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Editor: Susan Barton, Extension Specialist, University of Delaware
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ASSOCIATION NEWS
Valann Budischak
Executive Director, D.N.L.A.

The Summer Turf and Nursery Expo and Golf Tournament was held on August 20th at Jonathan's Landing Golf Club in Magnolia. Mother Nature continued to shine down upon us, providing us with a picture-perfect (albeit toasty) day. More than 110 people enjoyed the exhibits, interesting seminars, and pig roast at the new venue. It was a special treat to see the skill and talent involved in the creation of a dry stack stone wall. Thanks go to Carl Miller of London Grove Nursery and George Galli of Masonry Restoration for demonstrating the technique. Gary Johnston of Tull's gave an interesting talk on pond water quality. This is a very popular topic for our many attendees who install and maintain ponds. Once again, Jay Windsor and Gordon Johnson stumped many of us with their weed identification challenge. Following the delicious pig roast, thirteen foursomes revved up their carts and took to the golf course to participate in our 6th Annual Golf Tournament. DNLA president, Bruce Paulish, and I drove the very popular beer/beverage cart for our thirsty golfers. Our winning foursome, actually a threesome, consisted of Gary and Brandon Prettyman of Four Acres Trailer Sales, and Gene Christmann of First State Ford. Second place went to the Jonathan's Landing foursome. Joe Vetrone of Joe Vetrone Landscaping was our "Closest to the Pin" winner, and Steve Melton of Winterthur was our "Longest Drive" winner. Congratulations to all!! Thanks to our many tournament sponsors and program advertisers. Your continued support is what makes the Expo and Golf Tournament a success.

The Ornamental and Turf Workshop is just around the corner (November 13th), and the Delaware Horticulture Industry Expo (DHIE) isn't far behind. Registration for the November

13th event is currently underway. If you haven't received your registration form, please call the DNLA office at (888) 448-1203. We hope to see you there. The DHIE will be held on January 15th and 16th at the Modern Maturity Center in Dover. It will, once again, join forces with the Delaware Pesticide Conference. This event promises to be winner! Lenny Wilson from the DE Center for Horticulture will discuss "Integrating Tropical and Exotic Plants into Containers and Borders"; author and photographer Rick Darke will discuss "Transitions in the Landscape"; the ever-popular Bob Mulrooney will talk about the "Diseases of Perennials"; Lynn Atz of Atz & Associates will talk about "Sound Proposals – The Hidden Costs". There are also many more speakers such as Paul Meyer of Morris Arboretum, Steve Lange of ITMS, Fred Hyatt of Moon Nurseries, and Jay Windsor of Lakeside Greenhouses. I could go on and on. Be sure to join us!

This past summer, long-time University of Delaware employee and DNLA advisor, Jay Windsor, retired from the U of D. The DNLA recognized him for his many years of service at the Summer Expo. Jay's a founding member of the DNLA. His wisdom, sense of humor, and can-do attitude has proven priceless to our organization. We look forward to his continued presence in the DNLA.

On a more somber note, the DNLA would like to express their deepest sympathy to the John Ellingsworth and Forest View family. Sharon Sheats, Forest View's vice president, and John's sister, died suddenly on October 7th. She will be sorely missed.



WELCOME TO OUR NEW MEMBERS:

Bayhealth Medical Center

Paul Cunningham
640 S. State Street
Dover, DE 19901
(302) 744-7040

Delaware State Museums

Diane Crom
102 S. State Street
Dover, DE 19901
(302) 739-7070, Ext. 20

Cokesbury Village

John Dauphin
726 Loveville Road
Hockessin, DE 19707

U of D NEWS

Susan Barton, Extension Specialist

The Ornamentals Research Expo was held on September 16 at the UDBG this year. Promotional flyers went out very late (mostly due to my vacationing at the end of August). We had pretty good attendance anyway. This is always a fun event. Bob Mulrooney and Gordon Johnson did a pest walk focusing on disease and insect problems as well as cultural plant stresses in the landscape. I presented some information about Enhancing Delaware Highways (keep looking at the roadsides this fall for white fleecy baccharis, red sumac, yellow golden rod and lots of purple asters). We always have a great sub dinner and then the highlight of the evening—John Frett’s plant giveaway. John brought about 12 species of plants that have merit for use in the landscape. Attendees can take several (some people bring a truck) to try them out and make their own decisions about whether they would like to grow or use those plants in the future. It is the UDBG’s way of introducing the industry to promising species. Look for the Ornamentals Research Expo flyer next year—it is definitely worth an evening of your time!

A new program is coming to DE – Plants for a Livable Delaware! The University of Delaware and the Delaware Center for Horticulture in cooperation with the Delaware Department of Agriculture and the Delaware Nature Society have just received a \$25,000 grant from the Delaware Estuary Program. The program was conceived as a way to educate the nursery and landscape industry as well as the gardening public about great alternatives to invasive plants. It will be both an education and a marketing program. We will develop a brochure explaining the problem of invasive plants and list the species designated as most problematic by the Delaware Invasive Species Council. The brochure will also include suggestions of alternative plants that play the same function in

the landscape as a problematic invasive plant. We have developed criteria for “Livable Delaware Plants” and will suggest some examples, but do not plan to present an exhaustive list. It will be up to individual garden centers, public gardens and parks to determine which plants they identify as “Livable Delaware Plants” using the following criteria:

- Pose no potential as an invasive plant
- Have no serious disease or insect problems
- Be hardy to Delaware
- Possess adaptable characteristics to landscape situations (i.e. drought resistant, tolerant of poor soils, etc.)
- Feasible to commercially propagate and grow in the nursery industry

Many of these plants will be native to Delaware and surrounding states but that is not a requirement for receiving the “Livable Delaware Plant” designation. The best way to reduce the sale and purchase of some problem invasive plants that are still in commerce is to educate the gardening public and provide them with viable alternatives. We will identify problem invasive plants with a “Take a Closer Look” sign and good alternatives with “Livable Delaware Plant” sign.

We will work with a pilot garden center in each county to test promotional materials for this program. Promotional materials will include flyers, “Livable Delaware Plant” add-on signs and “Take a Closer Look” add-on signs. In addition we will develop posters that explain the program and can be posted near the checkout counters at garden centers and in educational areas at public parks and public gardens.

A final component of this program is to develop a demonstration garden featuring Livable Delaware Plants at the Delaware Center for Horticulture. We are excited about the

marketing opportunities this program can offer the industry and will be keeping you posted as well develop materials. Steve Castorani represents the nursery and landscape industry on the Delaware Invasive Species Council and provided valuable input in the development of this grant/project. We will continue to work with the industry to create a program that meets your needs and is feasible for implementation in garden centers and public gardens. If you want to provide input, please give me a call (302-831-1375).

The University of Delaware and the DNLA are cosponsoring a design workshop this January with the Association of Professional Landscape Designers (APLD). Deanna Pillarelli (Garden Escapes) has coordinated this 3-day workshop with Robin Templar Williams entitled “In the Design Trenches.” It will be held on January 7-9 in the design studio in Worrilow Hall on the University of Delaware campus in Newark, DE. Hold those dates if you are interested and more information will be forthcoming.

