

# The D.N.L.A. News

30

Delaware Nursery  
and Landscape  
Association

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## In This Issue

- 2 Association News
- 4 U of D News
- 5 Brown Marmorated Stink Bug
- 6 Maintaining Customer Relationships
- 7 10 Tips for Making the Most of Human Resources
- 8 Invasive Species Update
- 12 The Beef on Biocontainers
- 15 Winning the Marketing Marathon
- 25 Growing High Quality Heuchera
- 20 Pesticide Rotations & Mixtures
- 22 Understanding Plants
- 24 Mulches
- 29 Six Rules of Customer Service
- 30 Innovating Toward a Sustainable and Profitable Future
- 31 Research Briefs
- 39 Publications
- 40 Calendar

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Editor: Susan Barton, Extension Specialist, University of Delaware  
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## Association News

Valann Budischak  
Executive Director, DNLA

Happy Holidays! I hope this finds you healthy and happy despite having to fight your way through another year of economic frustration. It's hard to believe that 2010 could prove to be more challenging than 2009. But for many green industry businesses, 2010 was tough. Really tough. I hope 2011 offers you the opportunity to begin to regroup, rebuild, and reap the benefits of your perseverance. The DNLA is with you every step of the way.

A few weeks ago, 180 of us gathered at Hockessin Memorial Hall for our annual Ornamental & Turf Workshop. At that event, we had to opportunity to break into focus groups to provide feedback on a two-phase fertilizer education campaign designed to educate homeowners and commercial applicators. The committee that's assembling the framework of the program is comprised of DNREC, DelDOT, UD Water Resources Agency, UD Cooperative Extension, DNLA, DGMA, New Castle Conservation District, and USDA and Nutrient Management representatives. The first phase primarily focuses on a **voluntary** certification program. This program will certify lawn care companies that follow environmentally-friendly best practices in fertilizer application while educating homeowners on these best practices. The group obtained lots of great feedback at the Turf Workshop and took your thoughts back to the drawing board. Updates and more information will be available at the DE Horticulture Industry Expo & Annual Pesticide Conference which is scheduled for January 26 & 27 at the Modern Maturity Center in Dover.

### Other news:

Congratulations are in order for John Wiest, who was inducted into the DNLA Hall of Fame in August at the Summer Turf & Nursery Expo. The owner of John Wiest Landscaping Service,

John joined the DNLA in 1976 and became active immediately. He has served on the board, in various roles, for many years. John is a 4 time DNLA Landscape Award winner, and has served as a judge for more than a decade. Way to go, John! Well deserved.

The DNLA received great entries for the 2010 Landscape Awards contest. The judging took place in October. Congratulations to our winners! They will be honored at the DHIE. The winning entries were submitted by:

**Deanna Pillarelli**, Garden Escapes, LLC  
**Lenny Wilson**, The DE Center for Horticulture

The Delaware Plant of the Year Nominating committee provided the DNLA with many outstanding nominations for the 2011 Delaware Plant of the Year. The committee is comprised of individuals from academia, noted landscape authors and photographers, pioneers in plant exploration, writers, landscapers, growers, and garden center owners. Committee members nominate plants based on the following criteria: hardy in Delaware; few diseases and insect problems; non-invasive; adapts for a variety of landscape uses; possesses horticultural assets such as flower, fruit, leaf, habit, structure, attractiveness to wildlife, etc.; currently under-used in Delaware landscapes; readily available from Delaware growers, nurseries, and garden center outlets. Based upon their input, the board on directors voted to select the following as the 2011 Delaware Plants of the Year:

Woody selection: *Aronia arbutifolia*  
**'Brilliantissima'**

Herbaceous selection: *Geranium 'Gerwat'*  
**Rozanne®**

Informational sheets with photographs of the plants will be circulated to all members in early 2011.

## **Welcome New Members:**

### **Blue Hen Organics**

Robert Tunnell III  
33529 Fox Run Road  
Frankford, DE 19945  
302-732-3211

### **Nature Design Landscape Consulting**

Chantal Bouchard  
P.O. Box 200  
Ocean View, DE 19970  
302-858-8586

### **Hooked on Plants**

Kathy Cherico  
35557 Airport Road  
Rehoboth Beach, DE 19971  
302-227-3449

### **GreenLine Lawn and Landscape**

Mike Cackowski  
138 Bunting Drive  
Wilmington, DE 19808  
302-239-6253

### **Organic Mechanics Soil Company**

Mark Highland  
110 E. Biddle Street  
West Chester, PA 19380  
484-557-2961

### **Mt. Cuba Center, Inc.**

Bonnie Murray  
P.O. Box 3570  
Greenville, DE 19807  
302-239-4244

### **Tri State Turf Supply**

David Greenleaf  
9 Albe Drive, Unit C  
Newark, DE 19702  
302-731-3050

### **STI Landscape Solutions**

Dominick DiNunzio  
20144 John J. Williams Highway  
Lewes, DE 19958  
302-645-6262

### **All Care Lawns**

TJ Savage  
P.O. Box 264  
Harbeson, DE 19951  
302-684-0806

### **Holganix**

Rob Tyndall  
711 Concord Road  
Glen Mills, PA 19342  
866-563-2784

## **Congratulations New CNPs:**

Sherie Stiles  
*Bellevue State Park*  
Nursery Production Specialist

## U of D NEWS

Susan Barton, Extension Specialist

What is a design charette? Good question. One way to find out is to attend the DNLA design charette at the Delaware Horticulture Industry on Wednesday, January 26. The idea behind a design charette is to harness ideas from a group to develop creative solutions to a problem. I recently participated in a charette conducted by Longwood graduate students at the Delaware Department of Health and Social Services in New Castle, DE. While the charette was an important step in the development of the conceptual plan for the site, it was also a lot of fun for those of us who participated-and a great learning experience! We are conducting a design charette to help the Modern Maturity Center develop a garden for their new Adult Day Care Facility in Dover. But in addition to providing them with ideas, we plan to learn by doing. The design charette will teach participants:

- Basic steps in the design process
- The power of group design
- The concept that design is iterative
- How this process can be replicated to solve any problem in need of a creative solution

Therapeutic gardens are a growing trend in today's landscape as more people understand the healing power of plants. We will be learning about these gardens in several morning talks. Then we will have a chance to put those concepts into practice in the afternoon charette. In groups, participants will explore the site to collect data on

- Environmental conditions
- Design attributes
- Access issues
- User experience
- Sustainability issues
- Safety concerns
- Materials – hardscaping materials and plants

The Ornamentals Task Force at UD just met and came up with the following training opportunities for 2011:

### **Problem Solving Workshop**

New Castle County Extension Office  
Wednesday, February 2, 2011; 4 PM – 6 PM

### **Greenhouse Management**

Delaware Department of Agriculture Saturday,  
February 12, 2011; 9 AM – 12 PM

### **Plant Series – Groundcovers**

Culture of Groundcovers  
New Castle County Extension Office  
Wednesday, February 9, 2011; 4 PM – 5:30 PM  
Carvel Center, Sussex County  
Thursday, February 17; 4 PM – 5:30 PM

### **Diseases and Insects of Groundcovers**

New Castle County Extension Office  
Tuesday, February 17, 2011; 4 PM – 6 PM  
Carvel Center, Sussex County  
Thursday, February 24; 4 PM – 6 PM

### **Pruning Workshop**

Carvel Center, Sussex County  
Tuesday, March 22; 4 PM – 6 PM  
Kent County Extension Office  
Tuesday, March 29; 4 PM – 6 PM

### **Insect Short Course**

Townsend Hall, University of Delaware  
Tuesday and Thursday, March 29 and 31, 2011  
4 PM – 7 PM; Limited to 10 participants.

### **Beneficial Insect ID**

New Castle County Extension Office  
Wednesday, June 1, 2011; 6-8 PM  
Carvel Center, Sussex County  
Wednesday, June 8, 2011; 6-8 PM

### **Diseases of Ornamental Plants**

Kent County Extension Office  
Wednesdays, September 7, 14 and 21; 4-6 PM

## **BROWN MARMORATED STINK BUG**

Brian Kunkel, Delaware Cooperative Extension

The brown marmorated stink bug was identified in Allentown, PA in 2001 but was probably introduced as early as 1996 in bulk containers to the same area. Brown marmorated stink bugs (BMSB) have a wide host plant range including many ornamental plants. Stink bugs are generally a difficult group of insects to control in ornamentals and other commodities. Seventeen states have established BMSB populations and seven others have intercepted invading bugs. Adults fly long distances and 'hitch-hike' in containers or vehicles to distant localities with ease. In 2010, BMSB populations were significantly higher than previous years' populations and significant crop losses occurred in apple and peach tree orchards in western Maryland and West Virginia. Soybeans, corn, nurseries, and greenhouses also observed BMSB feeding in surrounding mid-Atlantic states. Little is known about the impact of BMSB feeding on ornamental plants. Scientists in Maryland noticed BMSB feeding through bark of trees, vascular injury, sap loss, and discoloration of bark. There are also reports of potential indirect injury such as transmission of pathogens during vascular feeding.

The University of Delaware is cooperating with nearby universities to develop research projects investigating the impact of BMSB in many different crop systems. Brian Kunkel would like to cooperate with nurseries, greenhouses, or landscape contractors in DE to monitor for BMSB, evaluate pesticide efficacy, examine host plants preferences and evaluate threats of pathogen transmission. We need volunteers growing or maintaining herbaceous perennials to operate or observe traps for BMSB during the spring and early summer. We also need volunteers to provide information about what plants they see BMSB eating – both herbaceous perennials and woody ornamentals. We intend to send a survey to cooperators asking about the

plants BMSB eats. Some of the plants we know BMSB feeds on includes Celosia, sunflower, zinnia, snapdragons and ornamental peppers. These and plants mentioned in the survey will be tested for host plant preference and determine if any are resistant to BMSB feeding. Notice the bands of white on the antennae and the white colored wedges on either side of the insect's abdomen. Please contact Brian Kunkel ([bakunkel@udel.edu](mailto:bakunkel@udel.edu) or 302.831.3641) if you would be interested in helping with this project or would like more information.



## MAINTAINING CUSTOMER RELATIONSHIPS

*You know the saying, "It's easier to keep your current customers than to find new ones." Well, in today's marketplace and economy it's getting hard to keep our current customers too. This is the time to do something extra - be seen, be heard, be proactive, to follow up. It doesn't matter what business you're in - doctor, dentist, lawyer, retail, manufacturing, insurance, you name it; we all have customers and losing just one often makes a major impact in your business. So how do we maintain a relationship? What can we do to be special, different, proactive and extra good?*

**One is to keep your name in front of your customers.** Staying in front of the customer, unobtrusively, is one of several ways to maintain a relationship. You see, once you interact with the customer, once they purchase an item from you, they don't like to be ignored. Well, it's not that they don't like it, they really don't understand it. The customers think to themselves, "Gee, I just bought a bunch of XXX from YYY and I never hear from them. They must have forgotten about me." I remember the copy machine salesman we had a while back. He was very good at the point of sale. But I promise you, we had a better relationship with the repairman (they outsourced it) than we did with the original salesperson. So in addition to a newsletter or direct mail, all of which are good, we have some other ideas to help you maintain a great relationship with your customers taken from our best selling program Maintaining Customer Relationships.

**Take a peek. Call the customer with a specific reason such as a follow up call to be sure all is going well.** And if you're worried about getting voice mail, here's a great Telephone Doctor tip. Expect and be prepared to reach voice mail. It's gonna happen. So be prepared! Have a ready made, short, sweet and

to the point message for your customer. It's not necessary to ask them to call you back (unless there's a very good reason). You can simply make an announcement such as, "Mrs. Jones, this is Bob at Bob's Appliances. I hope your new dishwasher is doing great. Was thinking about you and wanted to say thank you again for your purchase." That's it. Your company name will be in their computer brain. It's a way to maintain customer relationships. (Caution: Don't WING a voice mail. Be prepared!)

**Be proactive.** If your contact is no longer at the company, don't just let that go. Let's say you worked with Sue Smith at Fox & Company. And you called to say hello. Whoops, Sue Smith moved on to another company about 3 months ago. Sadly she didn't tell all her vendors that. So you still have her name on your list. You have two choices. You can hang up and move on to another call or you can be proactive and find out who replaced Sue Smith and start a new relationship. You have a great story to tell the new contact because you had a good relationship with Sue Smith. So find out who replaced Sue Smith. Someone is doing her job. Be proactive. You'll be pleasantly surprised at how well you'll be received. We have a great saying at Telephone Doctor. Make a few "NUM" calls a day. NUM calls? Don't look it up cuz we made it up. NUM calls stands for NO ULTERIOR MOTIVE. That's right, a simple "I was thinking about you and wanted to say hello" call. Until you do this a few times and get the amazing results we have over the years, you probably won't appreciate the technique. I hesitated to even share it with you. But then, what kind of customer service would that be? NUM calls are great for voice mails and especially if you have the good fortune to reach the customer. Wish someone would give me a NUM call once in a while - that's a rarity.

**Handle all problems immediately.** Don't we always you ask? Well ya know, sometimes people put things off, especially when it's

unpleasant. And if you need to call a customer back when there's been a problem, the sooner you call them back or handle it in person, the better off you are. And it speeds maintaining a relationship. Ignoring the customer or putting off calling will only make the situation worse. You know the old saying, handling a problem you're getting that ole 'second chance.' If you're good at what you do, you probably can help the situation move in the right direction. This is a great way to maintain customer relationships.

**Gain additional business.** Word of mouth is one of the best ways to maintain customer relationships. So when you make that NUM call or handle the problem immediately, what do you think your customers will tell others? Right. How good you are! And you can gain additional business by those methods. What do you think I would have told my business associates if that copy salesperson had stayed in touch with us? Right. How good he was. I could have gotten that sales person additional business. By staying away from me I had forgotten him. Not a great method. There are dozens of other ways to maintain a relationship with your customers. These are just a few.

Nancy Friedman, customer service and sales expert, is available to speak. Contact [nancy@telephonedoctor.com](mailto:nancy@telephonedoctor.com) to discuss your specific needs.

## **10 TIPS FOR MAKING THE MOST OF YOUR HUMAN RESOURCE FUNCTION**

Eileen M. Levitt, SPHR, The HR Team

### **Review your workplace safety:**

Are you in compliance with Occupational Safety and Health Administration (OSHA)? Are you aware of OSHA regulations that will impact your company? Is your worker compensation program in line with state & federal regulations?

