Training Young Trees

Using Your Wood Waste
Strategies that cut costs

Dogwood Anthracnose
Aerial Lifts are a very valuable piece of equipment used mainly for tree work. But there are a few important things to remember:

- When you purchase a new Aerial Lift, you will have many good years of service if you maintain the lift properly.
- Inspecting the lift on a daily and weekly basis is most important. Use the inspection list provided on the metal plate fastened on the deck of the Aerial Lift or in the manual provided with the new Aerial Lift.

When you know that your Aerial Lift was damaged in any manner, the owner must call the manufacturer for advice. A telephone call is very important to us. Used Aerial Lifts purchased from one or more owners could be a problem. You would not know how the Aerial Lift was used or abused.

Most Aerial Lifts are used on a full daily and weekly basis. Off the road equipment with Aerial Lifts on rough terrain have to be the most used and abused because there are no flat or good roads and the Aerial Lift is being punished by pounding the booms, cylinders, lock valves, leveling system and welds. These are the most critical parts of the Aerial Lift. Most important, the lift must be stowed when moved. When making repairs on your own Aerial Lift, there are many parts that may be purchased without ordering from the manufacturer. Major parts must be purchased from the manufacturer because the design has been proven. Do not try to guess on the type of material to use, such as steel, aluminum or fiberglass. It is not worth sacrificing the well being of your operator for a few dollars. Please call for advice, toll free.

The Aerial Lift must be dielectrically tested every year. It is important that the Aerial Lift meet ANSI, American National Standard Institute, A92.2 1990. Aerial Lifts of Connecticut must be tested only with an AC Test Machine. Make sure the fiberglass upper boom and isolator are clean. Use isopropyl alcohol on a rod with rags to clean the inside of the isolator. Never replace a hose in the upper or lower boom with a wire braid hose because it is a conductor. Use only a non-conductive plastic type hose.

Aerial Lift Inc. Daily & Weekly Inspection Sheet, Milford, CT

Daily Inspection - Based on 8 hours of operation.

1. Check lower cables for wear & proper tension.
2. Check lower cylinder rod and hanger area, clean out debris.
3. Check lower cylinder rod end for weld cracks.
4. Check lower cylinder hanger & gussets on turret for weld cracks.
5. Check lower lock valve for holding - BOTH SIDES.
6. Check upper cylinder saddle bolts for looseness.
7. Check upper lock valve for holding - BOTH SIDES.
8. Check rear of upper cylinder shell & nut for looseness.
9. Check upper knuckle for looseness & cracks.
10. Check lower knuckle for looseness & cracks.

Weekly Inspection - Based on 40 hours of operation.

11. Check 4 allen bolts-crows nest clamp for torque 100 ft. pounds.
12. Check isolator with both booms vertical & lower boom fitting for looseness.
13. Check knuckle hoses for chafing, lubricate hoses.
14. Check leveling cables for wear & rust at bucket, lubricate cables.
15. Check turret leveling cables for wear and rust, lubricate cable.
16. Check base of turret for excessive looseness, with both booms vertical.
17. Check top 20 turret bolts for tightness, top side.
18. Check bottom 20 turret bolts for tightness, underside.
19. Check 4 1-inch turret bolts for tightness. Torque 500 ft. lbs.
20. Check knuckle links, shafts & nuts for looseness.
21. Check leveling cables at knuckle for wear & rust, lubricate cables.
22. Check upper cylinder rod end for weld cracks.
23. Check high pressure oil for proper level & foaming. use Dexron® ATF III.
24. Check outrigger bolts for tightness.
25. Grease all fittings. (See manual)

Note: Items 5 & 7 with approximately 200 lbs. in crow's nest, raise booms and try to lower them without power. If boom lowers, valve is not holding.

Use Hydraulic Oil: Dextron® ATF TYPE III or compatible.

You must first operate the unit from the lower controls each day before getting into the bucket you must also wear a bodybelt and lanyard when operating from the bucket.

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When was the last time ... ?

... that you went to work in the morning and were really excited about your day? Instead of worrying about the two additional crews you need and the maintenance required on equipment, when was the last time you really felt the passion and love for your work that inspired you to go into the tree care business? When was the last time you had a little spring in your step when you got to do a job you loved, in a work environment you loved, with people you really enjoy.

Well, you know folks, you have today. That’s it. In the middle of all the business challenges, labor shortages, regulations, and office management, today is it. As cliché as it may sound, there is no guarantee you’re going to get to walk through that door and get in that truck tomorrow. So, if you’re not enjoying what you’re doing today, why not?