TRANSPLANTING LARGE TREES

Susan Barton

University of Delaware

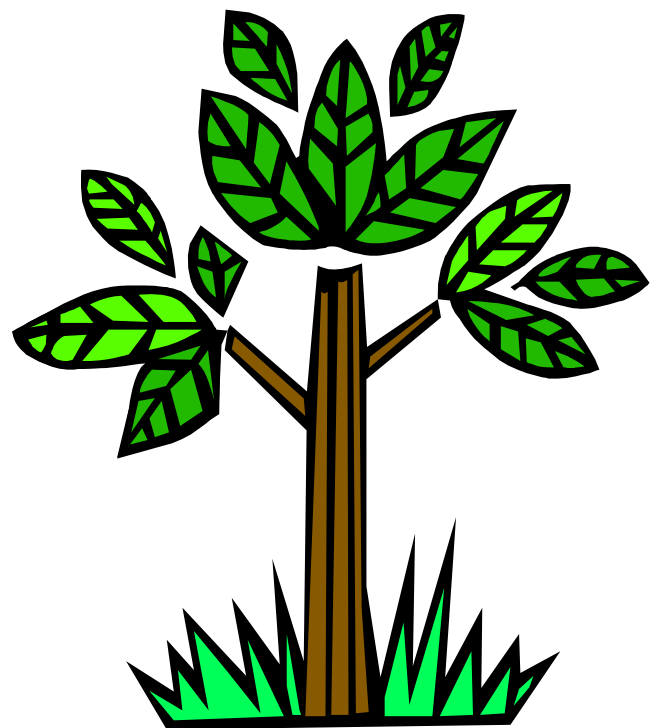
I recently attended a fascinating workshop at the American Society for Horticultural Science (ASHS) conference in Providence, RI. It was entitled 'Is Bigger Better: Challenges and Benefits Associated with Transplanting Large Trees.'

Todd Watson from Texas A & M reported on a number of studies that have demonstrated the difficulty of transplanting larger trees. Only 2-8% of a tree's root system is harvested by B & B transplanting. Once trees have been planted into the landscapes the root systems start to grow at about the same rate whether the tree is large or small so after 4 years a 4" caliper tree will have regenerated 68% of its root system, while a 10" caliper tree will only have regenerated 17% of its root system. In an Auburn University study 'October Glory' red maple were transplanted as small trees (6.3 cm dbh) and large trees (9.4 cm dbh). In the season following transplanting, the small trees grew twice as fast as the large trees and height increase for the first year was much greater for the smaller trees.

Nina Bassuk from Cornell spoke about a long-term project they have had planting 1 ½ to 2-inch caliper bare root trees in the city of Ithaca. Plants are dug bare root at a local nursery and dipped in a hydrogel solution, then bagged in a large pleated plastic bag. This treatment allows trees to be kept in cold storage for about a week prior to planting. Bassuk compared fall planting (second week of November) and spring planting (second week of April) for about 150 different tree species. Overall, summarizing over all the species for a period of 10 years Bassuk found that fall planted bare root trees outgrow spring planted bare root trees. For spring planting, B & B planting is much better than bare root planting but for many species fall bare root planting is

equal to or better than bare root planting. Bare root plants are less expensive and can be handled much more easily by volunteers so they offer a number of benefits for street tree programs. Bassuk cautions that individual species can vary in their suitability for fall or spring planting. Another research project with scarlet oak showed that scarlet oaks performed very poorly when transplanted bare root so B & B transplanting in the spring is recommended for scarlet oak.

Nothing is ever simple or perfectly clear in natural systems, though and Dan Struve from Ohio State presented research that indicated larger trees have similar re-growth potential to smaller trees. When B & B trees and bare root trees were placed in a Missouri Gravel Bed System in April and transplanted in September, survival for all trees was 100%. But, B & B trees had higher re-growth potential than bare root trees.



PLANTING WITH MECHANICAL TREE SPADES

Robert Schutzki
Michigan State University

Mechanical tree spades have expanded the size of plants that can be easily transplanted, extended the planting season, reduced labor, and contributed to the “instant “ impact of many landscapes. Access is an important issue, both at the nursery and the planting site, when transplanting with a mechanical tree spade. Trees to be harvested with a mechanical spade require wider spacing than hand-dug trees at the nursery. In some nurseries, every other tree or every other row is dug initially. The remaining trees are allowed to grow larger and then harvested with a tree spade. There is also an access issue at the planting site. You may be able to approach the planting site from one direction only, thus it will be important to load the tree into the spade so it faces the proper direction (best side facing toward the spade). With any B & B tree, you only harvest a small percentage of the root system. Since tree spades are usually used on large trees, this problem is even more critical. Nursery production practices such as root pruning and drip irrigation can encourage the development of a dense root system that is in closer proximity to tree trunk.

It is better to transplant a moist rootball than a totally dry rootball. In non-production fields or in non-irrigated areas, it may help to water the plant prior to harvest. Moistening the plant and surrounding soil can aid in transplanting and minimize stress from the initial loss of roots, especially when dug during the active growing season.

Instead of digging a planting hole, with mechanical tree spades, you extract a plug. Try to provide the closest fit between the hole and the incoming plant by orienting that plant in the same direction as the extracted plug. When

preparing the planting hole, you must consider the orientation of the plant with the best side in view; providing the closest fit between the hole and the incoming plant; and setting the plant plug at the appropriate level for site/soil drainage. Consider the best side of the tree when digging at the nursery is access is restricted. Hopefully, you can access the hole from multiple directions and the crown symmetry of the plant will allow for flexibility in orientation. The closest fit relates to the overall size of the hole and the gaps between the plan plug and the outer walls of the hole. If the spade frame is flat on the ground when extracting the plug and the plant, the two should fit like a glove. However, soil compaction, soil moisture levels, and obstructions may cause variations in the overall shape of the hole or plug. These variations could result in wider gaps when the plant is placed in the hole. If the spade operator uses the same tire tracks for extracting the plug and returning with the plant, the spade blade will be in the same position, thus minimizing gaps following planting. If drainage is a problem at the site, extract a shallower plug or backfill the hole prior to inserting the plant.

Glazing on the outside of the planting hole can be a problem when using a mechanical spade. Glazing is caused by friction from the penetrating blades and is especially a problem in clay soils. Compaction on the outside walls and the inner surface of the plug can extend for a couple of inches, causing a barrier for new root penetration into surrounding soils and for the lateral movement of soil moisture across the site, soil-plug, soil interface. If handled improperly, the root ball function as if its in a container with only water from surface application reaching the roots. Once the plant is in the hole, disrupt the glazing on both the root ball plug and wall of the hole by breaking up about 3 inches from each with a shovel to a depth of about 12 inches. This loosened zone

will allow soil to filter into the gaps between the root ball and the wall of the hole and provide a connection for lateral movement of water.

Bring in additional soil to fill any voids or bring the soil level back to the surface after loosening the interface zone. If the plant is placed higher than the surrounding soil, extra soil will be required to make a smooth transition from the plant root ball to the surrounding grade, widening the planting circle.

Staking and guying should be handled as with any large newly planted tree. Be sure someone (owner, contractor) is responsible for removing stakes and/or guys after one year. Apply mulch in a three-inch layer evenly over the entire planting surface without allowing it to come in contact with the trunk. When watering a spaded plant, water both the root ball and the transition area between the root ball and surrounding soil to encourage root growth into the surrounding soil.

Excerpted from “Planting Techniques: Mechanical Tree Spades” The Michigan Landscape, September/October 2003.

HOLIDAY PROFITS **Rebecca Barney, MCN**

Many landscape contractors offer snow removal during the winter months. Here is another idea—holiday lighting. For contractors, holiday lighting generates new business, increases customer retention and keeps crews working during an otherwise uncertain time of year. For customers, holiday lighting services provide attractively decorated homes with no hassle!

Here are some tips from landscapers who have added holiday lighting to their list of services:

- Use high quality products. Replacing faulty strands of lights or repairing damaged products will consume profits especially if those lights are on a rooftop.
- Offer discounts for early installation to spread the work out over a more manageable period. Install lights early and plug them in at the start of the holiday season.
- Provide a storage service so customers don't have to find their lights and supplies each year.
- Sell to commercial and residential clients.
- Take design cues from the customers but consider the popularity of more traditional themes—evergreen garlands with white lights and red bows.
- Have a good insurance policy.
- Sell customers on the idea that holiday decorating rounds out the seasonal attractiveness of their homes.

Excerpted from “Holiday Profits” The Michigan Landscape, September/October 2003.

