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

Hello summer! I hope this glorious season is proving to be enjoyable for everyone on both a professional and personal level. Our Summer Expo is quickly approaching --August 20th to be exact. The expo will once again be held at Joseph Wick Nurseries, Ltd. We will have the opportunity to visit with exhibitors, tour the nursery, hear from some outstanding speakers, and obtain a pesticide credit. Our afternoon will enable us to blow the dust off our golf clubs and get out there to hit a few. Our inaugural golf tournament will be held at Garrison Lake Country Club (next door to Wick Nurseries) followed by dinner. I look forward to meeting many of you at this event. Registration forms are on the way.

Plans are in the works for a 25th Anniversary Dinner. Dates and locations are being considered by the committee. This will surely be an event you don't want to miss! More information will follow as it becomes available.

The DAN participates in several events per year that focus on the general public. For example, the DE State Fair, Ag Days at the Christiana Mall, and the Tree Spree hosted in part by the DE Center for Horticulture. The board has been actively pursuing ways we can convey the Delaware Association of Nurserymen message to the public. We've been redesigning our show booth to include planting tips; provide more emphasis on the Plant of the Year and the CNP program; and have handouts available to the public on the CNP's in Delaware. We would also provide a list of all landscapers and garden centers that are DAN members.

Last but far from least, please keep in mind our Landscape Awards Program. In order to be

eligible, the landscape: must be designed and installed by a current DAN member; and must have been completed in the past 24 months. All landscapes are judged by committee. So take your photographs now and look for the application to be arriving soon in the mail. Applications must be submitted by September 28th with photographs and/or landscape plans.

**NOTES FROM THE PRESIDENT**  
**Naomi McCafferty**  
**President, D.A.N.**

Get ready, set, mark your calendar! Valann has touched on the many events coming up. So I'll focus on how I've enjoyed interacting with the D.A.N. It has been great to meet so many green industry professionals. These folks have deep and varied backgrounds in the business and an enthusiasm that's contagious. I now have contacts all over the state that I feel I can call for advice or help. I encourage all D.A.N. members to look beyond their local area and see what others are doing. The great part is that these opportunities are available not just to the President of D.A.N., but all active members.

By now maybe you're wondering how these opportunities arise. Well, they happen every time several green industry professionals get together, such as; the Summer Expo, the Ornamentals and Turf Workshop (fall), The Delaware Horticulture Industry Expo (winter). Yes, you might even call it networking. I've benefited from the experience of others, and shared with others. So, the next time you see an agenda for a meeting or workshop, look beyond the face value. Perhaps there is really more in store for you. Thanks to the D.A.N., I've met many great people with the same interests and concerns, the *green industry leaders!* I hope to meet you at the next D.A.N. event.

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

I am working on three new projects that have been funded by the Horticulture Research Institute (HRI) and the National Urban and Community Forestry Advisory Council (NUCFAC). I started the HRI project this spring. I am working with researchers in 7 other states to determine the affect of different types of landscaping on home value. We are looking at three levels of design sophistication, four levels of plant material and hardscape types, and three levels of plant sizes for a total of 36 treatment combinations. By using a statistical tool called conjoint analysis, we can show consumers 16 different computer-generated photographs and ask them to determine what they would pay for each home and landscape combination. Then we can break down the analysis to determine the treatment factors that impacted their decisions. I will be conducting this survey at the Delaware Home Show in October.

I have started working on the two NUCFAC projects the summer. The first project is a garden center point-of-purchase display. I plan to develop a display that will convey simple tree selection, planting and care instructions as well as promote tree planting. We are currently soliciting input from the industry with two national focus groups. If you'd like to add your two cents, give me a call. We will develop two display prototypes with a team of graphic artists and present those to the industry at the Management Clinic in February. Then we'll distribute the displays. Let me know if you would like to receive a display. Finally, we will conduct several types of surveys to measure the effectiveness of the display in educating garden center customers and promoting tree sales.

We will be studying several roadside vegetation

planting schemes for the second NUCFAC project. I am working closely with Gary Schwetz from the Delaware Center for Horticulture. We will be installing four treatment options throughout Delaware. Treatments include: : 1). Edit existing vegetation and add desirable native species, 2.) Cutback treatment with woody plants and herbaceous perennials and grasses in two cutback zones, 3) Herbaceous perennials and grasses and 4) Annual flowers seeded yearly. We will monitor establishment procedures and costs; maintenance procedures and costs; environmental impacts; and public perception for each treatment. Results will be used to develop recommendations for highway vegetation managers.

The second session of Ornamental Short Courses has begun with a pest walk in Kent County at the Governor's mansion on August 6, 1998. We have changed Jay Windsor's Herbaceous Plant ID from August 11, 18 and 25 to September 8, 15 and 22 from 3:30 until 5:30. If you want to learn about new annuals and perennials, don't miss this one. Jay will use plants in the herbaceous garden, specimens from his greenhouse and slides to illustrate some of the many to species and cultivars available to the trade.

On August 19, from 10 AM to 2 PM, we will be offering for the first time--Basic Landscape Management for Spanish-speaking Personnel. The course, taught by Raul Cabrera and Pedro Perdomo from Rutgers Cooperative Extension, will cover basic planting techniques, as well as landscape and turf maintenance. The entire course will be conducted in Spanish. This is a great opportunity to offer quality training to your personnel!

The Irrigation short course has been rescheduled for August 18 from 9-3. You will meet at the New Castle County Extension Office in

Newark.

Bob Mulrooney will lead a course in Disease Identification and Control on September 3, 8 and 10 in the Fischer Greenhouse Classroom from 6 to 8 PM.

A final pest walk will be held at Winterthur from 9 AM to 12 PM on September 15. Bob, Dewey and Sue will lead the group and discuss insect, disease and cultural problems we find in the landscape.

During October, we will hold an Insect and Weed Short Course at the Research and Education Center in Georgetown. Jay Windsor and Derby Walker will cover the major insects and weeds that plague woody ornamental plants. This class will be offered on October 6 and 8 from 3 - 5 PM.

John Frett, fresh from his sabbatical will cover Shrubs for the Landscape during three sessions on October 7, 14 and 21 from 5-7 PM. The course will begin in the Fischer Greenhouse and proceed out into the UDBG grounds for plant identification.

Ellen Baldo will be teaching her popular landscape design course on October 13, 15 and 20 from 7 to 9 PM in Worrilow Hall in Newark.

You should have received the new flyers several weeks ago. If you've misplaced yours, call Dot Milsom at 831-2531 for a new flyer.

Don't forget this year's Ornamentals Research Expo, scheduled for Wednesday, September 23. We will showcase several research and demonstration projects as well as provide plant give-aways, courtesy of John Frett. Look for flyers soon.

**DELAWARE DEPARTMENT OF  
AGRICULTURE  
PLANT INDUSTRIES NEWS**

**Lynn Harrison, Sr. Entomologist**

The Department of Agriculture has recently received bulletins from USDA-APHIS (Animal Plant Health Inspection Service) and Craig Regelbrugge, Director of Regulatory Affairs for the American Nursery and Landscape Association, requesting our support to prevent the importation of European Rhododendron plants established in growing media from entering the United States. European Rhododendron growers, who ship a multitude of plants to the United States, have requested that USDA-APHIS allow Rhododendrons to join the list of plants currently allowed to enter the U.S. potted in growing media. APHIS is in the process of reviewing a pest risk analysis for Rhododendron plant pests. Some of the reasons given for excluding the importation of Rhododendron in growing media include, (1) the rust fungus *Chrysomyxa ledi* var. *rhododendri* saying it should be considered a pest of quarantine significance to the U.S., and (2) to date, thirty-nine exotic pests have been reported on Rhododendron in Europe. Several of these are serious quarantine pests not known to occur in the U.S.

The disease *Chrysomyxa*, by itself, is a high pest risk potential that should be considered a significant threat to both native and cultivated Rhododendrons. An alternate host of this disease is the spruce tree. The probability of some virulent form of the disease entering, without postentry quarantines to monitor for its presence, is greatly increased. The spruce is a very popular Christmas tree species, as well as, being highly valued for its ornamental uses. The results of an infection of spruces by this disease could be devastating. For more updates,

contact the Plant Industries Section of the Department of Agriculture.

Nursery field grown stock and retail store inspections are currently in progress. You may be receiving, or may have already received, a visit from the nursery inspector this year. Depending on the scope and size of your business, you may receive additional visits each year as your inventory changes. To date, the Department has four individuals inspecting plant material at either the retail location or growing in the field. In addition to general insect and disease inspections, we are plotting Global Position system (G.P.S.) coordinates of business locations, field locations, nursery stock type, etc. This information is presently being used to map areas for exotic pest surveys. At this time, we are surveying statewide for pine shoot beetle in Christmas tree plantations and chrysanthemum white rust in perennial varieties of chrysanthemums. The G.P.S. units are recent equipment additions to enhance the quality and reporting procedures of our nursery inspections and certifications.

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).

## **VOLES**

**Ron Kujawski**

**UMass Extension Educator - Landscape,  
Nursery, and Urban Forestry**

We've been hearing a lot this year about vole damage to landscape plants; everything from bulbs and perennials to trees and shrubs. Most of this damage is from the meadow vole, sometimes called meadow or field mouse, and by the pine vole. The meadow vole is a stocky animal, 3.5 to 5 inches long, dark brown in color, with a tail that is 1.4 to 2.6 inches long. The eyes and ears are small. The pine vole is a bit smaller, 2.8 to 4.2 inches long, with a short tail, 1 inch or less in length. The fur is smooth and auburn in color.

