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ASSOCIATION NEWS
Valann Budischak
Executive Director, D.N.L.A.

I am somewhat of a superstitious person. I cringe at the thought of jinxing myself. I played volleyball in college, and must admit that I played with the same pair of socks my entire varsity career. Dirty or not! And, you never, ever got too comfortable when the team was on a roll. But, I'm willing to go out on a limb here by saying that we've been on one heck-of-a good weather roll for our Summer Expo and Golf Tournament! That's doesn't mean that I no longer wring my hands as I watch the weather channel prior to the event. However, we haven't been disappointed for the past few years.

What I enjoy most about the day, is that it gives us a chance to take a brief, well-deserved break from the busy summer schedule to visit with our piers – our friends. We spend the time learning, commiserating, checking out the new products offered by our suppliers, eating, and potentially golfing. Thanks to our many tournament sponsors and program advertisers. Your continued support is what makes the Expo and Golf Tournament a success.

Now for the winners of our 8th Annual Golf Tournament:

- Our winning foursome was Basher & Son. The foursome was comprised of Warren Basher, Bob Morris, Roy Guttman, and Ro Guzman.
- Our second place foursome was Tunnell Companies, consisting of Cameron Marcelle, Bud Kimble, Paul Baldwin and Greg Ewell.
- Longest drive award went to Evan Wrede of All Seasons Nursery & Garden Center.
- Closest to the Pin award went to Cameron Marcelle.

Congratulations, gentlemen!!

Keep the Dates: The Ornamental and Turf Workshop is just around the corner (November 17th), and the Delaware Horticulture Industry Expo (DHIE) and annual Pesticide Conference aren't far behind (January 18th & 19th). We hope to see you there. Both events promise to be winners!

Featured talks at the November 17th event will include: Proper Pruning for Landscape Plants; Seeding and Sodding – Techniques and Timing for a Better Success Rate; New Turf Irrigation Methods/Products; Managing Wildlife; Habitat Gardens; Back to Basics – Managing Soils for Plant Growth; Common Tree Problems and Common Solutions.

Our 2005 Landscape Awards deadline of September 28th is fast approaching. The contest rules and applications have been mailed to all of our members. We encourage any/every member to submit an entry.

The next Certified Nursery Professional exam will be administered on Tuesday, October 18th at the Delaware Department of Agriculture. Please watch your mailbox for the application form. If you need a study guide – we've got them. Just contact me at 888/448-1203.

DNLA NEWS FROM THE PRESIDENT

Hello to everyone! It has been awhile since I've had the time to write a little greeting for our newsletter. I wanted to take this opportunity to thank everyone who turned out for our Summer Expo at Jonathan's Landing Golf Course. The day turned out to be really nice for mid-August – we couldn't have ordered a better day! The seminars were both full of great information and the lunch was really good, too. Once again, Bob Mulrooney showed me exactly how much I don't know about insects and diseases. I love his problem-solving sessions!

The golfers set out after the luncheon. Congratulations go out to the Basher & Son foursome! They won the tournament with a score of 63. I talked my brother, Evan, into playing this year for the first time and he actually won a really nice driver for his "longest drive". I bet we will see him again next year!

Just a reminder that our annual Ornamental and Turf workshop is just around the corner. Be sure and mark your calendars for November 17th. I look forward to seeing everyone there.

Have a great fall!

Wendy A.W. Rezac

U of D NEWS

Susan Barton, Extension Specialist

Register now to attend the Exciting New 2005 Ornamentals Research Expo at the University of Delaware Botanic Gardens on Thursday, September 15, 2005 from 5 – 8 PM. This year we have a great combination of tours, displays and talks that showcase ornamental research and projects at the University of Delaware.

Tours will include:

Pest Walk conducted by Dewey Caron, Extension Entomologist and Nancy Gregory Extension Associate, Pathology (pesticide recert. credits will be awarded)

Tender Perennials For Landscape Color conducted by Bob Lyons, Longwood Graduate Program Coordinator

Talks will include:

Using Natives to Restore Biodiversity to Suburbia presented by Doug Tallamy, Entomology and Wildlife Ecology Department Chair

Displays will include:

Plants for a Livable Delaware – Sue Barton
Trillium Growth In Vitro – Sherry Kitto
Insects and Growing Degree Days – Dewey Caron
Horticulture Mentoring Program – Gordon Johnson

We will have a delicious picnic dinner (subs, chips, soda and cookies) followed by the now famous PLANT DISTRIBUTION!

John Frett, Professor in Plant and Soil Sciences will describe some interesting and underused plants that have potential for the nursery and

landscape industry. There will be enough plants for each participant to take a few home, try them in the landscape and see whether or not they might be grown successfully in Delaware. The following plants are scheduled for distribution this year:

Magnolia x loebneri ‘Leonard Messil’

Ilex x attenuata ‘Nasa’

Amelanchier obovalis

Euonymus sachalinensis

Acer carpinifolium

Ilex opaca ‘Arden’

Rosa virginiana

And more!

Cost for this great evening is a meager \$10. Registration forms have been mailed, but if you didn’t receive a registration form, call Dot Milsom at 302-831-2531.

CREATING A NATURAL STONE PATIO

At the 18th Annual Summer Turf and Nursery Expo sponsored by the Delaware Nursery and Landscape Association and Delaware Cooperative Extension, Doug Walraven from Wallace Landscape Associates presented a fascinating seminar on how to build a natural stone patio. Here are some of his tips.

There are all kinds of patios out there—brick, flagstone, pavers. In fact, patios made with prefabricated pavers are becoming more and more popular. So, why would someone choose to build a patio with natural stone? Most importantly, natural stone provides an organic, naturally aged feeling. It is readily available and relatively inexpensive. Patios made with natural stone have an informal feeling. Natural stone is not too difficult to work with and you can get great results with relatively little experience. The other big plus is that natural stone patios are not set in concrete. You can change them anytime if your needs change.

Start with assembling the right set of tools. You will need a wheelbarrow, shovel, rake, tamper and broom. A string line and transit will help you to get the correct grade. Use stakes, rebar and safety caps to mark out the dimensions of the patio. A hammer, chisel and stone saw are the tools you will need to cut the stone. One of the best marking tools is a soap pencil because it washes away easily. Use a garden hose to clean off the patio and wash in the stone dust; and a tarp to cover your work site between work sessions.

Don’t forget safety equipment. When working with natural stone, you will need a dust mask, safety glasses (to protect your eyes from stone chips), ear protection (when you use a stone saw), caution tape, rebar caps, a back brace (if you are handling large pieces of stone), and gloves (especially when the stone gets hot). If

you are working near windows, you may want to cover the windows with plywood to protect them from flying stone chips.

Doug Walraven likes to work with Pennsylvania irregular flagstone, Pennsylvania antique stone or Avondale brownstone. The first two have a blue grey color and the brownstone is light tan. Wallace Landscape Associates also works with Arizona sandstone, but it is very soft and hard to cut precisely. When you are considering which stone to use, look for stone that is at least 1 ½ to 2 inches thick. A medium density stone is best. Darker stone gets hotter and lighter stone stays cooler—this can be very important with a pool deck or any other surface where you will walk with bare feet.

To estimate the cost of the project, use the following guidelines and formulas. You will need to excavate about 8-9 inches of soil. If you can leave the soil on site that is easier, but if you must remove the soil, there will be a cost for dumping the extra soil.

Patio length x Patio width x Patio depth (inches)
/ 12 / 27 = cubic yards of soil to be removed.

When calculating the amount of crushed stone and stone dust you will need you can multiply the cubic yard amount by 1.5 to get the tons required.

Count on getting about 50-60 square feet of patio from one ton of stone. Most stone suppliers will tell you that a ton covers 100 square feet, but there will be a lot of loss when you cut stone to fit.

Excavate your patio area to a depth of about 8-9 inches. This allows for 3-4 inches of crushed stone, 1-2 inches of stone dust and 2-3 inches for the stone itself. Always excavate an area slightly wider than the intended patio. Fill the edges with crushed stone to improve drainage

away from the patio. Cover that area with mulch, plants or grass. If your patio is on a slight slope, you can dig a channel at the bottom of the excavated hole at the lower end of the patio to drain away water that might accumulate in the hole. Consider future needs for the patio. If you ever intend to add lighting or irrigation, installing a narrow pvc pipe below the patio will allow you to run irrigation tubing or electric lines below the patio at a later date without disturbing the stone.

So, now you are ready to build. Start with general excavation. Use a transit or string line to establish the pitch. Tamp the soil in the bottom of the hole to provide a secure base for the patio. Use a string line to determine the depth of the crushed stone and stone dust.

Now for the exciting part—laying the natural stone. If you are using more than one pallet, intermix stones from each pallet as you go. There is often slight color variation that won't be noticeable when intermixed but might show up if stone from one pallet is laid first. Also, use large and small pieces as you go. If you use all the large pieces first, one side of the patio will be comprised of large stone and the other of smaller stone. Use the largest stones in the places that will get the most traffic, like the bottom of a step because the larger stones will be more secure.

Natural stone patios do not require an edge, but they can be edged in weathered brick, pavers or cobblestone. To mark a curved edge, use a flexible piece of pvc pipe. Bend it in the curve you want and mark that line on the stone with a soap pencil.

If you use a stone saw to cut large pieces of stone, you will get a very regular edge. To make that edge look more natural, use a chisel after the cut to rough up the edge. You can also cut stone with a hammer, but it will often break

where it want to rather than where you want it to. Try undercutting the stone first—hit it with a hammer from below and then you can tap off small pieces to get the edge you want.

Since natural stone is irregular, you will get small open areas in between stones. You can plant a few such areas with small, low plants (like thyme) for an interesting effect. Do not try to fill in small pockets with small pieces of stone, because it will never be sturdy. Instead, lay a larger stone over the small pocket. Trace around the edges of the new stone onto the existing stones that you've already set. Remove the new stone and cut the existing stones on the lines you drew. The new stone will slip perfectly into the space you've opened up. This same technique is used for placing stones side by side. Set your new stone over the one you've already set, trace the edge, remove the new stone, cut the existing stone and your new stone will fit snugly up against the existing stone.