TAKING OUT A SMALL BUSINESS LOAN

Marilynn Katatsky, CIMA
Morgan Stanley

As a small business owner, you may feel the need for additional capital to build an inventory, install new equipment or expand your facilities. But you're concerned, because you know that taking out a small business loan is a serious matter that raises several difficult questions. For example:

- When should I borrow – after interest rates have fallen or when they're about to rise?
- Should I borrow at the outset or only after my business can turn a steady profit?
- Should I borrow to acquire cutting-edge technology or wait until I've gotten my money's worth from presently installed equipment?

Each of these questions is important, but you should also ask "How will this loan affect my business over the term of its financing?" Although it may be tempting to leap at a short-lived business opportunity in the hopes of gaining a competitive edge, a hastily made loan decision may not be a sound one. It's important to consider the long-term effects of any proposed business loan *before* you apply.

In most cases, it's best to avoid taking out a small business loan unless you're reasonably sure of a bottom line payback over the life of the loan. No matter how attractive a new product launch or expansion of facilities may be, these proposals should only be funded through a small business loan if they can increase the value of your company. Unfortunately, some planned improvements won't translate into tangible rewards; devoting time and money to them may endanger your long-term success. Before

signing on the dotted line, ask yourself if your proposal is likely to increase efficiency, improve productivity, reduce expenses or increase profits. And even though expanding your market may seem to be a good idea, what if your ongoing loan expenses outweigh the value of any new sales?

Rather than do your own math, it may be best to obtain an independent valuation of your company. For a fee, a professional business appraiser can look objectively at your proposal and help you determine if your company's finances can support the overall cost and payback schedule of the planned loan. It's better to be conservative in your estimates, but even if the figures don't initially add up, your proposal won't necessarily have to be cancelled. You may be able to obtain an alternate means of financing with terms more suited to your company's circumstances.

Financing Options

A number of financing options exist that are capable of providing additional capital to the small business owner. Two common examples are *commercial lines of credit and term loans*:

- *Commercial lines of credit* are usually used to meet short-term needs, such as building an inventory, bridging cash-flow gaps or preparing for a new opportunity. Although most financial institutions offer commercial lines of credit, these offers won't be the same. Compare interest rates and other features through a comprehensive cash management account; still others may feature no principal down payment or clean-up period.
- *Term loans* are generally best suited to help meet longer term business needs, such as financing the purchase of new equipment or making major

improvements to your facilities. Some popular term loan features include fixed or variable interest rates, payback periods of various lengths and flexible terms.

If neither a commercial line of credit nor a term loan meets your needs, consider securities-based financing, home equity financing, letter of credit or equity financing. If you're seeking a relatively large amount of new capitalization, securities-based financing (which requires a pledge of marketable securities as collateral) may be worth looking into. Or, if you'd rather avoid ongoing debt payments, equity financing might be a more viable alternative.

Look Beyond the Numbers

Although the suitability of a loan agreement will be determined largely by the "numbers," it should also help support your personal financial aspirations. Some forms of funding, such as equity financing, may have personal as well as business consequences – including dilution or loss of ownership control. Looking ahead, are you willing to invest the time and money needed to complete your plan? Or would you rather retire early to pursue other interests? Because any major decision you make will require some time to implement, before adding to your company's debt be sure your business and personal financial goals don't conflict.

Taking out a small business loan may raise some very complicated issues. If you'd like more information on funding options contact Marilynn.Katasky@morganstanley.com.

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Reprinted from Free State Nursery and Landscape News, Summer 2003.

CLEANING UP BUGS – A NON-CHEMICAL CONTROL OF INSECTS AND MITES ON NURSERY PROPAGATION PLANTS

**Stanton Gill-Regional Specialist
Central MD Research and Education Center,
University of Maryland Cooperative
Extension**

The University of Maryland Cooperative Extension is investigating alternative methods of dealing with insects and mites in the nursery. Grant money was provided by the Maryland Nursery Association to build a portable hot water re-circulation system that can be used by nursery managers to safely and quickly kill insect pests on plant material in the propagation stage. The system uses an instant hot water heater and propane gas for the energy source. Hot water is circulated through a 100-gallon stock tank and plant material is lowered into the water in PVC netted cages. Temperatures are monitored as the water moves to the tank and a thermostat records the temperature of the re-circulating water to make sure the temperature is constant and even.

We completed phase one of the project, building the system, over the last 6 months. David Ross, Chuck Schuster and myself spent many hours constructing and plumbing this system. The new portable re-circulation system was unveiled at the CMREC University of Maryland evening field day for nursery managers on July 2, 2003. Phase two will be testing out the system on several plant species to see what temperatures plants can tolerate but plant pests cannot. Phase three will be moving the system into working nursery operations.

Can hot water really help nursery managers control pest populations on cutting plant material? Research work conducted in Hawaii indicates that plant material infested with insects

and mites can be submerged in hot water for short durations and effectively control plant pests without injuring the plant material. Hot water treatments may offer nurseries involved with plant propagation a safe method of controlling pests without pesticide applications.

Pest management has become increasingly challenging for nursery managers. Concerns over owner's and worker's unnecessary exposure to chemicals has prompted many owners to look for alternative methods to deal with insect and mite control that places less reliance on pesticide applications. The problem is often small insects and mites present on the cuttings go undetected at the propagation stage, resulting in pest outbreaks when plants are moved on to nursery benches or production greenhouses. Pests carried through the plant propagation phase must be detected rapidly, before populations build to severe damaging levels and treated with applications of insecticides to prevent damage to the plant materials.

Alternative non-chemical control tactics have been examined and found to be successful for insects in Hawaii. For example, hot-water immersion has been used successfully in controlling root mealybug, *Rhizoecus falcifer*, (Hara, 2000 – S AF Conference), green scale, *Coccus viridis* (Hara, et al. 1994), and *Pseudaulacaspis cockerelli* (Hara, et al., 1993).

The idea is relatively simple but effective. Most pests on ornamental plants can survive at high temperatures but there is small temperature window at which insect pests die and at which plant material is tolerant. Dr. Hara at Hawaii University has tested the hot water bath method on a number of plant species and found that 49 C (128 F) for 8 – 10 minutes gave effective control of several species of scale, mealybug, and mites on nursery plant cuttings.

The method basically involves building a hot water whirlpool for plant material. An animal stock tank was purchased by faculty of the University of Maryland Cooperative Extension and a wood box was built around the tank and insulation placed to help hold the temperature even in the tank. An instant hot water heater is being used to heat the water to the desired temperature. Proper water circulation and temperature uniformity in the treatment tank is achieved through a circulation grid consisting of a centrifugal pump and plumbing system. The pump outlet is split to both sides of the tank, causing the water to follow to circle the periphery of the tank.

Hara, in his research work on hot water immersion, placed plant cuttings into a netted and preconditioned the plant material by holding the cuttings at 40 C for 15 minutes. The plant cuttings and net holding chamber is removed and the temperature is then raised to 49 C (128 f) for 8 – 12 minutes. After the disinfecting treatments at 49 C, the plants are then cooled to ambient air temperatures (approx. 24 C – 74 F) for 5-6 minutes. The cuttings are then stuck into their mist chamber.

The Maryland Nursery and Landscape Association Horticulture Research Foundation, Inc. provided seed money (\$3000) to cover the basic material cost to build a portable trailer mounted hot water treatment system. In our preliminary trial we will test the efficacy of hot water immersion for various lengths of time. We need to establish what length of time will kill pests without damaging the plant cuttings.

Marshy Point Nursery, Chase Maryland, has agreed to work with us this summer. Marshy Point nursery specializes in production of azaleas and rhododendron plant material. The two owners, Harry and Austin Weiskettle are interested in seeing if this non-toxic method can

be used to control spider mite and lace bugs that are cutting plant material plant material. We will take the device to their nursery in June of 2003 and they will hook up their gas supply to operate the instant hot water heater. We then investigate lengths of treatments and evaluate potential damage to plant cuttings and efficacy in controlling pests.