Both voles are common in orchards and open grasslands, but have also found their way into landscapes. Meadow voles spend most of their time above ground, where they maintain an elaborate system of trails, an easy diagnostic feature. They may spend some time underground if soils are cultivated or where there are existing burrows. Pine voles spend most of their life in underground tunnels that are usually within 1 or 2 inches of the soil surface, but will also travel via surface runways, often using the same runways as meadow voles. Pine voles will push soil out of their tunnels after burrowing for short distances.

Both species of voles feed on woody plants, bulbs and herbaceous plants. We have been receiving numerous reports of vole damage to perennials, an indication that population levels are very high. Meadow voles feed mostly above the soil surface, while pine voles are more likely to feed on plant roots and on bulbs. Voles will feed throughout the day, but are most active in early morning and evening. Most of the damage to woody plants is done during the winter when other food sources are scarce, but feeding on a variety of plant materials will continue

throughout the year.

Management of vole populations involves a number of approaches. First, eliminate their cover. This means mowing vegetation around trees and shrubs, and raking up leaves in the fall. Removing their cover makes them more vulnerable to predation.

Young trees can be protected from gnawing injury by meadow voles by placing tree guards, such as hardware cloth, around the trunks. Sinking the guard at least 6 inches into the ground will offer some protection from pine voles, but injury to the trees may still occur since these voles feed on roots.

The most effective short term means of population management is the use of toxic baits. Bait pellets should be placed in active runways or burrows for best control. Winter applications are especially effective since preferred foods are scarce. Where there is danger of pets or other wildlife eating the baits, the baits should be placed in a tube, such as a section of pvc pipe. The pipe or tube should be about 5 inches long with a diameter of 1.5 inches. The bait should be glued into the tube with a cellulose-based glue.

If using anticoagulant baits, repeat applications will be necessary for control. Repellents are not very effective. Mouse traps baited with peanut butter and oatmeal or apple slices, or pieces of potato, may be used in certain situations where it is not likely that other animals will encounter the traps. Place the traps so that the bait side is in the path of a vole runway.

Reprinted from HORT NOTES (Volume 9, Number 9), June 22, 1998, UMass Extension.

## MUGWORT W.L. Mountain

Mugwort is one of the most serious weeds in nursery production, landscape plantings and gardens. This member of the daisy family is also commonly known as wild chrysanthemum, chrysanthemum weed and wormwood. Though it is native to Eurasia, it is naturalized throughout the northeastern United States and adjacent Canada, and along the Pacific coast (Fig. 1).

Figure 1. Distribution of mugwort in the United States (courtesy of USDA-ARS).

**Description:** Mugwort is a perennial herb, with aromatic foliage. Stems are erect (0.5-1.5 m tall), simple or branched above, glabrous or nearly so below the inflorescence. Leaves are alternate, green and glabrous above, densely white-woolly beneath, ovate or obovate, 5-10 cm long, and 3-7 cm wide. The principal leaves cleft nearly to the midrib into ascending, acute unequal segments that in turn are again toothed or cleft, usually with 1 or 2 pairs of stipule-like lobes at the base (Fig. 2).

Figure 2. Vegetative growth of mugwort.

The inflorescence is generally dense and leafy. Flower heads are 3-4 mm high, arranged in terminal or axillary spike-like clusters (Fig. 3). Each head contains 15-25 florets, flowering from July to October.

Figure 3. Mugwort in flower.

The seed-like fruit is brown, ridged, oblong, narrowed to the base, and about 1.5 mm long. Viable seed is seldom produced. Underground parts include clump-forming perennial roots and horizontal rhizomes.

**Similar species:** The leaf shape and aroma of mugwort often cause it to be confused with garden chrysanthemums. Mugwort can be distinguished by the white-woolly leaf undersides and numerous small, inconspicuous flowers. Young mugwort plants may also be confused with common ragweed, but the latter is an annual, the leaves are more deeply dissected into many segments, are only slightly hairy, and are never white-woolly underneath.

**Biology/Ecology:** Although some reproduction is from seeds, mugwort mostly spreads vegetatively by its extensive rootstock. Rhizome fragments can be spread by cultivation or with infested rootball of nursery stock, topsoil, or composted organic matter. Once established, mugwort's forking horizontal rhizomes spread rapidly, sending up new shoots, and even move into lawns where it tolerates mowing.

Mugwort competes with ornamentals for nutrients, water, and light, and the roots secrete chemical substances that inhibit the growth of adjacent plants (allelopathy). This action helps mugwort dominate the plant community.

**Habitat:** Mugwort is a weed of nurseries, landscapes, gardens, turfgrasses and waste areas, especially on limy soils. Mugwort's invasive, persistent rhizomes make it difficult to control in perennial crops. It is rarely a problem in agronomic row crops that are under continuous tillage and cultivation.

**Control:** Examine rootballs of nursery stock carefully for mugwort stems and roots to prevent introducing infested soil.

In nurseries, dichlobenil provides excellent control of mugwort. Apply between late fall and very early spring. Since dichlobenil may injure some species of nursery stock, follow the product label instructions carefully. Directed applications of glyphosate are an option, but must be repeated for satisfactory control.

In gardens, hand weeding and digging isn't very effective, since any rhizome pieces left in the soil will sprout new plants. If you do use this method, remove as much root as possible, repeating the effort as new shoots appear. Where safety of other plants permit, spot-treat carefully with glyphosate before the weed blooms.

Reprinted from *Regulatory Horticulture*, Vol. 24, No. 1, Spring 1998. Commonwealth of Pennsylvania, Department of Agriculture.

## **FERTILIZING LANDSCAPE TREES: TOO MUCH OF A GOOD THING?**

**Reeser C. Manley, Assistant Professor  
UMass Department of Plant and Soil Sciences**

Horticultural paradigms are constantly shifting. One example is amending the backfill soil when planting trees. Twenty years (or so) ago, when I was learning proper horticulture, the recommendation was to amend the backfill soil with organic matter. Studies subsequently demonstrated that this was not always a good idea and these studies, restricted to a few species, were suddenly used as the foundation for a new recommendation to never amend the backfill soil. Now, new research with indicates that amending the backfill improves the establishment of some species and has no effect on others. And so it goes.

Another horticultural paradigm, that tree health is equated with rapid growth stimulated by annual applications of nutrients, has recently been challenged in the light of new research. This new research suggests that fertilizer may actually decrease insect resistance, disease resistance and environmental stress tolerance in trees.

A full appreciation of this concept comes from understanding the relationship between nutrient (and water) availability, photosynthesis (carbon assimilation) and growth. The growth of trees is very sensitive to availability of nutrients and water, with growth decreasing with even moderate deficiencies. Photosynthesis on the other hand is much more resilient and does not become limited until nutrient and moisture levels become more limited. Under high rates of nutrient availability, growth consumes the majority of the products of photosynthesis, utilizing this carbon for synthesis of new tissues. At moderate levels of nutrient and water stress however, growth is significantly reduced while rates of carbon assimilation continue to remain

high. What does the plant do with this surplus of assimilated carbon?

As growth rates drop off in response to moderate nutrient and water stress, the surplus of photosynthate is used in the production of defense compounds--allelochemicals. Allelochemicals are chemical substances produced by plants which, are involved in protecting the plant from natural enemies and environmental stresses. Thus moderate nutrient and/or water stress results in increased stress tolerance, i.e. stronger trees.

Fast-growing trees are not necessarily healthy trees and, in fact, may be more susceptible to insect attack, disease attack and abiotic stress attack. How much fertilizer should be applied to landscape trees? Perhaps none. For many species of landscape tree, maintenance of soil organic matter may provide sufficient nutrients for moderate growth coupled with high rates of photosynthesis, the formula for strong, healthy trees. Unless you see symptoms of nutrient deficiency, fertilizing will increase growth without increasing photosynthesis, resulting in reduced production of defense compounds. If nutrient deficiency is suspected, first determine which nutrient element is deficient and then make sure the deficiency is caused by a shortage of the element and not by some factor (such as soil pH, soil temperature, soil moisture) preventing uptake of the element. This means testing both the soil and the tissue before making the decision to fertilize landscape trees.

### References:

Herns, D.A. 1996. Growing, growing, gone. *American Nurseryman* 184(2):52 (July 15, 1996).

Herns, D.A. 1998. Understanding tree responses to abiotic and biotic stress complexes. *Arborist News* 7(1):9 (February 1998).

Reprinted from *HORT NOTES* (Volume 9, Number 4) April 13, 1998.

**THE TRUTH ABOUT TREES**  
**Edward Gilman**  
**Department of Environmental Horticulture**  
**University of Florida.**

Information gathered in the last 20 years has heightened our understanding of trees. It also has revealed that widespread misinformation exists about trees, even among professionals.

The following information is the latest available on tree growth and development, planting techniques, and proper care during and after nursery production. The discussion is divided into six sections: roots, trunk and branch structure, safe construction practices, pruning, planting and fertilizing.

### **Roots**

Most trees do not have tap roots. In sandy, well-drained soils some trees develop deep roots. Five-year-old oak and pine tree roots, for example, could extend down to eight feet or more. They are usually located directly beneath the trunk (Figure 1).

