

**ASSOCIATION NEWS**  
**Marianne McGloin**  
**Executive Director, D.A.N.**

Summer is here and hopefully it will be a prosperous season for everyone. Mark your calendars for August 14, which is the date set for the 10th annual Summer Nursery and Turf Expo. You should be receiving the registration program in the mail shortly. This year the Expo will take place at Joseph Wick Nursery, LTD, in Smyrna, DE. We have a great lineup of workshops for that day and are looking forward to seeing you there!

The next Certified Nursery Professional exam will be October 21, at the Department of Agriculture, Dover, DE. It is a never too early to prepare for the exam. Manuals are available at the DAN office and short courses are provided by Delaware Cooperative Extension. Please call Marianne McGloin at the DAN office or Sue Barton at the extension office (831-1375) for more information.

The American Association of Nurserymen has proposed a name change to the Association before the board of Governors. The proposed name change is the American Nursery and Landscape Association. The proposal will be voted on by the Board of Governors at the upcoming AAN Convention at Nashville, TN in July. Members are encouraged to share their views. The Board of Governors would like to hear from members in writing. To share your opinion on the proposed name change, you can contact the DAN office, the AAN office or our Governor, Jamie Jamison.

We are no longer having a Turfgrass/Trade Show in November at the Hockessin Hall. The show will be replaced with a Turfgrass Seminar at the New Castle County Extension office. This will be a one-day seminar on turf subjects. A date has not been set yet but it will be sometime in November. You will be notified by

late summer.

Look for the Landscape Award application in your mail soon. The deadline remains the same to give ample time for participants to prepare for the contest. The DAN will no longer have a commercial and a residential category. The categories will be replaced by the cost of the job so smaller scale jobs can be recognized. The award money has also been increased. Two prizes of \$500 will be awarded to the winners of both categories. We are looking forward to many members participating in this year's contest.

On a final note, the DAN will be sending dues renewal notices at the end of August. The holiday season is such a busy time for all of us to remember to mail your dues and this extra time will allow us to prepare the 98 Directory in a better fashion.

We hope to see everyone at the Summer Expo! Please do not hesitate to call with any questions or concerns.

**WELCOME NEW MEMBERS**

Associate member

Treesource  
Brad Hopkins  
P.O. Box 577  
Easton, MD 21601

Quote for the Quarter

Persistence is the twin sister of excellence. One is a matter of quality; the other, a matter of time.  
Marabel Morgan, The Electric Woman (word)

Happy Summer,  
Marianne

**U OF D NEWS**  
**Susan Barton**  
**Extension Specialist**

The bus tour is on the road again! The garden center bus tour has been combined with a nursery tour and extended to a 3-day, multi-state tour. We will visit four garden centers, six nurseries and the Virginia Tech's experiment station at Hampton Roads. Garden center operators will have the chance to visit some excellent nurseries, look at a variety of nursery stock and discuss their needs with suppliers. Growers will be able to visit four great garden centers and see how their product is merchandised. The tour will take place on October 14, 15 and 16. For more details, look for the flyer in the back of this newsletter.

Pruning and ponds are the subjects of this year's Summer Turf And Nursery Expo. Come to Joseph Wick Nurseries on August 14 to see and hear some great demonstrations on pruning trees and shrubs and establishing successful water gardens. Tour the Joseph Wick Nurseries and receive pesticide recertification credits by attending a Dept. of Agriculture update on new pest problems.

At the University, we have established an aster demonstration garden. Thanks to North Creek Nurseries, we have over 40 species and cultivars of asters planted in two beds behind the Fischer greenhouse. Come see them starting in August and learn about the many fabulous plants in this genus. We will feature the aster bed at our Ornamentals Research Expo held in the UDBG (around Townsend Hall) on September 24<sup>th</sup>, in the evening. We will also tour our newly-installed turf establishment demonstration. In early September, we will be planting tall fescue into soil that has been treated in a variety of ways—tilled, tilled and amended with compost, raked to expose soil, and amended but not tilled. It will be interesting to see how well turf becomes established in each of the soil

preparation methods. John Frett will be on hand, of course to talk about some new and underused plants in the industry and as always, have a few plants for you to take home and try.

The aster and turf establishment studies are also being conducted at the Research and Education Center in Georgetown. Look for the asters at Farm and Home Field Day on August 13<sup>th</sup>.

The U of D has the pleasure to host part of this year's Eastern Regional Plant Propagator's Society tour. If you are currently a member or interested in becoming a member, join us on the tour. You will see and learn about Sherry Kitto's tissue culture of native, herbaceous perennials research, the Beneficial Insects Research Lab, wildflower establishment and kenaf as a component of potting media research, new plants on the internet, and much more. In the afternoon, we will visit Conard Pyle Nurseries, one of the largest container growers on the east coast. We will finish with a tour and social hour at North Creek Nurseries. For more information, call Steve Castorani at 239-4675.

This spring we dedicated the new Charles W. Dunham Entranceway. It is the official entrance garden to the University of Delaware Botanic Garden (UDBG). It is located on the South side of the building. A plaque, honoring Charlie for his years of service at the University and contribution to the nursery industry in Delaware, is mounted on a stone in the center of the garden. Many thanks to all of you who donated plants and supplies for this garden!

**DE DEPT. OF AGRICULTURE  
PLANT INDUSTRIES NEWS  
Lynn Harrison, Sr. Entomologist  
Randy Ciurlino, Sr. Entomologist**

The Delaware Department of Agriculture Plant Industries Section has added a new full-time nursery inspector to its staff as of April 1 (no fooling). This will increase the number of nursery industry regulatory personnel available to provide assistance to plant handlers and insure that all appropriate regulatory issues are met. Leslie Berry is a local resident and a graduate of the University of Delaware. She has gained a broad spectrum of knowledge of the nursery industry through past employment with Conard-Pyle. Many of you may already know her if you have conducted business with her previous employer. Her primary responsibilities include monitoring retail activities of the industry. She is currently inspecting retail establishments statewide, so you may be receiving a visit from her soon.

Nursery stock field inspections are currently in progress. Inspectors will be visiting field grown plant materials to certify them for out-of-state shipment. The inspections are conducted annually during the spring and summer months. Any key pest conditions found are immediately reported to the owner or field manager. Without these inspections, interstate shipments can not be made.

Purple Loosestrife (*Lythrum salicaria*) (PLS) is a perennial invasive wetland herbaceous plant that grows in sunny wetlands, ditches, around water bodies, and in disturbed habitat. PLS is native to Europe and was accidentally introduced to North America. Because it is an introduced plant, nothing feeds on PLS or utilizes it in any significant way. PLS reproduces prolifically from seeds, offshoots, cuttings, and root stocks. A single PLS plant can produce up to 300,000 seeds, which are carried by wind, water, animals, and humans.

PLS has spread aggressively throughout Canada and Northeastern and Midwestern United States. PLS is present in Delaware with the largest concentrations in the northern most areas of the state. PLS has a very aggressive growth habit, out-competing and eliminating native plants that are utilized by native wildlife. PLS has virtually zero value to wildlife as food or shelter and where it invades, wildlife habitat is destroyed. Once PLS is established, marshes, wetlands, and waterways become choked from the spread of this plant.

The Delaware Department of Agriculture, in cooperation with the USDA-APHIS and other federal and state agencies has initiated a biological control program on PLS. This effort utilizes leaf feeding beetles, *Galerucella spp.* (Coleoptera: Chrysomelidae) to control the growth and subsequent spread of PLS. These beetles are native to the same area of Europe as PLS and their entire life cycle is spent in close association with PLS. If you have questions on the PLS Biological Control Program please contact the Plant Industries Section.

If you need additional information, you may contact the Department of Agriculture, Plant Industries Section at 1(800)282-8685 (Delaware only), (302)739-4811, by fax at (302)697-6287, or E-mail at [lynn@smtp.dda.state.de](mailto:lynn@smtp.dda.state.de).

## AAN UPDATE

May 26, 1997

The American Association of Nurserymen is very aware that the nursery industry is facing a lot of turmoil with the U.S. Department of Labor's wage-hour audits, as well as the Immigration & Naturalization Service's raids. Since last year's defeat of the AAN-sponsored House floor amendment that would have created a new alien agricultural worker program, AAN has deliberately kept this issue on the congressional hot burner. As a result, a Senate bill (S169) reforming the current H-2A guest worker program was introduced by Senator Larry Craig (R-ID) in February. Nearly 40 AAN members and nursery association executives (NAE) teamed up in March for a joint NAE-AAN Lobby day to update Members of Congress on the latest INS actions and the need for an overhaul of the H-2A program.