Who is involved with this project beside myself? Paula Shrewsbury, Extension Specialist, Department of Entomology, University of Maryland Cooperative Extension; David Ross, Agricultural Engineer, Department of Biological Resources Engineering; Chuck Schuster, Extension Educator, Montgomery Co. office, University of Maryland Cooperative Extension.

There will be a learning curve with this project in our first year of operation but we feel confident that if we can find the correct temperature and duration of hot water treatment that we will have a viable, non-toxic control method for dealing with nursery pests on cutting plant material.

If you are a Maryland nursery and produce plant cuttings and have pest problems and are willing to work with the University of Maryland Cooperative Extension in a field trial contact us at 301-596-9413 or 410-869-9400.

Reprinted from *Free State Nursery and Landscape News*, Summer 2003.

TOP-TEN REASONS WHY PEOPLE QUIT THEIR JOBS

Gregory P. Smith

There are many reasons why good employees quit, most are preventable. From my years of experience as a consultant, I've identified a "Top Ten" list of reasons why people leave jobs:

1. Management demands that one person do the jobs of two or more people, resulting in longer days and weekend work.
2. Management cuts back on administrative help, forcing professional workers to use their time copying, stapling, collating, filing and other clerical duties.
3. Management puts a freeze on raises and promotions, when an employee can easily find a job earning 20-30 percent more somewhere else.
4. Management doesn't allow the rank and file to make decisions or allow them pride of ownership. A visitor to my website E-mailed me an message that said, "Forget about the "professional" decisions - how about when you can't even select the company's holiday card without the President rejecting it for one of his own taste?"
5. Management constantly reorganizes, shuffles people around, and changes direction constantly.
6. Management doesn't have or take the time to clarify goals and decisions. Therefore, it rejects work after it was completed, damaging the morale and esteem of those who prepared it.

7. Management shows favoritism and gives some workers better offices, trips to conferences, etc.

8. Management relocates the offices to another location, forcing employees to quit or double their commute.

9. Management promotes someone who lacks training and/or necessary experience to supervisor, alienating staff and driving away good employees.

10. Management creates a rigid structure and then allows departments to compete against each other while at the same time preaching teamwork and cooperation.

Reprinted from VNLA Newsletter, July/August 2003.



FERTILIZING LANDSCAPE TREES AND SHRUBS

**Bonnie Appleton and Kathy Kauffman
Virginia Tech**

A good maintenance program for trees and shrubs in both residential and commercial landscapes includes monitoring and controlling insect and disease problems, suppressing weed competition, and making timely applications of water, mulch, and fertilizer.

Tree and shrub fertilization is especially important in urban and suburban areas where soils have been altered due to construction. These urban soils tend to be heavily compacted, poorly aerated, poorly drained, and low in organic matter. Even where soils have not been affected, fertilization may be needed as part of a maintenance program to increase plant vigor or to improve root or top growth.

Fertilizer Objectives

How and when to fertilize landscape trees and shrubs depend on:

- Maintenance objectives (stimulate new vs. maintain existing growth)
- Tree and shrub ages (generally more for younger and less for older plants)
- Plant stress levels

Determining the Need to Fertilize

Visual inspection of trees and shrubs is often the best overall factor to use in making fertilization decisions.

Look for:

- Poor or chlorotic leaf color (pale green to yellow)
- Reduced leaf size and retention
- Premature fall coloration and leaf drop
- Reduced twig and branch growth and retention
- Overall reduced plant growth and vigor

In addition to observing signs of possible nutrient deficiencies on plants, soil and foliar analysis can be used to determine or confirm whether supplemental fertilization is needed.

Fertilizer Selection

A variety of fertilizer types exist:

- Complete (N-P-K) vs. incomplete (one or more select nutrients)
- Organic vs. inorganic
- Fast release vs. slow release
- Dry (granulated, pelletized, spikes, pulverized, encapsulated) vs. liquid

To help determine the type of fertilizer to apply, consider the following: type of plant, time of year, desired rate of plant reaction, application methods and equipment cost, proximity to water sources, effect of soil type and pH, type of deficiency, and results of a soil test or other sampling method.

Most landscape plants benefit from a slow release nitrogen fertilizer that may be organic or inorganic. Keep in mind that nitrogen is readily leached but phosphorus and potassium are not, meaning they require less frequent application. Secondary and minor nutrient deficiencies are rare, with the exception of iron.

Application Methods

Fertilizers can be applied either directly or indirectly to plants. When turf is fertilized, tree and shrub roots that extend into the turf area absorb some of the fertilizer, and are therefore indirectly fertilized. Turf fertilization rates should be supplemented only if trees and shrubs are showing symptoms of nutrient deficiency.

Direct application of fertilizer may involve incorporation into the backfill soil or placement in the planting hole at planting time. However, the most common form of direct fertilizer application, broadcasting, is generally the most

effective, especially relative to cost. Simply broadcasting the desired fertilizer over the soil atop the tree and shrub roots and watering it in is usually adequate. Compacted soil should first be aerated or raked.

Fertilizer Placement

Fertilizer should not be concentrated around the stem or trunk of a tree or shrub, but should be applied over as much of the plant's root zone as possible. For trees and shrubs, fertilizer should be applied over an area twice as large as the crown spread or dripline. Since most landscape plant roots grow in the top foot of soil, surface or shallow, but not deep application, is recommended.

Factors Affecting Fertilizer Uptake

Numerous factors affect how easily and well trees and shrubs absorb fertilizers. The most important uptake factors are:

- Fertilizer form (inorganic, fast release, or liquid forms are absorbed faster than organic, slow-release, or dry forms)
- Soil type (clay particles and organic matter absorb or bind more nutrients than sand, so fertilizer application needs to be more frequent in sandy soils, but with lower rates each time due to leaching potential)
- Soil moisture content and soil temperature (nutrient uptake is faster in most warm soils)
- Plant vigor (plants under stress are less able to take up available nutrients due to damaged or reduced root systems)

Fertilizer Rates

Fertilizer use rates should be based on plant type, with younger trees and shrubs generally receiving higher rates (of N) than mature plants. Fertilizer rates for trees are no longer based on trunk size or caliper, but on root system spread, calculated by doubling the area of crown coverage (crown coverage = $3.14 \times \text{radius}^2$).

In general, use one to six pounds of actual N/1000ft² of root zone. Evergreen shrubs and trees need less (1-3lb while deciduous trees and shrubs commonly need more (3-6lb). Reduce the rate when plants are growing in restricted areas (sidewalk cuts, parking lot islands) or where roots of multiple plants overlap.

If applied fertilizer will go over a turf area, do not exceed 1 ½lb N/1000ft² for any one application to avoid overstimulating or burning the grass. Use split applications a few months apart if higher rates are needed. If a soil test shows that P or K is needed, apply at the rate of 1-2lb and 1 ½lbN/1000ft², respectively. If a complete fertilizer is used, the ratio of N-P-K should be 3-2-2 or 3-1-1.

Application Timing

Fertilizer should be applied when plants need it, when it will be most effective, and when plants can readily take it up. Late summer and early fall fertilization may stimulate new growth that

is not winter hardy, and summer drought may interfere with nutrient uptake, but spring, fall, and winter applications are acceptable. A split application may be beneficial, applying half the yearly rate in early spring and the rest in the fall as or after plants go dormant. If water is unavailable, do not fertilizer at all – plants will be unable to absorb the nutrients. (During a dry season, fertigation – application of fertilizer through an irrigation system – can be beneficial).

Summary

Tree and shrub fertilization is only one part of total plant maintenance. Fertilization may not benefit a plant if it is under stress from poor soil aeration or drainage, saturated soil, insufficient light or space, or excessive pest problems. All factors influencing plant growth should be kept at optimum levels to ensure plant vigor.

Reprinted from VNLA Newsletter, July/August 2003.

A BUSY SUMMER PLANNED FOR EMERALD ASH BORER MANAGEMENT

James McRay
Emerald Ash Borer Communications
Specialist, Michigan Department of
Agriculture

Editor's Note: We are on the look out for Emerald Ash Borer in Delaware so this article from Michigan, where the pest is a real problem may be of interest.