To make a natural stone patio more interesting, consider adding larger planting pockets to provide an oasis of shrubs, perennials or ornamental grasses in the patio. These plantings can help divide a large patio into different areas within the patio that have different functions—such as a sitting area and a dining area. You can also use larger, irregular boulders within a natural stone patio to perform the same function.

Doug Walraven uses an oxyacetylene torch to remove scratches made during patio construction. But, he cautions “this is a dangerous process”. You need lots of body protection and some experience using the torch. Also, be extremely careful if you are working adjacent to wood or plastic siding.

To get ideas about how a natural stone patio might be incorporated into the garden, visit the Wallace Landscape Associates website at www.wallacelandscape.com.

GROWING ON COMPACTED SOILS EQUALS EMBEZZLEMENT **Jerry Faulring, Waverly Farm**

Compacted soils rob your bank account of cash. The theft is subtle, continuous and forever unless you make it a priority in your agronomic soil management practices to prevent the theft.

Except for 2003, the last several years have been very dry with record drought recorded in many jurisdictions. In 2003 however, many growers and landscape owners discovered what good drainage is all about because plants suffered due record rainfall. I heard reports from the Carolinas where magnolias died in great numbers and hurricane Isabel revealed that thousands of huge, old trees were anchored to the earth with very shallow roots that probably declined during the drought years. Both circumstances are in part due to problems in the soil profile.

In my Internet study for this article I found one paper that showed heavy compaction of silty clay loam soil reduced corn yield from 200 bushels per acre to 85. Is it possible that we could see a 50% decline in the productivity of horticultural crops due to soil compaction? Probably.

Productive silt loam soils will contain roughly 50% soil particles, 20% air space and 30% water. Roots consume oxygen. When oxygen is absent because the pore space was crushed out of existence (compaction), plants will not flourish. Most plants will start to decline within 48 hours of having their roots flooded with water. We will not be able to maintain the perfect relationship year round due to variation in weather cycles. However, the goal is to do so. Anything we can do or not do that nurtures the ration will serve our best interest. The most important factor for maintaining the relationship

is to avoid soil compaction by implementing every tool and practice available that still fits into an economically viable production system.

Symptoms of Compacted Soils in Nursery Production

1. Surface water remains for long periods after rainfall or overhead irrigation. A 'long period' is thought of as greater than 24 hours.
2. Equipment tracks holding water.
3. Premature foliage drop in any season but excessive in the fall.
4. Variable plant productivity in the same row or block. Inconsistent plant development such as bush growth when not the norm, a range of leader development, the wrong foliage color, and smaller than normal leaves can all be symptoms of compaction but may also be signs of high or low nutrient values.
5. Increased wind and water caused soil erosion.
6. We find ourselves thinking the tractor is losing horsepower when in fact compacted soils require more horsepower to work.
7. Not seen before weeds start showing up and our old favorites disappear.
8. Irrigation water runs off prematurely instead of infiltrating to the roots where needed.
9. More mosquitoes than you remember in previous years.
10. Increased sucker production on many different trees.
11. Plants show stress more readily in dry periods.
12. Increased identification in the anaerobic environment can lead to the loss of natural and synthetic nutrients. This may be difficult to detect as other symptoms may cause confusing results but lack of plant vigor is occurring due to the lack of available nitrogen.

Two zones of compaction will affect productivity.

1. Surface compaction caused by excessive tillage and equipment use in both wet and dry soil conditions blocks air, water and nutrient penetration in the root absorption zone. This can be relieved by tillage but excessive tillage may increase the problem by reducing soil particle size. Coarse tillage by use of chisel plow type tools as compared to a rototiller will reduce damage to the soil.

2. Deep compaction is, in part, caused by equipment operating over wet soils. Deep compaction will prevent the soil profile from storing moisture, can cause excessive moisture to be retained from wet spells, prevents roots from penetrating greater depths to sustain the plant during dry periods and reduces the effectiveness of any manmade drainage system such as field tiles.

Some ways to prevent soil compaction.

The absolute number one rule is to **stay out of the field during wet periods** for sure, but to also develop production systems that keep equipment out of the field as much as possible year round. Even during dry periods, soil compaction will occur to the upper soil profile.

Use equipment that provides the lowest possible pressure exerted on the soil surface. Foot traffic over the same path of lawn for several years will show up as compaction induced decline of the lawn. Think about taking the tractor over the same path in all weather conditions for several years and you can begin to easily understand the level of damage we can cause unknowingly.

Ground that is fallow after spring digging while waiting to plant the next rotation should be cover cropped with a deep-rooted plant to help relieve compaction. Such crops include corn, winter wheat, sorghum and

soybeans. Of these, winter wheat produces the deepest root system, up to 6 feet in one year if the soil profile permits. One of the significant secondary benefits of cover crops is to increase the size of soil aggregates, which greatly improves water infiltration.

Plant grass in aisles, low use roadways, field end turning strips and perimeter strips. This will improve soil structure, water and air infiltration and reduce compaction. Even though this will be out of the planting zone, benefits can accrue to the land in general that translate to improved lateral root development, air exchange, and water infiltration. Importantly, grass strips have proven to be the best defense against soil erosion and nutrient run-off.

A common myth is that a one year cover crop plowed into the field will increase the soil's organic content. Cover crops repeated for many years can slowly increase organic content but not much. Common sense says that if it took Nature 1000,000 years to build a few inches of 'topsoil', we are not going to have much impact in the short term.

In horticultural production, **sub soiling is encouraged prior to each rotation** but the grower should not believe his job is done by simply sub soiling every 5 to 8 years. Sub soiling is most effective when done during the driest season, which requires more horsepower and results in more damage to the surface soil structure. Sub soiling is often thought of as the panacea of soil compaction relief. It is an effective tool in the production of short term crops such as in traditional agriculture, but of limited use in horticultural production. It has long been known that the effects of sub soiling decline starting immediately after the procedure and is mostly exhausted after one year. Variation in soil type and depth, severity of freeze/thaw cycles and the amount and intensity

of rainfall will all play a role in the long-term effectiveness of sub soiling procedures.

Use drip irrigation. Drip irrigation has numerous benefits as mentioned in a previous article. One of which is to eliminate the pounding effect of overhead irrigation. We cannot prevent rain, but we have the power to irrigate gently. Falling water causes soil movement and reduction in the size of soil particles on the surface. The clay and silt size particles wash into the desirable airspace to reduce water infiltration and reduce the overall composition of larger soil aggregates to result in potential surface soil layer compaction.

Use appropriate tillage tools and systems. Europeans have been using **spading machines** for years and now use the old plow as a lawn ornament. Plows create what we refer to as the 'plow layer' and the 'plow pan'. Over time, the plow actually modifies the soil profile into a zone of soil that has reacted to plowing. Eventually, the profile becomes more compact at the interface of the bottom of the plow share and the soil below, the 'plow pan'. This may have the affect of inhibiting roots to grow well through the compacted layer. Much U.S. acreage in small grain production is now planted by the 'no-till' method to obtain many benefits, one of which is to prevent the 'plow layer'. Tillage by spading machines has the benefits of deeper tillage with less horsepower, greater incorporation of sub-soils into the upper soil region, the ability to deeply incorporate grown or added organics, complete planting preparation in one pass to reduce compaction by multiple passes, AND the beneficial elimination of the plow layer due to the very 'coarse grind' resulting from the limited contact of the tool with the soil.

Buy and use a penetrometer (soil compaction meter). Like most attempts to find improvement in our practices, measurements are

required to track progress. A penetrometer is not a precise method of measuring soil compaction because it measures the resistance to inserting a probe into the soil to varying depths, which will produce different results as a function of soil moisture. However, the tool can be purchased for about \$200, which compares to \$3000 for high end, more effective infrared systems. For our use, the penetrometer is fine in that it yields a relative measurement of different sites at the nursery. Its usefulness can also be enhanced through the use of a moisture tensiometer to read the soil moisture content in relative terms. By combining both tools, we can make penetrometer tests at different times of the year or in different years when the soil moisture level is determined to be about equal. The penetrometer measures the resistance of the soil profile to the insertion probe in pounds per square inch. By taking multiple measurements in different areas, we can judge the relative compaction of the soil. Find a plot of soil that has been undisturbed and not driven on for many years, is deemed to be well drained, and is similar to your growing fields. Record readings at 3, 6, 12, 18 and 21 inches, if possible. Then compare those readings against various sites at the nursery such as undisturbed 1-, 2-, 3-, 4-, and 5-year old planting rows. Take measurements in the planting row, and every foot or so into the aisle to see if there are differences caused by equipment maintenance practices. Over time, you should be able to draw some useful conclusions particularly if you start seeing big variations in troublesome areas such as all the trees died. It is important to note that heavily compacted but saturated soils may lead to low readings, which are false relative to the compaction issue. Tests should be conducted on moderately dry soils at all depths. Look for tools over the Internet. Using a search engine, type in Penetrometer and Moisture Tensiometer.

On October 19, 2003 I took a series of penetrometer readings at the farm to give you a feel for the exercise. Soil moisture was high but not at field capacity. The numbers are in pounds per square foot (psi). The soil is a deep Hagerstown silt loam. All measurements were taken within about a 50 foot radius.

	<u>3"</u>	<u>12"</u>	<u>21"</u>
5 year old heavy use grassed road	1000+	600	450
5 year old grassed aisle	325	425	500
5 year old plant row	80	275	450
1 year old plant row	25	20	300

The 'feel' of the probe was more or less like pushing through sand in the planting rows. I describe this so you know 200-300 psi is fairly loose soil. Note the road compaction was severe at 3 and 12 inches but about like the rest of the soils tested at 21 inches. Soil settles over time even without any manmade pressure from above which is shown as the variance in the different aged planting rows. The 1000 psi reading was greater than indicated, by gauge stops at 1000.

Do not be tempted to work soil and plant new liners when the soil is too wet. You are inviting disaster because the wet soil will increase compaction significantly thereby preventing the newly planted liners from developing adequate root systems. We only get one change every 5-8 years to start the lines off in the most desirable environment. It is difficult, if not impossible to repair the damage done during rotation. It is better to delay planting until conditions are near perfect rather than live with a poorly prospering planting for years into the future.