Meanwhile, AAN has met one-on-one with the General Accounting Office, which (thanks in strong part to AAN) is required by Congress to complete its study in August of the inadequacies of the H-2A program. AAN has met several times with the leadership of the House Agriculture Committee. As a direct result of these meetings, AAN now expects significant new legislation to be introduced in the House very soon. AAN members will receive Legislative Alerts as soon as this bill is introduced, so please watch your mail!

AAN is exercising leadership on a wide front of critical legislative and regulatory issues directly impacting your bottom-line. These include estate tax relief, alien agricultural worker program reforms, OSHA ergonomic standards; INS raids; and, Labor Department wage-hour audits. AAN is already involved in, or monitoring, 144 separate pieces of federal legislation. One of the critical components of AAN's government affair's program is AAN-NIPAC, the political action committee arm of

AAN. It is a separate, segregated fund that pools voluntary AAN member contributions to support, on a bipartisan and modest basis, election campaigns of members of Congress and promising candidates who aggressively support the nursery and landscape industry's interests. In 1996, a record 151 AAN members personally contributed \$28,710. In turn, AAN-NIPAC disbursed \$31,500 to select congressional races.

For more information, contact Ben Bolusky at (202)789-2900. All contributors to AAN-NIPAC receive invitations to participate in the 4th biennial AAN Legislative Leadership Conference to be held in the nation's capital on September 22-23, 1997. Attended by the business and association leaders of the nursery and landscape industry, the conference features presentations by influential Members of Congress on pivotal industry interests.

Recent OSHA enforcement actions in the nursery industry serve as a reminder that OSHA sometimes uses its "General duty clause" to cite employers - including nursery and landscape operations - for violations. OSHA's general duty clause essentially requires that an employer provide a workplace free of recognized hazards that could cause death or serious injury of an employee.

However, in a significant loss for OSHA enforcement policy, a U.S. Appeals Court recently ruled that OSHA may not cite employers on a "per employee" basis for violations of OSHA's general duty clause. The court decided that the clause allows citations only for each violative condition at a place of employment, not a citation and fine for each employee exposed to the condition. The company involved in the recent court decision faced potential OSHA penalties of \$4.35 million. However, the court's decision reduced these penalties to \$50,000

## THE 1997 PERENNIAL PLANT OF THE YEAR IS *Salvia* 'MAY NIGHT'

The Perennial Plant Association is pleased to announce that *Salvia* 'May Night' ('Mainacht') has been selected as the Perennial Plant of the Year for 1997. *Salvia*, members of the large mint family, are known for their aromatic foliage, attractive leaves, and long season of bloom. 'May Night' is one of the most versatile cultivars. Bred and introduced in 1956 by the famous German plantsman and philosopher, Karl Forester, it is thought to be a hybrid between *S. pratensis* and *S. nemerosa*. It has the typical square stems of the mints, deliciously fragrant foliage, and its flowers are attractive to honey bees and other garden-flower pollinators. Leaves are slightly blue-gray in color, finely toothed, hairy, and about 2-3" long. *Salvias* love sun, and 'May Night' is no exception. It will grow in a variety of soils, but does best in moderately rich soils, and even dry ones that occasionally stress the plant during short term summer droughts. The growth habit of 'May Night' is distinctively stiff and upright, forming a small mound.

It is the gorgeous floral display that sets this gem apart from its plainer cousins. Florets are born on upright spike-like inflorescence and are deep, rich, indigo-black, outlined with delicate purple bracts. When mature, this plant will be 2-2 ½ ft. tall and 1-2 ft. across. The main flowering time for 'May Night' is in May/June and the bloom time extends into July. Place 'May Night' in the middle of the perennial border, or use it as a specimen plant. 'May Night' does best in hardiness zones 4 through 8, and it likes a winter mulch in colder areas. However, as with so many perennials, placing it in soils that are well drained during the winter increases plant vigor and extends its life. It has no serious disease or pest problems, although in hot, humid areas it will occasionally be attacked by spider mites.

'May Night' is moderately easy to propagate either by division or by cuttings. Division is best in early spring before the shoots start to elongate. If propagated by cuttings, it is important that it be done before the hot weather of June arrives, and the moisture content of the propagation bed is critical. Intermittent mist can be used, but be sure the cuttings are misted only for a few days, or just enough to allow the plant to form adventitious roots. Then turn the mist off and syringe by hand once per day while providing light shade. Rooting hormones are generally not necessary, but if they are used, a concentration of no more than 1000 ppm IBA is all that is needed.

In northern gardens, *Salvia* prefers sunny locations, but would probably benefit from light shade in the more intense summer heat of southern gardens. 'May Night' can be easily established from container-grown plants anytime during the growing season, or from bare-root field divisions during spring. When planting, be sure to dig a hole twice the diameter of the plant, and place at the same depth as it was in the container or in its previous location. Firm the soil around the plant and water-in thoroughly. *Salvias* do best in a moderately rich soil, so a spring application of an organic fertilizer or general purpose fertilizer such as a 10-10-10 or a 10-6-4 at the rate of 1-2 lbs. per thousand square feet is adequate.

In the perennial border, 'May Night' is especially good in combination with the yellow *Achillea* 'Coronation Gold', or with pink or red herbaceous peonies.

Reprinted from *Perennial Plants Newsletter*, Autumn 1996.

## SLIME MOLD: WHAT IS IT?

Frank E. Dinsmore

Slime mold puzzles many people each year. When it suddenly appears in wood mulch around ornamental plants, in lawns, in strawberry beds, or in the sweet potato patch, it can become a concern. But should it be?

Technically, slime mold is not a disease nor does it cause disease. It belongs to the class Myxomycetes, a group intermediate between bacteria and fungi, in a subdivision of its own known as Myxomycotina. In general, slime mold is more unsightly than harmful and is of no economic importance. Regarded as a saprophyte, it feeds on bacteria, protozoa, and other microorganisms. It is not parasitic.

There are many species of slime mold. Most live on rotting logs and tree trunks in the cool, moist environment of the woods. A few species appear in open spaces.

Slime mold has two distinct stages of development. The first is the plasmodial stage, which is mobile. Slimy to the touch, it may be either inconspicuously or brightly colored. The plasmodium may seem like a giant amoeba, creeping or flowing over low-lying vegetation. Its development is favored by cool, wet weather. Excessive thatch in lawns enhances slime mold growth by serving as food. Decaying wood bark mulch holds moisture, creating favorable conditions in ornamental beds for the slimy, gelatinous growth to develop. Occasionally, slime mold will creep over ornamentals, disrupting photosynthesis in the leaves it covers, but causing no other damage.

The second stage in the life of a slime mold more closely resembles a fungus and looks very different from the plasmodial stage. This is the fruiting stage, which is responsible for the dispersal of the organism. The fruiting stage is dry and thickly crusted, often mistaken for

animal excrement or vomit. When disturbed, the powdery spores are released into the air in a cloud.

There is usually no need for control action against slime mold. However, if it becomes a nuisance in your lawn, it can be controlled mechanically by raking, brushing, or frequent mowing. Leaf washing with a stream of water may be used if weather conditions allow. Do not wash during prolonged periods of rainfall. In wood mulch, remove by rake or shovel. On ornamentals, wash with a stream of water.

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Reprinted from *Regulatory Horticulture*, Plant Pathology Circular No. 76, Fall 1996. Pennsylvania Dept. of Agriculture, Bureau of Plant Industry (Vol. 22, No. 2).

## **LABOR PAINS FOR THE NURSERY & LANDSCAPE INDUSTRY**

**Ben Bolusky**

**Director of Government Affairs, American Association of Nurserymen**

If anyone in the nursery and landscape industry is wondering what issues we're facing as the new 105th Congress has slowly gotten underway, you don't need to look very long or far. The industry is experiencing "labor pains": Immigration and Naturalization Service (INS) raids, wage and hour audit investigations by the US Department of Labor (DOL), and the possible issuance of sweeping ergonomic standards on repetitive motions and heavy lifting by the Occupational Safety and Health Administration (OSHA).