### **Review your employment records:**

Do you know how to maintain employment files and have you recently conducted a random sample to ensure compliance? Have you recently updated and refreshed employee job descriptions and reviewed job postings? Are you current with required federal and state postings?

### **Review your diversity program:**

Are you in compliance with Equal Employment Opportunity (EEO) and Americans with Disability Act (ADA) regulations? Is your company required to have an affirmative action plan? And if so, do you have one? Have you clearly defined your harassment (sexual and non-sexual) policies and practices?

### **Review your recruitment process:**

Are you conducting background checks on all potential employees? Do you have a standard offer letter that is sent to all new employees that includes at –will language? Do you have an ongoing new employee orientation program?

### **Review employee compensation:**

Have you recently reviewed your organization's compensation practices for consistency and effectiveness? Are you in compliance with newly issued Fair Labor Standards Act (FLSA) classifications? Do you conduct a random sample of time records to ensure accuracy?

### **Review employee benefits:**

Are you in compliance with the newly revised Consolidated Omnibus Budget Reconciliation

Act (COBRA) and HIPAA regulations? If you have more than 50 employees, have you communicated your Family and Medical Leave Act (FMLA) policy? In plans that require it (do you know which?), do you complete the required IRS testing on a regular basis?

### **Review your compliance with federal and state regulations**

Do you file the EEOC and new hire reporting information on a timely basis? Do you know where and when these filings are required? Do you have an updated employee handbook that outlines your compliance with local, state and federal regulations?

### **Review your employee relations and counseling program**

Is there an established chain of command for employee concerns or complaints? Do you regularly measure performance for employees and management? Have you implemented an employee morale program? Do you conduct exit interviews with departing employees?

### **Review of HR information management**

Do you stay apprised of human resource issues? Does your company do statistical tracking and best practices evaluations?

### **Review of strategic HR management**

Does your company understand the role of HR professionals in your organization? Do you have methods to measure your HR programs and track their success? Do you regularly participate in continuing education programs?

The HR Team, a human resources consulting and outsourcing company based in Columbia, Maryland. The HR Team develops customizes human resources programs that fit each company's corporate cultures. For additional information on The HR Team, please call 410-381-9700.

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## **INVASIVE SPECIES UPDATE**

John Peter Thompson

Invasive species keep on coming like a biological oil spill for ecologists, but an almost invisible firestorm for the nursery industry and its customers. From time to time, the issues explode across the political landscape like rockets and surprise the nursery industry all over again. Earlier this year, groups interested in protecting and supporting uncultivated and undisturbed natural areas and resources in Maryland began to gather lists of ornamental plants they would like banned from sale and gardens.

Lists were extensive (see below). It is worth thinking about the depth and breadth of those species identified as problematic for the state's ecological systems and their potential impact upon resource services those systems provide. I have spent years warning that this day would come. It is time for the industry to decide whether it wants to be part of the conversation and to be active in the direction the discussion takes or whether it will allow others to dictate its future. This is the time for the nursery industry to meet to decide its positions and direction for the future. In Maryland, an advisory council to investigate the issue and to make recommendations to the state is proposed.

It is worth remembering that the United States Executive Order 13112 defines an invasive species as "an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health." The term invasive species is further clarified and defined as "a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health."

Besides outright bans and restrictive legislation, one system that may address invasive species concerns and issues is certification. Certification consists of existing, regularly updated, and new

programs making the best use of current federal and state legislation and regulation, combined with voluntary codes of conduct or standards, for the establishment of an early detection and rapid response (EDRR/IPM) systems, the creation and maintenance of linked invasive species inventories through monitored chains of supply, awareness-raising activities, exchange of best practices, and eradication and control measures at national, state and local levels. Certification is an assessment carried out to ensure compliance with a publicly available technical specification. The assessment with the greatest weight is carried out by an independent, third party organization that is qualified to issue certification when the assessment is successfully completed. Rather than an assessment or certification delivered by an organization or company claiming to comply with industry standards, a third party certification takes the commitment to quality and accountability further because of the involvement of an external third party to verify that the product or service does indeed comply with the industry standards. In a brief prepared for the USDA, Economic Research Service (ERS) states that " ... agricultural pests are difficult to detect and eliminate, and because many are highly mobile, population control in one area may affect population levels, damage, and control costs in nearby areas. If the pest control decisions made in one area are based solely on the benefits to individuals making those decisions, the level of prevention and control effort is likely to be less than desirable from society's perspective. When the prevention and control efforts in one area affect pest population levels in other areas, coordination of decisions by all of those affected often requires government intervention. For this reason, government agencies around the world regularly devise and implement prevention and control policies."

Horticultural certification has two components: risk assessment and "clean" stock. Ultimately, the goal is to create a system that lessens the risk of unwanted or unintentional introductions

of plant or plant pathogens and insects from disturbed areas into natural and cultivated ecosystems.

Audit-based nursery industry pest certification is an example of a quality management process used to validate that specialty crop production systems meet standard phyto-sanitary requirements pertaining to target pest risk mitigation. There is some discussion nationally of a project that will examine the feasibility of using audit-based certification to mitigate plant pest risks associated with the nursery and greenhouse industry. To accomplish this proposal, USDA seeks to develop, enhance, transform and formulate the details for a horticulture industry invasive species certification process.

The goal of the USDA project is to develop a fair and balanced system for certifying pest risk management measures used in the production of nursery and greenhouse material to prevent plant pest dissemination associated with the movement of these plant materials.

Whatever the industry decides, pretending that invasive species will go away is not an effective strategy. The issue is growing across the United States as well as the world and our industry, like the natural area now under attack, will be overwhelmed if we do not begin to manage the process and the dynamics through discussion and collaboration with all interested parties.

**Some of the plants of concern in Maryland include:**

- 1) Amur Corktree (*Phellodendron amurense*)
- 2) Amur honeysuckle (*Lonicera maackii*)
- 3) Amur Maple (*Acer ginnala*)
- 4) Autumn olive (*Elaeagnus umbellata*)
- 5) Beefsteak plant, Chinese basil, purple mint (*Perilla frutescens*)
- 6) Bell's honeysuckle (*Lonicera xbella*)
- 7) Bittersweet nightshade (*Solanum dulcamara*)
- 8) Black swallow-wort (*Cynanchum louiseae*)
- 9) Border privet (*Ligustrum obtusifolium*)

- 10) Bristle knotweed (*Polygonum caespitosum*)
- 11) Brittle water-nymph (*Najas minor*)
- 12) Burningbush (*Euonymus alatus*)
- 13) Bush Honeysuckles (*Lonicera maackii*)
- 14) Butterfly bush (*Buddleja davidii*)
- 15) Callery Pear (*Pyrus calleryana*)
- 16) Canada bluegrass (*Poa compressa*)
- 17) Canada thistle (*Cirsium arvense*)
- 18) Chinese lespedeza (*Lespedeza cuneata*)
- 19) Chinese Elm (*Ulmus parvifolia*)
- 20) Chinese Silvergrass (*Miscanthus sinensis*)
- 21) Chinese wisteria (*Wisteria sinensis*)
- 22) Coltsfoot (*Tussilago farfara*)
- 23) Common buckthorn (*Rhamnus cathartica*)
- 24) Common day lily (*Hemerocallis fulva*)
- 25) Common gorse (*Ulex europaeus*)
- 26) Common kochia (*Kochia scoparia*)
- 27) Common lesser/burdock (*Arctium minus*)
- 28) Common reed (*Phragmites australis*)
- 29) Crested late-summer mint (*Elsholtzia ciliata*)
- 30) Crown vetch (*Coronilla varia*)
- 31) Curly leaved Pondweed (*Potamogeton crispus*)
- 32) Cypress spurge (*Euphorbia cyparissias*)
- 33) Dame's rocket (*Hesperis matronalis*)
- 34) Doublefile Viburnum (*Viburnum plicatum tomentosum* Miq)
- 35) Drooping brome-grass (*Bromus tectorum*)
- 36) Dwarf /fly honeysuckle (*Lonicera xylosteum*)
- 37) Standishii /Buh honeysuckle (*Lonicera standishii*)
- 38) Egeria/Brazilian water-weed (*Egeria densa*)
- 39) English Holly(*Ilex aquifolia*)
- 40) Eurasian water milfoil (*Myriophyllum spicatum*)
- 41) European waterclover (*Marsilea quadrifolia*)
- 42) False indigo (*Amorpha fruticosa*)
- 43) Fanwort (*Cabomba caroliniana*)
- 44) Lesser celandine/ Fig buttercup (*Ranunculus ficaria*)
- 45) Five-leaved akebia (*Akebia quinata*)
- 46) Flowering rush (*Butomus umbellatus*)
- 47) Forget-me-not (*Myosotis scorpioides*)
- 48) Fountain Grass (*Pennisetum alopecuroides* 'Hameln')
- 49) Garden heliotrope (*Valeriana officinalis*)
- 50) Garden loosetrife (*Lysimachia vulgaris*)
- 51) Garlic mustard (*Alliaria petiolata*)
- 52) Giant hogweed (*Heracleum mantegazzianum*)
- 53) Giant knotweed (*Polygonum sachalinense*)
- 54) Giant reed (*Arundo donax*)
- 55) Giant salvinia (*Salvinia molesta*)
- 56) Glossy privet *Ligustrum lucidum*)
- 57) Goldenrain Tree (*Koelreuteria paniculata*)
- 58) Goutweed (*Aegopodium podagraia*)
- 59) Ground ivy (*Glechoma hederacea*)
- 60) Golden bamboo (*Phyllostachys aurea*)
- 61) Hairy Joint Grass (*Arthraxon hispidus*)
- 62) Heavenly bamboo (*Nandina domestica*)
- 63) Higan Cherry /winter-flowering cherry (*Prunus subhirtella* Miq.)
- 64) Hydrilla (*Hydrilla verticillata*)
- 65) Japanese Barberry (*Berberis thunbergii*)
- 66) Japanese Holly (*Ilex crenata*, Thunb.)
- 67) Japanese honeysuckle (*Lonicera japonica*)
- 68) Japanese hops (*Humulus japonicus*)
- 69) Japanese knotweed (*Polygonum cuspidatum*)
- 70) Japanese sedge (*Carex kobomugi*)
- 71) Japanese Spiraea (*Spiraea japonica*)
- 72) Japanese stilt grass (*Microstegium vimineum*)
- 73) Japanese privet (*Ligustrum japonicum*)
- 74) Japanese wisteria (*Wisteria floribunda*)
- 75) Jetbead (*Rodotypos scandens*)
- 76) Jimsonweed (*Datura stramonium*)
- 77) Katsuratree (*Cercidiphyllum japonicum*)
- 78) Kudzu (*Pueraria montana*)
- 79) Leafy spurge (*Euphorbia esula*)
- 80) Leatherleaf Mahonia (*Mahonia bealei*)
- 81) Linden Viburnum (*Viburnum dilitatum*)
- 82) Marsh dew flower, Asian spiderwort (*Murdunnia keisak*)
- 83) Mile-a-minute vine (*Persicaria perfoliatum*)
- 84) Mimosa (*Albizia juibrissin*)
- 85) Morrow's honeysuckle (*Lonicera morrowii*)
- 86) Multiflora rose (*Rosa multiflora*)
- 87) Narrowleaf bittercress (*Cardamine impatiens*)

- 88) Norway Maple (*Acer platanoides*)
- 89) One row yellowcress (*Rorippa microphylla*)
- 90) Oriental bittersweet (*Celastrus orbiculatus*)
- 91) Ornamental jewelweed (*Impatiens glanulifera*)
- 92) Pale swallow-wort (*Cynanchum rossicum*)
- 93) Paper Mulberry (*Broussonetia papyrifera*)
- 94) Parrotfeather (*Myriophyllum aquaticum*);
- 95) Perennial pepperweed (*Lepidium latifolium*)
- 96) Periwinkle (*Vinca minor*);
- 97) Pond water-starwort (*Callitriche stagnalis*)
- 98) Porcelainberry (*Ampelopsis brevipedunculata*)
- 99) Prickly lettuce (*Lactuca serriola*)
- 100) Princess tree (*Paulownia tomentosa*)
- 101) Privets (*Ligustrum* spp.)
- 102) Purple loosestrife (*Lythrum salicaria*)
- 103) Ragged robin (*Lychnis flos-cuculi*)
- 104) Ragwort (*Senecio jacobaea*)
- 105) Reed managrass (*Glyceria maxima*)
- 106) Russian olive (*Elaeagnus angustifolia*)
- 107) Sweet autumn clematis (*Clematis terniflora*)
- 108) Sawtooth Oak (*Quercus acutissima*)
- 109) Scotch thistle (*Onopordum acanthium*)
- 110) Sheep sorrel (*Rumex acetosella*)
- 111) Siberian Elm (*Ulmus pumila*)
- 112) Slender snake cotton (*Froelichia gracilis*)
- 113) Spotted knapweed (*Centaurea biebersteinii*)
- 114) Tree of Heaven (*Ailanthus altissima*)
- 115) Tatarian honeysuckle (*Lonicera tatarica*)
- 116) Tree of Heaven (*Ailanthus altissima*)
- 117) Bigleaf periwinkle (*Vinca major* L.)
- 118) Water chestnut (*Trapa natans*)
- 119) Water lettuce (*Pistia stratiotes*)
- 120) Water primose (*Ludwigia grandiflora*)
- 121) Watercress (*Rorippa nasturtium-aquaticum*), except for watercress sold for human consumption without its reproductive structure
- 122) Waxyleaf privet (*Ligustrum quihoui*)
- 123) Wavyleaf Basketgrass (*Oplismenus hirtellus* ssp. *undulatifolius*)
- 124) White Mulberry (*Morus alba*)
- 125) White poplar (*Populus alba*)

- 126) Wineberry (*Rubus phoenicolasius*)
- 127) Winter honeysuckle (*Lonicera fragrantissima*)
- 128) Wintercreeper (*Euonymus fortunei*)
- 129) Yellow floating heart (*Nymphoides peltata*)
- 130) Yellow/ Garden loosestrife (*Lysimachia vulgaris*)
- 131) Yellow iris (*Iris pseudacorus*)

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***Editor's Note:*** Publication of this plant list is in no way an endorsement of these plants as problem species that should be regulated. This is a list generated in Maryland of plants for which there is concern about invasiveness.