Figure 1. Pines and oaks capable of extending some vertical roots to great depths, provided soil conditions are suitable. (In most urban sites, conditions are not suitable.) These vertical roots, or tap roots, constitute a small portion of the root system. Most of the root system is oriented horizontally and is located in the top two feet of soil.

These “tap roots” may grow to a diameter equal to or greater than the trunk. As the tree ages, the shallow, lateral roots become dominant and the tap root often becomes less prominent. By the time a tree is 20 to 30 years old, tap roots often are indistinguishable from the rest of the root system. In fact, many trees, such as those in urban landscapes, never develop tap roots. For instance, when the water table is close to the surface or when the soil is compacted, tap roots are deflected and essentially become lateral roots. If the tree was field-grown with well-drained soil, the tap roots often die back after planting because they are transplanted into compacted or waterlogged soil.

Roots grow far beyond the dripline. Trees growing in their natural habitat have root systems reaching well beyond the edge of branches. Frequently, roots extend from the trunk as far as the tree is tall. Roots on trees and shrubs planted in a nursery or landscape grow to about three times the branch spread within two to three years after planting (Figure 2). Lateral roots grow at a rate of three to seven feet per year.

Figure 2. Diameter of the root spread is one and one-half to four times that of the crown spread (dripline). Average root spread to crown spread ratio is 3:1. Trees in the forest have a more restricted crown spread, but the root spread is not reduced—resulting in a higher ratio. Similarly, genetically restricting crown spread (by selecting upright cultivars) appears to have no influence on root spread, so the ratio is increased.

Drip irrigation does not restrict roots to the wetted zone. Drip irrigation increases the growth of fine roots within the wetted zone and may aid in transplanting, but it does not appear to confine roots to this region. There is ample soil moisture available after a rain to accommodate root growth in the soil beyond the drip emitter.

Damaging roots on one side of the tree may cause branch dieback on that side only, or at random throughout the crown. Roots on trees with large spring wood pores, such as oak and mahogany, generally supply water and nutrients to branches on the same side of the crown. When roots on one side of the trees are injured, branches on that side often die, unless the wood grain spirals up the trunk. Then you can't predict where the damage will occur. Spiraled grain is often indicated by the bark spiraling up the trunk.

Trees with small spring wood pores, such as maple or rosewood may experience branch death anywhere in the crown, even if root injury is limited to one side of the tree.

Root pruning does not stimulate root branching all the way back to the trunk. Roots are often pruned before moving a tree in hopes of creating a denser root ball. Root growth after root pruning actually occurs at the end of the root, just behind the root pruning cut, not back toward the trunk. Therefore, dig the root ball of a recently root-pruned tree several inches beyond the location of the root pruning. Root pruning should be conducted about six weeks before moving the tree. Root pruning more than six weeks before moving the tree may reduce the advantages of pruning, because regenerated roots will form quickly outside of the root ball. Roots on live oak can extend as much as 4 to 10 inches beyond the root pruning cut within six weeks after pruning. Irrigate daily following root pruning to enhance prospects of survival.

Roots circling around a container do not continue to grow in a circle once the tree is planted in the landscape or nursery. Roots sometimes circle within the perimeter of a container several times before the tree is planted. The root, which grew in the container, does not straighten out, but new growth on this root will not continue to circle.

Most roots are in the top two feet of soil. The

finer roots are concentrated in the top several inches of soil. Many of the major lateral roots, which are largely responsible for water and nutrient absorption, are in the top 8 to 12 inches of soil. Because the majority of fine roots are near the soil surface, minor soil disturbances can injure or remove a large portion of the absorbing roots.

## **Tree Trunk and Branch Structure**

Trees do not heal. Unlike people or other animals, trees do not have the ability to replace or regenerate injured tissue. Instead, they form boundaries that isolate the area from the rest of the tree. This prevents decay from spreading throughout the tree. The wood within the area, which has been sealed off, can no longer supply the rest of the tree with stored food. Additional injuries seal off more wood, which further reduces the supply of available food. The tree can slowly starve in this manner from repeated injuries.

A trunk with a crook in it is just as strong as a straight one. Trunks with slight doglegs, crooks or bends are not weaker than straight trunks. Healthy trees will grow out of this condition and the trunk will appear straighter as it becomes larger in diameter. It is much more important that a tree have only one trunk.

Horizontally-oriented branches are attached more securely than vertically-oriented branches. Upright branches are poorly attached to trunks because they usually grow fast. Branches that are more horizontal are normally well-secured because they grow at a slow rate, compared to the trunk. This allows a structure called a branch collar to develop at the base of the branch, which holds the branch securely to the trunk (Figure 3).

Figure 3. Branch collars (BC) and branch bark ridges (BBR) take on a variety of shapes and sizes: A) sycamore, B) dogwood, C) magnolia, D) oak and E) pine. When removing a branch from the trunk, cut as indicated by the dashed line on the branch side of the swollen collar tissue.

A nearly vertical branch becomes a second trunk. The tree is said to have a double leader. Because there is no branch collar, double leaders can easily split from the tree in a storm, causing personal or property damage.

Topping creates a dangerous tree. Topping is cutting branches or trunks to random lengths. Trees should never be topped. Wood inside the cut branch begins to decay. The sprouts, which grow in response to topping, are not well-secured to the topped branch and they can easily split from the tree as they grow larger. To avoid this, always prune a branch back to a living branch crotch. This is called drop crotching.

A large shade tree with multiple trunks will become hazardous. Never allow trees to grow with multiple upright leaders. These trees may look handsome when young but they will become hazardous as they grow older. Always prune so branches are spaced 18 to 36 inches apart, along the main trunk, and be sure they are no larger than one-third the diameter of the trunk (Figure 4).

Figure 4. Branches should be spaced along the trunk, not clustered together in one spot. Large-growing shade trees should be trained to only one trunk.

### **Safe Construction Practices**

Small trunk wounds can cause major injury to the tree. As has already been noted, injured tissue is isolated from the tree and its function is lost forever. Small injuries permanently reduce the tree's capacity to fight stress caused by insects, disease, drought or other factors.

Grading the site can harm trees. Sites are often graded in preparation for laying sod or planting shrubs. Since many of the fine roots are located close to the soil surface, changing the grade by as little as four inches can cause extensive damage to the root system of existing trees. Design the landscape to fit the existing grade. If changes are necessary close to a tree, it may be better to remove the tree and plant several younger trees.

To save a tree during construction, do not disturb soil beneath the branch dripline. Many roots are destroyed as heavy equipment operates over the root system. One pass over the root

system with a bulldozer or earth scraper can cause significant root damage. Do not operate equipment within the dripline of trees that are to be saved. Sturdy fences should be constructed for enforcement of this guideline. However, protecting a larger area may be required.

Approximately 50 percent of the root system is located outside the dripline. On sites with a high water table or compacted soil or a heavy clay-content, virtually all the roots will be shallow. In these cases the protected area should extend well beyond the dripline.

A "tree well" will not save a tree from the effects of fill soil. Adding three or more inches of soil within the dripline often will kill a tree, even if a "tree well" is used. (Tree wells are walls constructed several feet from the trunk.) If a tree well is used, construct it no closer than the dripline and grade the soil outside of the well to prevent runoff water from entering the well.

When fill cannot be avoided, consider aerating the root zone. There have been reports of success using a system of vertical and horizontal pipes for this purpose. Vertical vent pipes are connected to the horizontal pipes, which are arranged around the tree like spokes of a wheel. The horizontal pipes are surrounded by gravel and exit the soil at the tree well. Coarse textured fill soil is then carefully spread over a soil-separator fabric, placed over gravel.

A tree may die years later from construction damage. Trees frequently decline and die after construction. Often branches die within a year or two due to severe root damage. However, it is not uncommon for large trees to show a slow decline over a 5- to 15-year period. The tree may not show obvious signs of decline for many years but, following a drought period, branches may quickly loose leaves and begin a rapid decline. The tree may be dead a year or two

later.

Small trees survive construction damage better than large trees. Because most of the roots on large trees are located close to the surface, they are sensitive to construction damage. Smaller trees have a larger portion of the root system deep in the soil, so they are able to adapt to the soil conditions created after construction. Fewer roots on small trees are damaged when bulldozers and other equipment operate over the root system.

## **Pruning**

Never cut a branch flush with the trunk. It has been standard practice to prune a branch flush with the trunk. Extensive research has shown that this practice injures the trunk and is extremely detrimental to tree health and shortens tree life. Flush cuts make trees more susceptible to frost cracks, heat injury, root problems, cankers and sprouting. To avoid this, always cut to the outside of the branch collar, located at the base of the branch (Figure 5). This collar is easily seen as a swelling where the branch meets the trunk. When pruning in this manner, it may appear that a stub is left on the trunk, however, properly done, this technique removes the entire branch and does not injure the trunk.

Figure 5. Proper pruning. A) Notice the swelling at the base of the branch. This is trunk tissue (called a branch collar) and helps hold the branch securely on the trunk. A proper cut is made between the two arrows. B) This shows how to properly remove three branches from the trunk. Always cut to the outside of the branch collar. C) Never make a flush cut as shown here. This initiated trunk decay and can reduce growth in the nursery and in the landscape after planting. Do not purchase trees that have flush cuts.