**MORE INS AUDITS TO COME:** One unfortunate by-product of the tough, new immigration reforms enacted into law last year is a stepped-up effort to "get tough" on employers who are in violation of the law. This includes nursery and landscape firms, who have been the subject of INS raids. In fact, AAN can confirm that at least 400 workers were apprehended and deported by the INS last fall from industry firms.

Fraudulent work authorization documents were the reason. Finding replacement workers who are willing, available and qualified--even at better than competitive wages--is difficult at best, especially in those areas where the unemployment rates are so low. AAN expects the industry will experience increased INS raids this year.

AAN is moving aggressively with a legislative strategy to provide relief in the form of legislation to create a workable and effective agricultural guestworker program. But, let's be candid. Such a legislative battle will require grassroots activity the likes of which this industry has rarely seen--if ever. There will be

no major immigration bill in this Congress to which we can attach our legislative proposal. We will need to move it on its own accord, and AAN will push hard--with our grassroots help.

**WAGE-HOUR AUDITS: A PRELUDE TO AN INS VISIT?** As if the INS raids are not enough, AAN learned that the US Department of Labor's Wage and Hour Division (DOL) has targeted the nursery industry for wage and hour audits and investigations. These audits, which will occur in all 50 states, will focus on common tripwires and rigid DOL interpretations of both the federal and minimum wage and migrant/seasonal worker laws. DOL often works hand-in-hand with the INS. So, it's very possible that if you are audited by DOL, you may have a follow-up visit by INS officials.

**MORE OSHA REGULATION TO COME?** OSHA had been prohibited by Congress from spending any funds in the development of ergonomic standards governing repetitive workplace motions, which result in injuries such as back stress or carpal tunnel syndrome. Organized labor was successful in getting the 104th Congress to strip away the prohibition. As a result, OSHA is now free to move forward and propose standards which will undoubtedly take the form of sweeping, rigid and costly mandates.

If OSHA succeeds in doing so, these standards will impact all facets of the nursery and landscape industry--from repetitive finger motions when propagating, to stooping in the fields when planting, to lifting plants and hardgoods in garden centers and on landscape jobs. AAN will work with our Congressional allies in opposing these unreasonable ergonomic standards if, or when, they are proposed this year.

**WHAT CAN YOU DO TO EASE THE PAIN?** For starters, you should make your voice heard on Capitol Hill, where immigration relief

legislation is in need of grassroots support. If you're a part of the industry grassroots legislative network, as an AAN member or a Lighthouse Fund participant (at only a dime-a-day), you've already received extensive background information on the issue, and, most recently, a call to action. Your involvement in the industry's grassroots network will also help to bolster AAN's position in opposition to new OSHA ergonomic regulations.

To prepare for possible Wage-Hour enforcement, you really should have a copy of recently updated AAN's Wage-Hour Summary. You want to be aware of what's required and consider how best to address those issues before the DOL shows up. The message for 1997 is "Don't just stand there, do something!" With the "labor pains" that are now upon our industry, the cost of sitting on the sidelines has become far too expensive.

This article provided compliments of DAN's partnership with the American Association of Nurserymen. For more information on the AAN Lighthouse Fund, contact DAN at 302-697-1895.

## **STRATEGIES FOR PRICING TIME AND MATERIALS**

**James Huston, President  
Smith Huston, Inc.**

Many landscape firms ask how to establish time and material (T&M) rates. The following example demonstrates options for calculating T&M labor rates.

Before developing labor rates, it helps to consider how to price materials used on repairs and non-site time (e.g. drive time, load time, picking up materials time, etc.).

I recommend charging for repair materials independent of labor rates. Most contractors charge clients the manufacturer's list price for materials used to T&M service work. Sometimes list prices will be lowered for commercial customers. However, I recommend marking up materials a minimum of twenty percent above your actual invoice cost (10% for overhead and 10% for profit).

Off-site labor time (drive, load, and picking up materials time, etc.) can be handled one of three ways:

1. Include off-site labor time in the hourly "curb-time" rate charged to the client. Curb-time is the actual time that a worker or crew is on the job site. It starts when they arrive at the site (curb) and ends when they leave the site (curb). Calculate the curb-time rate by dividing the total price (including all costs and net profit) for an average day of service work by the average amount of on-site (curb-time) labor hours.
2. Charge the client for actual off-site time (primarily drive time to the job site). This is often referred to as "portal to portal" billing. Essentially, the clock begins to run once the driver leaves the

yard and stops when the job is completed or in some cases when the driver returns to the yard. This method has some inherent problems, especially if the driver starts from a location other than the yard, gets stuck in traffic, or has to make other stops along the way. An average time could be allocated to the job, instead, but this puts you into the third method.

3. Charge a show-up fee that includes drive time and other non-site time plus a certain amount of time on the job (i.e., the first thirty minutes on site). Time after that is charged at a set hourly rate.

Our firm uses the following formula to price irrigation service work. The same process can be used to calculate other T&M labor rates, too.

\* \* \*

### BACKGROUND & ASSUMPTIONS

- Our sprinkler repair man works alone for eight hours a day, forty hours per week which means the overtime factor (OTF) is zero.
- All work is performed on a "T&M" basis, so the "Risk Factor" is also zero.
- Labor hourly rate is \$8.00. Labor burden is thirty percent.
- This person drives a mini-pickup truck with a \$3.00 cost per hour (CPH).
- An average job is twenty minutes from the office and requires an additional ten minutes of off-site time to load the truck, pick up materials, etc. You plan to perform and bill a minimum of four jobs per day.
- Materials are charged to the customer at current list price.
- Approximately \$80.00 of materials (at cost) are to be installed per day.
- The overhead per labor hour (OPH) amount

- has previously been calculated to be \$11.00.
- A minimum combined profit and contingency factor of 10% is desired. Phase I costs include six labor hours.
- General conditions contain the remaining two hours of estimated daily drive and other off-site time.
- Total price for an average day of sprinkler repair is \$217.00. Put another way, total revenue that must be generated per day to cover all costs (including overhead and providing a 10% net profit) is \$217.00. In other words, we must bill \$217.00 per day, excluding materials, to cover all costs and to show a ten percent net profit.

Let's break this down into more meaningful scenarios:

SCENARIO #1: You bill four jobs per day and keep the repairman busy (billable) all day.

4 jobs x \$35.00 (show-up charge) = \$140.00  
 4 hours billed at \$27.50/hour = \$110.00  
 TOTAL: \$250.00  
 You have exceeded your goal by \$33.00

SCENARIO #2: You bill five jobs per day and keep the repairman billable all day.

5 jobs x \$35.00 (show-up charge) = \$175.00  
 3 hours billed at \$27.50/hour = \$82.50  
 TOTAL: \$257.50  
 You have exceeded your goal by \$40.50

SCENARIO #3: You bill six jobs per day and keep the repairman billable all day.

6 jobs x \$35.00 (show-up charge) = \$210.00  
 2 hours billed at \$27.50/hour = \$55.00  
 TOTAL: \$265.00  
 You have exceeded your goal by \$48.00  
 Each of the three scenarios produces an extra \$33.00 to \$48.00 of net profit in addition to the \$21.70 profit built into the rates. The key is keeping repair people billable all day and billing to a minimum of \$217.00 per day.

## **WATER ISSUES UPDATE**

**Charles Jenner**

Track your service work on a daily basis. At a minimum, monitoring the following:

- Sales or total billable dollar amounts per day.
- Labor hours and job tasks (e.g. drive to Jones' residence, 15 minutes; repair two heads, 35 minutes; return to shop, 15 minutes; pick up irrigation materials, 20 minutes, etc.).
- Materials used and billed per job.

Armed with historical data, adjust hourly and show-up charge rates, if desired.

This article was provided by the American Association of Nurserymen, and its grower, retail, and landscape divisions, in partnership with DAN. For more information, contact AAN at 202/789-2900.

### *PGMS Continues Efforts While Supply Plans Meet New Obstacles*

During the past three months, many new obstacles have confronted plans to improve our area's future water supplies.

- The recently proposed Thompson Station reservoir site has provoked vocal and effective opposition from environmental groups.
- The newly elected New Castle County administration has voiced opposition to reservoir development and has threatened to cut funding for the Water Resources Agency and the water supply development Environmental Impact Statement project (EIS).
- One area water supplier has claimed that overestimation of future water demands and their increased supply potential have made large-scale supply improvement unnecessary. These claims are not entirely impartial and are being contested by state environmental officials. This development further confuses these issues.

