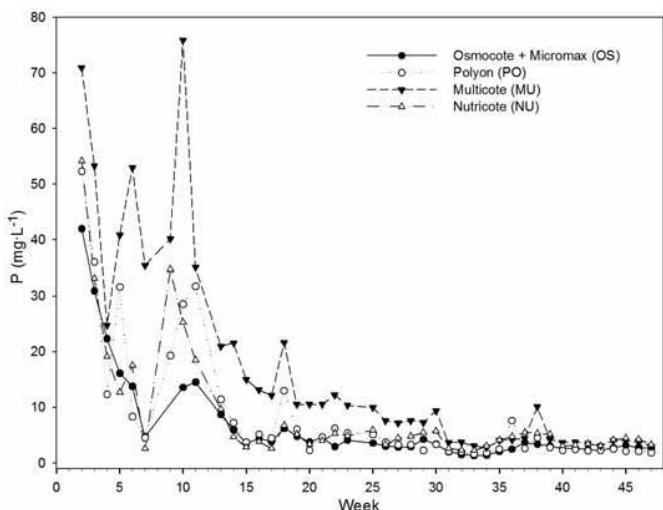


Figure 4. Total phosphorus concentrations in irrigation leachates collected from one gallon containers weekly during the experiment.

Conclusions

There are several important points to be gathered from these studies:

1. Nutrient release from CRFs increases with increasing temperature. Nutrient release from CRFs in container growing media can be relatively high (at least for the products tested) if planting is done during hot summer months.
2. Electrical conductivity (EC) of leachate is not directly correlated with nutrient content. Nonessential salts such as sodium, as well as other breakdown products of the growing medium, will contribute to the EC of the leachate. In addition, some fertilizers, such as urea, have a low salt index; therefore, assumptions cannot be made that EC is directly associated with the concentration of any one particular element (compare Figure 2 [EC] with Figures 3 [inorganic nitrogen] and 4 [phosphorus]). However, with experience and use of long-term records of fertilizer types used, type of growing media, and environmental conditions, EC can be used as a general guideline for estimating nutrient levels.
3. Measurements of chemical characteristics of leachates from pots of growing media will vary from week to week and from container to container. Even in controlled studies, such as the studies described here in which no plants were used, EC and nutrient concentrations of leachates fluctuated within a given treatment, especially during the first half of the study period. Therefore, if collecting samples and making cultural management decisions based upon leachate data, it is important to collect leachate samples from several containers (rather than a single container) for testing. Sampling and testing should also be done on a regular basis and a record of the results should be maintained so that changes over time can be used to make cultural management decisions.

Based on these conclusions, several BMPs should be considered when using CRFs.

BMP1: Canning. Prepare growing media and plant crops in the cooler periods of the year when possible. This will allow roots to develop throughout the container. As temperatures warm,

nutrients released from CRFs will be taken up by the already present root system.

BMP2: Irrigation and weather. Minimize water runoff from containers by avoiding excessive irrigation volumes during each irrigation event. This is especially important during warm or hot weather, when the rate of nutrient release from CRF prills is higher.

BMP4: Irrigation and new plantings. Newly planted crops (plugs or liners transplanted into larger containers) have special water and fertilizer needs. Until root systems become established in containers, any water and nutrients in excess of that needed by the plants will end up as runoff.

BMP5: Media storage. If CRFs are blended into the growing media, prepare only enough media for immediate use. The CRF prills in any unused media will begin releasing nutrients, especially if the pile of planting mix is large and heats up (like a compost pile).

BMP6: Fertilizer storage. Always store unused CRFs and other solid fertilizers in cool, dry locations.

BMP7: Electrical conductivity. EC is not well correlated with nutrient concentrations. Use EC only as a general guideline for troubleshooting, not for direct estimation of specific nutrient levels.

For more details from these studies, please refer to the following articles published by the American Society for Horticultural Science:

Merhaut, D.J., E.K. Blythe, J.P. Newman, and J.P. Albano. 2006. Nutrient release from controlled-release fertilizers in acid in a greenhouse environment: I. Leachate electrical conductivity, pH, and nitrogen, phosphorus, and potassium concentrations. *HortScience* 41(3):780-787.