Quick calluses do not indicate proper pruning. The callus and wound-wood forms around a pruning scar, often rapidly, regardless of the pruning technique. This tissue should form a ring or donut shape if the branch was removed properly. If the callus is elongated or oval shaped, the branch was pruned too close to the trunk. Despite rapid callus formation around a pruning cut or injury, extensive wood rot can develop.

Wound dressings and pruning paints do not prevent wood decay behind a pruning cut. They provide no benefit to the tree. Some research indicates that wound dressings even promote decay. If pruning paints are used for cosmetic purposes, apply a very thin coat. Only proper pruning prevents wood rot.

## **Planting**

Planting trees at the same depth or slightly shallower allows for the quickest root growth, which is crucial to tree establishment. Planting too deep slows root growth and leads to poor establishment or death.

## **Fertilizing**

Established trees do not need to be fertilized to maintain their health. Because their root system grows into fertilized shrub beds and turf areas, established trees growing in a maintained landscape receive enough fertilizer for moderate growth. In most instances, no additional fertilizer is needed. Some trees with micronutrient deficiencies respond to applications of minor elements. Some pals may benefit from additional fertilizer.

Tree fertilizer does not need to be injected into the soil. Tree roots grow among turf and shrub roots. Most are located within the top 12 inches of soil. Fertilizer broadcast over the surface reaches roots in adequate amounts. Soil injection may be beneficial in compacted soil or on slopes, to reduce runoff.

Fall fertilizing does not produce fall growth. Generally, trees will not respond to an application of fertilizer until the following year. Fall is an excellent time to fertilize trees. Crape myrtle and some other plants may grow in the fall in response to a fall fertilization.

Tree fertilizer is not tree food. Trees use the elements in fertilizer to produce glucose, proteins and other materials that might be considered food. In other words, they manufacture their own food.

Reprinted from *Florida Nurseryman*, March 1991.

## **MANAGING PERSONNEL**

**Susan Barton**

**Delaware Cooperative Extension**

*This is the seventh in a series of seven articles on garden center management, excerpted from a new AAN publication designed to provide information for garden center operators of new and existing businesses on strategies required to operate a successful garden center. Copies of Establishing and Operating a Garden Center: Requirements and Costs are available from AAN (\$49 members. \$98 nonmembers).*

Employees are the direct link between customers and products and services offered by your business. They affect the magnitude of sales through garden center image, merchandise quality, their ability to present accurate information, and their ability to identify and satisfy customer desire. In a survey questioning why customers stopped shopping at a particular garden center, 68 percent of the respondents cited indifference by sales and service personnel. A popular misconception is that the garden center is a horticultural enterprise when, in fact, the retail garden center is a people business that must rely on customers, employees, and managers to be successful.

Labor costs are approximately 25 percent of gross sales and 60 percent of total operating expenses at a typical garden center. This significant expense requires significant management attention. In fact, finding, hiring, training and motivating good employees is one of management's key tasks.

### **Reducing Labor Costs**

To reduce labor costs, address the efficiency with which you use your labor force. Labor efficiency is comprised of individual efficiency or job performance and adjustment of labor supply to meet job requirements. Improve job

performance with affordable labor saving equipment, skills training, high expectations, creation of a positive work environment and incentives. Adjust the labor supply with better job scheduling, subcontracting when appropriate, and better scheduling of vacation time.

Traditional, full-service garden centers have found that fewer, well-paid, well-trained, full-time employees are more efficient than many poorly-trained, part-time employees. To maintain a small, professional, full-time work force, keep employees active throughout the year. Extend the selling season with products, services and promotions that attract customers during the slow seasons.

Schedule sign production, equipment repair, planning, buying, hiring and training during the off-season. During busy times, place a knowledgeable salesperson in an information booth to handle specific questions, rather than placing that person at the cash register or tying him or her to watering or unloading plants. Assist employees by creating an intelligent store layout to promote efficient sales. Provide good equipment, including walkie-talkies, to improve communications.

### **Interviewing, Hiring, Orientation**

Labor efficiency starts with hiring the right employee. Begin the hiring process by creating a job analysis and job description for each position. A job analysis explicitly states the job to be performed and attributes the employee needs in order to do the job correctly and efficiently. A job description emphasizes and clarifies those activities upon which an employee will be evaluated, including the activities for which an employee is personally responsible, reporting relationships, and coordination and communication relationships. These forms characterize a job. Based on the

job analysis and job description, write a position announcement that characterizes a person.

Conduct professional interviews to set the stage for an efficient and productive employee/employer relationship. Prepare core questions in advance based on the job analysis and job description. Use open-ended questions to draw out the candidate. Include a tour of the facilities, during which you pose on-the-spot problems. If a job requires specific skills, test for those skills. Both employer and employee must understand the job's duties and responsibilities (and skill requirements) and the job's coordination and communication relationships to improve labor efficiency and reduce labor costs.

Start new employees off with an orientation program. Present background information about the company, work expectations, benefits and policies. Conduct ongoing training on new promotions, display skills, sales training and product knowledge by holding periodic training meetings. Use your own employees as trainers and bring in sales reps and consultants to enhance the program. Take advantage of outside training opportunities provided by GCA, ANLA, state nursery associations, Cooperative Extension and suppliers. Use state certified nursery professional programs to provide training and credentials for your employees.

### **Evaluating Employees**

Conduct a formal employee evaluation at least once a year to let employees know how they are doing. Use evaluations to provide a reward, identify professional development opportunities, evaluate current performance, motivate employees, plan for the future and clarify expectations of the employee and the company.

Discover the true costs of labor not just the wage rate, to effectively evaluate and

compensate labor performance, determine the appropriate level of automation, evaluate alternative business activities and evaluate the purchase of labor-saving equipment. Complete a labor cost estimation worksheet for each employee. Worksheet items include direct wages, overtime wages, cash bonuses, social security, federal unemployment insurance, state unemployment insurance, worker's compensation and fringe benefits such as, health insurance, dental insurance, retirement, uniform, transportation and educational expenses. Use the total cost of each employee, divided by the hours worked when calculating job costs and labor estimates for decision making. Make sure the employee understands the total compensation package, not just the cash wages.

## **HIRING THE RIGHT PERSON FOR THE JOB: FIFTY GREAT INTERVIEW QUESTIONS**

**Richard Ensmann, Jr.**

Hiring decisions are among the most important business decisions you'll ever make. And in the hiring process, nothing is more crucial than the employment interview.

Within the space of a brief interview, you must learn about background skills and experiences your job candidate is bringing to the table. You've got to discover whether the candidate is able to work effectively with a variety of people and possesses aptitudes that fit the needs of the position.

### **The Candidate's Background**

1. Tell me about yourself.
2. What objectives would you use to describe yourself?
3. Why are you here?
4. Describe the duties and responsibilities of each of your last two (or three) positions.
5. Why do you want to leave your present job?
6. Would you explain the reasons for each of your last two (or three) job changes?
7. Would you elaborate on this particular activity (note the activity) you mention in your resume?
8. What are your most significant accomplishments?
9. How do you see this position in relation to your overall career plan?
10. Summarize your present salary and benefit package.

### **The Candidate's Skills**

1. If you could start your last job (or your career) all over again, what would you do differently?
2. What's the most difficult problem you've

- faced in the last two years? How did you handle it?
3. Describe a crucial responsibility that you held in your last position.
  4. What did you learn from your last job?
  5. Give me a few examples of your initiative.
  6. What were the biggest mistakes that you made in your last job (or career)?
  7. How do you evaluate yourself?
  8. What would you say are your most important and valuable skills? Why do you believe these are important?
  9. What steps are you taking these days to upgrade your skills, or learn a new one?
  10. Show me a sample of your work.
  11. How can you contribute to our bottom line?
  12. What concerns do you have about working in this position, or for this organization?
  13. What are your weakest skills? How have you addressed these weaknesses in the past?
  14. What criticism about your work have you ever received over the last several years? How have you responded to these criticisms?
  15. What academic strengths did you show when you attended school?

### **The Candidate's Teamwork Talents**

1. Describe your relationship with your supervisor. Your peers. Your subordinates (if applicable).
2. What would your present supervisor say about you? How about your peers? Your subordinates (if applicable).
3. What was the most difficult work relationship you encountered during your last job (or career)? How did you handle this difficulty?
4. Without using names, describe two or three of the worst people you've ever worked with? How did you manage to work with them?
5. What do you look for in a supervisor? In co-workers?

6. What kind of supervision do you need?
7. How did your supervisor give you feedback in your last job? How did your peers assess your work?
8. Give me an example of two of your teamwork skills.

### **The Candidate's Match with the Position**

1. What did you like about your last job? Dislike?
2. What challenges are you seeking in a new job?
3. How do you make decisions?
4. What kind of organization do you like to work for?
5. Describe your ideal employer.
6. Describe your ideal workday for yourself.
7. What kind of earning power do you want to have five years from now?
8. What motivates you?
9. Why do you think you'd do well here?
10. What would you do your first day on the job?
11. What would your top priorities be during your first week (or month, or year)?
12. How would you spend the bulk of your time on the job?
13. How will you transfer skills from your last job to this job, if you're hired?
14. Why should we hire you?
15. What other positions are you considering right now?
16. If you're hired, how long would you see yourself staying in this position? Why?