Some positive developments have also occurred during this period.

- Despite the objections of County leaders, the EIS will continue and the reservoir option will still be evaluated.
- United Water Delaware's plan to construct an inflatable dam on the White Clay Creek has encountered little opposition. When completed, this dam would be capable of trapping tidal flows during dry periods to supplement existing supplies.

The First State Branch of PGMS continues its cooperative efforts with the Delaware

Association of Nurserymen (D.A.N.) in seeking viable alternatives for improved water supply development. Our efforts have included:

- Correspondence with the Army Corps of Engineers to support the inflatable dam project and the continued study of all EIS alternatives.
- Correspondence with state, county and municipal officials to encourage the completion of the EIS project.

PGMS, D.A.N., and the Golf Course Superintendents' Association are awaiting DNREC's third draft of proposed water use restrictions. After this draft is evaluated, a meeting is to be scheduled with the Delaware Emergency Management Agency (DEMA) to review the proposal.

Questions and comments on PGMS and DAN involvement in water issues can be directed to: Charles Jenner - 239-0996, John Feliciani - 888-4865 or Steve Castorani 239-4675.

## **TREE ROOTS AND THE HARDCAPE: RESEARCHER'S PERSPECTIVES**

**Deborah C. Swanson**

**Extension Educator: Landscape, Nursery  
and Urban Forestry Program**

Tree root systems were the topic of a workshop held at the American Society for Horticultural Science meetings in October. An interesting program given by Dennis Pittenger, University of California Cooperative Extension, and the discussion that followed summarized the current research and problems encountered with tree roots and hardscapes.

The soil beneath asphalt or concrete may not be as inhospitable an environment to roots as one might imagine. When roots grow under pavement, they tend to grow just beneath the surface where the oxygen supply is greatest. Once roots successfully navigate their way under a sidewalk to open ground, the roots on the other side can exploit new moisture and fertility resources. Subsequently, roots thicken up and can exert pressure on the pavement.

Preventing roots from damaging pavement begins with species selection and good design. Certain trees, like silver maple, have a "reputation" for surface roots, but according to my colleague, Dr. Davis Sydnor, just about any tree of ten-inch diameter can cause surface root problems. A four-by-four foot sidewalk cut-out would be preferable for medium or large size species.

Root pruning or trenching to correct a problem is costly and often severely affects the tree. Researchers who have attempted to determine how much of a tree root system may be safely removed have met with mixed results probably due to differential sensitivities among tree species. However, without a doubt, major root removal can cause tree decline and often mortality.

Preventing root growth by installing some type

of barrier has been successful in some cases. Most rigid root barriers are manufactured from plastic and take the form of solid, molded forms that are placed into planting holes, panels that are fastened together, or continuous sheets of material. The latter two types can be fitted to a planting hole or be used in a linear fashion along one side of a planting. Most materials are used to form a barrier between 12 and 24 inches deep. Some of the products have vertical ribs on the tree side that are supposed to direct roots down-ward and prevent circling. Some example of these barriers are products from the Deep Root, Vespro and Bumble Bee Manufacturers. Researchers who have worked with these materials have found that they do in fact direct root growth downward and protect hardscapes; however, there are drawbacks:

1. Root escapes were the biggest problem with the barriers. All rigid plastic barriers must have a tip that remains at least an inch above the soil line. Settling, mulching, or adding soil to cover the barrier will "encourage" roots to grow over it and defeat the purpose of the barrier.
2. Mowing and foot traffic can damage or crack the portion of the barrier that is above ground. Not all plastics hold up equally well; polyethylene is usually considered superior in durability and resilience. Connections that fasten panels together can also give way. Once a barrier is compromised in any way, roots can grow over or through it.
3. Since barriers entrain tree roots to grow downward before they can grow outward, trees with barriers may be destabilized and more subject to windthrow.
4. In cold climates, freeze and thaw cycles may reduce the useful life of the rigid barriers and heave them. Not surprisingly, most of the research with the rigid barriers took place in

California.

Flexible fabric barriers impregnated with a chemical toxic to roots are an alternative to rigid barriers. The Biobarrier product is an example of this type. Flexible root barriers won't heave in climates like Ohio, but are somewhat more difficult to install. The biggest problem with fabric barriers is that it is more difficult to prevent roots from growing over the top of them. Excess material must be allowed to remain above the surface. It's even more important not to mulch over fabric barriers than the rigid types. I don't see why the fabric could not be looped around a plastic or metal collar to keep it above the solid surface, but apparently no one had tried this at the workshop. Circling roots also may be more of a problem than with the rigid types with vertical ribs.

Most researchers at the October workshop agreed that, at best, properly installed barriers can buy some time before pavement is affected by trees roots. Roots that are entrained to grow downwards by barriers will grow towards the surface once the barrier is cleared. Thus, pavement disruption eventually occurs, only later. Is the time that is "bought" worth the considerable price of installing the barriers? Participants in the root workshop did not offer a cost/benefit analysis. Only future observations in the real world will tell us the story.

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## TREE ROOTS - WHERE ARE THEY?

**Alan R. McDaniel**

The plant root system may be described as unseen and unappreciated. It is extremely difficult to study an entire root system, particularly in the case of trees, said Diane Relf, horticulture specialist with Virginia Cooperative Extension at Virginia Tech. Heavy, woody roots, at diameters up to 12 inches, may be revealed by washing away the soil. However, trees also produce a multitude of hair-like, non-woody roots (about 0.008 inches in diameter).

### **Gravity pulls primary root; secondary roots branch horizontally.**

When a tree seed germinates, the primary root grows down in the soil in response to gravity. Secondary roots then branch off horizontally, with subsequent branching into tertiary roots, etc. Absorption of water and mineral nutrients is the function of the very fine, non-woody roots (the feeder roots). With continued growth, each root will lose its ability for absorption. These large woody roots then function as the transport system for water and nutrients from the new feeder roots to the stem. They are also the tree's system of anchorage and a food storage area. The resulting system thus consists of several main transport roots that extend radially and horizontally from the tree base and divide into ever smaller roots, each ending in a dense mass of fine feeder roots.

Because of the horizontal growth pattern of the tree root system, nearly 99 percent of all the tree's root mass is usually located in the top three feet of soil. The roots can also extend far beyond the tree's "drip line", typically radiating out from the trunk a distance of 0.5 to 1.5 times the tree's height. Imagine tree roots branching in a round pie plate one-yard deep and with a diameter 2 to 3 times the tree's height.

This growth pattern is a direct result of the root

biology. When the soft feeder roots become woody, or if they are lost to insect feeding or other physical damage, the absorption capacity is lost, and new feeder roots must be produced. This means that absorption is dependent on continued growth of new roots. Roots only grow where the physical and chemical environment is correct - temperature, moisture, aeration, pH, nutrient supply, and soil structure.

### **Roots grow where moisture is available.**

Roots do not seek water; they grow where moisture is available. Roots also need oxygen, and growth is restricted where oxygen is limited. Unless the tree is particularly adapted to growing in wet, swampy soils, the maximum rooting depth possible is just above the water table. In most soils, a satisfactory growing environment exists only within the top few feet. In fact, the greatest proliferation of tree roots will be found in the transition zone at the soil surface under the leaf litter in a forest or thoroughly intermingled with grass roots in a lawn.

The landscaping implications from this pattern are significant. In the case of tree fertilization, one researcher has stated, "Any tree growing in a well-fertilized lawn is well fertilized. Because the trees feeder roots are in the same soil volume as the grass roots, both have access to all the applied fertilizer."

There is no advantage to punching holes in the ground for deep application of general fertilizers, including phosphorus. We do need to be aware that the tree and turf are competing for those nutrients. Poorer growth of both may indicate that a higher application rate is needed, although remember that water may actually be the limiting factor.

Other lawn treatments can pose a threat to the trees. Some good turf herbicides are very damaging to trees and shrubs when absorbed by

the roots. The herbicide does not have to move down in the soil to the tree roots; these roots are with the grass and weed roots. Restricting herbicide application to the lawn outside the tree canopy may not be sufficient as we do not know how far the roots extend.

### **Injury to roots can take years to show.**

Other care is needed when the soil is disturbed. Construction or landscaping activities that cut roots of mature trees will often lead to the death of part or all of the tree top, commonly two years or more after the injury was done and forgotten. Keep in mind that tree roots do not respect property lines. The effects of these activities in your yard may be in your neighbors trees, and vice versa.