**THE BEEF ON BIOCONTAINERS:  
STRENGTH, WATER USE,  
BIODEGRADABILITY & GREENHOUSE  
PERFORMANCE**

Matt Taylor, Longwood Gardens  
Michael Evans, University of Arkansas  
Jeff Kuehny, Louisiana State University

Biocontainers offer an exciting opportunity for the greenhouse industry to become more environmentally friendly. Currently, the majority of greenhouse crops are produced in petroleum based plastic containers. Plastic has a relatively low cost, is strong, and can be formed into essentially any size and shape. However, the extensive use of plastic containers results in a significant waste disposal problem for the greenhouse industry, and this waste plastic either ends up in a landfill or, hopefully, gets recycled.

Biocontainers are containers that are not petroleum-based and will degrade rapidly when placed in a composting operation or when planted. Biocontainers fall into two categories: compostable biocontainers, which are designed to be removed from the rootball before the final planting (the container is then composted separately); and plantable biocontainers, which are designed to be left intact on the rootball and planted directly into the field, landscape bed, or final container. Plantable biocontainers are designed to allow roots to grow through the container walls and to decompose after being planted. Some of the primary concerns for growers when using biocontainers are the physical strength of the container, changes in water use, and plant performance in the greenhouse and field.

Despite the introduction of many types of biocontainers, limited research has been conducted to evaluate the performance of these containers compared to traditional plastic containers. To determine the suitability of these biocontainers as a replacement for plastic

containers, a comprehensive study was undertaken at Longwood Gardens in Pennsylvania, Louisiana State University, and University of Arkansas. Researchers compared container wall strength, container biodegradability, water use, and greenhouse growth of vinca and impatiens.

**Container Wall Strength:** Container wall strength is very important when considering how easily biocontainers can be handled. Research was conducted at the University of Arkansas to determine the wall strength of the biocontainers in both wet and dry states. For determining dry strength, new, unused containers were tested. For wet strength, containers were filled with a peat-based substrate, placed in a greenhouse, and watered once per day. After four weeks, root substrate was removed, and the container strength was tested. The test was performed by measuring the force required to punch a 0.2-inch (5 mm) probe through the side of the container. This test was done to simulate the force required for a finger to puncture the container wall. In both wet and dry states, 4- and 5-inch plastic containers had the highest wall strength followed by paper containers. Coconut fiber and ricehull containers had higher wet and dry strengths than OP47, Fertil, Cowpot, peat, and straw containers, which had the lowest wall strengths. Of all containers tested, peat and Fertil containers had the lowest wet wall strengths, which were just below Cowpot containers. For all containers that were able to absorb water into the container wall, wet strength was lower compared to dry. The absorption of water by the container material resulted in a softening of the container wall and a subsequent reduction in strength. Wet strength is an important test to determine whether a container possesses enough durability for packaging, shipping, and handling by consumers. Currently, there are no specific standards or recommendations developed for biocontainer wall strength. The researchers found that if a container's wet wall strength was

less than 2 kg, the containers tended to tear or break, and handling became difficult. In this study, all containers had adequate wall strengths with the exception of Fertil, peat, and Cowpot containers; handling of these containers when wet was difficult and could make them problematic for greenhouse crop producers.

#### **Decomposition of Plantable Biocontainers:**

Research evaluating decomposition of biocontainers in the landscape was performed at Longwood Gardens in Pennsylvania and at Louisiana State University. ‘Cooler Blush’ vinca plants were greenhouse produced in plantable biocontainers (Cowpot, peat, Strawpots, Fertil, and coconut fiber). After plants were grown to a marketable size (approximately six weeks), they were transplanted into outdoor beds, and the biocontainers were left intact on the rootball. After eight weeks in the outdoor beds, the containers were dug, removed from the rootball, cleaned, and dried. The level of decomposition of the container was determined and expressed as a percentage of the original dry weight of an unused container. At both locations, Cowpot containers had the highest level of decomposition. Peat, Strawpot, and Fertil containers had a lower level of decomposition compared to Cowpot containers; however, all three had significantly higher levels of decomposition than coconut fiber containers in Pennsylvania. These results were similar in Louisiana, except that fertile container decomposition was similar to cocofiber containers. Differences in decomposition rates are likely due to the difference in materials used to make the containers. Those composed of high cellulose materials, such as Cowpots, had higher rates of decomposition than those containing high amounts of lignin or other difficult-to-decompose components such as coconut fiber containers. Additionally, nitrogen in the dairy manure used to produce the Cowpot containers may have stimulated the activity of microorganisms and subsequent decomposition

rates. All plantable biocontainers did not decompose rapidly. The rate of decomposition of coconut fiber containers may be low enough that the containers will still be present when a location is replanted. In this case, previously planted containers may need to be manually broken apart and incorporated into the soil or removed before replanting.

**Water Use:** For water use experiments, all 4-inch containers were filled with 400 mL of a peat-based substrate; OP47 and 5-inch plastic containers were filled with 740 mL of substrate. Plants were irrigated at 200 ppm N with 15-5-15 when the substrate surface was dry. At each irrigation, plants were placed on drainage trays, irrigated with 150 mL of water, and the resulting leachate was collected and measured. Geranium ‘Orbit Cardinal’ plants were greenhouse grown for eight weeks and total water use and average irrigation interval are shown in Table 4. Water use and irrigation interval followed similar trends in that plants that required greater amounts of water also had a lower irrigation interval. The only type of 4-inch biocontainers that did not require a greater amount of water than plastic to produce a marketable geranium was ricehull, which also had the highest interval of time between irrigations. Fertil and peat containers required the most water, about double the amount of water used for plastic. The amount of water required and the irrigation interval was not significantly different between the OP47 and the control 5-inch plastic container. Water loss through container walls was determined by filling containers to the rim with substrate, saturating the substrate to container capacity, and sealing the substrate surface and drainage holes with paraffin wax. Containers were placed in a greenhouse and weighed every 24 hours for 7 days. Containers tended to segregate into three groups based on water loss rates through the container walls. Plastic, ricehull, and OP47 containers had rates of water loss that were close to zero. Strawpots, coconut fiber, Fertil,

and peat containers had the highest rates of water loss, while Cowpot and paper containers were intermediate. Although differences in substrate surface area and plant growth may have affected the quantity of water required and irrigation interval to produce a marketable geranium, the containers with the highest rate of water loss through the container walls also had the highest water requirement and the lowest irrigation interval. Ricehull and OP47 containers were nearly impermeable to water and had a similar water loss rate, water requirements, and irrigation intervals as the plastic controls. Because water requirement may increase significantly with certain biocontainers, the benefits of reducing plastic would need to be weighed against increased water usage. In areas where water use or availability is a major concern, biocontainers such as Ricehull or OP47 may be favored to other biocontainers that have a higher water requirement.

**Greenhouse Performance:** Greenhouse growth of vinca ‘Grape Cooler’ and impatiens ‘Dazzler Lilac Splash’ were evaluated at all three test locations. Plants were grown to a marketable size from plugs starting the beginning of April. Root weights of both species of plants tested were relatively unaffected by container type. Shoot weights of both impatiens and vinca grown in 4-inch containers were highest in paper containers and lowest in coconut fiber. When both species were grown in 5-inch containers, those in OP47 containers had the greatest shoot weight. Although there were differences in weight between the plants grown in different containers, visually these differences were not recognizable for both impatiens and vinca. All plants in the experiment were considered marketable, indicating that all biocontainers tested would serve as suitable replacements for plastic when considering plant growth.

Container strength, biodegradation, water use, and greenhouse performance varied among the

different types of biocontainers tested. Fertil, peat, and Cowpot containers had wet strengths low enough to make handling difficult and had higher water requirements. On the other hand, these biocontainers were some of the fastest to decompose in the landscape. Depending on the geographic location, crop, cultural conditions, and postproduction handling, different biocontainer properties will be more or less important. Greenhouse managers wanting to improve sustainability by switching to biocontainers will need to evaluate which of the properties are the most significant and choose a biocontainer that best fits their production techniques, resources and end users.

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## **WALK, RUN, RACE: WINNING THE MARKETING MARATHON FOR BEGINNERS, INTERMEDIATES & ADVANCED PROFESSIONALS**

Bridget K. Behe, Michigan State University

No matter how long you've been in the industry or how many years of professional experience you have, there is still something to learn about connecting with consumers through sound marketing principles and practices. Once you've mastered the basics, beginners can move into other areas to improve their marketing effectiveness. Even the most seasoned veteran can still improve efforts to increase profitability.

**Beginning Marketers:** Beginners need to focus on “getting it right in the store.” The most basic level of retail marketing is in front of the customer in the store. The first rule to learn is to place products only from knees to nose but never down to toes. Out-of-reach means probably not sold. Paco Underhill, in *Why People Buy: the Science of Shopping*, outlines the real reason for this. People do not buy what they cannot reach. Make benches shop-able from both sides – not too deep that customers can't reach the innermost product. Never place product on the floor! Even the most savvy shoe marketers know to place shoes, worn on the floor, up at customer's eye level. The most pricey retail space in a supermarket or drug store is at eye level. That's where the popular brands are merchandised – and for a good reason! Eye level catches the eye and literally puts the name in front of the customer. Beginning marketers should also focus on improving average sale per customer. How do you know average sale per customer? Take weekly sales data and divide that by weekly customer count. The week works better than the day because daily sales can fluctuate greatly. Of course, weekly sales will also fluctuate, but knowing what last year's sales and customer count were for any single week gives you an accurate target to try to improve upon for

this year. Don't have last year's figures? Why not start collecting data now and calculating the prior weeks' average sale per customer. Share the number with all of the sales staff. Be sure they know what the target is for which they'll be asked to improve.

In-store signs should focus on information and clear pricing. Price all products clearly so customers don't have to ask. When you're busy, you'll miss a sale or two if you don't have everything priced. Signs in the store should also be focused on information. Provide enough information to give customers a “complete picture” of what the plant will grow into or produce. Good photos, waterproof signs, and concise information will help even the novice gardener make a better selection. Another beginner strategy is to clear the counter for only sales and, once at the register, collect zip codes. The “landing space” at the register should be devoted solely to sales. Take your arm and wipe the slate clean and free of other merchandising. Give customers plenty of space to unload their bounty and get ready to pay. Yes, wrapping and sleeves are permissible but nothing else. Clean beats clutter any day.

Ask for the customer's zip code as they swipe their credit card or are writing their check. Why? You can learn a lot from a zip code. You can learn how far from your store customers are traveling and, if you want to do some homework, you can learn about average income and other demographics from the zip codes you collect, often for free. Get some training and start training your staff. Plan to attend training sessions like the OFA Short Course, ANLA's Management Clinic, the Southeast Color Connection, or other regional educational events. Some of the best ideas are borrowed from other successful businesses. Take key employees to these events as a “reward” but expect them (and tell them ahead of time) to teach others what they learned. The best way to reinforce learning is to teach others.

Integrate in-store displays with complementary products. Don't just display colorful planters, tasty vegetables, or interesting statuary and fountains; show customers how to be successful at home with these products. Integrate products used together into your displays. Show how fountains and planters work together in the landscape. Merchandise tomato cages and organic fertilizers along with vegetable transplants. Augment landscape trees with night lighting. Partner with local landscape firms to offer planting services if you don't have your own. Make it easier for your customers to be successful at home by reminding them they may need a new shovel, trowel, or bulb planter with their plant purchase. Watch customers to see what they do and buy. Watch them to see what they pick up and what they leave behind. Watch seasoned professionals whenever you can. Visit other successful enterprises and learn from their success. Read a lot. Read and learn from examples within our industry and outside of it. Travel and observe retail in all industries. Successful strategies are everywhere, just begging to be borrowed.

**Intermediate Marketers:** The intermediate marketer can build on in-store success by putting together successful in-store strategies and also venturing out of the store to more effectively communicate with customers. In the store, intermediate marketers watch how traffic moves in the store on busy days. Afterwards, they develop good directional signs and/or change traffic flow by moving benches to move traffic (and sales) to locations in the store that need more visibility. They also watch to see what people are viewing, what they pick up to examine, and how they shop. These savvy intermediates provide models or, as industry consultant Judy Sharpton says, Mannequins to Model. Elevate the mannequin in the middle of the bench to show customers what the pieces and parts displayed around the mannequin could become.

Tina Bemis (Bemis Farms Nursery, Massachusetts) shows customers "living art" by displaying a combination container with a thriller, chiller, spiller, and filler. These informative merchandising strategies really help sell products.

The intermediate marketer knows that customers might want some dynamic information in the form of classes or clinics. Take your cue from the box store: 15 minutes is not too long for customers to pay attention and to learn a new skill. You can't teach everything in 15 minutes, but you can communicate the fundamentals of vegetable, container, or landscape gardening in a short period of time. Too busy or intimidated by a small crowd? Why not hire a Master Gardener to help with lessons on a few Saturdays?

This marketer knows to go outside the store to reach current and future customers. This might be with some traditional communication, like newspaper and billboards. More often, it is with electronic communications. A web site is mandatory for the intermediate marketer. At a minimum, this business needs a billboard site to simply say we are here, this is our address, and here is our telephone number. Feeling savvy? Ask for e-mail addresses and use a service like Constant Contact to circulate a newsletter, with permission of your customers, of course. Be sure to install Google Analytics at the launch of your web site (or now if it is already in use) so you can track key metrics. You should know how many unique visitors went to your site and how long they stayed, viewing which pages. You might also want to know what they downloaded (if you have that feature) and how they found your site. You can learn all this and much more for free by using Google Analytics. You know those classes or clinics you began holding as a novice? It's time to buy a Flip Video Recorder (\$200) to capture some of that information in video format. You can add that to

your web site when you're ready.

Having any garden tours (which really should be marketed as garden adventures that originate and end in your parking lot)? Why not ask the host to say a few words about products bought from your store? Testimonials are far more credible than paid advertisements.

What do you give back to the community? If you're like most businesses, you get asked to donate – a lot. Why not back one cause in the community and ask the others to get behind that? America in Bloom is one cause you might support. Only a few participants in a recent OFA seminar had initiated support of their community for American in Bloom. Why? Perhaps it is the time investment. Still, rallying your community efforts behind this or another worthy cause might improve the perception of your giving spirit within the community of customers you serve.