### **Tips for Great Interviews**

Exercise solid interview skills, and you'll learn volumes about a prospective employee. Use these tips to help plan top-notch interviews and assess the quality of the match between your needs and the skills of the job applicants. Carefully review the candidate's resume or application form before interviewing. You

should know the candidate's background so well that you don't have to refer to the paperwork in front of you while you're conversing with the candidate. If you need clarification on the candidate's resume or application form, open your interview with questions on the areas you want to probe. If you're interviewing several candidates, be sure that at least some of your key questions are identical for each. You'll be better able to compare candidates as a result. To make evaluation of candidates easier, think about the "ideal" answers to interview questions before you begin your interviews. Rely on two sets of interviews if you can. Your preliminary interview will assess the candidate's general qualifications for the position, and a later, in depth interview will explore his skills and match for the job in greater depth. Keep your questions open-ended. Begin with words "Why..." or "How..." These questions will encourage the candidate to talk about herself. Avoid obviously leading questions; the candidate knows the "right" answer to these. Don't spend a lot of time talking about yourself, the job, or the organization during the interview. Save this until the conclusion of your conversation or until you're ready to make a hiring decision. Focus on measurable accomplishments of the candidate during your conversation, not on vague talents or subjective impressions of his performance. Don't make or imply any promises during the interview. Under some circumstances, these statements could constitute a contract and come back to haunt you later. Listen for evidence of serious job-related problems during the interview: poor attendance, lack of integrity or loyalty, inability to maintain working relationships with others. Probe further by carefully checking references. During the interview, make brief notes-you'll need them to recollect the specifics of the interview later on-but don't bury yourself in your notepad. Better yet, use a pre-printed interview form that allows you to record your notes in prescribed categories. If you find a candidate too enamored

with the position, try to persuade her that she and the job don't seem to match. Her response will speak volumes about her interests, perseverance and commitment. Watch the candidate's body language during the interview. It reveals much about his comfort level with the position, and his interpersonal skills. Always be forthright about major problems the candidate might encounter in the job. Better to save this for the end of the interview process, however. Ask the candidate for some additional references, not included on the resume, or application, on the spot. Call them. Vigorously avoid all questions related to gender, marital status, race, ethnic background, and other personal characteristics that cannot legally be used as the basis for your hiring decision. Finally, use the interview as an opportunity to assess the candidate's self-management skills: her ability to handle tough questions, to analyze facts and ideas quickly, to think fast on her feet.

Reprinted from NJLA info-letter. Originally printed in *Nursery Notes*, September-October, 1997

## **NEW EMPLOYEES: WELCOMING THEM TO THE JOB**

**Richard Ensman, Jr.**

In years gone by, new employees were often welcomed to their jobs with a cheery “hello” and a firm handshake -- and then put right to work. Today, that’s not enough. Many employers go out of their way to make new members of the team feel welcome and appreciated. Strong welcomes lead to high morale, speedy and efficient training and solid performance from day one. Strong welcomes at the start of employment can even reduce turnover. Looking for ways to help employees feel welcome? Try these suggestions for starters:

When your new employee starts....

- Present him/her with a “welcome” sign or some other symbolic gift of greeting.
- Welcome him/her with coffee and Danish or some other simple gathering of new co-workers.
- Assign your new employee a “mentor” -- an experienced employee who can answer questions and show the new employee the ropes during his first few weeks on the job.
- Show your new employee the restrooms!
- Give your new employee a company gift or memento -- a special pen, a company calendar, an appointment pad, or a key ring.
- Make sure he/she has all the keys he/she needs.
- Explain your time sheet or punch-in procedure.

### **On the first day...**

- Encourage the new employee's co-workers to stop by and say "hello" sometime during the day.
- Show your new employee the amenities of the workplace, like the microwave oven, the staff lounge, and the cookie jar.
- Find co-workers who can share lunch and breaks with your new employee for the first few days.
- Introduce your new employee to co-workers, supervisors and other people he/she may run into on the job.
- Be sure your new employee understands where he/she can park their car. Give them parking stickers or parking maps if needed.
- Place your new employees' photograph and a "welcome" sign on the bulletin board.
- Give your new employee a "welcome" kit, containing information on area service stations, restaurants, and other conveniences. If you like, you can even include gift certificates and coupons, which area merchants may be happy to donate.
- Debrief your new employee about his/her last job. This is an excellent way to find out the strengths, weaknesses, salaries and benefits of other employers in your community.

### **Later in the first week....**

- Share the company procedure manual with the new employee and point out noteworthy information.
- Offer an informal orientation. Cover things that aren't covered during the formal orientation process like the company history, traditions and the like.
- Share an organizational chart.
- Let your new employee know about any special company rituals he might be expected to observe, like taking turns making the morning coffee or straightening the magazines in the lounge.
- Show your new employee any specialized equipment she may not have seen yet. Special tools or useful items stored away all fall into this category.
- Be sure your new employee has stationery, envelopes, and business cards if he needs them.
- Acquaint him/her with your Employee Assistance Program, if you have one.
- Schedule your first formal supervisory conference with your new employee to see how things are going.
- Be sure your new employee understands reporting procedures.
- Make it a point to say "good morning" and "good afternoon" to your new employee each day.

### A few weeks later....

- Conduct a general debriefing session with your new employee. Ask confidentially how he's doing and offer as much information advice about the job as you can.
- Play "twenty questions" with your new employee and his/her co-workers asking each other questions about mutual experiences, hobbies and interests. A great time for this activity: at the beginning of the staff meeting.
- Set work objectives with your new employee. These may include holiday parties, bowling tournaments and other after hours activities that can make almost any workplace sparkle with excitement.
- Furnish your new employee with company literature and audio-visual materials. Remember that employees can be one of your best sources of positive publicity.

### Every month....

Don't forget to say "thanks" for a job well done. Show appreciation for the contributions your employee makes and, as the months and years go by, you may well turn today's new employee into a valued veteran.

Reprinted from *NJLA info-letter*. Originally published in *Nursery Lines*, Spring, 1998. A publication of the New York State Nurserymen's Association.

## Pesticide News

### Insecticides:

D-22341 (bifenazate) - Uniroyal - Registration on ornamentals for mite control is expected in 1999.

DIMILIN 25W (diflurenzuron) - Uniroyal - Added to their label the anchor worm control in ornamental fish ponds and tanks. Use on ornamental or bait fish only, not on fish intended for human consumption.

DOOM MILKY DISEASE POWDER (*Bacillus papillae*) - Fairfax Biological Labs - EPA has proposed to suspend the registration for the usage of this product. It will be effective in 30 days unless reversed.

PYLON (AC 303, 630) - American Cyanamid - A new insecticide being developed in conjunction w/ Olympic Horticultural Products for usage on ornamentals.

PYRIGRO (pyriproxyfen) - Whitmire Micro Gen - A new microencapsulated formulation being introduced for usage on ornamentals to give long residual control of various insects.

SUPRACIDE (methedathron) - Novartis - EPA received a request from the manufacturer to delete from their label a variety of uses including nursery stock. Unless withdrawn, this will become effective on 10-14-98.

DISTANCE (pyriproxyfen) - Valent - has received EPA registration for this insect growth regulator in greenhouses, lathhouses and shade houses. Distance is designed to control whitefly, fungus gnat, shore fly, leafminer and various scale species.

SAMMITE (pyridaben) – BASF – This product is now labeled for outdoor use on ornamental plants to control mites, whiteflies and mealybugs.

### **Fungicides:**

CYGNUS (Kresoxim-methyl) - BASF - Registration is expected this year on greenhouse-grown roses, Gerber daisy, poinsettia and zinnia to control powdery mildew.

AQ-10 (*Ampelmyces quisqualis*) - Ecogin - Added to their label the control of powdery mildew on a number of plants including woody ornamentals.

ARMICARB 100 (potassium bicarbonate) – Church and Dwight – EPA approved added usages to the registration to control powdery mildew and other diseases on ornamentals.

DECREE (fenhexamid/BAY-KBR-2738) - Bayer - Tomen Agro will develop this new fungicide for use on ornamentals.

MANCOZEB – As a result of the IR-4 Project the usage on gloxinia can now be added to the label.

PIPRON (piperalin) - Se Pro - Obtained a new expanded label so it can now be used on any ornamental greenhouse crop.

THIRAM 50 WP - Gustafson - Added to their label for this seed treatment product the usage on ornamental flower seed.

ZERO TOL (hydrogen dioxide) - Bio Safe Systems - EPA has registered this new active ingredient as a fungicide/algaecide to control horticultural diseases in greenhouses, garden centers, landscapes, nurseries and interiorscapes.

### **Herbicides:**

BICEP II (atrazine/metolachlor) - Novartis - due to costs, the company has proposed to EPA to delete from the label the usage on roadside. Unless withdrawn this will be effective on 9-14-98.

DIMENSION (dithiopyr) - Rhom & Haas - Received a new label allowing the use of this product on sod farms. Sod should be established at least 6 months prior to application. Also received EPA registration to apply to more than 150 species of flowering plants, shrubs and trees to control crabgrass and other weeds. Up to 3 applications may be made per year. Apply only to established plants. And as a result of the IR-4 Project, they can now add to their label the usage on geraniums, hawthorn, juniper, sugar maple, red oak and yew.

GOAL (oxyflufen) - Rohm & Haas - received an EPA expanded label to use on hardwood tree plantings such as field-grown maples, oaks, dogwoods, sycamores, lilacs, cherry & others.