Excerpted from Free State Nursery and

ANOTHER TERRIBLE CRABGRASS YEAR

**Stephen Hart, Weed Scientist
Rutgers University**

The last five years have been characterized by mid/late-season crabgrass infestations in turf that have occurred even if the site was treated with preemergence (PRE) herbicides. This year was particularly bad because of the excessive heat, which stressed cool-season turfgrasses reducing their competitive ability while the crabgrass thrived.

In order for a PRE herbicide to be effective, it must be applied prior to crabgrass germination. Apply Pre herbicides around April 15 (applications could be delayed to late-April/early May if irrigation can be used to activate the herbicides) to insure that adequate rainfall is received to activate the herbicides in the soil prior to crabgrass germination. However, the last five springs have all had below average soil temperatures in April and May, which leads to a delay in the crabgrass germination cycle. From 2001 to 2005, significant crabgrass germination did not start until late May in established turfgrass sites. These weather patterns result in an extended crabgrass germination cycle, which ran into late July and August. In many cases, Pre herbicides will not persist long enough to control these later flushes of crabgrass.

The likelihood of mid/late-season crabgrass infestations increases significantly if cool wet springs are followed by cycles of dry and wet weather for two reasons. Dry cycles (and in 2005 combined with excessive heat) thin and weaken the turfgrass stand making it less resistant to crabgrass infestation. Wet cycles stimulate crabgrass germination and leach the herbicide out of the crabgrass germination zone. This year was characterized by a moderate June with good soil moisture, followed by excessive

heat and dry cycles in July/August.

The best way to avoid summer infestations of crabgrass is to maintain a dense and vigorous turf and apply split applications of Pre herbicides. Split applications entail applying 50 to 66% of the herbicide in mid-April and a second application in early/mid June as opposed to applying a single application at the full rate in mid-April. Split applications can greatly increase control levels compared to single applications. However, this year was so bad even split applications were providing only 80 to 85% crabgrass control in my research plots in mid-August. Single application were starting to fail as early as late-June.

Although split herbicide applications and maintaining a vigorous turf can greatly increase levels of crabgrass control, complete control can rarely be achieved. Frequent, heavy rainfall events in July/August, especially if they follow extended dry periods, greatly reduce the chances of achieving complete control. Turfgrass Professionals must be vigilant during these months to check for breakdown of Pre crabgrass programs and spot treat escapes with postemergence (POST) herbicides if complete control is desired. Seedling crabgrass (untillered) can be effectively controlled with Drive or Acclaim Xtra and Acclaim Xtra can control crabgrass up to 2 to 3 tillers in Kentucky bluegrass. In addition, both herbicides can be tank-mixed with residual herbicides to get through the remainder of the season.

Even with the use of split herbicide applications and timely use of POST herbicides, we have appeared to lose the battle to crabgrass this year. The effectiveness of POST herbicides was also reduced by the excessive heat, and many crabgrass plants were not completely controlled (plants re-grew from the crown) requiring additional applications. Hopefully, 2006 will be a better year in the battle against crabgrass.

WHEN SECONDS COUNT
Ron Jester, Extension Safety Specialist
University of Delaware

If an emergency occurs on your farm, nursery, or in your business, are you, family members, and employees prepared to respond? Preparation includes but is not limited to the following:

- being able to administer CPR and the Heimlich maneuver
- knowing how to disengage power and shut off the engine if someone becomes entangled or pinned under a piece of farm equipment
- knowing the Poison Control Center number and when to dilute or induce vomiting in the event of an accidental poisoning
- having a first aid kit accessible and in strategic locations such as on the combine and tractor
- having emergency numbers and directions to your farm posted
- having an escape plan in the event of a house fire

According the National Safety Council estimates for 2003, agricultural work-related deaths accounted for over 750 deaths and 120,000 disabling injuries in the U.S. alone. The welcome news is that the number of fatalities and the death rate are at an all-time low for agriculture. The bad news is that farming is currently rated as one of the most hazardous industries in the United States. Nevertheless, safety experts agree that the rate can be further reduced if farm families work more diligently at reducing risks and developing emergency preparedness programs.

Recent surveys indicate that there will be a disabling injury on 1 out of every 14 farms on the Delmarva Peninsula. Some of those injuries

will be traumatic and life-threatening ones where every second counts. If not an unintentional injury, consider that nearly every 20 seconds, an American suffers a heart attack. Other emergency scenarios on the farm include shock, severe bleeding, poisonings, animal bites, allergic reactions and, of course, childhood injuries.

Most rural and farm family members are aware of hazards on the farm, but are probably not updated on procedures to follow if they are the first one the scene of an emergency. Such incidents are complicated by the fact that they may be isolated, involve entrapment in equipment or a farm structure such as a grain bin, and may involve toxic chemicals. Since farms are typically remote from emergency services, it is critical that procedures be established and that all family members and employees be trained to deal quickly and effectively with emergencies. Everyone that can use a telephone should know how to quickly call for help and give clear directions to the scene of the incident.

The ability to make the right decisions when an emergency occurs depends on whether you have been trained in assessing farm accident scenes and knowledgeable of first aid and emergency procedures. One must be familiar with the operation and hazards so that decisions made will not further injure the victim or put you in danger. For example, being aware that high concentrations of toxic hydrogen sulfide gas can accumulate in manure pits and not entering such structures to rescue a victim without a self-contained breathing apparatus.

An acid test of your preparedness relates to specific planning to deal with children, the elderly and physically challenged. For example, in the event of a fire does your plan address specific details for evacuating the above risk groups? How do you safely and quickly

evacuate a family member with a mobility challenge? This same thorough planning has to take place for farmers with disabilities who are in the workplace – on the tractor, in the farm shop, or in the barn.

The primary goal as the first person on the scene is to keep the victim alive until the ambulance arrives. Training in CPR (cardiopulmonary resuscitation) and first aid is required to judge whether the victim needs resuscitation and then to perform the procedure properly. Intuition cannot be used in these situations. Everyone should know first aid and CPR. Those first 4 or 5 critical minutes between when something happens and when professional help arrives can mean the difference between life and death.

Contact the American Heart Association, the American Red Cross or your local fire department to locate the nearest training center for a CPR class or first aid training in your area. These courses are inexpensive, take little time, and can save a life!

Remember, the first person on the scene of an accident can help turn a tragedy into a second chance. Their response can make the difference between life and death. Are you, your family members, and employees prepared with the knowledge and skills to save a life?

**ALLURING ALTERNATIVES TO
BRADFORD CALLERY PEAR
John T Whaley, RLA, Certified Arborist,
PennDOT**

Fringetree – *Chionathus virginicus*. An east coast native reaching a maximum of 20 ft. height with equal spread. Linear, dark leathery, green leaves emerge in early summer and usually turn golden yellow to yellow brown in the fall. Mildly fragrant lacy white flowers appear in May.

‘Merrill’ Magnolia – *Magnolia x loebneri*
“Merrill”. Fast growing selection cross between
star magnolia (*M. stellata*) and kobus magnolia
(*M. Kobus*). Reaches 25-30 ft. tall with a
slightly wider spread at maturity. Produces 3-4
inch wide fragrant white flowers in mid-April.
Truck has a smooth steel-gray appearance in the
winter landscape.

‘Augumn Brilliance’ Serviceberry –
Amelanchier x grandiflora ‘Autumn Brilliance.
When this serviceberry is in full bloom it is
difficult to distinguish it from the Bradford pear.
Individual flowers are quite small but clustered
together forms a virtual white cloud effect in
late march to early April. Dark red to black
berries develop in early summer to delight the
birds. The tree develops slightly oval gray-
green leaves all summer before changing to a
brilliant, bright red fall color. It grows 20-25 ft.
tall and 20 ft. wide. Can be grown either as a
single or multi-stemmed tree.

“Ivory Silk’ Japanese Tree Lilac – *Syringa*
reticulate ‘Ivory Silk’. The tree is relatively
carefree to maintenance even though it is a lilac.
It produces profuse milky white flowers in mid
to late June and has a tight compact growth
habit to 20-25 ft. height and 15-20 ft. spread.
Excellent small street tree or locate anywhere
else where space may be limited.

How about a ‘pink’ Braford Pear? ‘Okame’
Cherry – *Prunus* ‘Okame’. This tree is similar
tin growth habit, size and blooms at the same
time as the Bradford pear except it has pink
flowers. It grows 20-30 ft. tall with 20-25 ft.
spread. The Okame has better branch strength
offering greater longevity in the landscape. The
leaves change to an orange-red fall color that is
quite spectacular.

Excerpted from Urban Forestry News, Vol. 14,

SOIL PREPARATION FOR PLANTING BULBS

**Frank Pemberton, Agricultural Program
Assistant Saratoga County**

Because their food reserves are already contained within the swollen storage tissues, bulbous plants will give a good display of flowers in the season after planting, with the absolute minimum of soil preparation. However, after flowering, that food reserve will be depleted. If the plants are to repeat their show the following year, they must have a fertile soil.

Before planting, make sure the soil is well drained to minimize the likelihood of the soft fleshy tissue succumbing to rot. It is a good idea to incorporate plenty of organic matter into the soil to fertilize and lighten it at the same time. If the soil has a tendency to become waterlogged, place the individual bulbs on a bed of sand mixed with bonemeal. With the most rot-susceptible bulbs – those with overlapping scale leaves like lilies and fritillaries – you can pack sand around the bulbs as well as underneath them.

When you plant, make sure that no manure comes into direct contact with the bulbs, for this will encourage rotting. Manure can however, be worked in below the planting depth to add to the fertility of the soil. A general light application of bonemeal, well worked into the soil or mixed into each planting hole, will aid in root development.

Excerpted from GrowLine, Cornell Cooperative Extension, June 2005.