The crucial period in the fight against Emerald Ash Borer (EAB) has begun again in Michigan, as EAB larvae mature into adult beetles and advance upon the beautiful treescape of southeast Michigan. Fortunately, help is on the way. The state received word in May that it will soon receive much needed federal funding and resources to combat the expansion of this ash killing, wood-boring beetle.

“Controlling the emerald ash borer emergency is one of my top environmental priorities, and I’m glad that the federal government is fully engaged as a partner to help spare millions of trees in Michigan and across the country from this invasive and destructive insect,” said Michigan Governor Jennifer Granholm.

The funding, totaling \$14.6 million with a small portion earmarked for Ohio, will be critical in implementing the state’s science-based program to detect, contain and eventually eradicate the borer and the dangers it poses to the ash resources of the state and continent. State and federal agencies will use the funds in four key categories during the remainder of 2003:

1. Quarantine Enforcement

The borer, a destructive exotic beetle from Asia, was discovered nearly a year ago in the six southeast Michigan counties of Livingston, Macomb, Monroe, Oakland, Washtenaw and

Wayne. To control and prevent its further spread, the Michigan Department of Agriculture (MDA) issued a quarantine on all ash trees and products in the affected counties. Under this quarantine, it is illegal to move ash trees, branches, lumber, firewood and wood chips larger than one inch in diameter outside of the quarantined counties.

To date, nearly six million ash trees in these areas have been killed or damaged by EAB, including nursery stock. It is estimated that there are 28 million ash trees in the quarantined area. If left unchecked, EAB threatens Michigan’s 700 million ash trees.

A public information campaign is also under way in an effort to educate Michigan residents about the quarantine restrictions and the importance of not moving firewood and other ash material. Public outreach efforts include:

- Public service announcements and news reports
- Direct mailings to registered users of campers, RVs, and camping trailers
- Posters and information in all state parks and campgrounds, and some rest stops and welcome centers
- Posters and information in outdoor retail stores

2. Disposal Sites

In February, the state opened the first of four disposal sites where municipalities, private contractors and homeowners can drop off ash trees/materials free of charge. Nurseries, landscapers, growers, and tree removal companies are also welcome to use the disposal sites.

The material brought to the marshalling yards are run through grinders that chip the wood, rendering it safe for movement to a wood

burning co-generation plant where it is used to produce electricity.

3. Survey and Research

The largest portion of the federal funding will be spent surveying to discover the “leading edge” of the infestation an accurate determination of the outer perimeter of the know-infested core area. In cooperation with the U.S. Department of Agriculture’s (USDA) Animal and Plant Health Inspection Service, MDA is setting up three zone offices in southeast Michigan. From these offices, 84 new surveyors will be inspecting ash trees looking for the borer.

“Literally hundreds of miles are going to be surveyed this summer and into the fall,” said MDA Director Dan Wyant, “It is critical that we collect accurate data on where exactly the borer is and is not so that an effective strategy can be implemented to successfully contain and eradicate the pest.”

While surveyors work on the outer fringes of the quarantined counties, researchers from Michigan State University and the USDA’s Forest Service will be conducting research projects within the core area. They will test a number of control options such as chemical pesticides and pest traps.

4. Restoration

A key element of the state’s EAB plan for 2003 is the replanting of trees in the most devastated areas. State and federal agencies along with private sector partners and researchers from MSU, will collaborate with the green industry to replant a diversity of tree species suited for local conditions, gradually restoring Michigan’s beautiful tree canopy cover.

The green industry, as well as Michigan residents are again reminded to report any

outbreaks of EAB-infested ash trees outside the regulated area to the local MDA office serving your country, to the local MSU Extension office or the MDA Ash Borer Hotline at 866-325-0023. More information on the Emerald Ash Borer can be found on the MDA web site at www.michigan.gov/mda/, key word “ash borer.”

EMERALD ASH BORER PHENOLOGY **Diane Brown-Rytlewski**

I have been keeping track of degree-days, plant phenological indicators and ash borer emergence at a site in Ann Arbor. Adults were observed emerging from holes on the trunks, and flying around and landing on foliage of ash trees on June 13th. The degree-day range for that time period was 472-582 degree-days base 50. I counted 32 emergence holes in the sections of 20 trees that I am monitoring. Most of the holes were low on the trunk, at a height of 4-6 feet, but there were a few at the 10-12 ft. height. All of the emergence holes were on the southwest or southeast side of the trees, on the sunniest side.

Plants in bloom at or near the Ann Arbor site during the June 6-June 13th period include: Black locust, mid-to late bloom; mockorange, early to full bloom; Viburnum plicatum tomentosum ‘Mariesii’; late to ending bloom; Amur honeysuckle, mid to full bloom, and dame’s rocket, full to late bloom.

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Excerpted from The Michigan Landscape, July/August 2003.

BEACH PLUM: A SHRUB FOR LOW INPUT LANDSCAPES

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Beach plum (*Prunus maritima* Marsh.) is a shrub native to the Atlantic coast with most populations occurring in dunes from southern Maine through Maryland. Though occasionally found in the nursery trade, beach plum is underutilized and could satisfy increasing demand for native, low-input landscapes such as reclamation sites, sand dune stabilization and roadsides. By virtue of its showy spring flower display and colorful fruits, this species warrants increased use in more intensively managed ornamental landscape as well. A fruiting shrub, fruits of this species and other native plums were used by Native Americans and have been wild collected since colonial times to make preserves and jelly. Today, jelly production from native stands is a small but thriving cottage industry in the Northeast. Interest in bringing beach plum into commercial production has necessitated small-scale production trials to optimize horticultural practices and to increase growth and yield.

Stress Tolerance

Growing conditions in coastal dunes include droughty, low nutrient and water-holding soil, high winds, blowing sand, unstable substrate, and wind borne salt. Soils on which natural stands of beach plum are found are excessively drained sands with less than 5% clay content and an organic matter content of <1% (Fletcher, 1993) and subsequently have little nitrogen, nutrient, and water-holding capacity. Beach plums are known to have extensive root systems. Observations in dune populations on Cape Cod indicated that leaf nitrogen was at a level (2.38%) comparable to fruit production orchards. In this case presumably limiting soil

resources were not observable in above ground plant measurements.

Beach plum, tolerates salt spray (Sinclair, 1987) and drought (Lorenz et al. 1991). Rieger (2001) reports that beach plum resisted salinity better than three other North American *Prunus* sp. and peach on the basis of foliar health, although, no special ability to exclude salt by the roots was found. It is noteworthy that beach plum is not limited to sandy soils and under cultivation it thrives on moist, rich soils.

Research

We evaluated the effects of irrigation, mulch, and fertilizer on the growth and yield of wild collected seed-grown plants in a test orchard on sandy soil on Cape Cod. Growth and yield were significantly greater in fertilized than in unfertilized treatments. Fertilization increased growth and fruit yield, while irrigation and mulch had no effect.

We planted in a gravel pit to test the feasibility of obtaining the multiple benefit of fruit production in land restoration efforts. Growth was compared with and without a compost soil amendment, wood chip mulch, and, bayberry, *Myrica pensylvanica*, a nitrogen fixing companion plant. Beach plum grew best without mulch and compost. The growth of beach plum was increased by the presence of bayberry but gains in growth were minimal. Survival of beach plum in this planting was high but growth was poor. To achieve enough growth on this site for beach plum fruit production, supplemental fertilizer at least at establishment would be needed. Bayberry thrived – presumably nitrogen was not a limitation.

Growers are often reluctant to accept a new crop if pest control practices are not well developed. This is not a stumbling block for beach plum because commercial products labeled for other

plums may be used to control pests. The most serious problem for fruit production was brown rot (*Monilinia* sp.) for which controls are available. Tent caterpillars are often found on beach plum in the landscape. Test results suggest that herbicide products labeled for other fruit bearing plum species appear to be safe for beach plum. Note, however, Simazine at rates of 1 and 2 lbs. active ingredient per acre injured first year seedlings. A pest management phenological calendar linking pest activity and harvest to degree-days was developed and is an important tool for fruit production.