PREFAR (bensulide) – Gowan – added to their label the usage on field grown flowers, bulbs and ornamentals to control annual grasses and broadleaf weeds.

RONSTAR (oxadiazon) – Rhone Poulenc – As a result of the IR-4 Project, they can now add to their label the usage on Cheddar pink, baby's breath, dahlia, daylily, ice plant, hardy mum, leopard's bane, mock orange, plantain lily, tickseed and sweet william.

SURFLAN (oryzalin) – Dow Agro Sciences – As a result of the IR-4 Project they can now add to their label the usage on bell flower, Kousa dogwood and redbud.

## Miscellaneous:

B-NINE (daminozide) –Uniroyal – As a result of the IR-4 Project the usage on larkspur (delphinium) can now be added to the label for this growth regulator.

SP-5001 (GABA) – Auxein Corp. – This new growth regulator is being developed and will be marketed by SePro Corp. later this year to the ornamental industry. The product helps a plant overcome the effects of stress resulting in more and bigger flowers, and faster rooting.

## Research Briefs

### *Propagation:*

**Seed germination and emergence improved with potassium hydroxide.** KOH provides a fast, simple and reliable means of improving germination and emergence for American licorice (*Glycyrrhiza lepidota*), *Angelica atropurpurea*, wild blueberry (*Vaccinium angustifolium*), wild mint (*Mentha arvensis*) and purple coneflower (*Echinacea angustifolia*). The optimal concentration and duration varied with species, so preliminary testing is required on particular seed lot before large scale treatment. Prolonged exposure to KOH solutions (especially at high concentrations) resulted in damage to seed. (Yong-Ping Gao, Guo-Hua Zheng and L.V. Gusta)

*Excerpted from HortScience 33(2):274-276.*

### *Container Production:*

**Cost comparisons for container production systems.** Pot-in-pot (PNP) production had the highest total capital outlay (purchasing and installing socket pots) compared to infield (IF) or above-ground container (AGC) production but was the least costly per harvested plant. Cost reductions were due to less intensive, labor-saving cultural practices and the ability to grow more plants per unit land.

	Cost/plant (\$)		
	IF	AGC	PNP
Equipment operation and related labor	1.39	.77	.67
Variable costs	5.15	7.36	5.47
Total costs	23.73	23.71	21.52

The technical benefits of PNP relative to above ground containers (AGC) include

- Insulates root zone from extreme temperature variation.
- Plants can remain in place throughout winter.
- Trickle irrigation decreased water usage.
- No need for intensive staking.

The technical benefits of PNP relative to infield production include

- Year-round harvestability.
  - Reduced harvest labor cost.
  - Decreased root loss at harvest.
  - Less bulky and cumbersome in shipping.
- (J.L. Adrian, C.C. Montgomery, B.K. Behe, P.A. Duffy and K.M. Tilt)

*Excerpted from J. Environ. Hort. 16(2):65-68.*

**Florel keeps Verbena ‘Homestead Purple’ compact.** This study shows that 500 ppm to 1000 ppm Florel sprays may be used to control elongating shoots of Verbena ‘Homestead Purple’ during container production. The appearance of the Florel-treated plants was symmetrical, compact, and very commercially acceptable. (T. Banko and M. Stefani)

*Excerpted from VNLA Newsletter. March/April 1998.*

**Florel controls growth of *Perovskia atriplicifolia* (Russian sage).** When Florel was applied as a spray treatment 500 ppm significantly reduced the height of *Perovskia*. Additional growth control may be obtained by following the initial Florel treatment with a B-Nine or Sumagic treatment one week later. (T. Banko and M. Stefani)

*Excerpted from VNLA Newsletter. March/April 1998.*

**Florel is best in controlling height of Petunias.** A single application of 500 ppm

Florel applied when plants were 4-5 inches in diameter was judged the best treatment (compared with other rates and combinations of ProShear and B-Nine). Growth was controlled but not excessively and flowering was not delayed. (T. Banko and M. Stefani)

*Excerpted from VNLA Newsletter. March/April 1998.*

Reducing pathogens in recycled irrigation water. Based on survey results, the amount of chlorine or ozone required to disinfect irrigation water can vary widely from nursery to nursery and between water sources at one nursery. The following general practices and procedures should be followed.

1. Design irrigation systems properly.
  - construct beds to minimize pot-to-pot water conduct
  - construct holding ponds as large as possible to allow a long retention time between inflow and withdrawal
  - locate tail water outlets and pumping intakes as far apart as possible
2. Customize disinfecting systems for each water supply
3. Implement quality assurance procedures to monitor system performance.
  - use direct microbiological monitoring on a regular schedule, testing for heterotrophic bacteria
4. Strive to make irrigation of containerized systems 100 percent efficient to avoid runoff water. (P. Reeser)

*Excerpted from American Nurseryman, June 15, 1998.*

**Growers may be overfertilizing ‘heavy feeder’ plants.** Containerized crepe myrtle were provided with applications of N ranging from 15 to 300 mg N/liter (ppm). The best

growth response took place in plants supplied with 60 mg N/liter, but higher concentrations depressed growth. This response was attributed to the high growing medium salinity observed at the higher applied N concentrations, and a leaf tissue nitrogen to sulfur imbalance. These two factors outweighed any growth improvements expected from the use of high N fertilization rates in the commonly believed ‘heavy feeder’ crape myrtle. In light of these results, growers should evaluate N fertilization management practices traditionally used to maximize growth, considering the plant species and the potential negative side effects associated with increasing fertilizer applications. (R.I. Cabrera and D.R. Devereaux)

*Excerpted from J. Environ. Hort. 16(2):98-104.*

**The right amount of dolomitic lime for container production of *Buddleia davidii*.** The optimum lime amendment to pine bark medium for the production of butterfly bush was 2.4 kg/m<sup>3</sup>. By adding a threshold level of dolomitic lime, and avoiding excess, producers can optimize growth and dolomitic lime usage. (J.H. Gillman, M.A. Dirr and S.K. Braman)

*Excerpted from J. Environ. Hort. 16(2):111-113.*

**Field Production:**

**Nursery field management systems to improve cold hardiness.** Bare soil treatments (cultivation and herbicide management) delayed acclimation and reduced cold hardiness compared to crop mulch (winter rye) and companion crops (bird’s foot trefoil and grass). Winter injury occurred only on *Acer* and *Gleditsia* and predominantly in bare soil. Crop mulch and companion crops increased cold hardiness and decreased plant loss due to winter injury. Nectria canker on honey locust was much worse on trees grown under herbicide

management and to a lesser extent cultivation. The primary concern with cover crops is the possible reduction in tree growth but this research showed that some combinations are possible.

Cover and companion crops also affect soil properties. They were superior to cultivation and herbicide management. With either cultivation or herbicide management, there was a decrease in water infiltration, a decrease in soil aggregation, and increase in soil bulk density. Soil temperatures were higher in the summer and lower in the winter. Bird’s foot trefoil and grass sod negatively influenced tree growth but winter rye is a suitable crop mulch. (J.B. Calkins and B.T. Swanson)

*Excerpted from J. Environ. Hort. 16(2):82-89 and 16(2):90-97.*

**Greenhouse Production:**

**Zero runoff subirrigation systems in greenhouse operations.** Zero runoff subirrigation systems are used to avoid fertilizer- and pesticide-containing effluent leaving the greenhouse. Managers greatest concern is the impact on their ability to produce high-quality plants in an economical way to stay competitive. This survey of the industry established benchmarks of management practices and systems performance.

Methods	Costs
ebb and flow benches	\$50.70/m <sup>2</sup>
flood floor	\$27.66/m <sup>2</sup>
trough benches	\$31.22/m <sup>2</sup>

Flood floor – crops are grown on the floor and

subirrigated with ebb and flow.

Trough benches – containers are placed in long rows of shallow sloped gutters and irrigation solution flows intermittently.

Greenhouse operators are interested in using subirrigation to improve operation efficiency by saving labor and conserving water and fertilizer, not due to government regulations. There is concern about disease problems but 84% do not treat for disease and almost all (98%) have reported no greater disease problems. This is probably because the foliage stays dry. Maintenance of subirrigation is not a problem. Operators need more readily available cultural and management information. Trial and error is a common method for making adjustments. Benefits cited from subirrigation use includes:

1. savings on irrigation labor
2. savings on fertilizer
3. greater product uniformity
4. water savings
5. better product appearance
6. increased productivity

(W.L. Urva, T.C. Weiter and R.A. Milligan)

**New longstem bluebonnets.** These plants are desirable for the cut flower industry with their 1) relatively short cropping time in the greenhouse (approx. 5 months), 2) good flower yields (12-15 harvestable racemes per plant and 3) excellent vase life (8-12 days). The new cultivars, 'Texas Sapphire' - blue and 'Texas Ice' - white are available from Foundation Seed Service, Texas A & M University, 11914 Highway 70, Vernon, TX 76384 (817) 442-6226.