NURSERY IPM - WHAT REALLY WORKS

Chuck Cornell, Nursery IPM

Good pest management starts by regularly taking a good look at your plants--every two to three weeks from March to October. We call this monitoring and it requires a dedicated effort, but the benefits are many and well worth the effort. Start by walking the fields looking at the general appearance of the plants. Always take a small beating tray to look for small pests like spider mites, rust mites, aphids, scale insects and lace bugs. Don't forget the hand lens so you can see what you're looking at. Look for evidence of other pests that either can't be knocked off into a beating tray or are not active now, such as wood borers, caterpillars, black vine weevils, and more. While you are in the fields, also look for signs and symptoms of plant diseases on bark and foliage. Remove dying plants to look for evidence of root diseases and nematodes. You can also check out how well your fertilization program, irrigation system and weed control are doing.

Some pests can't be efficiently detected using visual observations or beating trays. So, pheromone traps and black light traps are necessary. Pheromone traps will not only tell you if peach tree borer, banded ash clearwing, and other clearwing borer moths are present, but you can use this information to accurately time pest control actions for these pests. The same applies to the use of black light traps for defoliating caterpillars, such as greenstriped mapleworm, orangestriped oak worm and similar caterpillar pests of shade trees. Check pheromone traps and black light traps every three days for your key pests and clean them out at the same time. Replace the pheromone dispensers every two months.

Now that you've found the pests, have correctly identified them and noted which fields they are

in, you are ready for action. Management of insects and mites is based on a simple strategy-- detection and prompt action either when the pest is first detected or when the most vulnerable stage is present. For example, you may find spider mite eggs on plants during the winter, but this is not the most vulnerable stage for control. It is best to wait until mites are active, when they will be much easier to control.

What pesticide should you use—that new broad spectrum material labeled for control of over fifty different insects and mites that the salesmen are pushing or that expensive new biorational material that controls only a few pests that extension is pushing? The essence of IPM is to use the safest most effective pesticide only when and where necessary. You've identified the pest and you're ready to spray when the pest is most vulnerable, so just select the best pesticide for that pest. You can do this with confidence because there is rarely more than one pest on a plant at the same time in the nursery so broad spectrum pesticides and tank mixes are seldom required. Using a broad spectrum pesticide that promises to kill everything is never ideal because no single pesticide could be the most effective material for all the different pests found in nurseries.

However, there are times when you just have to spray as soon as the insect shows up. Potato leafhopper is a good example. Once they fly in from the deep South, potato leafhoppers reproduce quickly and cause significant damage to the summer flushes of growth on most varieties of red maple, other kinds of maple, honey locust, golden rain tree, oaks and more. I've tried lots of pesticides and different approaches for control of potato leafhopper, but the most effective, currently legal method, is to apply a carefully selected synthetic pyrethroid to all susceptible plants when the first leafhoppers are seen. Additional applications are often necessary on smaller trees where the damage is

more harmful. Some new pesticides that are due on the market soon may be used as soil drenches for a longer period of control. Keep tuned to when these new materials become available.

Management of most plant diseases requires a more premeditated approach – knowing which plants are susceptible to certain diseases and beginning preventative pesticide applications when the infection period for each disease begins. Continue applications throughout the entire infection period to fully protect plants. The number of applications and spray intervals vary according to control product and disease.

Include cultural considerations in plant disease as well as pesticide applications. Space plants properly to improve air movement and light penetration to keep foliage dry. Use only pathogen free, well drained potting mix for container plants.

Pesticide applications may never be completely successful for highly susceptible plants during conditions favorable for disease development. Good growers keep track of these sorts of things and learn which plants and cultivars are susceptible and which are resistant to diseases. They also learn to buy from reliable suppliers to keep diseased plants out of the nursery.

If this sounds like too much knowledge and too much to keep track of for your nursery right now, consider hiring a professional. If you hire the right pro, the results are well worth the cost of an experienced competent IPM specialist. Look for a pro with experience in the crops you grow and a philosophy that matches yours (someone dedicated to biorational pesticides and biocontrol won't work if you need consistent results and plants that are clean for immediate sales and shipping).

Excerpted from Free State Nursery & Landscape News, Spring 2005, Vol. 18, No. 1.

BETTER NURSERY PRACTICES TO PRODUCE HIGH QUALITY LANDSCAPE PLANTS

**Stanton Gill, Regional Specialist
University of Maryland**

Surveys of landscape managers indicate that the market is demanding bigger trees (3" caliper and up) and plant material that can be installed over a wide range of the year. Field-grown plants have always been "king" but various methods of container production are now entering the mid-Atlantic production market.

Field-produced plants are still preferred by most landscape managers and contractors. A good field grown, balled and burlapped plant (B&B) has the best transplant success rate for most tree species. The problem with field-grown material is that the ideal time for harvest is limited to spring and fall with limited summer digging. Summer digging usually involves a larger rootball and additional hardening off time.

In the 1990s, pot-in-pot showed up on the nursery production scene. This growing method enabled nursery producers to provide plant material at most times of the year. A well-grown pot-in-pot plant can be a very good product. Nurseries now grow 7-, 15-, and even 30-gallon trees and shrubs using the pot-in-pot method. The problem with pot-in-pot production is that some very vigorous plant material rapidly fills the pot and results in circling roots. A plant with circling roots can be difficult to establish successfully into the landscape.

Dr. Carl Witcomb introduced root containment bags to the nursery industry in 1985. The first products had problems with roots blasting through the plastic bottom or finding their way out through the seams. Root Control Company refined the product and now produces a root control bag that is a non-woven polypropylene.

The inside of the bag has what the company describes as a "fuzzy surface" that catches roots and prevents them from circling. Small roots penetrate the bag but are choked off as they increase in diameter, resulting in better root branching within the bag. Small- to medium-sized nurseries tend to utilize root containment bags but some larger nurseries use root containment bags for "hard-to-transplant" species. Leyland cypress grown in root containment bags have been reported to perform better for summer and fall planting than field grown Leyland cypress. "Blow over", commonly a problem with container grown Leyland cypress (especially those with circling roots) can be significantly reduced when plants are grown in root containment bags and roots grow more quickly into the surrounding soil, anchoring the plants.

Installing root containment bags during production is a relatively slow process and involves augering a hole and keeping the sides of the bag straight, as soil is backfilled and a liner tree installed. Harvest is relatively easy. A straight nursery spade can be inserted around the edge of the root containment bag to cut off fine roots that penetrate the bag. Then, the tree can be popped out of the ground with the spade. At this point, the grower should remove the root containment bag and cover the root ball with untreated burlap and place it in a daisy basket.

Since roots fill the major portion of the root ball volume, root control grown plants are relatively light. A 2-inch caliper B&B tree will have a root ball that contains a lot of soil and weighs 300-350 pounds. In comparison, a 2-inch caliper tree grown in a 18" diameter root containment bag would have a root ball that weighs 120-150 pounds. This means root containment grown trees must be staked or anchored. Since root control grown trees establish roots into the surrounding ground very rapidly, the staking should be removed even

sooner than stakes on normal B&B trees. A new anchoring device was evaluated at the Central Maryland Research and Education Center (CMREC) in 2004 called the 'Tomahawk' (www.borderconcepts.com). With this product, a metal stake is driven into the ground on the outside of the root ball and a metal extension holds down the root ball. The only problem is that the metal remains in the ground in the root ball zone and if the tree ever dies, it would be difficult to ground the stump out of the ground.

The CMREC is currently testing two above ground plant containment systems or nursery boxes.

1. **Smart Pot** – looks like a typical root containment bag but the bag is coated with a chemical that inhibits UV light breakdown of the fabric material. Also, the bottom of the bag is fabric that allows small roots to grow through the bottom of the bag. The Smart Pot is designed to grow above the ground usually on top of a weed barrier. The small roots that grow through the cloth bottom give it some anchoring so it is less likely to blow over in the wind. Roots that reach the outside perimeter of the fabric bag get air pruned and roots branch better within the confines of the bag.
2. **Amaroo Box** – nursery box with open slits on the side and plastic ridges on the insides. The plastic ridges block circling roots and the open slits cause air pruning. The box is made from recycled plastic that is black and consists of four sides and a bottom that are clipped and bolted together in about 5 minutes. The boxes come in a 35-, 75- and 125-gallon size. They are substantial but relatively lightweight (12.5 lbs for a 35-gallon box). This box is designed for reuse

with the plastic holding up for at least 10 years. (The ones in the CMREC trial plots are three years old and holding up well.)

When a tree is ready to go to the landscape market, the box sides are unbolted and unclipped and the root ball is slid out. The root ball can be placed in a burlap lined daisy basket so you end up with an intact root system that is similar in quality to a root containment grown plant.

In field tests at the CMREC, the intention was to surround these above ground pots with wood chips during the winter. But, due to a miscommunication the wood chips were never delivered. Surprisingly, there was very little damage to root systems during a cold winter. Thuja 'Green Giant' and Leyland cypress have thrived in both pots for two winter seasons (2003/2003 and 2003/2004 with the same or less winter injury as compared to the same species growing in the ground at Central MD nurseries.

During the next year, these experimental plants will be transplanted into the ground and evaluated for establishment.

Excerpted from Free State Nursery & Landscape News, Spring 2005, Vol. 18, No. 1.

NURSERY COPS - PART 2
Tom Fernandez, Dept. of Horticulture
Michigan State University

In my previous article (May/June 2005 issue, The Michigan Landscape and DNLA News, Summer 2005) I discussed some of the reasons for determining cost of production (COP) and some definitions. In this article, I will go over an example of how to determine COP and a couple of uses.

The following tables offer an example of how to determine the cost of production for 3-gallon containers. The costs in these examples are probably not the same as yours; you will want to use quotes from your suppliers for your calculations. The Microsoft Excel© spreadsheets used to make the tables are available on my web site, <http://www.hrt.msu.edu/faculty/fernandez.htm>. To download these spreadsheets, click on the “Cost of Production” link. The spreadsheets

include all the necessary equations so you can change each cost to reflect your situation and the spreadsheet will update automatically.

The labor costs included on the spreadsheet will vary from yours, so you should use costs for labor as described in the previous article.