By far, the most common and serious root injuries we inflict on mature trees are from changing the soil's aeration. Adding soil, even as little as a few inches, over the existing surface, places the major root mass that much deeper. With less oxygen the roots may die quickly, and unless new roots can be rapidly produced in the surface soil, the tree will die. Soil compaction has the same effect, reducing the soil's air supply plus creating a physical barrier to new root growth. Recreation and other areas that receive regular foot or vehicle traffic are prone to this problem.

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## **PRODUCTION-BASED PRICING**

**Dr. Charles R. Hall**

Every day in the life of a greenhouse manager is filled with decisions. Some of these decisions are general in nature. Is the operation profitable enough to ensure its survival for the next five or ten years or longer? Am I marketing a quality product at a competitive price? Does my business have a reputation for being honest, fair and considerate to customers?

Other decisions tend to be more detailed. What size plants should I grow? Should I invest in new machinery or technology? What price should I try to negotiate for this item? Should I produce my own plugs, buy them from someone else, or use a conventional seeding system? How many plugs should I put in each pot?

The primary responsibility of any greenhouse manager is to answer these types of questions and achieve the objectives of the firm. Of course, maximizing profits is generally one of the most important objectives of any operation. Not only are managers faced with making decisions that potentially impact the firm's costs and revenues, they must implement solutions in a manner that is both efficient and effective.

### **Cost Accounting**

Cost accounting or budgeting is a tool that can help managers make these decisions. It is basically a plan to allocate resources among alternative uses. That includes labor, water, capital and any other resources that may be scarce or limited. Budgets provide a basis for planning labor needs and for financing (deciding when to borrow and how much). They also provide guidelines for when to buy supplies and when to sell products.

Cost-accounting budgets are especially effective when a record system designed for managing is already in place. Records are important in evaluating performance and developing and

refining budgets. Thus, the effectiveness of budgeting is a function of the quality of the recordkeeping system.

Tax records are the most common type of records kept by greenhouse managers. They provide a good picture of the costs and returns of the entire business from a tax accounting standpoint. However, since most producers grow several crops, tax records will not provide information on the costs and returns for an individual crop. Only through cost accounting can the costs involved in operating your business be allocated to specific crops.

Although cost accounting and record keeping are valuable managerial tools, they take time to maintain and therefore represent a cost themselves. The cost of preparing and maintaining budgets and records must be included in the total cost of the business.

### **Working Example**

The production of geraniums from unrooted cuttings makes a good example for studying cost accounting. These figures represent updated information originally reported by Brumfield in *Tips in Growing Zonal Geraniums*. It was assumed in this analysis that one cutting was used per 4" pot at a cost of \$0.14 per cutting and that the geraniums took 13 weeks to finish.

Costs are generally categorized as variable or fixed (overhead) and are treated differently. Variable costs increase as the number of plants produced increases, and vice versa. Fixed or overhead costs do not vary with production; they remain constant regardless of level of output, and are incurred even if production does not take place.

The best pricing strategies are based on the cost of production determined through cost accounting.

### **Variable Costs**

Variable costs are estimated by multiplying the quantities of each product used by their prices. These costs can be determined easily from invoices, but may have to be allocated to the appropriate crop. Materials should be charged directly to each crop according to the amount used. It is more difficult to allocate the costs of labor, machinery and equipment. That is where detailed records pay off.

Material costs include the cost of cuttings, pots, growing medium, fertilizer and other chemicals. Costs will vary from producer to producer depending on quantity discounts, method of payment, rate of fertilization, pesticide practices and other managerial decisions. In this example, the cost of materials per 4" geranium totals \$0.26, as summarized in the table (next page).

Production labor is slightly more difficult to allocate to each unit, but with some simple record keeping, that can be accomplished. Many production tasks involve one size of container over several hours. Note the number of people performing the operation and when they start and finish. Then count the number of units they finish in that time. From this you can calculate the time per unit and multiply it by the wage rate, including benefits. This will give you the cost of that specific labor task per unit. Even though this method is not precise, you will be amazed at how consistent the time per flat will be if you analyze the operation on several different days. Some unallocated labor (trips to and from the greenhouse, breaks, etc.) can be included in overhead costs and allocated on a per-square-foot-per-week basis.

Production labor costs for this example were estimated using a wage rate of \$6.45 per hour. This includes a base wage of \$5.00 and \$1.45 per hour for benefits including social security, workman's compensation, unemployment insurance, and vacation and sick days. The total

amount of labor needed to produce one 4" geranium was 73.6 seconds (15 seconds to stick the cutting, 15.5 seconds to pot the cutting, 4.8 seconds to apply pesticides, 14.6 seconds to water and fertilize, 23.7 seconds to harvest). Thus, the production labor charge totaled \$0.13 per 4" geranium. ( $\$6.45 \div 3,600 \text{ secs./hr.} \times 73.6 \text{ secs.}$ )

You must also account for interest on the money it takes to cover materials and production labor costs. First, divide the annual interest rate by 52 to obtain the weekly interest rate. Next, multiply that figure by the number of weeks your money has been used from the time production costs are first incurred until the 4" geraniums are sold. The interest rate is assumed to be 12 percent for this example.

### Overhead Costs

Overhead costs include depreciation, interest on fixed assets, repairs, taxes, insurance and general categories such as managerial salaries, utilities, office expenses, professional fees, advertising and promotional expenses and bad debts. These costs cannot be allocated to specific crops but can be allocated on some other basis such as cost per square foot per week. To do this, take all overhead costs and divide by the number of weeks in production to obtain an overhead cost per week. Next, divide that number by the total square footage of greenhouse space. Finally, multiply by the percentage of greenhouse space used by the 4" geraniums to determine the cost of geraniums per square foot per week.

Overhead costs for a typical 100,000-sq. ft. southwestern greenhouse operation are estimated to be \$0.082 per square foot per week (\$0.025 for depreciation, \$0.005 for insurance, \$0.006 for repairs, \$0.001 for taxes, \$0.024 for interest, and \$0.021 for general overhead items). The overhead cost per 4" geranium may be calculated as follows: 13 weeks in production x \$0.082/sq. ft./week x 0.25 sq.ft./plant =

\$0.27/plant.

### Total Costs

As seen in the table (below), total costs for producing a 4" geranium cost to \$0.68 per plant. This is assuming an ideal situation where all the geraniums produced are salable. In reality, this is not the case. Some plants are lost to insects, diseases or cultural problems; others may be of such poor quality that they cannot be sold. When losses occur, the empty bed space increases overhead costs per week, in addition to the variable costs which are lost. These factors must be considered when determining the true costs of production.

#### Cost of Producing Geraniums in 4" Pots From Unrooted Cuttings

Variable Costs:	\$ Per Pot
Unrooted cutting	0.14
Oasis cube	0.02
4" plastic pot	0.05
Fertilizer	0.01
Growing media	0.03
Chemicals	0.01
Labor	0.13
Interest on operating capital	<u>0.02</u>
<b>Subtotal, variable costs</b>	<b>0.41</b>

Overhead Costs:	\$ per sq.ft. per wk.
Depreciation	0.025
Insurance	0.005
Repairs	0.006
Taxes	0.001
Interest on fixed assets	0.024
General overhead items	<u>0.021</u>
<b>Subtotal, fixed costs</b>	<b>0.082</b>

13 weeks x \$0.082 per sq. ft.  
x 0.25 sq. ft. per pot = **0.27**  
**Total fixed and variable  
cost per 4" geranium** **0.68**

### **Profitable Crops**

Now that we've discussed how cost accounting budgets are developed, let's talk about how they can be used. First of all, the estimated profit of various crops can be compared to select the more profitable crops and crop combinations. You may be producing crops that are not breaking even.

Breaking even in cost accounting terms is not necessarily a bad thing. Remember that all costs are being covered including opportunity costs. Positive expected profits may be viewed as a return for risk.

### **Minimum Prices**

One of the most important benefits of cost-accounting budgets is that they help establish a minimum selling price based on production costs. There are many ways of pricing horticultural products; some are good, and some are not so good.

One of the most popular pricing methods is to check what competitors are charging for similar products and charge about the same price.

However, if you do this you are assuming that (1) your competitors know their production costs and are pricing their products to cover these costs, and (2) that your production costs are the same or less than your competitors'. If either of these assumptions is incorrect, the possibility of losing money exists.