Blythe, E.K., D.J. Merhaut, J.P. Newman, and J.P. Albano. 2006. Nutrient release from controlled-release fertilizers in acid in a greenhouse environment: II. Leachate calcium, magnesium, iron, manganese, zinc, copper, and molybdenum concentrations. *HortScience* 41(3):788-793.

Newman, J.P., J.P. Albano, D.J. Merhaut, and E.K. Blythe. 2006. Nutrient release from controlled-release fertilizers in a neutral-pH in an outdoor environment: I. Leachate electrical conductivity, pH, and nitrogen, phosphorus, and potassium concentrations. *HortScience* 41(7):1674-1682.

Albano, J.P., D.J. Merhaut, E.K. Blythe, and J.P. Newman. 2006. Nutrient release from controlled-release fertilizers in a neutral-pH in an outdoor environment: II. Leachate calcium, magnesium, iron, manganese, zinc, copper, and molybdenum concentrations. *HortScience* 41(7):1683-1689.

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Seven Steps to Better Safety Training

by Gary Hanson

Employee safety training is one of the most important elements of an effective safety program. If employees are not provided proper thorough safety training they may never learn the safest way to do their jobs. Employees who are left to determine how to do a job on their own often develop bad safety habits that become extremely difficult to break later. Proper safety training has to be an integral part of each job. Employees should not be left on their own until they understand the safe work practices required for the job.

As important as safety training is, we do not always do as good a job of training as we need to do. Training takes time and follow-up. It takes an individual who is comfortable with the subject matter and competent in training. All too often, this is not the case. Many supervisors who are required to train new employees have not received the necessary training and do not feel comfortable doing the training. Therefore, in many instances, the training that is given is not effective.

The first thing we must do if we are going to be effective is to sell the program to our employees. Employees must buy into what we are trying to do. If they do not, training can be very difficult at best. Remember, many employees don't see a real need for it. They believe accidents happen to the other guy and they are somehow exempt from accidents and injury. Therefore, employees must be sold on the need and importance for safety training. This can be done if the instructor has a positive approach, is enthusiastic about it and know the subject matter well.

To have effective safety training, it is important to ensure that the individual doing the training know how to train and is comfortable with it. By knowing the seven key steps of effective training, and practicing these we can go a long way in improving our training program and effectively communicating safe work procedures to our employees.

The following seven steps have proven effective in significantly increasing the amount of knowledge retained after training has been completed.

Step 1 – Make sure all trainers are well prepared and know the job:

- Each trainer needs to go through and read the material in detail.
- A breakdown of each of the key steps needs to be made.
- An outline of the training sessions needs to be done.
- Trainers need to know the subject matter to such an extent that they can lead in a discussion format and not read the material.

Step 2 – Prepare the Learner:

- Put them in a position for job instruction. Set the stage so learning can take place. Identify areas that can interfere with the training or cause distractions and take steps to eliminate these.
- Put the trainees at ease and stress the importance of the training.

- Develop a personal dialog directly with the trainees. Find out what they know about the subject. Build upon this relationship.

Step 3 – Describe the subject matter or job in detail. Discuss each step in detail.

Step 4 – Demonstrate step by step:

- Do the job at the normal rate, then slowly step by step. Employees learn easier if the job is broken down into steps.
- Explain each step in detail.
- Repeat instructions as you go along.
- Ask the employee to explain the job back to you in detail. If the employee has difficulty, go over the steps again.

Step 5 – Have the employee do the job:

- Make sure they do the job in detail. Do not let them leave out any of the steps.
- Have the employee repeat out loud each step as they perform it.
- Correct any areas of confusion immediately.
- Have the employee go over the key safety points.
- Test the employees by asking “why” type questions.
- Have the employee continue to perform the job under close supervision until the employee knows the job or process thoroughly.

Step 6 – Evaluate the process:

- If it is felt the employee needs additional training, repeat steps 3 through 5 as necessary.
- The employee is not to be left alone until the trainer is convinced that the employee can work safely.