Table 1 shows the cost of containers and the cost of container substrate per container. Container substrate cost was based on \$3,800 per 100-yard load with a delivery cost of \$300 resulting in \$38/yard. Container volumes vary greatly, so yours may be different. To determine container volume, use the equation $v = \pi r^2 h$, where r is the radius and h is the height of the pot. Table 2 shows the cost of control-release fertilizer per pot, based on a 50-pound bag for \$38, or \$0.76 per pound ($\$38/50$). Most control-release fertilizer is applied on a gram basis; to convert pounds to grams, divide by 454 grams/pound ($\$0.76 \text{ per pound} / 454 = \$0.002/\text{gram}$).

Table 3 shows the cost of pesticide material per container. Suppose a pesticide costs \$500 for 25 pounds or \$20 per pound, and you apply eight pounds per acre. You figure out how many plants you have per acre and use the equation $(8 \text{ lbs/acre} * \$20/\text{lb}) / (\text{number of plants per acre})$ to determine cost per container.

The next three tables show how to determine COP for a three-year crop. Table 4 shows the COP for the year of planting (Year0). For the

example, we will start with 4000 plants at a cost of \$1.15 per liner for a total liner cost of \$4,600. Planting labor was \$0.12 per unit and maintenance labor for the year (planting, pesticide, moving, etc.) was \$0.51 per unit. Materials for planting (pots, substrate and control-release fertilizer from Tables 1 and 2) were \$1.26, and materials for maintenance were \$0.01 per pesticide application (from Table 3) for 5 pesticide applications, for a total of \$0.05 per unit. Multiply these costs by the number of plants to get the In-Ground and Price List costs.

Up to this point, there has been no difference between the In-Ground and Price List costs. From this point forward, however, you will start seeing the difference. Remember, In-Ground cost is the direct cost of producing the plant only; it does not include interest, management, facilities, etc. However, these costs will be included to calculate the Price List cost. In this example we use an overhead rate (which was described in the previous article) of 100% of direct labor to be conservative. We also add interest (the cost of money) to the Price List cost. We are using 7% in this example; you should use a reasonable interest rate that you would likely be charged to borrow. These two factors will create the difference between the In-Ground and Price List costs over the next two years, until it comes time to harvest.

At the end of the first year, our records show we have lost 50 plants for any of the many reasons we lose plants (disease, desiccation, poor-

quality liner, etc.). So after one year of planting and growing, we have invested \$12,360 in materials and maintenance (In-Ground cost) and another \$3,561.00 in interest and overhead. The liner that cost us \$1.15 now has an In-Ground cost of \$3.13 and a Price List cost of \$4.03, the cost-per-plant as determined by the In-Ground and Price List costs divided by the number of plants still in production. These costs are carried over into the next year represented in Table 5.

The next step is to carry forward the total costs from last year's spreadsheet and start adding this year's costs. During the second season of production, we don't have planting expenses since we potted into 3-gallon pots. We do have maintenance, labor and material costs. Again, use labor costs from your records as described in the previous article. Material costs are for five pesticide applications and a top-dressing of fertilizer. Add the overhead and interest cost to

the Price List column. We lost 39 plants this season, leaving a total of 3,911 plants. Divide the In-Ground and Price List costs by the number of plants remaining to determine the costs-per-plant for the second season.

Now for the final year, the year we get to sell the plants and hopefully make some money. Carry forward the total costs from the second season to start the third season. Add the maintenance labor and material costs again; in this example, we again applied five pesticides and top-dressed with fertilizer. Add the overhead and interest to the Price List cost. Notice we lost only nine plants this year--we're doing better. Also, notice we're selling 3,500 plants! They need to be harvested and that will cost us something. We used a \$0.15 cost of labor to harvest the plants and \$0.05 for harvesting material (packing material, etc.) per plant. Remember, we're basing overhead on labor, so harvest labor incurs an overhead charge as well. To

determine the cost-per-plant-sold, add all the lines: Plants Sold (after making positive) \$21,183.82, Labor (Harvesting) \$525, Materials (Harvesting) \$175, and Overhead (Harvesting) \$525 in the Price List column and divide by the number of plants sold (3,500) to get \$6.40 per plant. This is your break-even price. Sell above this price and you will make a profit; selling below this price will result in a loss.

You still have 402 plants remaining. Now you can use COP to determine whether you should carry them forward another year, pot them into larger containers, or discard them. You can estimate a COP for next year using estimated numbers for labor and materials costs and then determine the final Price List cost for keeping them in the same containers or up-potting. If you think you can sell the plants above the estimated break-even price next year, it is probably worth keeping them; if not you can discard them.

Research Briefs

Propagation:

Foliar application of auxin to improve rooting of 'Red Cascade' miniature roses.

Application of auxin to the foliage of cuttings via a foliar spray involves no particular requirements beyond those typically involved in the application of other growth regulators. Under nursery production conditions, the technique could allow one trained applicator to perform a foliage application with conventional spray equipment in less time than it takes for several workers to perform a manual quick-dip on the same quantity of cuttings, permitting the use of lower chemical rates and reducing the number of employees required for application. In this study, auxin applied to foliage of 'Red Cascade' miniature roses produced similar rooting percentages to those achieved with a basal quick-dip as long as the auxin concentration in the spray solution was not too high. But, sprayed cuttings had lesser total root length suggesting that foliar-applied auxin does not penetrate the leaf tissue and translocate to the site of root initiation to stimulate adventitious rooting as well as with a basal quick-dip. Total root length and shoot length in response to foliar applications of auxin were enhanced by the use of a surfactant. (E.K. Blythe, J.L. Sibley, K.M. Tilt and J.M. Ruter)

Excerpted from *HortTechnology*. 14(4): 479-483. October-December 2004.

Storing flowering dogwood seed. Based on the results of this study, it is recommended that dogwood seed be dried to 6 to 10% moisture content prior to storage, packaged into air-tight containers, and stored in a -20C (-4F) freezer. Use of these storage conditions should allow flowering dogwood seed to be stored for at least 3 years without a significant loss in viability and

will stabilize dogwood seed supply. (S.M. Reed)

Excerpted from *J. Environ. Hort.* 23(1):29-32 March 2005.

Seed germination of seabeach amaranth.

Seabeach amaranth is a summer annual native to the beaches and barrier islands of the Atlantic Coast. By 1990, it no longer occurred in most coastal states (including DE) but populations have recently reestablished in both DE and MD suggesting that seeds can remain viable to many years. Seabeach amaranth plays a role in the initial stages of the development of sand dunes by trapping and binding sand on the beach. Beach restoration and sand renourishment projects have created a demand for seedling transplants of seabeach amaranth. Seed germination of freshly harvested seeds is relatively easy to accomplish provided the seeds are first stratified (moist-prechilled) and germinated at an 8/16-hr thermoperiod of 86/68F with a daily 16-hr photoperiod. As durations of stratification increase in 30-day increments from 0 to 120 days, both the rate and total germination will increase. Following stratification, light is not necessary for germination but subjecting seeds daily to light will result in greater germination than seeds maintained in darkness. Seeds will not germinate at 77F with light despite prior stratification. (F.A. Blazich, S.L. Warren, D.L. Nash and W.M. Reece)

Excerpted from *J. Environ. Hort.* 23(1):33-36. March 2005.

New shoot development of boxwood.

Boxwoods typically produce a single flush of growth in the spring, and then shoot elongation and bud break cease. Plants remain dormant for the rest of the year, producing only slight, erratic growth. This research demonstrates that with the use of the growth regulator Promalin and/or pruning and defoliation, a second flush of growth from rooted cuttings during the growing

season may be possible for boxwood. Defoliation was especially effective in increasing new shoot development. A grower can potentially produce a larger plant in the same amount of time and increase revenues. (S. Musselwhite, R.Harris, J. Latimer and R. Wright)

Excerpted from *J. Environ. Hort.* 22(3):124-128. March 2005.

Response of hosta to BA crown drenches.

Hostas are propagated by crown division. Because most cultivars are slow to develop offsets during production, foliar sprays of BA have been applied to promote new offset formation. This research shows that crown drenches of 2000 or 3000 ppm (mg/liter) BA applied at either division or establishment were as effective as a foliar spray of 3000 ppm (mg/liter) BA and significantly more effective than an untreated control. While these findings provide additional BA treatment options, the material and labor costs of applying crown drenches are greater than those associated with foliar sprays. (J.C. Warr and G.J. Keever)

Excerpted from *J. Environ. Hort.* 22(3):129-132. September 2004.

Pinch number affects cutting production in vegetatively produced annuals. More vegetatively propagated annual market is increasing beyond the traditional species such as geranium, poinsettia and chrysanthemum. This study evaluated one, two and three pinches (P, PP, PPP) on stock plants of *Argyranthemum*, *Nemesia*, *Verbena* and *Osteospermum* and the effect on cutting production. Single pinch stock plants (P) began to produce cuttings earlier than multiple pinch stock plants. However, the rate of cutting production increased as the number of pinches increased due to the increased number of nodes per stock plant. Three pinch stock plants (PPP) had a higher rate of increase in

cutting production than P for all species, except *Osteospermum* (highest rate with PP). At the end of the study, the weekly rate of cutting production increased 66.3%, 84.0% and 30.5% as pinch number increased from P to PPP for *Argyranthemum*, *Nemesia*, and *Verbena*, respectively. (J.E. Faust and L.W. Grimes)

Excerpted from *HortScience* 39(7):1691-1694. December 2004.

Greenhouse production:

Compost and controlled release fertilizer in bedding plant substrates. When petunia and impatiens are grown with Nutricote Total 13-13-13 Type 70, the growing substrate should not contain more than 30% biosolids compost. However, if Nutricote Total 13-13-13 Type 100 or Type 140 are used the growing substrates should not contain more than 60% biosolids compost. (K. Moore)

Excerpted from *HortTechnology*. 14(4): 474-478. October-December 2004.