Think back to those days when you went with your father on your first job, or when a teacher inspired you to consider working outside every day in nature, or when you climbed for the first time. Where did the joy come from? What was the magic that led you to this industry?

Those things don’t change. We do. We change how we react to situations around us; our perceptions of the work environment we must survive in; the people who are around us every day; and whether or not we approach our work with the passion we first felt.

I have had the opportunity recently to visit with tree care professionals around the world. It doesn’t matter what accents they have, where they grew up, or whether or not they can completely understand the language of another. The sentiment and experience at the gut level are shared. I have also had the opportunity to travel back in time to visit with some people from earlier days in my career. Their appreciation for the experiences we shared together is as alive as it was five, ten, 20 years ago. I have also had the chance to visit with some folks who may not have as many tomorrows as you think you have.

Giving up the magic that first attracted you to this industry at the start of your career, while dealing with all the business challenges along the way, is a huge price to pay. Don’t lose sight of what you love about this job and the people in this industry in the middle of the hustle to the next job site. The camaraderie, common language and passion are worldwide. You are very fortunate to be part of a network of extraordinary people who do special work every day. Relish the opportunities you have to come together and share your experiences and new ideas. Make time for these experiences and the people you work with every day. You have been given a rare chance in this life to do something that really has a long-lasting value. The people who are drawn to this industry feel it ... They’re worth your time. After all, they may have tomorrow ... but you may only have today. Cherish the magic.

Cynthia Mills, CAE
Publisher
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By Cass Turnbull

Mycorrhizal Fungi and Other Microorganisms
By Dr. Donald H. Marx

Dogwood Anthracnose: Symptoms & Controls
By Warren Copes

Using Your Wood Waste: Strategies That Cut Costs
By Steve Sandfort

Pruning Practices: Training Young Trees
A few well-chosen cuts on a young tree can prevent hazardous trees from developing in the future and extend the working lifetime of urban trees.

Outlook
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TCI’s mission is to engage and enlighten readers with the latest industry news and information on regulations, standards, practices, safety, innovations, products and equipment. We strive to serve as the definitive resource for commercial, residential, municipal and utility arborists, as well as for others involved in the care and maintenance of trees. The official publication of the nonprofit National Arborist Association, we vow to sustain the same uncompromising standards of excellence as our members in the field, who adhere to the highest professional practices worldwide.
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3. Top: (removable) 8’ long .............. 14 ga. plate
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5. Tailgate (270° swing) ................. Expanded Metal
  w/tubing frame
6. Runners ..................................... 6” structural channel
7. Cross members ............................ 3” structural channel
8. Side vertical supports ................ 3” x 3” sq. tubing

General
1. All G-60 galvannealed material
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6. Hydraulic dump hoist
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8. Trailer light connector 6 pole; Elec.
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9. Pintle; or pintle/ball combination trailer
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Training Young Trees

By Cass Turnbull

Some define a young tree as one that is under 15 years old. Dr. Alex Shigo says it's any tree that is still all dynamic mass. Such a tree is difficult to damage with pruning. Though a young tree can take a lot of pruning, it generally doesn't require much, since most of the limbs of a young sapling are temporary and will be removed as the tree grows up. By knowing when, where and why to cut, arborists can solve many problems before they become serious and much harder to correct later in the tree's life.

The main goals of young tree pruning are:
1. removing suckers
2. removing temporary limbs
3. minimizing included bark.

Suckers

Suckers are the straight, thin, rapidly-growing shoots that arise from the trunk, the trunk collar, the roots, or below a graft union. Trunk or trunk collar suckers are often caused by wounding, such as flush cutting limbs or string-trimmer damage. Suckers can also occur when a graft union no longer suppresses the growth below.

The graft union is the place where two parts of a plant are spliced together, usually a desirable top portion (the scion) attached to the more vigorous, ordinary trunk or roots. The graft union on a weeping cherry tree will be high up on the trunk and will look like a bulge. The trunk below belongs to a standard cherry, and the weeping limbs just above are the desirable branches. Other graft unions on the trunk, either near the crown or near ground level, can be spotted as a sudden change in bark color or trunk diameter. Graft unions sometimes cease working, especially if the tree has suffered from drought, mal-pruning, late freeze or other cultural stress. When this happens, dormant buds below the union begin to grow out into suckers. These suckers must be removed on a young tree (even if they have gotten rather large), or they will overtake the tree. When you see a large, white-blooming cherry tree with a tiny puff of pink blooms down low, or a purple-leafed and green-leafed plant, you are looking at a plant whose “suckers” from below the graft union have overtaken the tree. By then, it’s too late to correct the problem.