What's Next

In addition to fruit product marketing research, which is planned for the next two years and sponsored by Northeast SARE (USDA), cultivar selection will be a focus. The combination of likely tolerance to multiple stresses and beach plum's demonstrated multi-purpose utility make it an excellent candidate for improvement efforts. We have assembled and seed propagated plants from 21 sites across the species range for a trial to screen for brown rot resistance, reliable high yield and antioxidant content. Provenance gardens were planted at several universities and private farms in spring 2003.

Several cultivars from the 1940's are mentioned in older literature but we have been unable to locate sources. If this material still exists we would appreciate assistance in finding it. More recently, the Cape May Plant Materials Center (NRCS) (<http://plant-materials.nrcs.usda.gov/njpmc/>) has released a selection of beach plum known as 'Ocean View' that was selected for coastal sand dune stabilization and it distributed as open pollinated seed to nurserymen.

Reliable vegetative propagation techniques will be needed for clonal selection. Presently, propagation of beach plum in the nursery

industry is almost entirely from seed. Published research on vegetative propagation is limited to 2 older reports in American Nurseryman (Doran & Bailey, 1942, 1943) and more recently, Dirr and Heuser, (1987). Both groups report up to 60-67% rooting. Following recommendations from these reports, our preliminary experiments on cutting propagation obtained only 25% rooting. We believe that precise timing of cutting propagation is a critical factor more closely related to the stage of phenological development rather than calendar date *per se*. Evidence of 60% or higher rooting makes experimental optimization of a cutting propagation strategy a worthwhile goal.

Website

Our website (<http://www.beachplum.cornell.edu/>) includes field day handouts, photos, contacts, annual reports, a grower's guide, goals, news articles, a consumer focus group report and links to websites of interest. This research was sponsored in part by The Landscape Plant Development Center.

Reprinted from Landscape Plant News, Vol. 14, No. 3, 2003.

Pesticide News

2003 Pesticide Safety Education dates are announced on the web at:

<http://www.udel.edu/pesticide/Cal.htm>

December 18 & 19 - Kent County Ext. Office

Insecticides:

ENDEAVOR (pymetrozine) – Syngenta – As a result of the IR-4 Project they can now put on their label the usage on ash, non bearing crabapple, honey locust, maple, oak, wisteria and yew.

FORBID (spiromesifen) – Bayer Environmental Sciences – Being developed to control various insects and mites on shrubs, flowers and trees.

OBERON (spiromesifen) – Bayer Crop Science – Being developed to control various insects and mites on corn, cotton, vegetables, fruit crops and ornamentals.

ORTHENE (acephate) – Valent – As a result of the IR-4 Project the suppliers can now add to their label the usage on 11 new ornamental species.

PEDESTAL (novaluron) – Crompton – As a result of the IRE-4 Project they can now put on their label the usage on 10 new ornamental species.

PYLON (chlorfenaphr) – BASF – Added to their label the control of foliar nematodes.

STARKLE (dinotefuran) – Mitsui Chemicals – Submitted an application to EPA to register this new active ingredient for use on various crops, turf, ornamentals, ant and cockroach bait and usage on dogs and cats. Comments must be received by 8-8-03. (FR Vol. 68, 7-9-03)

Fungicides:

AGRI FOS (potassium phosphate) – AgriChem Mfg. – Added to their label the usage on additional ornamentals, turf, tomatoes and brassica vegetables.

ALUDE (mono and potassium salts of phosphorous acid) – AgriChem Mfg. – the company has appointed Cleary Chemical Co. as the exclusive representative for this product in the turf and ornamental market to control various diseases on ornamentals, bedding plants, conifers and turf.

ARDENT (dimethomorph) – BASF – As a result of the IR-4 Project they can now add to their label the usage on 14 new ornamental species.

BANNER MAAX (propiconazole) – Syngenta – As a result of the IR-4 Project they can now add to their label the usage on poplar trees.

BRAVO (chlorothalonil) – Syngenta – As a result of the IR-4 Project they can now add to their label the usage on the ornamental walking stick.

CONTRAST (flutolanil) – Scotts – As a result of the IR-4 Project they can now add the usage on ornamental lilies to their label.

DITHANE (mancozeb) – Dow AgroSciences – As a result of the IR-4 Project they can now add to their label the usage on nonbearing cranberries.

ELEXA-4 (chitosan) – Safe Science – As a result of the IR-4 Project they can now add the usage on chrysanthemums to their label.

ELEXA-4 – (chitosan) – Safe Science – As a result of the IR-4 Project they can now add the usage on chrysanthemums to their label.

EMERALD (boscalid) – BASF – Registration on turf and ornamentals is expected sometime this summer. It is especially effective on dollar spot in turf.

FANATE 70 WSP (thiophanate-methyl) – Cerexagri – A new formulation for turf and ornamental usage.

HERITAGE (azoxystrobin) – Syngenta – As a result of the IR-4 Project they can now add the usage on poinsettia to their label.

INSIGNIA (pyraclostrobin) – BASF – Registration is expected by the end of the year for this granular formulation on turf to control over 15 different diseases.

PRO STAR (flutoloni) – Bayer Environmental Sciences – Added to their label the control of rhizoctonia and rust in ornamental plants. It can be used in shade houses, greenhouses, on outdoor containers and field grown ornamental nursery stock.

SUBDUE MAAX (mefenoxam) – Syngenta – As a result of the IR-4 Project they can now put on their label the usage on nonbearing peaches.

TOPSIN-M (thiophanate-methyl) – Cerexagri – As a result of the IR-4 Project they can now put on their label the usage on white pine.

Herbicides:

BETASAN 7-G (bensulide) – Gowan – The company has deleted from their label the usage on deciduous trees, shrubs and evergreens.

BROADSTAR (flumioxazin) – Valent – Being developed as a pre emergence herbicide for use

on field and container grown woody ornamentals.

ORNAMENTAL HERBICIDE II (oxyfluorfen/pendimethalin) – Scotts – As a result of the IR-4 Project they can now add to their label the usage on Pampas grass.

PENDULUM (pendimethalin) – BASF – As a result of the IR-4 Project they can add to their label the usage on balsam, mugwort, nonbearing strawberry and chrysanthemum.

RONSTAR (OXADIAZON) – Bayer – As a result of the IR-4 Project they can now add to their label the usage on African daisy and broom.

ROUT (oxyfluorfen/oryzalin) – Scotts – As a result of the IR-4 Project they can now add to their label the usage on 11 new ornamental species.

SNAPSHOT (isoxaben/trifluralin) – Dow AgroSciences – As a result of the IR-4 Project they can now add to their label the usage on false spirea.

SURFLAN (oryzalin) – Dow AgroSciences – As a result of the IR-4 Project they can now add to their label the usage on coneflower, leavenworth and stone crops.

TAHOE (triclopyr) – Nufarm- A new formulation used to control brush species in right-of-way forests and other areas.

VELOCITY (bipyribac-sodium) – Valent – Registration is expected next year for use on turf as a post emergence treatment to control poa annua and certain broadleaf weeds.

Research Briefs

Propagation:

Rooting stem cuttings of *Ilex glabra*.

Recirculating subirrigation circulates heated and aerated water to maintain a constant water table, and provides water to the base of stem cuttings through capillary movement via perlite rooting medium. This propagation system eliminates the need for overhead intermittent mist irrigation, which can leach mineral nutrients, increase pathogen incidence and become a management problem due to variability of the microenvironment. In this study, hardwood stem cuttings of *Ilex glabra* rooted in a recirculating subirrigation propagation system had higher rooting percentages than those rooted under intermittent mist. The recirculating subirrigation system maintained more consistent control over basal stem temperature and medium moisture content. However, cuttings rooted under intermittent mist had a greater number of roots longer roots and less basal stem necrosis. Across irrigation treatments, rooting percentage was highest when cutting were treated with 16 or 24 mM KIBA, or rooted at a basal stem temperature of 66 F. (J.S. Owen, Jr., W.A. Johnson and B.K. Maynard)

Excerpted from J. of Environ. Hort., 21(3): 119-125. September 2003.