Aquathol and Hydrothol treatments and their potential phytotoxicity to ornamental annuals. Results indicate that aquathol and hydrothol (used for aquatic weed control) can cause a 10% growth inhibition at the upper range of the labeled rates. Since these herbicides are applied only once or twice annually and phytotoxicity did not occur until higher concentrations were applied, the risk to ornamental plants is relatively small. However, aquathol and hydrothol treated water should not be used in commercial nurseries where irrigation water may be applied daily or more frequently. (T.J. Koschnick, W.T. Haller and G.E. MacDonald)

Excerpted from *HortTechnology*. 15(2): 318-323. April-June 2005.

Height control of Seashore mallow with growth regulators. A single foliar application of chlormequat chloride (CCC) at 750 mg/L to seashore mallow (*Kosteletzkya virginica*) when three to four expanded leaves are present is the best choice for height control (less material and labor costs than other effective alternative). Since no rate effects were observed with CCC in this study, it is possible that a lower concentration may prove effective. (K.R. Hilgers, C.Haynes and W. Graves)

Excerpted from *HortTechnology*. 15(2): 330-332. April-June 2005.

Height control of tulip and ‘Star Gazer’ oriental lily with growth regulators. A-Rest, bonzi and Sumagic are currently recommended for tulip height control. Topflor (Flurpirmidol) is currently used in Europe but will be available in the US. This study shows that Topflor is suitable for height control of ‘Prominence’ tulip as a substrate drench at 0.5 mg/pot or a preplant bulb soak at 25 mg/L. (B.A. Krug, B.E. Whipker, I. McCall and J. Dole)

Excerpted from *HortTechnology*. 15(2): 370-376. April-June 2005.

Rosemary cultivars for use as potted Christmas tree topiary. The most commonly used cultivar in commercial production of Christmas tree shaped topiaries, ‘Tuscan Blue’ had a low quality rating and a high amount of foliar damage compared to most other cultivars examined. The cultivars with the highest visual ratings and least foliar damage included: ‘Taylor’s Blue’, ‘Herb Cottage’, ‘Joyce DeBaggio’ (Golden Rain), ‘Shady Acres’, ‘rexford’ (Rex), an unnamed clone, ‘Logee White (Thinleaf white), ‘Salem’, and ‘Hill hardy’. (D.F. Warnock and C.E. Voight)

Excerpted from *HortScience*. 40(2): 343-345.

April 2005.
Nursery Production:

Consumer preferences for tabletop Christmas trees. Many consumers still enjoy the beauty and symbolism of a fresh Christmas tree in their home. In addition to—or as a substitute for—a fresh-cut tree, there appears to be a significant consumer acceptance of tabletop Christmas trees. More traditional tree species (like the black hills spruce) will have wider acceptance than less traditional species like arborvitae. Trees should be marketed with decorations because they are preferred to undecorated trees. Although consumers naturally prefer lower prices to higher ones, there may be some potential to pricing decorated trees moderately and reaping a better profit. Conservative estimates for cost of production showed plants could be produced for \$9.45 and marketed at a markup of at least 50% and generate profits for the grower. (B.K. Behe, R.M. Walden, M.W. Duck, B.M. Cregg and K.M. Kelley)

Excerpted from *HortScience*. 40(2): 409-412. April 2005.

Height control of tabletop Christmas trees. Container-grown tabletop Christmas trees have potential as new products for conifer nursery growers. However, intensively cultured conifers may grow too tall for use as table-top trees. Plant growth retardants offer the possibility of controlling height without manual pruning. Sumagic® and 6-BA were effective in controlling height of several species. The severe impacts of BA on growth of the spruces suggest that lower rates than those used in this study (foliar spray of 500 and 1000 ppm) may provide adequate height control. (M.W. Duck, B.M. Cregg, R.T. Fernandez, R.D. Heins and F.F. Cardoso)

Excerpted from *J. Environ. Hort.* 22(3):165-

169. September 2004.

Siding-scale nitrogen fertilization of container-grown ornamentals. To design a sliding-scale fertilization schedule for a plant taxon, its seasonal N accumulation pattern must first be defined. By using drip irrigation and fertigation, and organizing plants into groups with similar N requirements, water and nutrient loss associated with overhead irrigation can be reduced. In this study with weigelia and euonymus, sliding-scale liquid N fertilizer treatments resulted in plants with similar total dry weights, leaf areas, and total plant N contents, but higher shoot to root ratios than plants treated with Osmocote (18N-2.6P-9.9K). Sliding-scale liquid fertilization based on plant N requirement introduced less total N to the production cycle and resulted in higher N uptake efficiency than fertilization with a constant N rate of 200 mg/L. A sliding-scale N fertilization program based on biweekly N delivery is an appropriate level of precision when matching N applications to established N accumulations patterns of weigelia and euonymus. (D.R. Sandrock, A.N. Azarenko and T.L. Righetti)

Excerpted from *HortScience*. 40(2): 451-456. April 2005.

Irrigation of container-grown nursery crops—an overview of strategies for increased efficiency. Three areas of water management have been reviewed—water application efficiency (WAE), irrigation scheduling, and substrate amendment. WAE is affected by time-averaged application rate (accomplished with cyclic irrigation—smaller amounts of water added multiple times during the day) and pre-irrigation substrate moisture deficit. It seems reasonable that the greater the deficit, the more unfilled pores and opportunity to efficiently use applied water. That is true to a point, but when container media gets too dry it becomes hydrophobic and channeling occurs resulting in moisture loss without properly

wetting the medium.

Irrigation scheduling is defined as the process of determining how much to apply and when to apply it. Irrigation volume should be based on the amount of water lost since the last irrigation. Right now, the easiest way to determine the container moisture deficit is to weigh the container. The difference in weight from container capacity describes the volume (ml or fluid ounces) needed to return the container to 100% container capacity. Studies looking at irrigation timing have indicated that irrigation during the day may increase growth by reducing heat load and minimizing water stress in the later part of the day.

Recent evidence suggests that amending pine bark substrates with clay (arcillite) may reduce irrigation volume required for plant production. (S.L. Warren and T.E. Bilderback)

Excerpted from *HortTechnology*. 15(1): 14-18. January-March 2005.

Treating mouse ear deficiency in river birch. This research documents that mouse ear disorder on river birch is caused by a deficiency of nickel. Both foliar and drench applications of nickel sulfate were effective in this study. Superphosphate fertilizers and Milorganite do not provide enough nickel to reverse mouse ear disorder on symptomatic river birch. The American Association of Plant Food Control Officials approved nickel as a micronutrient fertilizer in August 2004 and a commercial nickel product will be available pending state registrations in 2005. (J.M. Ruter)

Excerpted from *J. Environ. Hort.* 23(1):17-20. March 2005.

Height control of coreopsis and rudbeckia with PGRs. Rapid growth of coreopsis and rudbeckia can be problematic for perennial plant growers, leading to excessively tall, leggy plants

that are often unmarketable and difficult to ship. Applications of B-Nine alone at 2500 to 7500 ppm were effective in suppressing height of 'Moonbeam' coreopsis and 'Goldsturm' rudbeckia. B-Nine/Cycocel tank mixes were less effective than B-Nine alone in controlling height, while Cycocel alone had minimal effect on plant height. (J.W. Amling, G.J. Keever, J.R. Kessler, Jr. and D.J. Eakes)

Excerpted from *J. Environ. Hort.* 23(1):25-28. March 2005.

Commercial mycorrhizal inoculants in plant nursery conditions. The percentage of mycorrhizal colonization obtained with 10 different commercial inoculants ranged from 0 to 50%. The infectivity was influenced by the three different growing media (soil based media, Sunshine #5—mostly peat, and nursery mix with bark, sawdust, calcined clay and sand) Two products promoted higher values of mycorrhizal colonization in the Sunshine mix, three in the nursery mix and one in the soil-based medium. Mycorrhizal colonization did not enhance plant growth. Nurseries should conduct preliminary tests to determine which inoculants will perform in their potting mixes. (L. Corkidi, E.b. Allen, D. Merhaut, M.F. Allen, J. Downer, J. Bohn and M. Evans)

Excerpted from *J. Environ. Hort.* 22(3):149-154. September 2004.

Shearing Fraser fir for Christmas tree production. Shearing in July caused the smallest reduction of potential growth and yielded the largest and heaviest branches with significantly more foliage and lateral shoots, all of which would be expected to improve crown density and commercial value. October was the least favorable time to shear. (L.E. Hinesley and S.A. Derby)

Excerpted from *HortScience* 39(7):1644-1646.

December 2004.

Vernalization of herbaceous perennials to control flowering. There is a need to understand how to bring herbaceous perennials into flower at scheduled dates so they can be sold to consumers while flowering. Many herbaceous perennials require a certain period of cold treatment or vernalization for flowering. Vernalization is defined as a cold treatment that promotes subsequent flowering when given to imbibed seeds, bulbs, or whole plants. In this study, rooted cuttings in 72-cell trays were vernalized. Based on the results of this study, at least 6 weeks of vernalization was needed in *Campanula* 'Birch Hybrid' to achieve uniform flowering and vernalization temperatures from 0 to 10C had an equal effect at promoting flowering. In *Leucanthemum x superbum* 'Snow Cap', plants vernalized at 0 to 5C for 4 weeks or longer had rapid, uniform flowering. Overall, 'Snow Cap' and 'Birch hybrid' are tolerant of high temperatures (30C) that greenhouses may experience on bright sunny days during vernalization. (G. Niu, R. Henis, A. Cameron and W. Carlson.)

Excerpted from *HortScience* 39(7):1647-1649. December 2004.

Herbicide movement in container media. When pendimethalin (active ingredient in Pendulum and Corral) was added to 100% pine bark, and followed by 7 inches of simulated irrigation, significant herbicide leaching occurred to the 1.2 to 2.4 and 2.4 to 3.5 inch depths. The highest amount of chemical was detected in the 0 to 1.2 inch depth. With chemical levels decreasing as depth increased. No effect was seen at depths greater than 3.5 inches. When the trial was conducted using 14 instead of 7 inches of simulated irrigation, a similar leaching pattern was observed. Therefore, the majority of herbicide leaching in pots may occur with the first few irrigations after herbicide application. When the same trial

was conducted using field soil, no leaching was detected past the 0 to 1.2 inch depth. Pre-emergence herbicides, therefore, have the potential to leach at much greater depths in pine bark than in field soil. (J.Derr and L. Simmons)

Excerpted from *VNLA Newsletter*, May/June 2005.