When you were a beginner, you took classes. Learning should never stop, but intermediate marketers should be teaching what works to their new employees. Spring training isn't just for baseball players. It is for marketers as well. Enlist the help of other seasoned veterans. After all, great companies have weekly training sessions that rotate the responsibility of training among key employees. Here is your chance to share some marketing wisdom with those who may not be on the front line on a daily basis or those who are new to the organization. Topics such as endcap entertainment, greeting a customer during the busy season, or calming cranky customers can be short but informative sessions. What marketing information should you be collecting? A Harvard Business Review article outlined "The One Number You Need to Grow" as a single item survey. This is easy enough to implement at any cash register, with or without electronics. The "one number" is measured on a scale with 0 equaling "not at all likely" to 9 equaling "highly likely." What's the

question? How likely are you to recommend us to a friend? This single item survey can be measured using one key on the cash register or a simple tally sheet. The folks who respond with 8 or 9 are the champions of the business, those unpaid (really they pay the business) cheerleaders who are so enamored with your "stuff" that they tell many of their friends. Those who respond with 6 or 7 are satisfied but may not be as big of an advocate as the others. Be careful of those who respond with 5 or less. They aren't very satisfied and may be detracting from a positive image you present to other customers. Growing businesses often have a ration of 3 promoters (responding 8 or 9) to 4 detractors (responding 5 or lower).

**Advanced Marketers:** Intermediate marketers got it right inside and moved outside the store walls. Advanced marketers build on that success to integrate marketing efforts, inspire customers and employees, and realize great possibilities. Advanced marketers are the marathon runners of marketing. They are in it for the long haul and the long-term investment. Advanced marketers focus on integrating their in-store and out of-store activities. They work to imagine possibilities with plants so their customers are successful. They inspire their customers to create new, exciting combinations. They can train the trainer and teach others how to do good marketing. They get nominated to compete in merchandising competitions. Integration is the key activity for advanced marketers. They develop a merchandising plan by month and event for the store. They know what key products will be featured in promotions and create supportive communication efforts for that. For example, they know what will be featured each month for tomatoes (what and when to plant, harvest questions, tomato tastings, etc.). Their plan helps customers focus attention on integrating products to create the results at home they want. For example, master marketers can integrate vegetable plants and flowers to create beautiful containers that

produce fresh vegetables while looking unique and attractive. They put information in the store and on their web site to support activities in the store. They might have fans on Facebook or send a Tweet when it is time to check tomatoes for blossom end rot (or apply calcium if you have it).

Their best marketing efforts build off other existing efforts. If they are using more traditional media, they get double duty by displaying sale items, or newspaper articles, in the store alongside the products. They play radio commercials in the store. Their real synergy occurs in their electronic and in-store communications. Savvy advanced marketers know how to schedule their online and in-store marketing simultaneously. The communication materials created for Mother's Day are off the web site the day after and fresh promotional materials are there. This business may even send out a message (Tweet) about harvesting tips or when it is safe to plant tomatoes outside. Advanced marketers stay in touch with the impact changes have on sales by conducting focus groups. They carefully plan one or two topics to investigate once or twice a year, like hanging baskets or vegetables. They invite 12 customers who bought the item and feed them light finger food, scheduling the session at 5:30 on a weekday. At 6 pm, the session starts, probably with only 8 or 9 of the 15 invited. Ask one person to take notes, another to ask the 3-5 carefully planned questions, and one other observer. Keep them only there for an hour and let them go on time with a plant or gift certificate to your store.

These folks are so creative that you know one when you see one. They will develop many of the trend-setting ideas and are keenly aware when their counterparts develop something new and are among the first to adapt it. Their stores, displays, and ideas are sometimes featured in the trade press. So, regardless the category you or your business falls, there are many good

ideas to borrow and adapt. Beginners can more easily launch their marketing communications in the retail operation. As they master indoor efforts, they should advance to communications outside the retail operation. More advanced marketers hit their stride when they can overlap and integrate in-store work with online and other out-of-store communication.

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## **GROWING HIGH QUALITY HEUCHERA**

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Heuchera has become a very popular foliage plant over the past several years. Many cultivars have been developed from this genus because of its potential for vivid venation characteristics and silvery effects. Variations of foliar color include gold, white, caramel, chartreuse, lemon yellow, scarlet, and burgundy with an equal amount of diversity in the variegation patterns. Little has been reported on the production requirements for this particular crop. We conducted two separate investigations to determine how much light and water heuchera needs for optimum growth.

### **How much water is needed to grow the highest quality heuchera?**

To answer this question, we grew plants using a unique irrigation system that maintains constant substrate moisture levels using moisture sensors. Heuchera was surprisingly tolerant of all moisture levels and were still considered marketable when grown in the lowest moisture content. However, plants grown in dry soils (15% to 30%) were smaller (i.e. reduced leaf area and dry weight) than those grown in relatively moist soils (35% to 50%). We quantified the amount of water applied throughout the 8 week production period and determined that plants needed, at most, 1.3 gallons (5 liters) of water throughout the entire investigation. With that said, we recommend maintaining substrate moisture content relatively high for heuchera production. Sensor controlled irrigation systems such as the one used in this study make it possible to grow high-quality plants with very little water. If you would like more information about sensor controlled irrigation systems, visit [www.hortphys.uga.edu/irrigationcontrol.html](http://www.hortphys.uga.edu/irrigationcontrol.html).

### **How much light is needed to grow the highest**

### **quality heuchera?**

As a typical understory plant native to deciduous forests, *Heuchera americana* plants are exposed to high light in the winter and low light during summer months. These plants are able to adapt to changing light levels throughout the year. Therefore, we are interested to find out whether higher light levels would be of benefit during plant production. We grew heuchera under 4 daily light integrals (DLI): 7.5, 10.8, 14.9, and 21.8 mol.m<sup>-2</sup>.d<sup>-1</sup>. Plants grown at the highest DLI (21.8 mol.m<sup>-2</sup>.d<sup>-1</sup>) were smaller and of lower quality. The shape of heuchera changed depending on whether it was grown under low or high DLIs. Plants grown under the lowest DLIs had open canopies, while those grown under higher DLIs were more dense. The best quality plants were grown at 10.0 or 14.9 mol.m<sup>-2</sup>.d<sup>-1</sup>. Even though heuchera were provided with optimal water, plants were smaller when they were grown in full sun.

### **Light and Water Recommendations**

In order to grow the highest quality heuchera, we recommend a DLI of 10 to 15 mol.m<sup>-2</sup>.d<sup>-1</sup> and, if using moisture sensors for automated irrigation systems, maintain relatively moist substrates at a moisture content of 35 percent.

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## **PESTICIDE ROTATIONS & MIXTURES: WHICH IS BEST FOR RESISTANCE MITIGATION?**

Dr. Raymond A. Cloyd, Kansas State University  
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Resistance to pesticides (insecticides and miticides) is always a concern because once arthropod (insect and mite) pest populations are no longer regulated with existing pesticides then management options become limited. Different mechanisms can confer resistance in various arthropod pest populations of the same species. The main resistance mechanisms are metabolic and target site insensitivity. Metabolic resistance refers to the dissolution of the active ingredient by the arthropod pest. When the pesticide enters the body, enzymes attack and detoxify or convert the active ingredient into a non-toxic form. For example, detoxifying enzymes may convert insecticides, which are hydrophobic or “water-hating,” to be more hydrophilic (“water-loving”), which usually makes the pesticide less biologically active and more readily excreted with waste products. Target site insensitivity involves interactions between the pesticide and the designated target site, which is similar to a key (pesticide active ingredient) fitting into a lock (the target site). Decreased binding associated with target site insensitivity is similar to the lock having been changed so the key no longer fits, and thus the pesticide is no longer effective. The rate of resistance developing in an arthropod pest population is approximately proportional to the frequency of pesticide applications, especially when using pesticides with similar modes of action. Two methods that may delay resistance development in arthropod pest populations are use of pesticide mixtures and/or rotations. There is already wide-spread use of pesticide mixtures among greenhouse producers, partly because combinations of selective pesticides may be required to deal with the arthropod pest population complex present in the crop. The implementation of pesticide

resistance mitigating strategies (either with pesticide mixtures or rotations) is important for preserving the usefulness of currently available pesticides.

### **Mixtures**

A pesticide mixture entails exposing individuals in an arthropod pest population to each pesticide simultaneously. Pesticide mixtures may delay the onset of resistance under the following assumptions:

- (1) Resistance associated with each pesticide in a mixture is independently genetically controlled. These conditions are met when there are both different target sites and mutually exclusive sets of detoxification enzymes implicated in resistance to the two pesticides. Under these given conditions, individuals simultaneously possessing resistance traits to both pesticides will be extremely rare.
- (2) Individuals in the arthropod pest population that are doubly resistant are extremely rare. Evolution of resistance will be instantaneous if survivors are doubly-resistant.
- (3) Some individuals in the arthropod pest population are not treated or exposed to the pesticide spray mixture, or there is immigration of, and mating with susceptible individuals.
- (4) The pesticides mixed together are equally persistent so that individuals in the arthropod pest population are not exposed to just one pesticide. In most instances, these assumptions are not realistic. Multiple evolutionary pathways exist that eventually result in a pesticide-resistant arthropod pest population. Although pesticide mixtures could delay resistance due to target site insensitivity, which is usually specific to a particular class of pesticides, use of pesticide mixtures enhances selection for increased expression of metabolic enzymes that can simultaneously detoxify both pesticides. Selecting for high levels of detoxification enzyme expression jeopardizes the usefulness of all pesticides, even those with new modes of action to which the arthropod pest population has not previously been exposed. Additional

problems associated with the assumptions for using pesticide mixtures are that the frequency of doubly resistant individuals in the arthropod pest population may be extensive. This may be due to a history of pesticide exposure pertaining to previous arthropod pest generations, which implies that there may be some background levels of resistance traits in the arthropod pest population for each pesticide used in the mixture. Finally, there is usually no refuge to preserve susceptible individuals. Overall, this leaves us with the question: Is using pesticides in mixtures the best way to make them last, or is it better to use them individually? Pesticide mixtures may be more expensive than rotations, especially if the pesticides being mixed together are used at the highest recommended label rate. More sophisticated use of pesticide mixtures would require a greater understanding than exists today of their interactions in order to optimize the dosage at below label rates when the components (active and inert ingredients) act synergistically.

### **Rotations**

Rotation is the alternating use of pesticides with different modes of action over time. The underlying theory with this approach is that the frequency of individuals in the arthropod pest population resistant to one pesticide will decline when another pesticide, with a different mode of action, is being applied. As with pesticide mixtures, there are a number of important assumptions that factor into how effective rotations are in mitigating resistance:

(1) The pesticides being used must have different modes of action or modes of detoxification. This avoids continuous “selection pressure” on a particular trait.

Rotations across generations, in the case where generations overlap simultaneously during the growing season, may be more appropriate than rotations within a single generation. The existence of traits that lead to cross resistance among pesticides is similar to the use of pesticide mixtures.

(2) There is a genetic disadvantage or fitness cost associated with particular resistance mechanisms. Therefore, when the pesticide is not being applied, susceptible individuals will produce more offspring than those carrying the resistance trait, and the proportion of the arthropod pest population carrying the resistance trait will decline.

(3) Some individuals in the arthropod pest population are not treated or exposed to pesticides used in the rotation program, or there is immigration of, and mating with susceptible individuals.

(4) The length of time or number of generations between applications of one pesticide with a specific mode of action is sufficient to allow resistance to decrease. As the intervals between applications of pesticides with similar modes of action are increased, the proportion of resistant individuals in the arthropod pest population should diminish. The assumptions for successful use of pesticide rotations to prevent resistance have problems, as they did with pesticide mixtures. In both cases, “lowest common denominator” traits such as increased expression of generalist detoxification enzyme systems can enhance resistance selection for multiple components of a pesticide rotation program. Fitness costs do exist, but may vary in importance with the pesticide and the number of generations in which resistance has been maintained within an arthropod pest population. Furthermore, the number of young (offspring) produced per female and generations per year will influence how effective pesticide rotations are in mitigating resistance because these factors often impact the frequency of pesticide applications. Both pesticide mixtures and rotations may be viable strategies to mitigate or delay resistance development in an arthropod pest population. However, it is critical that you understand the assumptions that have to be fulfilled in order for these two resistance mitigating strategies to be successful. Pesticide rotations are a more viable strategy to mitigate resistance because they reduce the overall use of

avored (effective) pesticides. Careful rotation of selective pesticides (those that can be integrated with biological control agents) is especially important because parasitoids and predators (and even microbes such as beneficial bacteria and fungi) can suppress arthropod pest populations irrespective of the arthropod pests' resistance traits. Finally, either strategy for delaying resistance must not divert attention from implementation of alternative pest management strategies including cultural, sanitation, and biological control that can reduce the reliance on pesticides.