Another popular pricing strategy is to increase prices on all products by a given percentage every year or so. This strategy assumes that any changes in production costs affect all aspects of an enterprise in the same manner, which is not true.

The best pricing strategies are based on the cost of production determined through cost accounting. Once the total costs of producing a crop are determined, the minimum price that

should be charged is revealed. The final price depends on what you feel is a fair return on your investment and the risks associated with producing greenhouse crops. Again, by using production costs as a guide to pricing your products, you are at least guaranteeing that all your costs are covered.

### **Business Variations**

Please keep in mind that every business has different costs. Do not assume that your costs are the same as this example. Every greenhouse firm faces its own unique set of circumstances and, thus, its own unique set of costs. Costs vary from greenhouse to greenhouse because of climatic location, size, managerial skill and style, market channel, time of year, space use, wage rates, age and condition of facilities, and many other factors.

Comparing your costs to industry averages will reveal areas where your costs are too high and others where your costs are low and you have a market advantage. However, looking at industry averages is no substitute for doing your own cost accounting.

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## MAXIMIZING MARATHON

Raymond A. Cloyd

Greenhouse managers are well aware of the effectiveness of Marathon 1G (imidacloprid) in managing whiteflies and aphids on crops such as poinsettias and chrysanthemums. Marathon has also shown activity on mealybugs and scales. It has provided excellent crop protection and has reduced the need for spray applications that could injure crops. However, the benefits of this product will continue only as long as greenhouse managers use it properly. The following guidelines will help to maximize its effectiveness.

### 1. Make applications to each pot.

Marathon should not be broadcast over the top of potted plants because some pots may not receive enough material. This can result in whiteflies and aphids accumulating on the plants which then act as reservoirs for the pests. In some instances, greenhouse managers mistakenly assume that the presence of whiteflies and aphids on plants treated with Marathon indicates that these pests are resistant to the material. However, the problem is more likely that plants either didn't receive enough material or were missed entirely.

### 2. Water plants appropriately.

The active ingredient in the Marathon granules needs to be activated by watering. During the first week after application, water lightly to give plants a chance to take up the material before it leaches through the bottom of the pot. The use of mineral soil in the growing media may help reduce leaching and increase uptake by the plant.

### 3. Make applications to actively growing plants with established root systems.

Marathon is a systemic insecticide, which is taken up by the roots. If applied before plants have established root systems, it can be leached out of pots without plants taking up the active

ingredient. In most cases, it is best to wait one to two weeks after transplanting before applying Marathon.

Marathon does not move very well in old or mature plant foliage. It is important to apply it early in the plant's growth cycle so the active ingredient can be translocated throughout the plant. If the material is applied later in the crop cycle, it may take longer for the active ingredient to move throughout the plant, delaying pest control. In addition, not enough active ingredient may be present in the plant tissues to kill pests.

It is best to apply Marathon during sunny, warm periods to enhance uptake by the plant.

Even when using Marathon correctly, greenhouse managers should maintain their scouting program. Marathon has a delayed action; a seven-to-ten-day delay between application and uptake may be too long to allow the material to rescue plants from a heavy pest infestation. Marathon should therefore be used on a preventative basis. If pest populations get out of hand, other insecticides must be applied. Growers should scout their crop regularly to prevent pest populations from building up.

Marathon does not translocate well into flowers. As a result, control of western flower thrips, aphids and other pests feeding in or on flowers will require the use of contact insecticides.

Marathon shows minimal control of spider mites. Due to the reduction in regular broad-spectrum sprays, arthropods such as the Lewis mite, *Eotetranychus lewisi*, have been observed attacking poinsettias. Materials for mite control may need to be applied to prevent economic damage to the crop.

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## PESTICIDE NEWS

### Insecticides:

D2N Diazinon 4E - Novartis - Added to their label the usage on Scotch pine for the control of the European pine sawfly.

LARSBAN 4E (chlorpyrifos) - Dow Elanco - Added to their label the control of midges on Douglas Fir.

CONSERVE (spinosad) - Dow Elanco - Being developed for usage on turf and ornamentals.

DACTHAL (DPTC) - ISK Bioscience - The company has decided to discontinue the manufacture of this product.

MESUROL 75% (methiocarb) - Bayer - Gowen Co. will market this discontinued product to the floriculture industry to control western flower thrips.

### Fungicides:

TM-402 - Tomen Agro - This new non-systemic fungicide will be marketed in US to control Botrytis and Monilinia on ornamentals.

DRENCH PAK (thiophanate - methyl/metalaxyl) - Cleary - A combination dual pack product being promoted as a soil drench on greenhouse crops and transplant seedling beds to control damp off and other diseases.

HERITAGE (azoxystrobin) - Zeneca - EPA has approved an application to register this new active ingredient to control certain diseases in commercial turf.

SYSTANE (myclobutanil) - Rohm & Haas - Added to their label the usage on poinsettias and chrysanthemums.

### Herbicides:

PRE PAIR (napropanide (oxadiazon) - UHS - A new formulation used to control broadleaves and grasses on ornamentals.

### Miscellaneous:

Rohm & Haas - The company has signed up IMC Vigoro as a new formulation to use Dimension crabgrass prevention in their turf fertilizer production.

A-REST (ancymidol) - SePro - Submitted a new label to EPA to allow this growth regulator to be used on any container grown ornamental crop grown both inside and outside the greenhouse. New crops on the label include impatiens, pansy, begonia, portulaca and others. Also a chemigation method of application will be on the label.

## RESEARCH BRIEFS

### **Propagation:**

**Biosolids improve rooting.** Municipal activated biosolids added to rooting percentages of *Bougainvillea* improved shoot and root development of the rooted cuttings as compared to treatment with IBA rooting hormone and mini-osmocote fertilizer. The most effective concentration varied with biosolid source. N. Atzmon, Z. Wiesman and P. Fine. (*J. Environ. Hort.* 15(1), March 1997.)

**Shade levels and IBA affect rooting.** Shading cuttings in the rooting environment to levels at or greater than 91% resulted in the highest percentage rooting of cuttings for 7 of 8 species tested. For the most part, IBA treatments were also necessary for the highest rooting percentages. High levels of shade is a strategy to increase rooting percentage for some difficult-to-root species. J.J. Zaczek, C.W. Heuser, Jr. and K.C. Steiner. (*J. Environ. Hort.* 15(1), March 1997.)

**Promoting offsets on hosta.** BA application to hosta may decrease production time of a wide range of cultivars, including certain cultivars that are otherwise slow to produce offsets. Among the cultivars evaluated in this study, BA application to 'Big Daddy', 'Francee', 'Francis Williams', 'Krossa Regal', 'Aureo-marginata' and 'Royal Standard' resulted in the largest increase in offset production. J. M. Garner, G.J. Keever, D.J. Eakes and J.R. Kessler. (*HortScience* 32(1), Feb. 1997)

**Propagation of 'Carolina Sapphire' smooth Arizona cypress by stem cuttings.** This fast-growing, attractive evergreen tree has considerable potential for landscape and Christmas tree use. Cuttings could be rooted at all growth stages but rooting percentages were highest at semi-hardwood and hardwood growth stages. H.L. Stubbs, F.A. Blazich, T.G. Ranney and

S.L. Warren. (*J. Environ. Hort.* 15(2), June 1997)

### **Micropropagation of *Stewartia***

***pseudocamellia.*** *Stewartia pseudocamellia* was propagated successfully by tissue culture and rooted easily under intermittent mist following treatment with Hormodin 1. P.J. McGuigan, F.A. Blazich and T.G. Ranney. (*J. Environ. Hort.* 15(2), June 1997)

### **Field Production:**

**Susceptibility of 'Skyline' honeylocust to cankers.** Susceptibility of honeylocust to nectria canker, a stress-related disease, was increased by practices associated with bare soil conditions: cultivation and herbicide management. This might be due to delayed cold hardiness development and subsequent winter injury or root injury. Trees grown with a vegetative groundcover such as bird's foot trefoil, winter rye and grass sod were less likely to get canker. J.B. Calkins and B.T. Swanson. (*J. Environ. Hort.* 15(1), March 1997.)