Herbicide impacts on nursery crop shoot and root growth. Pendimethalin is a root inhibitor, as is several other commonly-used nursery herbicides and is the active ingredient in Pendulum and Corral, among other formulations, and is one of the components in OH2. Pendimethalin can be absorbed by azalea shoots following overtop application, resulting in stunting of shoot growth. This chemical can also suppress root development when the root system is exposed. The emulsifiable concentrate (EC) formulation of pendimethalin inhibits both shoot and root growth in azalea. Nursery producers wanting a sprayable formulation of pendimethalin should use the dry flowable or microencapsulated form of pendimethalin, especially when making overtop as opposed to directed spray applications. The granular formulation provides maximum safety. By applying pendimethalin in granular form, the potential for shoot uptake is dramatically reduced. (J. Derr and L. Simmons)

Excerpted from *VNLA Newsletter*, May/June 2005.

Landscape:

Evaluation of sedums and other perennials for use on green roofs in Michigan. Eighteen plants (native to Michigan) were evaluated from plugs, seven sedum sp. were evaluated from seed and two sedum sp. were evaluated from plugs in three commercially available drainage systems for three years at Michigan State University. Drainage system design had

minimal effect on the initial growth, appearance during establishment or mortality of the taxa tested. Ideal plant selections for extensive green roofs in northern climates that lack irrigation, must be heat and cold tolerant, drought resistant, have a high growth index in order to provide quick coverage, and must be self-generating by seed, root systems or some other means. All sedum spp. (*S. acre*, *S. album*, *S. kamtschaticum*, *S. ellacombeanum*, *S. pulchellum*, *S. reflexum* and *S. spurium* ‘Coccineum’ – from seed; *S. middendorffianum* ‘Diffusum’ and *S. spurium* ‘Royal Pink’ – from plugs) were found to be suitable for green roof culture. *A. cernuum*, *C. lanceolata* and *T. ohioensis* were the most suitable for unirrigated roofs. (M.A. Monterusso, D.B. Rowe and C.L. Rugh)

Excerpted from *HortScience*. 40(2): 391-396. April 2005.

Influence of tree size on transplant establishment and growth. These studies have demonstrated that tree size affects establishment rates. It takes longer for larger transplanted trees to become established due to the longer time required to reestablish a root:shoot ratio comparable to non-transplanted trees. The question that has not been fully answered is whether the difference in recovery times between small and large trees will result in the smaller tree outgrowing the larger tree. Modeled data provided evidence that smaller transplanted trees would outgrow larger transplanted trees. When other factors were considered by Struve et.al., smaller trees were not predicted to outgrow larger trees. This research is hard to conduct because it takes time and significant funding for planting large specimens. (W.T. Watson)

Excerpted from *HortTechnology*. 15(1): 118-122. January-March 2005.

Using the Missouri Gravel Bed System for transplanting bare root nursery stock. In the Missouri Gravel Bed System (MGBS), dormant field-grown stock is heeled in gravel mulch, so that it can be transplanted later in the growing season. Large caliper bareroot green ash and red oak trees were successfully heeled in the MGBS and planted in mid- to late-summer. Bareroot and B&B plants held in a MGBS showed few transplant shock symptoms. Reduced transplant shock was attributed to extensive root regeneration during the heeling-in period. Pea gravel provided a well-aerated substrate for root regeneration; the irrigation system minimized water stress and delivered mineral nutrients to the root zone. Heeling in B&B trees in fresh wood chips yielded similar advantages to pea gravel for B&B red oak; however, the heat generated from the decomposition of fresh wood chips killed bareroot red oaks and should not be used. Extensive root growth in the MGBS necessitated larger planting holes, which result in a larger modified soil volume, which can increase root regeneration and reduce establishment time. Regenerated roots and tree canopies must be protected from desiccation during shipping and handling on the job site to successfully complete summer transplanting. (C.Starbuck, D.K. Struve and H. Mathers)

Excerpted from *HortTechnology*. 15(1): 122-127. January-March 2005.

Height control of coreopsis and rudbeckia with PGRs. Rapid growth of coreopsis and rudbeckia can be problematic for perennial plant growers, leading to excessively tall, leggy plants that are often unmarketable and difficult to ship. Applications of B-Nine alone at 2500 to 7500 ppm were effective in suppressing height of 'Moonbeam' coreopsis and 'Goldsturm' rudbeckia. B-Nine/Cycocel tank mixes were less effective than B-Nine alone in controlling height, while Cycocel alone had minimal effect

on plant height. (J.W. Amling, G.J. Keever, J.R. Kessler, Jr. and D.J. Eakes)

Excerpted from *J. Environ. Hort.* 23(1):25-28. March 2005.

Artillery fungus on 27 different mulches. 'Artillery fungus has emerged from an interesting mycological curiosity that grows in landscape mulch to a problem of major financial concern to homeowners, insurance companies, mulch producers, and landscape contractors. 27 different mulches were evaluated to determine their ability to support the artillery fungus. Mulch from large commercial mulch piles, comprised of composting mixtures of shredded bark and wood, supported significantly greater levels of artillery fungus sporulation than did other mulches. Large bark nuggets, cypress mulch, and 100% spent mushroom substrate supported less artillery fungus. Almost all wood/bark mulches will eventually support the artillery fungus over extended periods of time (3-4 years), and even more tolerant mulches should be replaced, or covered with a fresh layer of mulch, on a regular basis. (D.D. Davis, L.J. Kuhns, K. Akina and T.L. Harpster)

Excerpted from *J. Environ. Hort.* 22(3):117-123. September 2004.

Landscape establishment of *Kalmia latifolia*. Container-grown mountain laurel in pinebark substrate, commonly propagated by tissue culture, is relatively difficult to establish in the landscape, often resulting in death. Data from this study indicated that in climates similar to the Appalachian Mountain regions of Western Virginia (piedmont of DE), transplanting in fall will improve transplant survival and subsequent growth. Although 5-gal plants can be successfully transplanted, they may encounter more tissue water stress after transplanting than 2 gal plants. (A. Hanson, J.R. Harris and R. Wright)

Excerpted from *J. Environ. Hort.* 22(3):133-138. September 2004.

Turf:

Overseeding an annual bluegrass green with bentgrass. This study demonstrated success with converting an annual bluegrass green to bentgrass with early summer overseeding dates and the use of newer cultivars (velvet bentgrass ‘SR7200’ and creeping bentgrass cvs. ‘Penn A-4’ and ‘L-93’ were best and ‘Penncross’ had the lowest potential for success). The process may be less successful with an indigenous annual bluegrass green that is already well established and with the increased foot traffic of a green currently in play. (G.M. Henry, S.E. Hart and J.A. Murphy)

Excerpted from *HortScience*. 40(2): 468-470. April 2005.

Using Dazomet to control annual bluegrass in turfgrass renovation. Dazomet is a granular soil sterilant used to control the seed bank of annual bluegrass during turfgrass renovation. Dazomet rates of 420 or 504 kg/ha yielded the lowest rates of annual bluegrass reestablishment, resulting in an annual bluegrass cover of 1-20%. Creeping bentgrass planted one day after dazomet application had much less annual bluegrass than when seeded 7 or 9 days after application. Dazomet is a tool to help reestablish a new turf with lower level of annual bluegrass but will not eradicate annual bluegrass. (B.E. Branhma, G.A. Hardebeck, J.W. Meyer and Z.J. Reicher)

Excerpted from *HortScience*. 39(7): 1763-1767. December 2004.

Ball roll affected by PGR applications on putting greens. Routine mowing and PGR applications help minimize uneven leaf growth,

thus, promoting uniform surfaces for putting green ball roll. Inhibiting turfgrass leaf growth with PGRs may not arrest daily leaf growth fluctuations: however, diurnal growth fluctuations are significantly reduced to enhance ball roll distances relative to untreated turf. It appears that putting green ball roll distances may also be enhanced greater or equivalent to supplemental and subsequent mowing operations following flurprimidol, paclobutrazol, and trinexpapac-ethyl use. Ethephon, however, does not appear to be a suitable PGR for promoting ball roll on a monostand (100% weed green) creeping bentgrass putting green. Turf managers may be able to reduce putting green mowing frequencies without compromising ball roll distances following applications of gibberellic acid (GA) inhibitors. Furthermore, supplemental and subsequent mowing with GA inhibitors provided the greatest ball roll distance enhancements relative to routine daily mowing of untreated turf. (P.E. McCullough, H.Liu and L.B. McCarty)

Excerpted from *HortScience*. 40(2): 471-474. April 2005.

Minimum water requirements of four turfgrasses in the transition zone. Meyer zoysiagrass, Midlawn bermudagrass, Falcon II tall fescue and Brilliant kentucky bluegrass were evaluated in Manhattan, KS. These tests indicate that the turfgrasses requiring the least water to maintain quality between June and September were Midlawn Bermuda and Falcon II tall fescue. Tall fescue has lower water requirements than Meyer zoysia the first year, but similar requirements the second. (J. Fu, J. Fry and B. Huang)

Excerpted from *HortScience*. 39(7): 1740-1744. December 2004.

Disease:

Fireblight resistance in pears and quince.

Pyrus calleryana 'Chanticleer' was the most resistant commercially available cultivar of callery pear. *Pyrus betulifolia* 'Dancer', a clone of *P. regelii*, *P. ussuriensis* 'Prairie Gem' and an unnamed hybrid of *P. calleryana* x *P. betulifolia* were found to very resistant. *C. speciosa* 'Contorta' was the only highly resistant quince species. *Chaenomeles speciosa* 'Nivalis' and *C. x superba* 'Crimson and Gold' were moderately resistant. (A.C. Bell, T.G. Ranney, T.A. Eaker and T.B. Sutton)

Excerpted from *HortScience*. 40(2): 413-415. April 2005.

Fairy ring control with high-pressure injection on turfgrass.