*Excerpted from HortScience 33(2):348-349.*

**Efficient production of Canary Island ivy.** Hanging baskets of Canary Island ivy are in high demand for patio and interior decoration. Higher

foliage density (caused by lateral branching) enhances foliage density. The most efficient and commercially feasible production of Canary Island ivy is 16 C and 8-16 hours of light. (K.H. Al-Juboory, D. Williams, R.M. and D.G. Bullock)

*Excerpted from HortScience 33(2):237-239.*

**Poinsettia bract necrosis.** Bract necrosis may be related to more factors than simply bract Ca concentration. Practical treatments with growth regulators could be developed that have greater efficacy for controlling bract necrosis than do multiple Ca sprays. In this study a single spray of benzyladenine to bracts after bract necrosis symptoms first began to appear, totally arrested further development of bract necrosis for up to 34 days. (R.J. McAvoy and B.B. Bible)

*Excerpted from HortScience 33(2):242-246.*

**Entomopathogenic fungi can control western flower thrips.** Laboratory and field trials show that commercial formulations of *Beauveria bassiana* can infect and reduce western flower thrips numbers in greenhouse floriculture crops, thus demonstrating its potential as an alternative to conventional pesticides. (B.C. Murphy, J.P. Newman, T.A. Morisawa, S.A. Tjosvold, M.P. Parrella)

*Excerpted from California Agriculture 52(3):32-36.*

### **Landscape:**

**Growth regulators on perennial ryegrass.** Trinexapac-ethyl enhanced turfgrass quality during drought. There were no deleterious effects on rooting and canopy height was suppressed in the field for up to 2 weeks. Ethephon enhanced plant quality during drought and suppressed canopy height but treatment resulted in reduced rooting. Mefluidide reduced

rooting, suppressed canopy height and resulted in unacceptable chlorosis. Paclobutrazol treatment had negligible effects on quality, rooting and canopy height. (Hongfei Jiang and J. Fry)

*Excerpted from HortScience 33(2):270-273.*

**Biostimulant effect on transplanting red maples.** Humate-based biostimulant treatments included a wettable-powder applied as a soil drench; a liquid to which various purported root growth-promoting additives had been added applied as a soil drench; and a dry granular formulation applied as a topdress. Biostimulants did not increase early post-transplant root growth, but did increase stem sapflow in B&B red maples. Trees didn't differ visually after 20 weeks of growth and there were no differences in height or stem diameter. However, trees were well-watered. In drought situations, biostimulants may have a different influence. (M. Kelting, J.R. Harris, J. Fanelli and B. Appleton)

*Excerpted from HortScience 33(2):342-344.*

**Three new cultivars of *Ornithogalum*.** Normally *Ornithogalum* flowers in spring, producing 2-3 inflorescences before the leaves die. Plants are dormant in the summer. The following new cultivars are available from Bay City Flower Co., PO Box 186, Half Moon Bay, CA 94019.

'Chesapeake Sunshine' – evergreen, producing inflorescences throughout the season without becoming dormant.

'Sunset' – intense orange flower color and compact plant shape.

'Blaze' – strong, straight peduncle, intense orange flower color and large flowers. (R.J. Griesbach and F. Meyer)

*Excerpted from HortScience 33(2):345-347.*

**Effectiveness of four circling root barriers.**

Biobarrier, Typar fabric, Deep Root and Root Block were installed during planting of Lombardy poplar and Raywood ash. Researchers found that tree roots responded similarly, regardless of the type of barrier used. In all cases the roots upon growing past the lower rim of the barriers, began to grow upward toward the soil surface. Beyond three feet from the barriers, roots were at depths similar to those of the controls (i.e. tree grown without barriers). However, if the soils were cultivated prior to installation of the barriers, there occurred a greater distribution of the roots through the soil profile. Therefore, cultivation or reduction of soil bulk density should be the first step during installation of soil barriers. (L.R. Costello et. al.)

*Excerpted from J. of Arboriculture. 23(6):211-218.*

**Some cultivars of crabapple are resistant to Japanese beetle.**

None of the lindens or roses tested showed resistance under heavy beetle pressure. Resistance was found with the following crabapple cultivars: 'Jewelberry,' 'Harvest Gold,' *M. baccata* 'Jackii' and 'Louisa.' (D.A. Potter, P.G. Spicer, D. Held and R.E. McNiel)

*Excerpted from J. Environ. Hort. 16(2):105-110.*

**Primo can damage ornamentals.**

When Primo, a growth retardant used on warm- and cool-season turf is used at a rate of 0.25 to 1.0 oz/1000 ft<sup>2</sup>, the rate recommended for turf, sensitive woody and herbaceous landscape plants may be injured by overspray and drift. In this study, injury occurred to foliage of coleus and 'G.G. Berbing' azalea and to flowers of butterfly bush and petunia. (G.J. Keever and J.W. Olive)

*Excerpted from J. Environ. Hort. 16(2):114-117.*

**Disease Control:**

**Sythane Ornamental Fungicide effective against powdery mildew.** A marked reduction in foliage affected by powdery mildew when treated with Sythane Ornamental fungicide was found by researchers studying powdery mildew on flowering dogwood. (M. Windham and A. Windham). Another study showed that under moderate disease pressure, no powdery mildew colonies were detected on Veronica plants treated with Sythane Ornamental Fungicide. (M.K. Hausbeck, C. Wallace, J.J. Kusnier III)

*Excerpted from The Ornamental Growth Report 3(2), Summer 1998.*

**Weed Control:**

**Recycled waste paper as weed control in container production.** Recycled waste paper in a pelleted form provided superior weed control compared to the crumble form. A 1” depth is necessary for adequate weed control throughout growing season. ( D.R. Smith, C.H. Gilliam, J.H. Edwards, J.W. Olive, D.J. Eakes and J.D. Williams)

*Excerpted from J. Environ. Hort. 16(2):69-75.*

**Toxicity of preemergence herbicides on container-grown perennials.** The following chart illustrates the presence of injury at the 1X or 2X rates of the listed herbicides. Injury symptoms included plant stunting and leaf chlorosis, discoloration, marginal burn and deformities. In all cases, except three, the injury resulted in plants of unsalable quality. The exceptions were blanket flower, verbena and pachysandra--new foliage covered minimal injury symptoms. The test spring was cool and wet so plants may not have been as well-developed as they would be in some years.

Authority (sultentrazone) burned and stunted every specie in the study even at the low rate.

**Study 1:**

	Factor	Gallery	Pendulum	Surflan
Perennial				
astilbe		X	X	
threadleaf				
coreopsis				
ice plant				
dianthus				
purple	X	X	X	X
coneflower				
blanket		X		
flower				
coral bells		X		
hosta				
black-eyed		X		X
Susan				
stonecrop				
verbena		X	X	

**Study 2:**

F = Factor      G = Gallery      OH2 = OH2  
P = Pendulum   S = Snapshot      T = Treflan

	F	G	OH2	P	S	T
Perennial						
columbine			X	X		X
Peter Pan			X			
aster						
clustered			X			
bellflower						
tickseed		X	X	X		
threadleaf						
coreopsis						
pachysandra			X			X
dwarf						
fountain						
grass						
creeping						
phlox						
stonecrop			X			X
speedwell		X	X	X		X

*Excerpted from VNLA Newsletter May/June 1998.*

## *Marketing*

**Survey of garden center retailers provides information for growers.** Trends most frequently identified by retailers were the need for new varieties and the increased interest in perennials. Retailers relay customer complaints about high prices and poor plant quality. Garden centers cannot command premium prices without high quality. Retailers can accept only high quality plants, manage inventory to turn plants quickly, take care of plants, educate customers about plant care. (M.P. Garber)

*Excerpted from American Nurseryman, July 15, 1998.*

**Effective employee training methods.** Training by videotape, workbook and lecture worked equally well to increase test scores of garden center employees. After training, score on a 10-point tests were increased by approximately 2 points. (J.H. Potter, J.D. Williams, B. Behe and H.G. Ponder)

*Excerpted from 1996 SNA Proceedings.*

## **Publications**

**The Proceedings for the 27th National Agricultural Plastics Congress.** Copies for the 316-page Proceedings can be ordered prepaid at \$35 per copy w/ shipping included for U.S., Mexico, and Canada. Order forms available from the American Society for Plastics, 526 Brittany Dr., State College, PA 16803-1420. For more information contact: Patricia E. Heuser (814) 238-7045; FAX: (814) 238-7051.

**Best Management Practices Guide.** The 76-pg., 4-color handbook offers guidelines for implementing proactive management practices necessary to produce container-grown plants w/minimal environmental impact and addresses such issues as Container Management Practices and Container Nutrition Practices. Included is a 10-pg., laminated summary of BMP's designed for in-field use. Cost is \$25 for SNA members/\$35 for non-members. To order call: SNA (770) 973-9026. By mail, send check payable to "SNA" to: Southern Nursery Assoc., 1000 Johnson Ferry Rd., Suite E-130, Marietta, GA 30068-2100.

**Heat Zone Map.** The American Horticultural Society has released a Plant Heat-Zone Map. The new heat-zone map is aimed at making it easier to determine which plants handle heat during summer months. AHS has coded about 2,000 plants w/a heat-zone rating. Color poster of the Plant Heat-Zone Map is available for \$14.95. For information or to order, call: (800) 777-7931, Ext. 45.

**Tree Bytes CD ROM.** This is a teaching and learning tool to be used by teachers, students and professionals in the Green Industry. Over 600-full color images - over 160 insects and diseases common to the Northeast - pop-up definitions of key words - fact sheets are hyperlinked for quick cross referencing. Cost

\$60 shipping included. For more information call: (413) 545-2717, FAX: (413) 545-5174. Mail to: Bulletin Distribution Center, Draper Hall, Box 32010, Amherst, MA 01003.