Step 7 – Follow-up:

- Check on the progress of newly trained frequently at first, then periodically thereafter.
- Encourage employees to ask questions about their job if they need to. Continue to stress safe work practices and attitudes on a continuous daily basis.

All employees should be retrained if there is a new procedure or process. Also, any employee observed working unsafely should be retrained as necessary. Effective training can have a positive impact on an employee's safety attitude. Safety behavior has a direct link to an employee's safety attitude.

Remember: Training is more than just passing on information. If the trainee hasn't learned – the trainer hasn't taught.

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Touching Base – A Pretty Good Year?

by John R. Holmes, CAE



For many, 2007 was a pretty good year. For others, suffering through droughts, higher energy and labor costs, and tougher competition, 2008 is an optimistic and welcome change.

At OFA, 2007 was a pretty good year. We assumed new responsibilities by agreeing to manage the Ohio Produce Growers & Marketers Association (OPGMA) and the Southeast Greenhouse Conference (SGC); had very positive participation and buzz at the 2007 Short Course; saw continued growth in the OFA-supported and managed America in Bloom (AIB) public awareness and community beautification program; and began a fruitful journey to engage the board in more strategic development activities (See Bobby Barnitz' article on page 2).

These are all wonderful opportunities, marking success for OFA's efforts, but like most things in life, challenges also exist. For instance:

- By managing other organizations and events, we face the challenge of spreading ourselves too thin and losing focus on our core responsibility – OFA. I know there are some out there just waiting for us to fail so they can say how they knew it was a mistake. Fortunately for us, our experienced staff takes that kind of negativity as stimulation to work harder, do better, and prove the naysayers wrong. Has it been more work on all of us? Sure! But it is work that we know will pay dividends for OFA in the long run.
- General feedback and surveys express how positive an experience the 2007 Short Course provided participants. But, I know that hotel reservations continue to be a sore point for many – and I don't blame them. Now, the facts are that everyone wants to stay close to the convention center, but like nearly every other event in this industry, there are simply not enough rooms to accomplish that. What we've tried to do is create a process that gives everyone an equal opportunity to book the room of their choice. Unfortunately, some technical problems, along with some greedy souls over-booking rooms, have made it tough on everyone.

So what do we do about our housing/hotel crunch? Firing Experient, the housing company, is not the answer. Experient, despite its imperfections at times, is still one of the best in the business. Moving to another city with a better hotel and convention center package is also an option, but events of our size need to book space several years out and the earliest we could move is probably seven years away. And if we do exercise

this option, everyone needs to resist the impulse to be unduly anxious about change.

Two things we are doing include revamping the housing process to accommodate needs, access, and fairness; improve customer service; and pressuring Columbus to build a new convention center hotel to address OFA's and other large events' needs. Stay tuned for more information on the revamped housing process. We understand the challenge it presents in creating a good experience and remain serious about resolving it.

Don't get me wrong; there are many good things happening at OFA, and others continue to recognize and applaud our success and the support it affords. OFA received accolades and special recognition from the American Floral Endowment (AFE) as a Platinum Level contributor for donations of over \$100,000 to AFE-managed programs; both the American Nursery & Landscape Association (ANLA) and Society of American Florists (SAF) gave generous recognition for our financial and in-kind support of their advocacy efforts; and the OFA Short Course was again recognized as one of the largest trade shows in the United States (of all trade shows, not just horticulture).

The point I am making about true success is that it comes from recognizing our imperfections and challenges and overcoming them. Through this we grow and become stronger as individuals and as an organization. In fact, associations were originally created to combine limited resources and collectively address challenges which, as individuals, we could not resolve on our own. The ultimate message is that despite all the challenges, opportunities, successes, or failures, you are not alone. OFA is a group of individuals combining resources to help you achieve your goals.

Thank you for supporting us, and I hope a year from now I can say that we all had a pretty good year!



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Millstream Nursery Inc – Baltimore, OH
Moerings USA LLC – Stevensburg, VA
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Rack & Roll Systems Inc – Whitsett, NC
RiskControl360 – Dublin, OH
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