You have the greatest chance of success by correcting sucker growth on young trees.
A thorough understanding of branch attachments, branch collars and included bark is essential for every arborist. All cuts should be made to the branch collar or inclusion, as shown here, will develop.
Cut the suckers off just as they meet the parent wood. If the suckers are a few years old, they may even have developed a collar. Cut it to, but not into it. Cutting suckers too far out (leaving stubs), or too close (flush cuts), stimulates even more suckers to grow. Even if suckers are pruned “just right,” they may keep returning to plague the tree owner for a lifetime. Moderately better luck can be had by pruning in the summer, though even this is not a magic bullet. There is a product on the market (Sucker Stopper RTU, active ingredient NAA, Ethyl 1-naphthaleneacetate) that claims to prevent regrowth for up to a year. Beware that it is a powerful growth regulator that can damage plant tissue. It should, therefore, be used only on 1-year-old sucker growth, not as a treatment for regular pruning cuts. The best “cure” for suckers remains prevention, and that is done by keeping the tree healthy.

Suckers sometimes arise below ground level from a young tree’s roots located near the trunk. This is often the result of the tree being planted too deep—a common problem in the landscape industry and in volunteer and homeowner tree planting projects. A study conducted by the horticulture industry found that 80 percent of the trees planted by professionals were planted two to four inches too deep. This is indeed an astounding percentage. Not only do these trees send up troublesome suckers, they fail to thrive and many can die before reaching maturity. If you find such a tree, and it is young, dig it up and replant at the correct level. If it is too large to dig, just pulling the soil away several inches from the trunk collar (hopefully with positive drainage) can help immensely. You will know where the correct level is by carefully digging down the trunk collar with a trowel until the trunk flares out into a major root or roots. That is the correct soil level. If the tree has been planted too deep for a few years, know that some adventitious roots may have developed in the higher soil level. Ignore them and continue to dig down looking for the “butt flair,” which is at the true and correct soil/root level.

Temporary Limbs

As the urban tree grows, it is usually necessary to remove the lower limbs to create clearances for people, cars, houses, and such. It is important that this be done when the limbs are neither too young, nor too old.

If a sapling is limbed up all at once, the trunk may flop over or it may develop a vertical crack in the trunk. This cracking is often called “sun-scald” or “frost cracks.” Yet they are not the result of frost or sun but are caused by improper pruning. Shigo has often said, “Flush cuts cock the gun and the sun pulls the trigger.” Also, if cuts are made one directly above the other, pockets of rot may coalesce between...
cuts, causing cracks. It is therefore advisable to vary cuts at different heights and sides of the tree over the course of years. On the other hand, delaying pruning until the limbs have become major scaffolds is equally bad for the tree. Older trees are less able to deal with the larger pruning wounds.

Research has shown that a limb on a trunk "feeds" the portion closest to it, making that part of the trunk stronger and giving it the necessary taper. Poor nursery practices, especially rampant in southern California, result in saplings being tightly staked and then quickly limbed up. This creates a taller tree faster, but it will be a pathetic, weak tree that needs constant re-staking for life. It is important for project managers to specify tree size by caliper, rather than height, to prevent the further invasion of the "California floppy" tree. Richard Harris struggled with various methods of staking these weakling trees in earlier editions of his textbook, *Arboriculture*. His final solution to the California floppy tree was to cut the entire trunk off near ground level (a terrifying sight, and a hard sell to the customer), letting the trunk shoot back up, strong and straight, in a year. This is a case where understanding the incredible resiliency of the young tree is useful knowledge.

The side limbs on a shade tree sapling are called temporary limbs, and over the course of years they will be removed. In a forest situation, the canopy quickly shades out young trees' lower limbs. But such trees are also not subject to the wind stresses of lone trees in urban settings, and have little trunk taper. Therefore, we wait for a few years until that part of the tree trunk is strong enough before removing the temporary branches. A good rule of thumb is that at any given time two-thirds of the length of the tree trunk should be covered in leafy-crown. Another rule is that side

An unstaked "California floppy" tree.
New trees are often planted 2 to 4 inches too deep, causing a variety of problems in the landscape.

branches should be thinned off before they reach one-half the diameter of the parent stem.