**Controlling rooting-out of B&B nursery stock.** Spin Out<sup>TM</sup>-treated burlap effectively reduced rooting-out into mulch over a four-month storage period. B.K. Maynard and W.A. Johnson. (*J. Environ. Hort.* 15(2), June 1997)

### **Container Production:**

#### **Economic feasibility of micro-irrigation.**

Cyclic micro-irrigation for container production offers a viable alternative to overhead irrigation systems, despite the higher costs associated with installation and maintenance. Water consumption was between 1/4 and 1/16 the level of overhead impact sprinklers, depending on container size (#3, 7, 10 and 15). Profitability was higher due to the shorter times required to achieve a salable crop. J.J. Haydu and R.C. Beeson, Jr. (*J. Environ. Hort.* 15(1), March 1997.)

**Composted green waste as a container medium component.** Unblended composted green waste (CGW) was not consistently equivalent to traditional potting mix in terms of overall growth. If CGWs are to be used as a container medium, they will have to be blended with some other material to minimize inherent deficiencies (i.e. water holding capacity, porosity, etc.) and variability among sources. Seed germination was most problematic in CGW and woody plants were least affected. The use of CGW as an amendment (25%-50%) is promising as a low-cost alternative to peat or bark products. (Peat is currently four times the cost of CGW.) D.W. Burger, T.K. Hartz and G.W. Forester. (*HortScience* 32(1), Feb. 1997)

**Shade influences *Kalmia* production.** Shading resulted in no growth reduction during the first year of production. Shading improved leaf color, therefore giving the appearance of a healthier plant. During the second year of production, growth was reduced by shading. Shading during year one may be beneficial to maintain a cooler root zone for young plants. By year two, the roots are shaded by plant foliage. Shading is not necessary in the northeastern US. If nurseries use shade, they should use 40% or less. M.H. Brand. (*HortScience* 32(2), April 1997)

**Phosphorus retention in pine bark-based medium.** Super phosphate is often recommended as a n addition to soilless growing media for nursery container production. Results of this study indicate that phosphorus from soluble super phosphate (SSP) was quickly released from the medium and may be unnecessary. Plant dry weights did not differ regardless of P-source. But controlled release fertilizers, (such as CTP) slow P release and retain available P for plant use over a longer period of time. J.D. Cole and J.M. Dole (*HortScience* 32(2), April 1997)

**Compost and rubber tire chips as peat**

**substitutes.** Fifty percent peat replacement with mature compost in conventional media enhanced plant growth and performance. Rubber tire chips were unacceptable as a peat substitute when used at high rates (OK at 50%). Use of immature compost in container media negatively influenced plant growth. J.B. Calkins, D.R. Jarvis and B.T. Swanson. (*J. Environ. Hort.* 15(2), June 1997.)

**Estimating container plant production costs.** Fixed costs per plant represented approximately one-third of total cost per plant for each variety and production method. Without allocation of fixed costs, the variable cost per plant may be below selling price falsely leading the nursery owner to believe that a profit is made by selling that type of plant. K.H. Foshee, L.O. Helms and T.D. Phillips. (*J. Environ. Hort.* 15(2), June 1997)

#### ***Greenhouse Production:***

**Irrigation systems affect root distribution.** Geraniums were grown using hand (HD), microtube (MT), ebb and flow (EF) and capillary mat (CM) irrigation systems. Irrigation affected the distribution of root growth, which was negatively correlated with soluble salt and N concentrations in the root medium regions. Soluble salts and medium-N were concentrated in the top region of root balls produced with subirrigation systems (CM, EF), while surface irrigation, especially the HD irrigation system caused a relatively even distribution of root growth, salts and root medium-N. pH was lowest in the bottom region of the root ball regardless of irrigation system. All irrigation systems produced similar shoot growth. EF resulted in the least runoff. J.K. Morvant, J.M. Dole and E. Allen. (*HortTechnology* Vol. 7, No. 3, April-June 1997)

**Pinching influence on delphinium production.** Pinching lengthened the duration from planting to harvest of delphinium cultivars, however, stems were longer and yield was higher among pinched plants. A production

program for delphinium could include non-pinched plants for earliness and pinched plants for enhanced stem length and yield. J.M. Garner, S.A. Jones and A.M. Armitage. (*HortScience* 32(1), Feb. 1997)

***Landscape Installation and Management:***  
**Hydrophilic polymer in annual landscape beds.** Under dry conditions, the incorporation of a hydrophilic polymer increased growth, but not flowering of marigolds. There was no increase in growth or flowering of vinca. When water was plentiful, incorporation of hydrophilic polymer provided no benefit. J.L. Boatright, D.E. Balent, W.A. Mackay and J.M. Jajicek. (*J. Environ. Hort.* 15(1), March 1997.)

***Weed Control:***  
**Corn gluten hydrolysate as an herbicide.** Corn gluten hydrolysate (CGH) is a water soluble material derived from corn gluten meal (CGM), a material that has shown potential as a natural herbicide. CGH reduced the survival of all 19 broadleaf grass species tested. Buckhorn plantain, common lambsquarters, creeping bentgrass and yellow foxtail were the most susceptible species (greater than 74% reduction at the lowest rate (1 g/dm<sup>2</sup>)). The second most susceptible species were barnyard grass, black medic, curly dock, giant foxtail, large crabgrass, purslane and red root pigweed (greater than 50% reduction at the lowest rate). All species, except annual ryegrass, died at the highest rate (8 g/dm<sup>2</sup>). Less CGH was required to achieve the same inhibition as CGM. D.L. Liu and N.E. Christians. (*HortScience* 32(2), April 1997)

***Insect and Disease Control:***  
**Biological control of rose powdery mildew.** *Telletopsis pallescens* spore suspension or culture filtrate provided excellent control of rose powdery mildew. It shows promise for the commercial greenhouse environment. K.K. Ng, L. MacDonald and Z.K. Punja. (*HortScience* 32(2), April 1997)

**Control of iris borer.** Two species of entomopathic nematodes (*Steinernema carpocapsae* and *Heterorhabditis bacteriophora*) provided control equal to that of imidachloprid and dimethoate for iris borer on bearded iris. S.A. Gill and M.J. Raupp. (*J. Environ. Hort.* 15(2), June 1997)

***Marketing:***  
**Consumer perceptions of service quality.** Surveys of retail florist and supermarket florist customers showed customer expectations were similar regardless of the outlet patronized. Overall, traditional florists did a better job at meeting their customers' expectations. Performing services at the time promised was the area in which retail florists could improve the most. Results indicate that either retailer could gain or regain market share by reducing the gaps between customer expectations and perceptions, especially in areas related to personnel. W.A. Becker, B.K. Behe, J.L. Johnson, C.D. Townsend and K.K. Litzenberg. (*HortScience* 32(2), April 1997)

# Publications

**Dirr's DC-ROM Assists Professionals and Students Alike** by Jennifer Jaros. A digital garden consisting of 118 families, 423 genera, 1,474 species, 1,977 cultivars and 142 varieties and subspecies is blooming under the guidance of PlantAmerica, New Britain, PA. Michael A. Dirr's Photo-Library of Woody Landscape Plants is now available on CD-ROM through American Nurseryman Publishing Co. For more information, contact Kathy Valduga, director of book distribution, at (800)621-5727 or fax (312)782-3232. For more information on the program, contact PlantAmerica at (888)752-6823 or fax (516)674-4241; or visit the company's Web site at <http://www.plantamerica.com>.

**American Association of Nurserymen Releases New Edition of American Standard for Nursery Stock.** This book is widely recognized by the nursery industry as the primary reference for standardization of plant terminology. Contains illustrated charts, tables, and drawings, this latest edition is organized into 13 major sections that cover the full range of nursery plants. Copies are available for \$15, plus \$5.75 shipping/handling. For further information on AAN or the American Standard for Nursery Stock, contact AAN Publications at 202/789-2900, or fax your Visa or Mastercard order to 202/789-1893.

**ALCA Landscape Industry Employee Compensation and Benefit Report.** This publication will provide you with the facts and information you need in today's competitive business environment. Data was collected from landscape companies throughout the nation for this in-depth study of landscape industry compensation. Order your copy of the ALCA Landscape Industry Employee Compensation and Benefits Report today, and obtain this insightful and informative guide to bettering your business. Cost \$45 each (members) \$75 each (non-members plus \$5 per copy to cover shipping via credit card by calling 1-800-395-ALCA.