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## UNDERSTANDING PLANTS

Lynn P. Griffith Jr., A & L Labs

Anyone who works in a plant-related industry deals with plant physiology to one degree or another. Plant physiology can be defined as the study of the physical and chemical processes that go on within living plants. Stated more simply, it refers to how plants operate and how they respond to the environment. This subject is actually quite complicated, involving numerous chemical, biological, and physical processes. Most college students dread their physiology class so this article is designed to explain certain important aspects of plant physiology in easy-to-understand terms. First of all, as humans, if we are hot or cold or hungry or thirsty or otherwise uncomfortable, we have the ability to do something about it, to correct that discomfort. Plants, on the other hand, have to sit and take whatever the environment is giving them. They can't make a sandwich, get a glass of water, or put on a sweater. However, plants have developed a number of rather ingenious ways to monitor and adapt to their environments. Plants don't have brains, so they don't think like people or animals. However, at any given time, whether it is a petunia seedling or a giant redwood, plants constantly monitor levels of moisture, humidity, temperature, and light. They do this through mechanisms called biochemical pathways. Humans have a similar response to their environment. When your body is hot, you will likely start to perspire. This is not a voluntary or cognitive response. You don't think, "Gee, it's hot, I better start sweating." Via its own biochemical pathways, your body knows that it is heating up, and the evaporative cooling of perspiration is one way your body avoids excessive temperatures. You were probably taught in science class that green plants take in carbon dioxide and give off oxygen. Technically, this is only half true. During daylight hours, plants are absorbing moisture and nutrients through their root systems, and carbon dioxide through the pores

in the leaves called stomates. With these raw materials plus energy from light, plants manufacture the building blocks they need to survive and grow. During the day, the plant is making amino acids, simple sugars, and other basic molecules. Interestingly, if the plant is drought stressed and must close the stomates to conserve moisture, this photosynthesis will be temporarily interrupted because the plant can't absorb adequate carbon from the atmosphere. Plants don't do much growing when they are excessively dry. During the day, the plant is taking in carbon dioxide and giving off oxygen. At night, the whole thing changes. The stomates close, and moisture and nutrient absorption largely cease. The plant goes into an assembly mode, putting together the building block molecules it made in the daytime, assembling them into proteins, enzymes, carbohydrates, fats, etc. This is why some fruits and vegetables are sweeter when the nights begin to cool. On cool nights some of the building blocks such as sugars may be left in their simple state, rather than being made into starches or complex carbohydrates. For a long time, I wondered why plants didn't grow extra roots. If you were a plant, wouldn't it be helpful to have some extra reserve roots on hand, in case of drought, root disease, excess temperature or wind? Plants, for the most part, don't do this, and I found out why after reading a text book called *Plant Roots: The Hidden Half*. The limiting factor in a plant's ability to grow large quantities of roots is generally carbon. Plants must budget the carbon they take in from the atmosphere to flowers, leaves, stems, and fruits as well as roots. There is generally not enough carbon available for the plant to make reserve roots. This is why it is more difficult to regenerate a damaged root system in a low light environment such as a dark greenhouse or interiorscape. There is less light, less photosynthesis, and less carbon. It is also interesting to note that when everything is perfect in the plant's environment, the quantity of carbon dioxide in the atmosphere is usually the limiting factor in a plant's ability to grow

and develop. If the temperature is perfect, the moisture is perfect, the fertility is perfect, the light is perfect, and the humidity is perfect, plant growth is limited by carbon in the atmosphere. In the area of nutrient management many plants have rather elegant ways of obtaining what they need to survive and grow. Many plants can secrete acids from their roots in order to increase nutrient absorption in a high pH environment. Some plants can do this better than others. That explains why some plants like tomatoes and verbena can grow fairly well in high pH environments, while others like pentas and geranium have more difficulty. Some plants can even secrete chelating agents from their roots in order to help with micronutrient absorption. Plants also have the ability to direct ions in the transpiration stream. In simpler terms, plants have some degree of control over what nutrients they absorb, and to an extent can control where they put those nutrients. Through these metabolic pathways, a plant "knows" where things like boron or iron or phosphorus are needed for their development, and they can send those nutrients where they are needed. Plants can sense when they are deficient in something, and can use various types of absorption tricks to absorb more of that nutrient. At the same time, plants perceive when they are taking in too much of something. Let's say a plant is taking in too much sodium or fluoride. It senses this through the biochemical pathways, and can arrange to send these elements to the tips or margins of the older leaves, with the ultimate intention of shedding those older leaves and thereby reducing the effects of the toxicity. This is why most nutrient toxicities occur in older foliage. Dealing with moisture relations is especially important for most plants. Plants have a moisture economy, where moisture is absorbed through the roots, passes through the stems, and ultimately out through the stomates in the leaves. At the onset of dry conditions, the plants can close their stomates, or sometimes primarily close the stomates on the upper leaf surface. They can encourage their roots systems

to absorb and transport more water. The plant will start to make hormones that can induce leaf drop if the dry conditions are severe or persist for a long time. The wilting response is a physiological way for plants to reduce their moisture loss until better conditions return. On the flip side, when plants are growing in excessively wet or flooded conditions, they have several response options they can use. Some plants can transport oxygen down to the roots in order to help them survive. Other plants may wilt to reduce the sun exposure. Waterlogged soils generate ethylene. Some plants respond to this ethylene by dropping older leaves when exposed to it. This is why an overwatered plant can look fairly similar to an under watered plant.

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## MULCHES

Dr. Robert Schutzki and Dr. Bert Cregg  
Michigan State University

Mulches are considered to be any materials applied to cover and protect the soil surface. The extent of “protection” varies with the selected material, the intended use and its application. The ideal mulch is: loose, well aerated; does not compact; does not inhibit water or air movement in the soil; breaks down slowly; buffers rapid changes in soil temperature and moisture; does not present a fire hazard; is weed free; attractive; and stays in place. Mulches are usually classified as organic, inorganic and synthetic. Organic mulches are basically plant products in various forms including: bark (hardwood and coniferous); ground wood products; pine straw (needles); composted leaves; and composted manure. Organic mulches contribute to a healthy environment by enhancing the overall appearance of our landscapes, enriching our soils and aiding plant growth. Inorganic mulches are products from the earth such as stones, rocks and gravels. They may be whole or crushed and provide their benefits through shielding the soil surface. Inorganic mulches enhance aesthetics and provide physical protection of the soil; however, they do not contribute to soil structure or nutrient availability. It also should be noted that dust from crushed limestone materials can influence soil pH. Synthetic mulches include plastic, fabrics, foils, and ground rubber. With the exception of ground rubber, these materials are usually used in combination with other coverings and provide physical protection. The complementing material usually provides the aesthetics. The aesthetic, economic and environmental benefits of mulches have been well documented. Mulches are an important component in improving the sustainability of landscape systems. They, particularly organic, enhance sustainability by reducing chemical inputs and the use of fossil fuels to maintain

healthy and aesthetically pleasing landscapes. Mulches in our urban and suburban landscapes also play a significant role in providing ecosystem services. Ecosystem services are the beneficial resources and processes that we receive from the natural environment. The Millennium Ecosystem Assessment (2006) categorized these services into four groups: provisioning; regulating; supporting; and cultural. Mulches provide a benefit in each one of these groups through contributions to: crop production, energy conservation and water quality; carbon sequestration, waste recycling and decomposition, pest and disease control; nutrient cycling; and aesthetics or recreation uses.

## BENEFITS OF MULCHES

### **Enhance Aesthetics**

It goes without saying that mulches add to the aesthetic appeal of the landscape. The host of materials and their different colors and textures attest to the importance that the general public places on its use. This is further supported by the increased use of color-enriched organic and synthetic mulches.

### **Conserve Soil Moisture**

Mulches conserve and enhance soil moisture by increasing percolation, reducing evaporation and reducing the evapotranspiration losses due to weeds. Coarse organic and inorganic mulches allow water to percolate into the soil structure. These soils have the ability to retain this moisture due to the reduced evaporation from the mulch surface. Mulch surfaces may appear dry, but due to the large pore spaces of the mulch particles, soil moisture is not drawn from the soil depths and lost to the atmosphere. Fine textured mulches on the other hand may retain too much moisture and not allow for adequate aeration within the soil structure. In suppressing weeds, mulches eliminate the evapotranspiration losses that contribute significantly to reduced soil moisture loss at the surface layers of the landscape.

### **Regulate Temperature Fluctuations**

Mulches help minimize extreme temperature fluctuations at the soil surface. These temperature extremes, both hot and cold, can have a negative impact on fine roots. Organic mulches are more tempering in their influence than inorganic mulches. Coarse mulches are more influential than fine textured mulches. The ability to minimize soil temperature extremes is particularly beneficial in fall plantings where the objective is to extend the period of root development and maximize establishment.

### **Provide Nutrients (organic mulches) in Forms that are Readily Available**

As they decompose, organic mulches release nutrients into the soil. These nutrients are available for use by plants and soil microorganisms. Although the amount released may be minimal and not adequately address nutrient deficiencies, their benefits have been recognized.

### **Soil pH**

It has been widely promoted that organic mulch contributes to a decrease in soil pH. Pine needles have been touted as the most acidifying of the group. In the review of landscape mulches (Chalker-Scott 2007), no scientific studies were found to support the influence of mulches in lowering soil pH. A study on pine bark and pine needles found no influence on soil pH. Quite the contrary to what has been suggested over the years. In our study (Cregg and Schutzki 2009), we found no difference in soil pH among any of the mulch treatments or between the mulched and unmulched plots.

### **Nitrogen Deficiencies**

Another point concerning mulches needs clarification. There is no evidence that organic mulches cause nitrogen deficiencies in landscape soils. We all have seen chlorotic ground covers and other herbaceous plants following planting with the thoughts being that microorganisms are tying up nitrogen during

decomposition. The potential tie-up is within the mulch not within the soil below it. Quite often the nitrogen deficiency found in the ground covers is because they were planted in the mulch, not in the soil.

### Minimize Weed Seed Germination

Mulches reduce weed seed germination in two ways. They create a physical barrier at the soil surface thereby reducing or eliminating light from hitting the soil surface. The second way is through allelopathy. Allelopathy is the release of inhibitory chemicals from plant parts. These chemicals can inhibit seed germination and/or reduce plant growth. The most widely known example is juglone from Black Walnut. Thuja and Pinus species also exhibit allelopathic

tendencies. In a recent research project (Cregg and Schutzki 2009), we found that cypress mulch suppressed weeds as well as the photosynthetic efficiency and growth of the landscape species in the project. This inhibition suggests that allelopathy is associated with cypress mulch.

### Types of Mulch

Chris Starbuck (2008), Department of Horticulture, University of Missouri produced a series of comprehensive tables outlining the relative value of a variety of different mulch types. Tables 1, 2, 3 and 4 outline information for organic mulches based on degree of persistence, inorganic mulches, and synthetic mulches. This information is useful when evaluating the comparative benefits of different mulch types.

**Table 1**

Relative value of mulches that break down in one season or less.

Material	Resistance to compaction	Attractiveness	Resistance to wind blowing	Availability	Source of weeds and disease	Fire hazard	Comments
Compost	Good	Good	Excellent	Excellent	Fair	No	Value varies with ingredients.
Corn stalks	Excellent	Unsatisfactory	Good	Fair	Excellent	Yes	Coarse and unsightly. Should shred or compost.
Hay	Good	Fair	Good	Fair	Fair	Yes	Good when available.
Lawn clippings	Poor	Poor	Good	Excellent	Fair	No	Compost first.
Leaf mold	Good	Good	Excellent	Excellent	Fair	No	Value varies with ingredients.
Leaves	Unsatisfactory	Good	Poor	Excellent	Good	Yes	Compost first.
Mature (well rotted)	Good	Good	Excellent	Fair	Unsatisfactory	No	Odor may be bad.
Peat moss	Good	Excellent	Excellent	Excellent	Good	No	Universally available. Coarse grades best.
Rice hulls	Good	Fair	Poor	Poor	Fair	No	Good when available.
Straw	Excellent	Poor	Poor	Good	Poor	Yes	Often contains grain seed.
Waste paper	Fair	Unsatisfactory	Unsatisfactory	Excellent	Excellent	Yes	Must be shredded. Unsightly.

**Table 2**

**Relative value of some persistent mulches.**

Material	Resistance to compaction	Attractiveness	Resistance to wind blowing	Availability	Source of weeds and disease	Fire hazard	Comments
Bark chunks	Excellent	Excellent	Excellent	Excellent	Excellent	No	Generally available. Expensive.
Cocoa shells	Excellent	Excellent	Good	Poor	Excellent	No	High potassium content may cause problems.
Corn cobs	Good	Poor	Good	Fair	Poor	No	Add nitrogen. Unsightly.
Cottonseed hulls	Good	Fair	Poor	Poor	Good	No	Hard to keep in place.
Pean hulls	Excellent	Excellent	Good	Fair	Excellent	No	Locally available. Good.
Pine needles	Excellent	Good	Good	Fair	Good	Yes	Especially good on acid-loving plants.
Sawdust (coarse)	Fair	Fair	Good	Good	Excellent	No	Add nitrogen. Use aged material.
Sawdust (fine)	Poor	Fair	Poor	Good	Excellent	No	Compacts too easily. Requires nitrogen.
Shredded bark	Good	Excellent	Excellent	Good	Excellent	No	Good when available.
Wood chips	Good	Good	Excellent	Good	Excellent	No	Inexpensive when available.
Wood shavings	Good	Good	Good	Fair	Excellent	Yes	Add nitrogen when spaded under.
Wood fibers	Fair	Fair	Good	Poor	Excellent	No	Add nitrogen. Coarse grade preferred.

**Table 3**

**Inorganic mulching materials.**

Material	Resistance to compaction	Attractiveness	Resistance to wind blowing	Availability	Source of weeds and disease	Fire hazard	Comments
Black plastic film	Tears	Unsatisfactory	Unsatisfactory	Excellent	Excellent	No	Must anchor. Unsightly.
Crushed rock	Excellent	Good	Excellent	Excellent	Excellent	No	Many colors available. Avoid crushed limestone.
Geotextile weed barrier	Excellent	Unsatisfactory	Unsatisfactory	Excellent	Excellent	No	Must anchor. Best covered by other mulch.
Gravel	Excellent	Good	Excellent	Excellent	Excellent	No	Use sparingly.
Volcanic rock	Excellent	Good	Excellent	Good	Excellent	No	Small sizes moved by water.
Perlite	Good	Good	Poor	Excellent	Excellent	No	Good as soil amendment.
Vermiculite	Fair	Fair	Poor	Excellent	Excellent	No	Physical structure breakdown.

**Table 4**

**Synthetic mulching materials.**

Material	Resistance to compaction	Attractiveness	Resistance to wind blowing	Availability	Source of weeds and disease	Fire hazard	Comments
Black plastic film	Tears	Unsatisfactory	Unsatisfactory	Excellent	Excellent	No	Must anchor. Unsightly.
Geotextile weed barrier	Excellent	Unsatisfactory	Unsatisfactory	Excellent	Excellent	No	Must anchor. Best covered by other mulch.