Chilling affects budbreak of *Ginkgo biloba*.

This study reveals chilling to be important for foliar budbreak of Ginkgo. Optimal chilling appeared to begin in the 700-800 chill hour range. It is reasonable to predict that tissue cultured plantlets and rooted cuttings may be produced at a faster rate by alternating cold storage with greenhouse growing conditions. Field production is appropriate for areas receiving 700 or more hours of chilling (DE would quality!). (J.C. Wilson, J.E. Altland, J.L.

Sibley, K.M. Tilt, W.G. Foshee, III.)

Excerpted from J. of Environ. Hort., 21(3): 153-158. September 2003.

The affect of media porosity and container size on ornamental grass overwintering.

These was no effect of container size on overwintering of any of the grass divisions. *Sporobolis heterolepis* should be divided in spring only and wetter media resulted in poor survival. *Schizacharium scoparium*, *Calamogrostis x acutiflora*, *Miscanthus* 'Purpurescens' and *Miscanthus sinensis* 'Variegatus' all performed well with either spring or fall division. (M.H. Meyer and B. Cunliffe)

Excerpted from HortScience, 38(5): 686. August 2003.

Pawpaw seedlings in copper treated

containers. Pawpaw (*Asimina triloba*) has a strong taproot that complicates container production. Cu(OH)₂ (Spin Out) treatment on Roottrainers (small narrow pots used for seed propagation) was not effective for pawpaw production. Larger Treepots (2 gal. containers) treated with Spin Out did improve growth of paw paw seedlings. They resulted in a better-looking plant after 30 days and after one year. 17% of the control plants survived and 88% of the Spin Out treated plants survived. (K. Pomper and S. Jones)

Excerpted from HortScience, 38(5): 686. August 2003.

Container Production:

Monitoring nutritional status of trees in large

containers. Suction cup lysimeters (SCLs) are valuable tools for extracting and monitoring the mineral nutrient levels of substrate solutions of large nursery containers. Approximately 7 oz

per container of a controlled-release fertilizer (CRF; Osmocote 15-9-12) resulted in optimal growth of willow oaks in #15 containers of a pine bark substrate. Electrical conductivity associated with optimal growth was 0.5 dS/m. In this study the initial CRF application was sufficient for the entire season but depending on growing conditions, additional CRF could be required to maintain 0.5 dS/m electrical conductivity (which could be measured easily at any time from the SCLs). It is recommended that three of four 1.9-inch ½ bar lysimeters be installed within a block of plants of similar size and fertility regimes. A vacuum pressure of 30 to 40 kPa should be applied to each lysimeter 1 to 2 hr after irrigation and maintained for an extraction time of at least 5 min in order to obtain enough solution to monitor the nutrient status of large container-grown plants. (M. Stanley, R. Harris, H. Scoggins, and R. Wright)

Excerpted from J. of Environ. Hort., 21(3): 111-118. September 2003.

Cyclic irrigation improves growth in containers. Cyclic irrigation of substrate volume-limited production systems (pot-in-pot systems) does compensate for limited root volumes and produce trees with comparable growth rates to trees grown in less root restrictive systems. (R.C. Beeson, Jr. and K. Keller)

Excerpted from J. of Environ. Hort., 21(3): 148-152. September 2003.

Greenhouse Production:

Subirrigating seed geraniums with Bonzi. The results of this study show that the growth of seed geraniums can be successfully controlled by subirrigating from saucers with 3.4 fl. oz. per pot of Bonzi solutions at 0.11, 0.22 or 0.33 ppm once when the plants were 2-3 inches in diameter. Subirrigating with lower levels (10%

of the active ingredient applied to the plants getting one subirrigation treatment) of bonzi 11 times over a four-week period was as effective as one subirrigation treatment for controlling growth. Plants grew larger when they were subirrigated with very dilute Bonzi solutions (40 or 20 percent of full strength) compared to plants that received less dilute solutions (80 or 60 percent of full strength) or a solution not diluted (full strength). Based on the results of this study, commercial growers subirrigating with Bonzi should not allow their stock tank solution to become diluted to a level more than about 60 percent of full strength. If the stock tank becomes more dilute, the effectiveness of Bonzi may be reduced. Significant dilution could result in little or no growth control, especially for species less responsive to Bonzi than geranium and at minimal Bonzi concentrations. (D. Cox)

Excerpted from GPN. p, 30-35. August 2003.

ZZ: A unique tropical ornamental foliage plant. *Zamioculcas zamiifolia* (ZZ) is a member of the Araceae family and has potential as an ornamental foliage plant due to its attractive aesthetic appearance, ability to tolerate low light and drought and resistance to diseases and pests. ZZ has pinnate leaves, cylindrical and tapering petioles and looks similar in shape to the cardboard cycad, which is why it has common names of aroid palm or cardboard palm. Its naturally glossy leaves are so shiny that the plant appears to have been polished. ZZ is mainly propagated vegetatively through rhizome division or leaf and petiole cuttings. For division, separate individual rhizomes, and plant into a peat, pinebark, perlite mix with 1-5 similar sized rhizomes per container. ZZ is fairly slow growing with marketable plants requiring 8 to 12 months after rhizomes are planted. While adaptable to low light levels, preferred light levels for commercial production are 1500 to 2500 fc. Optimum growth takes

place between 68 and 82 F and during winter temperatures should not be lower than 50 F. Media should remain moist during production with drip or subirrigation preferred. ZZ plants do not have high nutrient requirements. 200 mg/L N for drip irrigated plants weekly and 100-150 mg/L for subirrigated plants are recommended. (J. Chen, R.J. Henny)

Excerpted from HortTechnology, 13(3): 458-461. July-September 2003.

Growth regulators on *Curcuma* species.

Curcuma are commonly known as hidden or surprise ginger. They have colorful bracts, an interesting form and few disease or insect problems, thus have potential as flowering pot plants. Soaking rhizomes in gibberellin₄₊₇ delayed short emergence and flowering but did not affect flower number. This treatment would be useful to extend dormancy and inhibit sprouting in storage but should not be used to increase flowering. Paclobutrazol at the rates tested did not reduce the height of *Curcuma alismatifolia* 'Chiang Mai Pink' sufficiently to make it acceptable as a flowering pot plant. The other two species tested (*Curcuma gracillima* 'Violet' and *Curcuma thorelli*) are naturally low growing and do not need a PGR. Post production life for these plants were as follows:

C. alismatifolia 'Chiang Mai Pink' – 4.6 weeks

C. gracillima – 2.6 weeks

C. thorelli – 3.8 weeks

(M.J. Sarmiento and J.S. Kuehny)

Excerpted from HortTechnology, 13(3): 493-496. July-September 2003.

Landscape:

Crabapple survey results. A survey was sent to nursery and landscape industry professionals in 13 states throughout the country to help determine crabapple preferences. Most

respondents (79%) stated that retail customers focused mostly on flower color when choosing crabapples for the home landscape, while commercial clients showed slightly more interest in growth habit (33%) than flower color (29%). Respondents in all regions, except the west central, identified 'Prairiefire' as the crabapple most frequently recommended to clients when tree size is not important. Respondents in all regions, except west central, also named scab-susceptible 'Radiant' as the selection most frequently discontinued. (J.P. Romer, J.K. Iles and C.L. Haynes)

Excerpted from HortTechnology, 13(3): 522-526. July-September 2003.