**Systems for Success: Strategies for Maximum Efficiency in Landscape Installation and Nursery Production** by Dwight Hughes, Jr., owner of Dwight Hughes Nursery, Cedar Rapids; with Julie S. Higginbotham, former editor of American Nurseryman. 1996. Covers 96 pages of Hughes' application of time, market and employee-management principles to landscape and nursery operations. Contains 140 black-and-white photographs and illustrations, detailing labor-saving systems, such as handling and planting, truck customization, customer service and nursery production. Includes tips and techniques on how to increase efficiency

and profitability with adding to payroll. For more information call: Kathy Valduga, director of book distribution, American Nurseryman Publishing Co. (800)621-5727 or (312)782-5505 (in Chicago); fax (312)782-3232.

**Shrubs for Landscape and Amenity Uses** by Plant Publicity Holland. 1996. 24-page, full-color booklet surveys the scope of shrubs and separates them into four categories: shrubs for rural areas, for municipal outskirts, for residential and working environments, and for solitary plants and containers. The booklet includes planting and culture information. Separately, Plant Publicity Holland has produced a four-part "season series" of posters designed for garden centers. Each full-color poster includes photographs of perennials, conifers and ornamental shrubs that provide color during a given season. For more information call: Kathy Valduga, director of book distribution, American Nurseryman Publishing Co. (800)621-5727 or (312)782-5505 (in Chicago); fax (312)782-3232.

**National Pesticide Telecommunications Network.** If you or your customers have pesticide questions and need an objective information source, consider NPTN, the National Pesticide Telecommunications Network. NPTN is a toll-free information service sponsored cooperatively by the Oregon State University and EPA. The service provides science-based information on a wide variety of pesticide-related subjects, including pesticide products, poisonings, toxicology, and environmental chemistry. While NPTN cannot provide information about which pesticide to use to control a particular pest, NPTN can direct callers to a number of other information sources.

# Calendar

**July 10-13** - Convention. American Association of Nurserymen. Opryland Hotel, Nashville, TN. Call: (202)789-2900 or fax (202)789-1893.

**July 12,13,14,15 & 16 - (Educational Seminars)-** 1997 Ohio International Floral Short Course, Let Yourself Grow! Cincinnati Convention Center, Cincinnati, Ohio. Sponsor: Ohio Florists' Association, with cooperation from The Ohio State University. For more information contact: Ohio Florists' Assoc., (614)487-1117, fax: 614-487-1216.

**July 13,14 & 15 -(All-Industry Trade Show) -** 1997 Ohio International Floral Short Course -Same information as above.

**July 15,17,22,24** - Herbaceous Plant Production, Ornamentals Short Course Series, Research & Education Center, Georgetown, 6-8 pm. Contact Dot Milsom, (302)831-2531.

**July 17** - pH & Soluble Salts Testing For Interiorscapes, 227 Luerssen Bldg., Berks Campus, 9:30 am - 2:30 pm. Contact Thomas Contrisciano (610)378-1327.

**July 29-31** - PANTS. Pennsylvania Landscape & Nursery Assoc., Ft. Washington Expo Center, Ft. Washington, Pennsylvania Landscape & Nursery Association. Call: 800-898-3411, (717)238-1673, fax: 717-238-1675, e-mail: plna@plna.com.

**July 31-August 1** - "SNA 97" Researcher's Conference and Trade Show. Georgia World Congress Center. Host Hotel: Marriott Marquis, Atlanta, GA. Contact: Danny Summers, (770)973-9026 or SNA infoline, (770)973-4636.

**August 3-6** - 73rd International Society for Arboriculture Annual Meeting. Salt Lake City, Utah. Contact: ISA office (217-355-9411).

**August 3-9** - Symposium. Perennial Plant Association. Sheraton Imperial Hotel and Convention Center, Durham, NC. Call: (614)771-8431 or fax (614)876-5238.

**August 4-7** - Perennial Plant Association Meeting, with tours prior to and after. Sheraton Imperial Hotel, Research Triangle Park, NC. Contact: Steven Stills, (614)771-8431 or fax: 614/876-5238.

**August 4-8** - 1997 Professional Course Schedule- Topic: Field Wetland Botany, Environmental Concern, Inc. (EC)

- St. Michaels, MD. 8 am - 5 pm. Cost \$600. For more information please call (410)745-9620; fax:410-745-3517.

**August 6** -1997 Professional Course Schedule- Topic: Constructed Wetlands for Stormwater and Sanitary Wastewater Treatment, Environmental Concern, Inc. (EC) - Patuxen NWVC, Laurel, MD. 9:30 am - 5:30 pm. Cost \$145. For more information please call (410)745-9620; fax:410-745-3517.

**August 6** - Running a Landscape Business in the Electronic Age, Ornamentals Short Course Series, Townsend Hall, Newark, 9 am - 3 pm. Contact Dot Milsom, (302)831-2531.

**August 14** - 10th Annual Summer Turf and Nursery Expo. Joseph Wick Nurseries, Smyrna, DE. Contact Marianne McGloin, (302)677-1895.

**August 19,21,26** - Shade Trees for the Landscape, Ornamentals Short Course Series, Fischer Greenhouse, Newark, 3-5 pm. Contact Dot Milsom, (302)831-2531.

**September 4-6** - Sustainable Tree Care Conference, an intensive course in soil fertility, tree health and insect/disease resistance. University of California, Los Angeles, sunset Village Complex - Horizon Room, 2931 Markridge Road, LaCrescenta, CA 91214. For more information phone: (818)248-4425 or (818)248-9522.

**September 11,16,18** - Diagnosis & Control of Diseases on Woody Ornamental Plants, Ornamentals Short Course Series, Research & Education Center, Georgetown, 4-6 pm. Contact Dot Milsom, (302)831-2531.

**September 16-17** - Quarterly Pesticide Applicator Training, Kent County Extension, 2319 S. Dupont Highway, Dover, DE (exam at the Delaware Dept. of Agriculture on Sept. 17. For more information contact: Susan P. Whitney, (302)831-8886, fax 302/831-3651.

**September 17-20** - 8th National Urban Forest Conference: Cities by Nature's Design, Atlanta, GA. Contact: American Forests, P.O. Box 2000, Washington, DC 20013.

**September 22-23** - 1997 Professional Course Schedule- Topic: Wetland Evaluation Methods, Environmental Concern, Inc. (EC) - Patuxen NWVC, Laurel, MD. 9:30 am - 5:30 pm. Cost \$475. For more information please call (410)745-9620; fax: 410-745-3517.

**September 23-25** - Diagnosis & Control of Insects on Woody Ornamental Plants, Ornamentals Short Course

Series, Research & Education Center, Georgetown, 4-6 pm. Contact Dot Milsom, (302)831-2531.

**September 24** - Ornamentals Research Expo, UDBG, University of Delaware, Newark. Contact Sue Barton (302)831-1375.

**September 24-26** -1997 Professional Course Schedule- Topic: Wetland Mitigation, Environmental Concern, Inc. (EC) - Patuxen NWVC, Laurel, MD. 9:30 am - 5:30 pm. Cost \$575. For more information please call (410)745-9620; fax: 410-745-3517.

**October 14, 15 &16** - Nursery and Garden Center Tour, Maryland & Virginia nurseries and garden centers. Contact Dave Suchanic (610)489-4315.

**October 15** -1997 Professional Course Schedule- Topic: Uses for Constructed Wetlands, Environmental Concern, Inc. (EC) - Patuxen NWVC, Laurel, MD. 9:30 am - 5:30 pm. Cost \$135. For more information please call (410)745-9620; fax: 410-745-3517.

**October 20-24** -1997 Professional Course Schedule- Topic: Wetland Delineation, Environmental Concern, Inc. (EC) - Patuxen NWVC, Laurel, MD. 9:30 am - 5:30 pm. Cost \$500. For more information please call (410)745-9620; fax: 410-745-3517.

**October 21** - CNP exam. Delaware Department of Agriculture, Dover, DE. Contact Marianne McGloin (301)677-1895.

**December 2-3** - Quarterly Pesticide Applicator Training, Sussex County Extension office, RD #6, Box 48, Georgetown, DE. Contact: Susan P. Whitney (302)831-8886, fax: 302/831-3651.

**December 9-10** - Quarterly Pesticide Application Training, Kent County Extension, 2319 S. Dupont Highway, Dover, DE.(exam at Delaware Dept. of Agriculture on Dec 10th). Contact: Susan P. Whitney (302)831-8886, fax: 302/831-3651.