## **Mulch Application**

Applying organic mulches may vary, but a general rule of thumb is to apply 3 inches to the landscape surface. It is important to remember to keep mulch about 6 inches from the trunks of woody trees and shrubs. Trunks that are in direct contact with mulch will stay too moist and may cause damage to the plant. This also discourages rodents from chewing the bark of the plants. An application of 1-1½ inches of mulch is recommended for herbaceous perennials and ground covers, although it can also be beneficial for annuals. The general practice when using plugs, cells, or 2¼ inch pots is to prepare the soil to finished grade, apply the mulch and plant through the mulch ensuring that the root system is entirely in soil. Application of inorganic mulches takes the particle size of the material and the corresponding gaps between the particles into consideration. The overall objective is uniform coverage while eliminating light penetration to the soil surface. Gravels or other rounded materials usually require multiple layers to achieve the desired coverage. Mulching with 2-inch stone may require 3 layers or a 4-6 inch depth to achieve uniform coverage with minimal open pore space. In some instances, multiple sizes will be used in combination to achieve the desired coverage. Crushed particles or other angular materials usually overlap or knit in a fashion that minimizes open pores.

Plastic films and fabrics are used as mulches in many production systems. Their use in the landscape or in other garden applications is in combination with another mulch cover. Fabrics and films are used for the most part as a weed barrier, however, they must allow air and moisture exchange from the soil surface and are not usually recommended with organic mulches.

## **Mulch Practice**

Mulch conserves soil moisture, reduces soil erosion, minimizes weed growth, moderates soil temperatures, and contributes to soil fertility following decomposition. However, abiotic

disorders can surface from its improper or excessive use. Improper mulching can result in excessive moisture build-up on trunk collars, negative impacts on rooting depth, promotion of girdling roots, and initiating nitrogen deficiencies in the case of ground covers and annuals plantings.

## **Planting Depth**

In heavier soils, it is suggested that plants be elevated to alleviate any problems with poor soil drainage. However, there may be problems associated with planting too high. It is important to “plant the plant in soil”, meaning that soil needs to be added to the sides of the elevated root mass. Too often plants are observed with the top of the root mass planted in mulch. Mulch settles leaving the root mass exposed. The drying of the upper portions of the root mass contributes to plant decline and causes an unsightly appearance.

## **Girdling Roots**

Girdling roots have been a long recognized abiotic problem in both production and landscape systems. Encircling roots due to production methods, poor soil conditions, excessive mulch, and narrow planting sites have contributed in one form or another to the problem. Excessive mulch layers around the base on plants cause new roots to work their way upwards to capitalize on optimal aeration, moisture, and nutrient levels. Roots remain in the mulch layers and encircle as continued topdressing maintains the preferred environment. Remove mulch layers periodically and cut and redirect problem roots. Mulches provide a multitude of ecosystem services that contribute to a healthy environment by enhancing aesthetics, enriching our soils and aiding plant growth.

Excerpted from *The Michigan Landscape*<sup>TM</sup>  
July/August 2010.

## **SIX RULES OF CUSTOMER SERVICE**

Nancy Friedman, The Telephone Doctor

There are a lot of 'rules' in customer service, but few more important than these six.

### **Rule #1 – Personal Responsibility/ Accountability: Don't Pass the Buck**

One of the most important attributes a company staff member can have is personal responsibility – personal accountability. Those that have it refuse to accuse, blame and complain. Those that do accuse, blame and complain break one of the most important cardinal rules. "Who" statements accuse and blame. "Who took my stapler?" We should use a more positive manner and take personal responsibility by saying, "I seem to have misplaced my stapler; has anyone seen it?" Remember to take full responsibility with the customer. The customer doesn't like to hear accusing, blaming and complaining statements. They know when you're passing the buck!

### **Rule #2 -People before Paperwork**

When someone walks into your place of business or calls you while you're working on something, Cardinal Rule #2 says drop everything. Attend to that person. Remember, paper and other tasks can wait, people should not. We've all been abused when we go shopping and been ignored because the staffer is doing something else and we know how that feels. Let's not abuse our own customers. Remember: People before paperwork.

### **Rule #3 -Don't RUSH Your Customers**

Sure, you may understand something real quick, but rushing the customer along will only lead to them feeling intimidated. Remember to mirror their speed. Trying to be "done" with a customer as quickly as possible is seen as being rude and uncaring. Rushing threatens customers. Take your time with each and every contact.

### **Rule #4 -Company Jargon**

Ever get a report from a company and not understand it? Some companies have company jargon that makes the CIA wonder what's up. Be very careful not to use your own company jargon on your customers. You and your employees may understand it very well, but the customer may not. And you'll only cause a lot of unnecessary confusion. Spell things out for your customers. Use easy words. Try not to abbreviate. Remember, don't use military language on civilians.

### **Rule #5 -Don't Be Too Busy To Be Nice**

Hey, everyone's busy! That's what it's all about. Being busy does not give you carte blanche to be rude. Remember, you meet the same people going down as you do going up. They'll remember you. (What's worse than being busy? NOT being busy.)

### **Rule # 6 - Be Friendly BEFORE You Know Who It Is**

There's a good lesson to be learned here. Smile BEFORE you know who it is. Often times it's too late. Being friendly before you know who it is will earn you classic customer service points. The customer needs to know you want to work with them, no matter who they are. Remember, sometimes it's way too late to smile and be friendly after you know who it is. Any one of these tips can boost your customer service!

Excerpted from *VNLA Newsletter*, May/June 2010.

## **INNOVATING TOWARD A SUSTAINABLE AND PROFITABLE FUTURE**

Sustainability is not just a fad; it is a trend that has its roots in the environmentally conscientious generation of the 1960s that has come of age, combined with the fact that the planet's supply of oil and other resources is being strained to its limits. Thanks to the speed and breadth of communication, people around the world are more aware than ever before of issues regarding pollution, rapidly diminishing biodiversity, and the reduction of the quality of life that accompanies these changes. There are many examples of the economic reality of the strength of the "green" movement in the United States and abroad. One of the most obvious and opportunity-filled ones is the emergence of the LEED system. In addition, the emergence of the Sustainable Sites Initiative promises to expand the opportunities for the landscape industry both within and outside of LEED.

Most of our technologies are based on energy resources that are limited and non-renewable. While advances are being made, energy production without any harmful effects to the environment or by-products does not presently exist. That does not mean, however, that we should be satisfied with the status-quo. We should strive to minimize the use of resources and the production of pollutants in the near term while future technologies and energy sources are developed that produce usable by-products rather than waste. In the early stages of "greening" the industry, there will be opportunities for companies to take leadership roles and distinguish themselves as being more sustainable than the competition. By riding the green wave that is trickling through the American public and educating employees and clients, these companies will differentiate themselves from the crowd. As companies head down this path, it would behoove them to view themselves through the threefold lens of People,

Planet, and Profits. Excluding any one of these three focal points can lead to unbalanced development and more missteps on the road to more sustainable practices. Companies must examine their practices and look to reduce and eventually eliminate waste. The idea of waste reduction has its roots in LEAN practices championed by companies like Toyota. It's interesting to note that Toyota brought us the first hybrid car as well. The examination of sustainable practices passes through every level of a company: internally in the office, throughout the delivery of services, in the standards a company embraces in its designs, in the vendors it chooses to partner with, and in the way it treats its employees and partners within the community. Start with a grand vision for your company. Be bold and audacious. Anchor this vision with small, simple, implementable steps, always keeping in mind that your company will need the cooperation and buy-in of all your staff in order to implement change and remain profitable. No doubt, as circumstances change, so will the steps toward reaching the goal. As long as you keep your eyes on the prize and adjust as needed, keeping People, Profit, and Planet balanced in your plans, you cannot fail. Some industry leaders are embracing sustainability through composting; through special growing practices that are not only eco-friendly, but also less expensive; through pursuing green roof and green walls; through providing more energy-efficient maintenance services by using biofuels and the latest equipment; and through making their employees the heart of their process.

Excerpted from *VNLA Newsletter*, May/June 2010.

# Research Briefs

## Propagation

### **Maximizing adhesion of auxin solutions to stem cutting using sodium cellulose glycolate.**

Auxin solutions prepared with sodium cellulose glycolate ( a thickening agent used in salad dressing, fruit pie fillings and other products) applied to stem cutting using a basal quick-dip extend the duration of exposure of cutting to the auxin and increase root number and/or total root length on stem cuttings of certain taxa.

Maximum adhesion of soolution was obtained using SCG at 13.35 to 13.71 g/L. With the use of SCG at an appropriate rate for preparation of auxin solutions, auxin effectiveness can be enhanced, leading to increased efficiency in cutting propagation. (E.K Blythe and J.L. Sibley)

*Excerpted from HortScience. 45(10):1507-1509, October 2010.*

**Cost comparisons between three liner production systems.** Field ground bed, polyhouse-covered ground bed and polyhouse – covered container systems were modeled. With 11.9 plants/sq.ft., per plant costs (depending on species) were .76-.85 for field ground bed liners, .85-.97/plant for polyhouse-covered ground bed liners, and 1.6-1.7/plant for polyhouse-covered containers. Field ground bed systems require the least input in facilities and are one of the easiest systems to establish. They also permit the greatest flexibility in crop planting densities and can facilitate production of the greatest number of plants per square foot. A disadvantage is full environmental exposure with consequent dependence on favorable weather for management actions like crop harvesting. Polyhouse-covered ground beds offer variable planting densities and have additional crop protection, such as overwintering and maintenance beneath a polyhouse cover. In theory, a salable crop can be grown in less time.

A major disadvantage is the reduction in growing space with a center aisle left wide enough to allow passage of tractors. The polyhouse-covered container system is constrained by the size and style of container in which plants are grown. Many growers use two or more of these systems simultaneously, depending on past crop productivity and experience. Analyses like this can be used to better predict costs and consequences before expanding and adopting systems in individual operations. (A.H. Jeffers, W.E. Klingman, C.R. Hall, M.A. Palma, D.S. Buckley and D.A. Kopsell)

*Excerpted from HortTechnology. 20(4):804-811, August 2010.*

### **Seed germination of *Rhododendron vaseyi*.**

Rigorous cleaning and grading techniques combined with a liberal application of seeds to a germination medium can compensate for low viability and help produce a uniform stand of seedlings. Seeds should be dusted on the surface of a germination medium and be exposed to an 8/16-hr thermoperiod of 86/68 F with a 24-hr photoperiod (continuous light). These conditions will maximize germination, which should begin 9 to 12 days after sowing and be nearly complete by 24 days. (C.J. Hebert, F.A. Blazich and A.V. LeBude)

*Excerpted from J. Environ. Hort. 28(3):166-172, September, 2010.*

## Container Production

**Reclaimed water useful as an irrigation source for nursery crops.** Reclaimed water (processed sewage) was a viable source of irrigation for the container plants in this study (annual vinca, annual salvia, dwarf yaupon holly and ‘Helleri’ holly), either when applied to substrate surface or applied to the plant canopy and substrate surface. A key component of crop management when using reclaimed water

irrigation is the monitoring and regulation of EC levels of the substrate within a range most appropriate for the plant species grown. Additionally, producers should monitor EC of irrigation water. The EC of reclaimed water processed according to Part III guidelines ranged from 0.5 to 0.7 dS/m during 2004 to 2007. Surveys of container plant growers indicates a willingness to use reclaimed water for irrigation with a few notable contingencies. Primary concerns were costs, availability, water quality, and politics. Thus, if low-cost, high-quality reclaimed water was consistently available with freedom from political barriers, container plant producers would embrace the opportunity to use this valuable irrigation resource. (T.H. Yeager, J.K. van Merveldt and C.A. Larsen)

*Excerpted from HortScience. 45(11):1610-1615, November 2010.*

**Chrysanthemum production in organic waste substrates.** Peat-perlite substrates can be replaced with recycled organic materials in container production of mums. Most of the experimental substrates produced plants of equal or better quality than the peat-perlite for both overhead-irrigated and subirrigated management. Particle size was critical, because the Groco biosolids compost had fewer fines and lower water-holding capacity and produced the least growth and poorest quality plants. Addition of bark to Groco reduced the particle size problem. The Tagro biosolids-based materials performed well, particularly under low N fertilization, with particle size similar to the peat:perlite control and the EC of the leachates was low, indicating no negative effects of the alternative substrates on water quality. N rate had a greater effect than substrate on leachate water quality. Materials in this study included: Groco (biosolids compost consisting of anaerobically digested, class B biosolids blended with sawdust at a volume of 3:1 and composted to remove pathogens); Tagro

(biosolids product consisting of a thermophilically digested class A biosolids “cake” that is mixed with sawdust and sand at a volume of 2:1:1); dairy compost (solids screened from dairy manure slurry and then composted in turned piles on the dairy to remove pathogens) and dairy fiber (solids fraction from an anaerobic digester used to capture methane gas from dairy manure). Once technical aspects of container substrate production are mastered, the question of customer acceptance remains. However, attitudes are changing. The results of this study prompted commercial production of Tagro Potting Soil marketed in bulk and in bags and was sold in sufficient quantities in 2009 to utilize 25% of the total biosolids output from Tacoma, WA. (M. Krucker, R.L. Hummel and G. Cogger)

*Excerpted from HortScience. 45(11):1695-1701, November 2010.*

**ET (evapotranspiration)-based irrigation scheduling for *Viburnum odoratissimum*.**

Compared with a fixed-rate irrigation schedule of 1 cm/d, and ET-based irrigation schedule designed to resupply water at a rate proportional to ET reduced the total volume of irrigation water applied by 39% and the total volume of runoff collected by 42%. ET-based irrigation had less effect on reducing nutrient leaching losses compared with the fixed-rate 1 cm/d rate than it did in reducing the amount of irrigation water applied and runoff collected. Higher concentrations of nutrients were found in runoff from the ET-based irrigation treatment indicating that nutrients that accumulate during periods of low leaching may be leached when periods of greater leaching occur. There is a practical limit to reducing N leaching under growing conditions where precipitation is likely to be important. Thus, choosing controlled release formulations with release rates that match plant demand is crucial in minimizing nutrient leaching even with conservative

irrigation practices. (J.B. Million, T.H. Yeager and J.P. Albano)

*Excerpted from HortScience. 45(11):1741-1746, November 2010.*

#### **Pruning of meadowsweet and steplebush.**

These two native spireas produce long-lasting terminal inflorescences on their vertical stems from mid-June (meadowsweet) and mid-July (steplebush) through August in upper Midwestern U.S. Both species are used primarily in habitat restoration, but have potential as landscape shrubs if growth form could be improved. Pruning could eliminate apical dominance, resulting in shrubs with more branches and thus a fuller, more attractive plant. Pruning of meadowsweet and steplebush to 15 cm can improve form. Pruning to 3 cm is not recommended in the first year after planting because it significantly reduces size and flowering. (K.M. Stanton, S.S. Weeks, M.N. Dana and M.V. Mickelbart).