A conventional curative fairy ring control program for golf course putting green includes irrigating the target area to field capacity, followed by the topical application of a fungicide plus soil surfactant and immediately irrigated again to essentially move the fungicide to the target thatch or root zone. The application of fungicides and soil surfactants via high-pressure injection could provide an alternative method of product delivery and placement for both curative and possibly preventative control of fairy ring. (HPI) (M.A. Fidanzam P. F. Colbaugh, M.C, Engelke, S.D. Davis and K.E. Kenworthy)

Excerpted from *HortTechnology*. 15(1): 169-172. January-March 2005.

Tx-1 as a biological control agent for dollar spot and brown patch on turf.

Pseudomonas aureofaciens Tx-1 is suggested as biological control for dollar spot and brown patch on golf courses. This research indicates that Tx-1 applied via the BioJect through an irrigation system is capable of marginally reducing dollar spot severity and extending fungicidal control

only to a minimal extent only when disease pressure is low. Since this field research was done under ideal Tx-1 delivery conditions (irrigated less than 0.3 ha with a new, well-functioning irrigation system with irrigation heads a maximum of 70m from the Tx-1 source), the researchers conclude that Tx-1 has limited practical value for disease control. (G.A. Hardebeck, R.E. Turco, R. Latin and Z.J. Reicher)

Excerpted from *HortScience*. 39(7): 1750-1753. December 2004.

Weed Control:

Mugwort regeneration from cut rhizomes.

Mugwort will regenerate after rototilling and cultivation from rhizome sections as small as ¼ inch. Nursery growers should maintain clean field-grown liner stock. Mugwort can easily become established in the landscape if infested container grown nursery corps are transplanted. Growers and landscape managers should scout proactively for mugwort populations and initiate aggressive control strategies when populations are found. (W.E. Klingeman, D.K. Robinson and G.L. McDaniel)

Excerpted from *J. Environ. Hort.* 22(3):139-143. September 2004.

Postemergent crabgrass control on bentgrass putting greens.

Acclaim Xtra (fenoxaprop) can be used on velvet bentgrass at application rates of 0.04 to 0.07 kg/ha to control larger crabgrass and goose grass plants on putting greens. Application at those rates resulted in phytotoxicity on creeping bentgrass. (G.M. Henry and S.E. Hart)

Excerpted from *HortScience*. 39(7): 1768-1770. December 2004.

Plant Introductions:

‘Princess’ and ‘Prince’ Napiergrass.

‘Princess’ and ‘Prince’ are dwarf and semi-dwarf, respectively, purple-foliaged cultivars of *Pennisetum purpureum*. These grasses are perennial in USDA hardiness zones 8 to 10 and can be grown as vigorous annuals in northern zones. These plants are only recommended for landscape use in locations where a hard freeze will occur by December 1 (otherwise, they may become exotic invasive pests). ‘Prince’ has initial leaves that emerge with a purple midrib and mottled purple/green blade; later the leaves emerge purple. ‘Princess’ has initial leaves that emerge green with purple margins and a purple midrib. The lower blades rapidly become mottled purple/green and then emerge purple. In unirrigated conditions, ‘Princess’ is similar in size to *Pennisetum setaceum* ‘Rubrum’ and ‘Prince’ is larger. Both cultivars can be easily propagated by stem cuttings. ‘Princess’ and ‘Prince’ are patented cultivars (in process) so contact the GSDC (www.gsdc.com) for information on availability.

Excerpted from *HortScience*. 40(2): 494-495. April 2005.

Evaluation of American elm clones for Dutch Elm Disease (DED) resistance.

‘Valley Forge’, ‘Princeton’, ‘New Harmony’, R18-2 and ‘Delaware’ showed less dieback and greater survival than a randomly chosen American elm clone. Other clones show promising levels of DED tolerance including N3487, 290, 190, CDH and 180. The remaining selections and cultivars tested (including ‘Augustine’ and ‘Independence’) appeared too susceptible for use as parents in a breeding program or for direct use as landscape trees. (A.M. Townsend, S.E. Bentz and L.W. Douglass)

Excerpted from *J. Environ. Hort.* 23(1):21-24. March 2005.

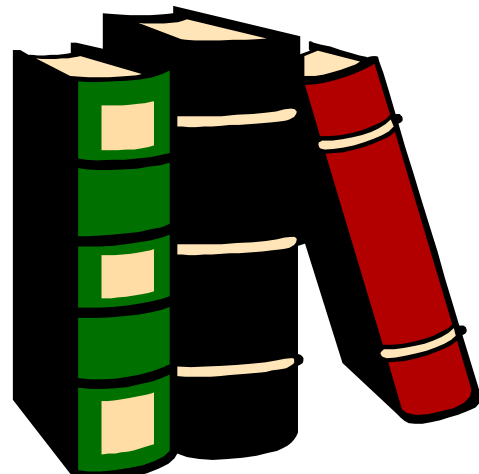
Publications

Enhancing Profitability in Greenhouse

Firms, NRAES-164, is available for \$18.00 per copy plus \$4.25 S&H from NRAES, Cooperative Extension, PO Box 4557, Ithaca, NY 14852-4557. The 56-page book was written for potential and current greenhouse operators and managers, their business advisors, and educators. For more information or a free book catalog, contact NRAES by phone (607)255-7654, by fax (607)254-8770, e-mail: nraes@cornell.edu

Dogwoods 2005. Paul Cappiello and Don Shadow. Timber Press, Inc. The Haseltine Bldg, 133 S.W. Second Ave., Suite 450, Portland, OR 97204-9743. This is a 224 page hardcover. ISBN 0-88192-679-5. Color photos, glossary, and index. Cost \$39.95. For more information: www.timberpress.com

Lawn Care without Pesticides, written by Frank Rossi, Ph.D., Associate Professor of turfgrass science, Dept of Horticulture, College of Agricultural and Life Sciences, Cornell University. A new publication for homeowners and gardeners who want a beautiful/safe lawn. 16 pages paperback. Cost \$8.95 plus S/H. ISBN:1-57753-300-3. Item code:141IB248. Contact (607)255-2080 or fax 607-255-9946 or order online at: www.cce.cornell.edu/store



Calendar

September 15 – Ornamentals Research Exp, 5-8 PM, UDBG, Newark DE. Contact Dot Milsom (302)831-2531.

September 16-17 – Coastal Plain Native Plant Conference at the Norfolk Botanical Gardens. For more information call: (757)441-5838, www.norfolkbotanicalgarden.org

September 17 – 10th Annual Tree Spree Fair, Carousel Park. Contact Vikram Krishnamurthy, 302-658-6262, ext. 33.

September 18-24 – GCA Eastern Performance Trials – by the Garden Centers of America at Virginia Growers White's Greenhouses, McDonalds' Garden Center, www.easternperformancetrials.org

September 21 & 22 - Pesticide Applicator Training at the Delaware Department of Agriculture Conference Center in Dover.

September 21-23 – Mid-Atlantic Composting and Compost Use Conference & Expo, Beltsville, MD. Cost: \$75 member/\$100 non members if registered before Sept 2nd. Call (410)729-8634 , e-mail: ablei@menv.com for more information.

September 24 – Growing Green Roofs In the U.S. 10-11am. U.S. National Arboretum, Washington, DC Fee: \$15.00 (FONA \$12) Registration required. Phone: (202)245-5898. Location Admin. Bldg. Auditorium.

September 27 – Grounds Managers' Field Day and Update, Schnecksville Fire Company Pavilion Rout 309, Schnecksville, PA, 4:00 to 9:00pm. Cost-\$15.00, deadline for registration is Sept. 20th. Pesticide credits will be applied. For more information call-(610)391-9840.

September 27 and 28 – Urban and Community Forestry Council Annual Conference, Penn State Great Valley, Warren V. Musser Auditorium, Malvern, PA. Contact Bill Elmendorf (814)863-7941, website: <http://www.gv.psu.edu/>

October 14 – Perennial Plant Conference, Lang Performing Arts Center, Swarthmore College, Swarthmore, PA. Deadline: Sept. 30th. Registration fee: \$75 per/by Sept. 15th, \$85 per/if postmarked between Sept. 15th & Sept. 30. Please call Longwood Gardens' Continuing Education Office (610)388-1000, ext. 507 for more information (no phone registrations)

October 3-7 – Tree Climbing School, the Gardens at Morris Arboretum, Philadelphia, Pa. 9:00am – 4:30pm. Contact Cheryl Bjornson (610)696-3500, ext. 20, faxⓈ(610)-696-4831. e-mail: cab46@psu.edu. Enrollment is limited.

October 5, 6, & 7 – Nursery, Greenhouse & Garden Center Tour. Deadline for registration is Sept 15th. For additional information and cost- Call: (610)690-2655 or e-mail: wqgl@psu.edu

November 9 – Soil Health Care: New Perspectives for Nurseries and Landscapes, sponsored by the Penn –Del IPM Research Group. 8:00am – 3:15pm, Connelly Center, Villanova University. For registration flyer call: (302)831-2531.

November 10, 12, 13 – 9th Annual Southeast Pennsylvania Poinsettia and Pansy Trials with Seminars, Delaware Valley College, Doylestown, PA. Contact Warren Golf (610)690-2655. Pesticide update credits will be provided.

November 14 – Horticulture Training for Spanish Speaking Employees, Montgomery County 4-H Center, Creamery, PA. Contact: Mary Concklin (610)489-4315. Pesticide update credits will be provided.

November 15, 16, 17 – Golf Turf Conference, Nittany Lion Inn, State College, PA. Contact: Turfgrass Council (814)355-8010; Dr. Peter Landschoot, (814)863-1017; or e-mail: ptcinfo@turf.org Pesticide update credits will be provided.

November 17 – Turf and Ornamentals Workshop, Hockessin, DE Contact Val Budischak (610)274-2166.

January 2-17, 2006 – Winter School for Turf Managers, University of Massachusetts, Amherst. Application deadline: Sept 16th. For more information- Phone(413)545-0530; fax: (413)545-3351, e-mail: academicprograms@contined.umass.edu

January 18-19, 2006 – Delaware Horticulture Industry Expo, Modern Maturity Center, Dover, DE. Contact Valann Budischak (610)274-2166.