**Landscape Plant Problems: A Pictorial Diagnostic Manual.** (MISC0194). This book describes the afflictions of 78 popular ornamental and fruit-bearing plants. Contains five hundred thirteen full color photographs - identifies cultural, insects, disease, and herbicide problems. Spiral bound, 168 pages. Cost is \$25 plus \$4 shipping. You may fax your order to Bulletins (509) 335-3006 or call toll free (800) 723-1763.

**New England Management Recommendation Guide for Insects, Diseases and Weeds of Shade Trees and Woody Ornamentals.**

Presented by U-Mass Extension, this contains virtually all the insects, diseases and weeds of woody plants in New England, current and legal listings of chemical compounds labeled for the management of these pests, IPM considerations for most of these pests, environmentally friendly alternatives in pest management such as horticultural oils, soaps, biologicals, etc. Also available on CD-ROM- \$60, 1998 Guide-\$20. For more information or ordering and/or computer requirements, Call: Kathleen M. Carroll (413) 545-0895.

**Water and Nutrient Management for Greenhouses,** NRAES-56. A 110-page book that provides greenhouse managers w/guidelines for fulfilling crop nutrient needs while minimizing the environmental risk of runoff. Publication is available for \$20 per copy plus shipping/handling from the NRAES Cooperative Extension, 152 Riley-Robb Hall, Ithaca, NY 14853-5701. For information about quantity discounts or for a free publications catalog, contact the NRAES at (607) 255-7654 or fax at (607) 254-8770.

**Ball Identification Guide to Greenhouse Pests and Beneficials.** This 244-page book contains detailed information and over 480 full-color photos for the identification of greenhouse pests such as aphids, various flies, scales, mealy bugs, thrips, beetles, whiteflies, and other pests, plus detailed information on biological control of these pests. Priced at \$67, plus \$5 shipping/handling. To order a copy, call Ball Publishing (630) 208-9080 or (888) 888-0013. Major credit cards are accepted.

## Calendar

**August 18** - Irrigation Systems - Ornamental Short Course Series, New Castle County Extension Office, Newark, DE, 9 AM - 3 PM, Fee: \$50, Contact Susan Barton (302) 831-1375.

**August 18, 20, 25 and 27** – Introduction to Landscape Contracting at the Lehigh County Agricultural Center in Allentown, PA. Contact Emelie Swackhammer (610) 391-9840.

**August 19** - Basic Landscape Management for Spanish-Speaking Personnel - Ornamental Short Course Series, Fischer Greenhouse Classroom, Newark, DE, 10 AM - 2 PM, Fee: \$25, Contact Susan Barton (302) 831-1375.

**August 20** - DAN Summer Turf and Nursery Expo, Smyrna, DE and Research and Education Fund Golf Outing. Contact: Val Budischak (888) 448-1203.

**August 20** - Fourth Annual Field Day, (sponsored by Virginia Nursery & Landscape Assoc., formerly: Virginia Nurserymen's Association, Inc.) Location: Riverbend Nursery, Riner, VA, 9 AM - 4 PM. For more information contact: Floyd Virginia (800) 476-0055. Internet home page: <http://www.growzone.com/association/vna/> E-mail: [vna@swva.net](mailto:vna@swva.net), Fax: (540) 382-2716.

**August 26** - Hands on Paver & Wall Installation Seminar - at the NJNLA headquarters office in Bordentown, NJ. 4pm-7pm. Dinner includes: Pizza, hoagies, salad, beverage, etc., cost \$10 per person. Advance registration is a must. Contact: NJNLA, 605 Farnsworth Ave., Bordentown, NJ 08505.

**August 28-29** - NCAN Charlotte Show, Charlotte, NC;

Contact: (919) 266-3322.

**September 3 ,8, 10** - Identification & Control of Diseases on Ornamental Plants - Ornamental Short Course Series, Fischer Greenhouse Classroom, Newark, DE, 6-8 PM, Fee: \$75, Contact Susan Barton (302) 831-1375.

**September 8, 15, 22** - Herbaceous Plant Identification - Ornamental Short Course Series, Fischer Greenhouse Classroom, Newark, DE, 3:30-5:30 PM, Fee: \$75, Contact Susan Barton (302) 831-1375.

**September 8, 15, 22, 29; October 6, 20** – Perennials II Certificate Course, Longwood Gardens, (610) 388-1000 ext. 516.

**September 10 or 24** – Plant Disease Identification Walk, Longwood Gardens, (610) 388-1000 ext. 516.

**September 10** – Water Gardening Workshop, Longwood Gardens, (610) 388-1000 ext. 516.

**September 11 or 18** – Weed Identification Walk, Longwood Gardens, (610) 388-1000 ext. 516.

**September 12 & 13** - Power of Herbs: 7th Annual Weekend of Healing Plants Workshops, The New York Botanical Garden, Continuing Education. For a free 64-page course catalog: Call (718) 817-8747, Code:3319803A, FAX: (718) 817-8666, E-mail:conted@nybg.org - Website: [www.nybg.org/edu/conted/conted.html](http://www.nybg.org/edu/conted/conted.html)

**September 15** - Pest Walk - Ornamental Short Course Series, Winterthur Museum & Gardens, Winterthur, DE, 9 AM - 12 PM, Fee: \$25, Contact Susan Barton (302) 831-1375.

**September 16** - The International Plant Propagator's Society Professional Propagator's Field Day. Hosted by Bluemount Nurseries, Foxborough Nursery, Manor View Farm and the Eastern Region IPPS Chapter. Contact Alan Jones, Manor View Farm (410) 771-4700.

**September 18 or 19** – Garden Photography Workshop, Longwood Gardens, (610) 388-1000 ext. 516.

**September 23** - Ornamentals Research Expo. UDBG. Contact Susan Barton (302) 831-1375.

**September 23** – Nursery Production Bus Tour. Visit Foxborough Nursery, Inc., Maryland Aquatic Nursery, Manor View Farm and Bluemount Nursery, Inc. Bus will depart from Plymouth Meeting Mall and Longwood

Gardens. Contact Dave Suchanic (610) 489-4315.

**September 25** – Garden Pest Identification Walk, Longwood Gardens, (610) 388-1000 ext. 516.

**September 30** – Garden Pest Identification Walk, Longwood Gardens, (610) 388-1000 ext. 516.

**October 3 or 8** – Fall Perennials, Longwood Gardens, (610) 388-1000 ext. 516.

**October 6 & 8** - Diagnosis & Control of Insects and Weeds on Woody Ornamental Plants - Ornamental Short Course Series, Research & Educational Center, Georgetown, DE, 3 - 5 PM, Fee: \$50, Contact Susan Barton (302)831-1375.

**October 7-10** - Eastern Region International Plant Propagators' Society Annual Meeting, Toronto Hotel Toronto, Ontario, Canada. Contact: Margot Bridgen, 26 Woodland Road, Storrs, CT 06268, (860) 429-6818, E-mail: mbippser@neca.com

**October 7, 14, 17, 21, 28** - Garden Design: Putting Your Thoughts on Paper, Longwood Gardens, (610) 388-1000 ext. 516.

**October 8, 15, 22, 29; November 5, 12** – Deciduous Trees Certificate Course, Longwood Gardens, (610) 388-1000 ext. 516.

**October 7, 14, 21** - Shrubs for the Landscape - Ornamental Short Course Series, Fischer Greenhouse Classroom, Newark, DE, 5:30-7:30 PM, Fee: \$75, Contact Susan Barton (302) 831-1375.

**October 12** – Perennial Garden Maintenance Workshop, Longwood Gardens, (610) 388-1000 ext. 516.

**October 13, 15, 20** - Ornamental Short Course Series, Worrlow Hall Landscape Design Studio, 7-9 PM, Fee: \$75, Contact Susan Barton (302) 831-01375.

**October 15, 23, 29** – Design Concepts in the Garden, Longwood Gardens, (610) 388-1000 ext. 516.

**October 20** - Prepare for the next - Certified Nursery Professional Exam - Department of Agriculture, Dover, DE. For more information call: Val Budischak (888) 448-1203.

**November 4-6** -ERNA Expo. Eastern Regional Nurserymen's Association. Atlantic City Convention Center, Atlantic City, NJ. Call (800)376-2463 or

(301)9908350; FAX (301)990-9771.

**November 17** – Ornamentals and Turf Workshop, Dover, DE. Contact: Val Budischak (888) 448-1203.

**January 5-7** - MANTS, Baltimore Convention Center, MD, Contact: (800) 431-0066

**January 16, 23, 30; February 6, 13, 20** – Garden Design Studio II, Longwood Gardens, (610) 388-1000 ext. 516.

**January 7-10** - NCAN Green & Growin Show, Winston-Salem, NC; Contact: (919) 266-3322.

**January 11 - 15** - Advanced Landscape Plant IPM Short Course. Sponsored by University of Maryland, Cooperative Extension. Contact John Davidson (301) 405-3927.

**January 12, 13, 14**- DAN Hort Industry Expo, Sheraton, Dover. Contact: Val Budischak (888) 448-1203.

**February 4-7** - WNGA/NLA/GCA Management Clinic, Louisville, KY; Contact: ANLA (202) 789-2900.