*Excerpted from HortTechnology. 20(4):700-704, August 2010.*

**Seaside alder production with controlled-release fertilizer.** Seaside alder is a threatened species native to the U.S. in Georgia, Oklahoma, and along the Delmarva Peninsula in Delaware and Maryland. Seaside alder is well-suited to nursery production and landscape use. It can be propagated readily from cuttings or seed. Plants have the capacity to fix atmospheric nitrogen through root nodules. The presence of nodules on nursery plants could reduce N fertilizer use and result in more efficient use of applied N. The use of CRF for fertilization may reduce NO<sub>3</sub>-N leaching from containerized nursery crops. Vigorous nodulated plants of seaside alder can be produced by using CRF rates below that prescribed by the manufacturer, with minimal leaching of NO<sub>3</sub>-N. Seaside alder has potential for use in sustainable landscapes and can be produced readily in a nodulated form

by growers. (T. Beddes and H.A. Kratsch)

*Excerpted from HortTechnology. 20(4):740-745, August 2010.*

#### **Sustainable production practices in the nursery industry.**

A nationwide survey revealed that none of the producers surveyed were certified sustainable, but 25.8% were interested in certification. More than half the respondents currently recycle plastic pots, use controlled-release fertilizers, and composted plant waste. However, only 12% of growers want to use biodegradable plant containers or implement water conservation measures into their production system within the next 1 to 3 years. Grower respondents felt the biggest obstacle toward implementation was the sustainable production practice would not be compatible with their existing system of production. (J.H. Dennis, R.G. Lopez, B.K. Behe, C.R. Hall, C. Yue, B.L. Campbell)

*Excerpted from HortScience. 45(8):1232-1237, August 2010.*

**Use of processed biofuel crops for nursery substrates.** Switchgrass, willow, corn and giant miscanthus were processed through a hammermill equipped with a 0.375 in screen. Materials were used alone or with 20% sphagnum peatmoss or with 20% sphagnum peat moss and 10% municipal solid waste compost. Annual vinca was used as the test crop. All plants were considered marketable at the end of the study. Biofuel based substrates alone do not provide physical properties considered ideal for container crops. Air space is too high and container capacity is too low and pH is 1-1.5 units too high. Amending these substrates with 20% sphagnum peat moss and 10% municipal solid waste compost adjusts physical properties so they are within ideal ranges and lowers substrate pH. The propensity of these materials to decompose or disintegrate during longer production cycles is a

concern. (J. Altland).

*Excerpted from J. Environ. Hort. 28(3):129-134, September 2010.*

**Light and temperature recommendations for growth of *Helleborus* sp.** In general, to maximize growth, *H. foetidus* and *H. xhybridus* should be grown under long-day conditions at days/nights of 64/57 F, whereas *H. niger* is best grown at days/nights of 57/50 F. The need for such temperatures during the summer months may require various temperature control methods such as reflective shade, fans, and cool cells to reduce temperatures within growing structures. (A.W. Lowder, H.T. Kraus, F.A. Blazich and S.L. Warren)

*Excerpted from J. Environ. Hort. 28(3):179-186, September, 2010.*

## **Greenhouse Production**

### **Using composted dairy manure solids as a peat substitute in bedding plant production.**

Seven substrates were formulated using Canadian sphagnum peat (S), Florida reed-sedge peat (R), and/or composted dairy manure solids (C) in the following combinations (100% S, 100% R, 100% C, 2S:1C, 2R:1C, 1S:2C, 1R:2C). All substrate tested appeared to be commercially acceptable for production of container-grown bedding plant species. There was no evidence that replacing traditional sources of peat with composted dairy manure solids will have a significant impact on plant growth or quality. However, nutrient losses from the containers will differ depending on the peat or peat substitute used to formulate the substrates. Producers should use best management practices to control nutrient losses in leachate. N losses in leachate will be the main concern when traditional sphagnum or reed-sedge peat materials are used, whereas losses of dissolved P will be greatest when composted dairy manure solids (or other

manure-based sources) are used as a peat substitute. Producers should reduce P fertilization when using composted manures in potting substrates. In addition, maintaining a near neutral pH will reduce the dissolution of calcium phosphate minerals and subsequent leaching of dissolved reactive P when composted manures are used as a peat substitute. (A.L. Shoiber, C. Wiese, G.C. Denny, C.D. Stanley, B.K. Harbaugh and J. Chen)

*Excerpted from HortScience. 45(10):1516-1521, October 2010.*

### **Supplemental lighting to improve quality and flowering in petunia and pansy transplants.**

Greenhouse growers could use supplemental lighting (provided by sunlight plus 90  $\mu\text{mol}/\text{m}^2/\text{s}$  for a 16hr day) from the two true leaf stage onward to obtain good-quality transplants, rapid flowering, and energy savings when the ambient mean daily light interval is low (e.g. less than 8 to 10  $\text{mol}/\text{m}^2/\text{d}$ ). (W. Oh, E.S. Runkle and R.M. Warner)

*Excerpted from HortScience. 45(9):1332-1337, September 2010.*

### **Reduced nutrient feed concentrations in potted miniature rose production using subirrigation.**

In potted miniature rose production using subirrigation, nutrient feed concentrations can be reduced to 75% of the full-strength concentration (EC of 1.756 dS/m) without negatively affecting production and quality. (Y. Zheng, D. F. Cayanan and M. Dixon)

*Excerpted from HortScience. 45(9):1378-1383, September 2010.*

**Paclobutrazol liner dips for size control of three bedding plants.** Paclobutrazol is a widely used plant growth regulator for size control of commercially produced bedding

plants. The liner dip or soak is a technique for delivering the recommended early dose of plant growth regulators with specific protocols to maximize plant growth regulator efficiency. Containerized rooted cuttings are dipped in a solution containing the desired concentration of growth regulator before transplant into the final container. The paclobutrazol liner dip yields effective size control of petunia, scaevola and impatiens. This technique can improve efficiency of bedding plant production and the quality of the finished product. Decreasing early internode elongation allows reduced spacing and improves plant appearance in small containers. (R.A. Schnelle and J.E. Barrett)

*Excerpted from HortTechnology. 20(4):700-704, August 2010.*

**1-Methylcyclopropene (1-MCP) blocks ethylene injury for cut tulip production.** In cut flower tulip production, bulbs are forced in hydroponic systems that facilitate flower harvesting. During tulip bulb development and storage before cooling, ethylene can cause a number of physiological and morphological disorders. 1-MCP is an ethylene perception inhibitor that blocks ethylene binding sites in plant tissue thus protecting the tissue against ethylene damage for variable periods. In this study, 1-MCP was effective at reducing ethylene injury for at least 1 week in the earliest phases of growth and establishment in the greenhouse. (G.B. Cerveny and W.B. Miller)

*Excerpted from HortScience. 45(8):1164-1166, August 2010.*

**Substrate components for greenhouse produced annuals.** Wood-based alternative substrate components are viable renewable alternatives to peat for greenhouse production. Chipped pine logs (CPL) is obtained by chipping and grinding a pine log that has been delimbed. *WholeTree* (WT) is obtained by chipping and grinding all aboveground portions

of a pine tree. Results from this study with vinca and impatiens indicate that growers can use WT and CPL interchangeably as a substrate component in equal volumes with peat. (W.G. Gaches, G.B. Fain, D.J. Eakes, C.H. Gilliam and J.L. Sibley)

*Excerpted from J. Environ. Hort. 28(3):173-178, September, 2010.*

## Landscape

**Compost added as an amendment to sandy soils improved plant growth of ornamental plants.** Composted dairy manure solids can improve soil physical and chemical properties when sandy fill soils are used. Application of composted dairy manure solids can also enhance the establishment and improve the growth of selected ornamental plants (*Galphimia glauca*, *Rhaphiolepis indica*, *Ilex cornuta* 'Burfordi' and *Liriope muscari*). Topdressing with composted dairy manure solids enhanced plant growth and quality as much as incorporation of compost to a depth of 20 cm by tillage. In contrast, shallow tillage and aeration had little effect on the physical properties of sandy fill soils. And there was no effect of plug soil aeration on plant establishment or growth. This lack of effects from tillage or aeration was probably due to the coarse textured soils used in this study. (S. Loper, A.L. Shober, C. Wiese, G.C. Denny, C.D. Stanley and E.F. Gilman)

*Excerpted from HortScience. 45(10):1522-1528, October 2010.*

**Post-transplant irrigation scheduling for two native deciduous shrubs.** Monitoring root ball matric potential is more effective for irrigation scheduling than monitoring the surrounding soil matric potential with respect to increased shoot growth and initial establishment of *Itea virginica* 'Henry's Garnet' and *Rhododendron austrinum*. Irrigation outside the original root ball did not aid in quick establishment in other

research. Another study found that root ball moisture can be significantly lower than backfill soil. (A.B. Griffin, A.N. Wright, K.M. Tilt and D.J. Eakes)

*Excerpted from HortScience. 45(11):1620-1625, November 2010.*

#### **Comparison of deer repellents on Taxus.**

Deer avoided repellents containing putrescent egg solids (Big Game Repellent, Deer-Off and Deer Stopper II) up to 6 weeks, whereas other repellents tested failed after 4 weeks. Egg-based repellents may be effective because they contain sulfur compounds that deer could associate with predators. (P.D. Curtis and J.R. Boulanger)

*Editor's note: Repellex was tested in this study and did not perform as well as the egg-based products. My personal experience has been long-lasting repellency with Repellex when applied and allowed to dry for 48 hours.*

*Excerpted from HortTechnology. 20(4):730-734, August 2010.*

**Response of five hydrangea species to foliar salt spray.** Cultivars of *H. macrophylla* and *H. serrata* were more tolerant of full-strength salt spray than cultivars of *H. paniculata*, *H. anomala* and *H. arborescens* and therefore should be planted where maritime salt spray will occur. At half strength salt spray, *H. anomala* ssp. *petiolaris* was most tolerant. (N.B. Conolly, N.L. Bassuk and P.F. MacRae, Jr.)

*Excerpted from J. Environ. Hort.. 28(3):125-128, September 2010.*

**Purple-leaved Japanese barberry indistinguishable from green-leaved genotypes at low light.** Anthocyanin accumulation by purple seedling Japanese barberry decreased to produce green leaves as shade levels increased. Thus, barberry seedlings that are green in a shaded woods environment

may be progeny of purple-leaved landscape specimens. (J.M Lehrer and M.H. Brand)

*Excerpted from J. Environ. Hort. 28(3):187-189, September, 2010.*

#### **Turf**

#### **Salt tolerance of creeping bentgrass cultivars.**

Substantial variation in salinity tolerance in 26 commonly used creeping bentgrass cultivars were observed, of which, 'Declaration', 'Seaside II', 'T-1', and 'Bengal' were considered salt-tolerant, whereas 'Tyee', 'SR1150', and 'Kingpin' were salt-sensitive. (S. Wang and Q. Zhang)

*Excerpted from HortScience. 45(11):1747-1750, November 2010.*

#### **Management of Bermudagrass on sand-based athletic fields.**

'Tifway 419' and 'Riviera' (fine-textured, denser cultivars) had better traffic tolerance than 'Quicksand' and 'Yukon' (coarse-textured, open cultivars). Treatment with the growth regulator, TE, which has been linked to faster recovery from heat, drought, and mechanical stress did not significantly improve tolerance to wear. Overseeding with perennial ryegrass was effective in improving wear tolerance for coarse-textured open cultivars but had no effect on fine-textured denser cultivars. (M.T. Deaton and D.W. Williams)

*Excerpted from HortTechnology. 20(4):724-729, August 2010.*

#### **Weed Control**

#### **Non-fertile clones of *Hypericum adnrosaemum* clones are are potentially useful as non-invasive landscape shrubs.**

*Hypericum adnrosaemum* is a desirable landscape shrub with yellow flowers that is

native to Europe and Western Asia. It has ornamental traits and pharmacological properties. It has naturalized outside its native range into Australia, New Zealand and Chile, forming dense thickets and displacing native plants. It is considered an invasive plant in the northwestern U.S. Triploid clones were found to be highly infertile with no measurable female fertility. These clones will provide ideal alternatives to fertile forms of *H. androsaemum* where invasiveness is a concern. (C.E. Trueblood, T.G. Ranney, N.P. Lynch, J.C. Neal and R.T. Olsen)

*Excerpted from HortScience. 45(7):1026-1028, July 2010.*

**Mesotrione damage to bermudagrass when used for broadleaf and grassy weed control in managed turfgrass systems.** Mesotrione is not currently labeled for use on actively growing bermudagrass turf. However injury after application is not excessive enough to induce mortality to bermudagrass plants. Visual tissue whitening reached a maximum of 38% by 14 DAT; however regreening of discolored tissue was observed by 21 DAT. Results indicate that although mesotrione initially decreased bermudagrass pigment concentrations, treatment with this herbicide eventually results in higher concentration of chlorophylls and carotenoids. (D.A. Kopsell, J.T. Brosnan, G.R. Armel and J.S. McElroy)

*Excerpted from HortScience. 45(10):1559-1562, October 2010.*

**Tolerance of seashore dropseed to pre- and postemergence herbicides.** Seashore dropseed (*Sporobolus virginicus*) is a salt-tolerant grass with wide distribution along tropical and subtropical shorelines worldwide. Oxadiazon, oxyflufenoxifen and sulfosulfuron were found to be safe and effective for controlling weeds in establishing transplanted seashore dropseed plugs. (O.C. Baldos, J. DeFrank and G.