Dry soilless media after transplanting

container plants. This study measured the soil moisture in soilless media once transplanted into a landscape setting. While soilless media actually holds a greater amount of water than soil, it has less water that is available to the plant. The top sections of soilless media dry down very quickly once transplanted into the landscape. Therefore it is critical for transplant success that frequent irrigation is applied directly to root balls after transplanting in order to keep roots moist. Also, posttransplant practices that promote fast root growth into the surrounding soil will increase transplant success. (A. Hanson and J. R. Harris)

Excerpted from HortScience, 38(5): 676. August 2003.

VAM treatment does not improve

establishment of woody plants. There is no documentation of increased survivorship in studies of woody plants treated with VAM (vesicular-arbuscular mycorrhizal) inoculum. This might be due to the inoculum losing viability from production to application in the landscape; or the inoculum fails to colonize due to competition from other organisms or

mycorrhizae might not be the limiting factor during transplanting. In this study, VAM significantly improved growth of corn so it can be assumed that it was still viable at the time of application, but it did not improve the growth of any woody plants. The authors believe that woody plants already have significant mycorrhizal colonization so the addition of VAM has no effect. (E. Wiseman, C. Wells.)

Excerpted from HortScience, 38(5): 775. August 2003.

Perennial groundcovers for weed control in the landscape. 15 groundcovers were tested for their ability to provide weed control. None of the species provided sufficient weed control without some hand weeding during the establishment period. Taller plants were able to shade the ground more and performed the weed control function better. *Veronica prostrata*, *Dianthus deltoides*, *Dianthus myrtinervius*, *Stachys byzantina*, *Mentha x piperita* and *Heuchera americana* were among the better performers. (J. Allaire, A. Senesac and L. Weson)

Excerpted from HortScience, 38(5): 797. August 2003.

Insect Control:

Using sticky cards for thrips treatment timing. Sticky cards provide a coarse measure of thrips populations that can be used to identify times of year when thrips must be managed intensively. The threshold value of 20 thrips/card/week appeared to be adequate to time insecticide applications in a cut carnation greenhouse. This case study over a 2-year period is the first to demonstrate that routinely scouting for thrips throughout the year can lead to fewer insecticide applications and thus possible cost savings in labor and insecticide purchases. (R.A. Cloyd and C.S. Sadof)

Excerpted from HortTechnology, 13(3): 497-499. July-September 2003.

Insect growth regulators reduce fungus gnats but not western flower thrips. Diflubenzuron, pyriproxyfen and fenoxycarb are effective tools for managing fungus gnats on greenhouse-produced ornamentals. While pesticide applications for fungus gnats are traditionally only made to the medium in which the plants are growing, there may be additional locations that need to be treated to provide adequate fungus gnat management (i.e. to the soil under the bench). No definitive results were obtained about the growth regulators' effects on thrips. (S.W. Ludwig, K Hoover and R. Berghage)

Excerpted from HortTechnology, 13(3): 515-517. July-September 2003.

Publications

University of Connecticut Plant Database.

This online encyclopedia known as Plant Pages provides information and images describing over 600 species of trees, shrubs and vines along with thousands of their associated cultivars. The UConn Plant Database can be accessed at www.hort.uconn.edu/plants>

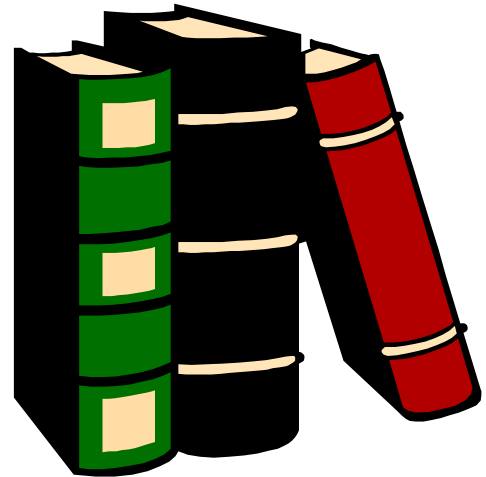
Small Business Resource CD-Rom. The IRS, in conjunction with the Small Business Administration and other federal agencies has developed the fifth edition of its *Small Business Resource Guide*. The guide contains information on starting a business, developing new ideas for a current business, filing tax returns, and related topics. Included on the CD is a section on the Welfare-to-Work Credit, and valuable information concerning the IRS Disaster Relief Efforts. For more up-to-date information, visit the Small Business/Self Employed section of the IRS Internet site at www.irs.gov/smalibiz. To order a copy of the Small Business Resource CD-Rom, go to the IRS site listed above or contact Geoff Galster for more information.

Top Filing Errors Made by Small Business and Self-Employed Taxpayers can also be downloaded from the IRS site listed above. This document, whether you are self-employed or part of a C or S Corporation, contains a list of the most commonly made mistakes made by small businesses by category and how to rectify the errors.

So You Want to Start a Nursery by Tony Avent. This book is a cross between a manual and an advice column. His approach to the nursery business is witty, wise, and decidedly irreverent. Far from being a dry recitation on business practices, it underlines the “people” part of the nursery. Avent discusses four reasons

for business failure and outlines six basic skills necessary for success and what it takes to establish a nursery and make it succeed. This book is a must-have for anyone who has ever imagined turning his or her love for plants into a dream job. 340 pages, 105 photos, 6x9”, hardcover, ISBN 0-88192-584-5, price \$24.95 For more information:(800)327-5680, Fax: (503)227-3070 or email: Istovall@timberpress.com

Plant Production in Containers II. By Carl E. Whitcomb. Covers all aspects of the unique container environment, including propagation, nutrition, container designs, water management and more. Lacebark, Inc. P.O. box 2383, Stillwater, OK 74076. (405) 377-3539, (405) 377-0131 (FAX); sales@lacebarkinc.com; \$69 hardcover. 1152 p. numerous photos. ISBN 0-9613109-6-0.



Calendar

November 4 and 6 – Integrated Landscape Management, 4-6 PM, New Castle County Extension Office. Contact 302-831-2506.

November 6 – Southeast Pennsylvania Poinsettia & Pansy Trials with Seminars, Doylestown, PA. Contact: (610) 690-7676, wqg1@psu.edu

November 6-8 – Holly Society of America Annual Meeting, Baltimore, MD. Contact (757) 898-9159.

November 7-8 – Green Industry Expo, St. Louis, MO; Contact: (888)303-3685.

November 12, 13 – Power Expo 2003. Pennsylvania Landscape & Nursery Association. Pennsylvania Farm Show Complex, Harrisburg. Call (800) 898-3411 or (610) 544-5775; e-mail lweiss@plna.com; Internet www.plna.com

November 13 – Ornamentals and Turf Workshop, Hockessin Memorial Hall, Hockessin, DE Contact Valann Budischak, phone: (888)448-1203.

November 13-15 – Garden Centers of America Holiday Season Tour, Detroit, Contact (888) 648-6463.

November 13-15 – TCI Expo 2003, National Arborist Asso., Baltimore, MD (603)314-5380.

November 19 – Record Keeping, 6:30 – 8:30 PM, New Castle County Extension Office. Contact 302-831-2506.

December 18 & 19 – Pesticide Safety Training – Kent County Extension Office.

January 7-9, 2004 - In the Design Trenches with Robin Templar Williams. Design Workshop sponsored by APLD, DNLA and UD. Rates are \$340 for APLD and DNLA members, \$315 for Students and \$450 for non-members. For more information, contact Deanna Pillarelli at dpillarelli@comcast.net.

January 7-9, 2004 – MANTS Trade Show, Baltimore, MD. Contact: www.mants.com

January 14-15 – Delaware Horticulture Industry Expo, Dover, DE Contact Valann Budischak, phone: (888)448-1203.

January 14-17 – NCAN “Green & Grownin’ Show”, Winston-Salem, NC

January 26-28 – CENTS Show – Ohio; Contact: ONLA-(800) 825-5062, www.onla.org

January 30-31 – ALCA’s Masters in Management for the Landscape Industry, Atlanta, GA; Contact: (800) 395-2522.

February 5-8 – ANLA Management Clinic, Louisville, KY; Contact: ANLA at www.anla.org