Sakamoto)

*Excerpted from HortTechnology. 20(4):772-777, August 2010.*

## Diseases

**Phytophthora causes bleeding canker on European beech.** At least five different species of *Phytophthora* are capable of causing bleeding canker on European beech, these pathogens can be found in soil surrounding trees, and they are capable of causing disease when artificially inoculated into stems. (A.H. Nelson, J.E. Weiland and G.W. Hudler)

*Excerpted from J. Environ. Hort. 28(3):150-158, September 2010.*

## Insects

**Borer management in field grown red maples.** Neonicotinoids were very effective at managing flatheaded apple borer (FAB) on red maple and offer many advantages for borer management programs owing to the diverse methods by which they can be effectively soil-applied; including pellets, seed dressing, root dips, implantation, injection, or painting. Although systemic neonicotinoid treatments are more expensive than trunk sprays like Dursban and Onyx, borer damage in trunk spray treatments was generally higher than the neonicotinoid insecticides. Another disadvantage for trunk sprays is they must be applied at least two times each year, whereas neonicotinoids utilized in this study were applied only one time at the beginning of the four-year test. Imidacloprid drenches at rates from 0.011 to 0.024 oz ai/in trunk diameter provided complete FAB prevention for two to three years and at rates of 0.049 oz ai/in provided complete prevention for four years. Since FAB damage generally ruins marketability of a nursery tree, the economic threshold for damage is essentially none.

Therefore, treatments that provide 100% protection and reduce the number of applications over a three year crop production cycle save money even if initial costs are higher. (J.B. Oliver, D.C. Fare, N. Youssel, S.S. Scholl, M.E. Reding, C.M. Ranger, J.J. Moysenko and M.A. Halcomb)

*Excerpted from J. Environ. Hort. 28(3):135-149, September 2010.*

## **Marketing**

**Gardening consumer segments vary in ecopractices.** Savvy marketers rely on the principles of customer segmentation and product targeting to more efficiently allocate scarce resources and effectively reach groups of consumers with similar likes, preferences or demands. Our objective was to identify and profile consumer segments with regard to their gardening purchases to determine whether there were differences in their ecofriendly attitudes and behaviors such as recycling. A cluster analysis based on plant purchases yielded three consumer segments: low use, woody plant buyers, and herbaceous plant buyers. There were some differences with regard to recycling behaviors among consumers in the three groups. Generally, herbaceous plant buyers were most ecofriendly followed by woody plant buyers and low use. Given these differences, there appears to be some merit in the future to segment consumers by plant purchases versus others to target specific types of ecofriendly products to them. (B.K. Behe, B. Campbell, J. Dennis, C. Hall, R. Lopez and C. Yue)

*Excerpted from HortScience. 45(10):1475-1479, October 2010.*

**Branding awareness and willingness-to-pay for Texas brands.** The green industry is facing a maturing market and a variety of plant promotion programs have been initiated to increase the demand for selected horticultural

products, raise awareness among consumers of Texas-grown plant material, promote environmental responsibility, and increase producers' profitability by providing branding price premiums. This study shows that consumer awareness of Texas Superstar™ and Earth-Kind™ is low, but the level of satisfaction among customers is high. Consumers who shop weekly or monthly for ornamental plants are more likely to be aware of such programs. Those who are aware of the brands are willing to pay more. The brands differentiate the product and create price premiums. It was estimated that the willingness-to-pay for Texas Superstar™ and Earth-Kind™ for the average respondent was 10% higher than the willingness-to-pay for an unbranded plant. (A.J. Collart, M.A. Palma and C.R. Hall)

*Excerpted from HortScience. 45(8):1226-1231, August 2010.*

## **New Plants**

**Lysimachia congestiflora 'Zimai': An ornamental plant with purple veined leaves.** Dense flowered loosestrife is a mat-forming perennial herb native to south, southwest and central China with a subtropical monsoon climate. It is currently marketed as a bedding plant, hanging basket, and potted plant in North America and Europe. It is grown primarily for its creeping stems as well as its terminal cluster of bright yellow flowers. 'Zimai' has been selected for its striking purple vein compared with the typical species. For potted plants and hanging baskets, it can be planted in the substrate with equal volumes of vermiculite or perlite and humus soil and fertilized with N at 50 ppm 15N-9.9P-14.1K when necessary. Contact: [yedizhw@yahoo.com.cn](mailto:yedizhw@yahoo.com.cn). (W. Zheng, X-D Xu and L-Q Chen)

*Excerpted from HortScience. 45(10):1549-1551, October 2010.*

### **‘Cree’ and ‘Nantucket’ Viburnums.**

*Viburnum rhytidophyllum* ‘Cree’ is an evergreen, fairly upright, multistemmed, coarse-textured shrub (2.5 m high and 2 m wide in 12 years in Washington, DC). Foliage is dark green. Flowers are white to cream colored in flattened cymes. Red fruit ripen to near black and can persist into winter. *Viburnum* ‘Nantucket’ is a semievergreen upright, relatively compact shrub (4 m high and 2 m wide in 16 years in Washington, DC). White branched inflorescences, containing sterile florets around the margin and interspersed in the inflorescence. Fruit ripens from red to black (light fruit set). Both cultivars are appropriate as a single specimen plant, an evergreen hedge, in a mass planting, or as a backdrop in the shrub border. ‘Cree’ was selected for its somewhat slower growth rate and more compact size compared to the species. ‘Nantucket’ was selected for its large, mildly fragrant, abundant branched inflorescences that cover the plant in spring as well as its upright and relatively compact growth habit. ‘Cree’ and ‘Nantucket’ are not patented. Plants are available from wholesale, mail order, and retail nurseries. The National Arboretum can supply unrooted cuttings to nurseries wishing to propagate these plants. (M.R. Pooler)

*Excerpted from HortScience. 45(9):1384-1385, September 2010.*

## **Publications**

**Pocket Guide to Rhododendron Species.** J.F. J. McQuire and M.L.A. Robinson, 2010. Published by Kew Publishing, Royal Botanic Gardens, Kew; distributed by the University of Chicago Press. 704 pages; 700 color plates. \$97.00. Hardcover. ISBN 13:978-1-84246-148-8. For anyone interested in identifying rhododendrons currently in cultivation of species, this is the field reference for you. It is a complete guide to the taxonomy and characteristics of over 1,000 rhododendron species and is presented in an easy to follow format with over 700 color photographs. The book is quite humorously titled a “pocket guide” when in fact you would need an awfully large pocket to carry it in. The hardcover text measures 22 cm x 13 cm x 3.4 cm and weighs over 2 lbs, so it is more of a “backpack guide,” although much easier to tote around than a large, standard text reference.

**Garden.com Founder Launches the Ultimate Virtual Backyard Fence for North American Gardeners.** If you’re searching for localized gardening info on the Internet, or seeking a green thumb friend with similar passions, you now may be able to find both with one click of the mouse. A new social networking website, [www.digthedirt.com](http://www.digthedirt.com), is designed to put gardeners in touch with other gardeners on an information-packed website dedicated to all aspects of the growing hobby of gardening. DigtheDirt.com goes beyond blogs and forums to create a virtual back fence over which gardeners (whether across the country or right next door) can share their experiences while together building the most comprehensive interactive source of horticultural ideas and information ever created.

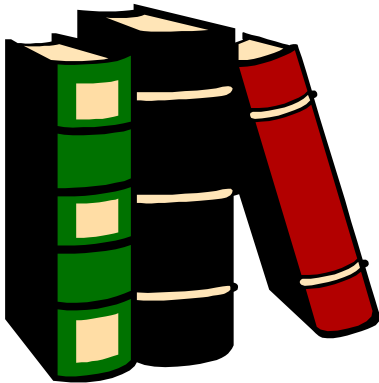
The website is the brainchild of Seattle-based Web veteran and gardener Cliff Sharples, who calls his team’s creation “a gardener’s virtual playground for meeting, seeking, learning and

obsessing over shared enthusiasms.”

**Pest Alert for thousand cankers disease of black walnut.** Thousand cankers disease of black walnut has been an increasing problem in the Western United States over the past decade. It was found in Tennessee in 2010 and it is feared that the insect vectored disease may spread further to trees in the Eastern U.S. It is vectored by a small bark beetle and the disease is caused by a fungus. Affected trees usually die within several years.

[http://na.fs.fed.us/pubs/palerts/cankers\\_disease/thousand\\_cankers\\_disease\\_print\\_res.pdf](http://na.fs.fed.us/pubs/palerts/cankers_disease/thousand_cankers_disease_print_res.pdf)

**Ornamental Plants Plus 4.0.** This unique DVD includes 2,083 horticultural topics and 5,855 full-color images for your marketing efforts. Cost is \$139.95 (\$99 for educators). Available from Michigan Nursery and Landscape Association (800-879-6652).



## Calendar

**January 5-7** – MANTS, Baltimore Convention Center, Baltimore, MD, [www.mants.com](http://www.mants.com)

**January 6, 13, 20, 27** - Arborist Short Course on Thursdays in January, Chester County Extension, West Chester, PA, Contact Cheryl Bjornson, 610-696-3500.

**January 11-13** – Eastern PA Turf Conference and Trade Show, Drowne Plaza Valley Forge, King of Prussia, PA. Contact: 814-237-0767

**January 13** – Nursery/Landscape Conference, Delaware Valley College, Contact: Scott Guiser – 215-345-3283.

**January 13 and 14** – uncharted territory: An Expansive Approach to Environmental Landscape Design, Haverford College, Haverford, PA, Contact: 215-247-5777 x 125; [jlm@upenn.edu](mailto:jlm@upenn.edu)

**January 18 and 19** – Estimating and Bidding for Landscape Installation, Montgomery County Cooperative Extension Office, Creamery, PA, Contact Emelie Swackhamer 610-391-9840.

**January 19-21** – PA Christmas Tree Growers Association Winter Meeting, Holiday Inn, Grantville. Contact: 800-547-2842.

**January 20 and 21** – uncharted territory: An Expansive Approach to Environmental Landscape Design, Connecticut College, New London, CT, Contact: 860-439-5020; [jlm@upenn.edu](mailto:jlm@upenn.edu)

**January 23-28** – Mid-Atlantic Horticulture Short Course, The Founders Inn & Spa, Virginia Beach, VA, Contact: 757-523-4734 or [info@vahort.org](mailto:info@vahort.org)

**January 26-27** – Delaware Horticulture Industry Expo, Modern Maturity Center, Dover, DE, Contact Valann Budischak (610-274-2166).

**January 27** – Turf Topics: Turf Identification and Uses, Berks County Agricultural Center Auditorium, Leesport, PA, Contact: 610-378-1327

**January 28 and 29** – Mid-States Horticultural Expo, Kentucky international Convention Center, Louisville, KY. Contact: 931-473-3951.

**January 30 - February 1** – Shade Tree Symposium, The Lancaster Marriott and Lancaster County Convention Center, Contact [www.penndelisa.org](http://www.penndelisa.org); [penndelisa05@comcast.net](mailto:penndelisa05@comcast.net); 215-795-0411

**February 2** - Problem Solving Workshop, 4 PM – 6 PM  
New Castle County Extension Office, Contact: 302-831-2506.

**February 8** – LCAP Winter Lawn Care Conference,  
Holiday Inn Lehigh Valley, Allentown. Contact: Judy  
Becker, 888-577-6801.

**February 9** - Culture of Groundcovers, 4– 5:30 PM  
Carvel Center, Georgetown, DE. Contact: 302-856-7303.

**February 9 and 10** – Green Industry Leadership Summit,  
Lancaster Convention Center, Lancaster, PA. Contact  
PLNA, 800-898-3411.

**February 10-13** – Maymont Flower & Garden Show,  
Greater Richmond Convention Center, Richmond, VA.  
Contact 301-330-4128.

**February 11** – Today’s Horticulture at Longwood  
Gardens, Kennett Square, PA. Contact: 610-388-5454

**February 12** - Greenhouse Management, 9 AM – 12 PM,  
Delaware Department of Agriculture, Dover, DE. Contact  
302-856-7303.

**February 15 and 22** – Tree Identification, Tyler  
Arboretum, Media, PA. Contact Cheryl Bjornson, 610-  
696-3500 x20.

**February 16** – Winter Grounds Management Seminar,  
Kutztown Grange, Kutztown, PA. Contact: Emelie  
Swackhamer, 610-391-9840.

**February 17** - Culture of Groundcovers,  
New Castle County Extension Office, Newark, DE, 4–  
5:30 PM. Contact: 302-831-2506.

**February 17** - Diseases and Insects of Groundcovers  
New Castle County Extension Office, Newark, DE, 4– 6  
PM. Contact: 302-831-2506.

**February 17** – 11<sup>th</sup> Annual Land Ethics Symposium,  
Bowman’s Reserve, Sheraton Bucks County Hotel in  
Langhorne, PA, check the website ([www.bhwp.org](http://www.bhwp.org)) for  
more information and online registration.

**February 18** – KAFMO Athletic Field Conference,  
Holiday Inn, Grantville. Contact: Linda Kulp, 717-921-  
8801.

**February 24** - Diseases and Insects of Groundcovers, 4 –  
6 PM, Carvel Center, Georgetown, DE. Contact: 302-856-  
7303.

**February 24** – Basics of Turfgrass Management,  
Delaware County Cooperative Extension, Springfield.  
Contact: Nancy Bosold, 610-378-1327.

**March 2** - Pruning Woody Plants, Upper Hanover Twp.  
Parks Dept. East Greenville, Contact: Julianne Schieffer,  
610-489-4315.

**March 14** – Raising the Canopy: Building Landscapes for  
Future Generations, The Native Plant Center, West  
Chester, New York, Contact:  
[Nancy.Inzinnia@sunywcc.edu](mailto:Nancy.Inzinnia@sunywcc.edu)

**March 22** - Pruning Workshop, 4 – 6 PM, Carvel Center,  
Georgetown, DE. Contact: 302-856-7303.

**March 24** – Back to Basics – Tree and Shrub Planting,  
Plant Health Care, Pruning and Mulching, Chester County  
Government Services Building, West Chester, PA.  
Contact: Cheryl Bjornson, 610-696-3500, x 20.

**March 29** - Pruning Workshop, 4 – 6 PM, Kent County  
Extension Office, DE. Contact: 302-730-4000.

**March 29 and 31** - Insect Short Course, 4– 7 PM,  
Townsend Hall, University of Delaware; Limited to 10  
participants, Contact: 302-831-2506.

**June 1** - Beneficial Insect ID, 6-8 PM  
New Castle County Extension Office, Newark, DE.  
Contact: 302-831-2506.

**June 8** - Beneficial Insect ID, 6-8 PM  
Carvel Center, Georgetown, DE. Contact: 302-856-7303

**September 7, 14 and 21** - Diseases of Ornamental Plants,  
4-6 PM, Kent County Extension Office, Dover, DE