If the young sapling tree is planted on a narrow median strip, the only limbs may interfere with people walking down the sidewalk. In this rare situation, it is recommended that the temporary limbs be headed back, out of traffic's way, but allowed to continue feeding the lower portion of the trunk. This is one of the few exceptions to the rule, "Do not head back tree branches." When enough of the crown is above head height, begin to remove the temporary limbs, at the rate of perhaps two a year, from opposite sides and different heights on the trunk.

And, of course, all cuts should be made to the branch collar. A thorough understanding of branch attachments, branch collars and included bark is essential for every arborist to do a proper job. Shigo has written extensively on the subject and provides us with great photographic documentation in his many books, booklets and pamphlets.

**Included Bark**

Other targets of early pruning are included bark and the removal of double leaders. When a narrow angle of attachment exists, bark can get trapped between the two leaders or between the leader and a major limb. This V-shaped crotch (as opposed to U-shaped) can result in a hazardous situation, since there is no connective tissue between the two parts. As the tree grows larger, the two parts get heavier and the area of disconnect increases. They may push themselves apart, ruining the tree. Worse yet, if the tree is on a right-of-way or near...
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Please circle 50 on Reader Service Card
A study conducted by the horticulture industry found that 80 percent of the trees planted by professionals were planted two to four inches too deep. This is indeed an astounding percentage. Not only do these trees send up troublesome suckers, they fail to thrive and many can die before reaching maturity. If you find such a tree, and it is young, dig it up and replant at the correct level.
double leaders, especially trees with an opposite branching pattern. Responsible nurseries maintain a strong central leader on shade trees, and do follow-up pruning to alleviate overcrowded branches.

Exceptions to the Rules

It should be mentioned that there is a point where the size of the cuts and the amount of pruning needed to correct included bark is so severe that it can no longer be considered a viable option.

Small maturing ornamental trees may already have their scaffolds chosen and should not be trained back to central leaders. And some—for example certain cherry trees—may be crowded at the point of juncture. It is inadvisable to attempt correction of this situation as well.

Know the natural habit as well as the estimated size of your tree. The Florida dogwood (Cornus florida) often grows with an open, U-shaped, or even V-shaped double trunk. This gives the tree even more aesthetic interest. And since this small tree is sensitive to pruning cuts, do not try to make it into a single-leadered tree. The crown of a purple-leaf plum tree is likely to have mostly included-bark scaffolds. To try to eliminate them would eliminate the entire crown, create a nightmare of watersprout regrowth, and perhaps even kill the tree. And, since this tree rarely gets large enough to do major damage when the limbs fail, the situation is best ignored. Many of the new fastigiate trees developed for street right-of-ways consist mainly of included bark limbs. But since these limbs are of relatively smaller size and they stay at an acute angle, they are not considered dangerous.

Even on a medium or large-growing young tree, you will sometimes come across a side branch or double leader that is too large to remove. (i.e. a cut over two or three inches). In this instance, attempt to suppress one of the leaders by selectively heading it back to a large lateral. And when double leaders are spotted even later in the tree’s life, the arborist can only minimize the danger by thinning each of them and cabling the two together.


As the title indicates, it has an enormous and helpful array of illustrations of branch collars and included bark situations. (See TCI, July 2000, “Beyond Deadwooding.”)

The adage goes, “As the twig is bent, so grows the tree.” Once the basics of young tree training are understood, arborists can get trees off to a good start. A few well-chosen cuts can prevent hazardous trees from developing in the future and extend the working lifetime of the urban tree.

Cass Turnbull is the founder of PlantAmnesty in Seattle, Wash.

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Durs-Ban

The U.S. Environmental Protection Agency confirmed June 8 that it has banned most landscape and home uses of the pesticide Dursban (chlorpyrifos)—the most widely used pesticide in the nation found in more than 20 million homes, according to the EPA.

The EPA's declaration followed the June 7 announcement by Dursban manufacturer Dow AgroSciences that the company and other makers of related products agreed to voluntarily comply with the EPA's stipulations on chlorpyrifos. Tree care pesticide applicators and others will now have to adjust to the reduction in uses for chlorpyrifos-based products.

Chlorpyrifos and other organophosphate pesticides are under governmental review as part of an ongoing effort to implement the Food Quality Protection Act (FQPA) of 1996. The FQPA requires a systematic government review of all pesticides to ensure they meet tighter standards with the foremost goal of protecting children. Congress passed the law requiring the review to be completed by October 1999. However, only a few of the chemicals have been examined thus far.

For 30 years, landscapers, pest-control operators and homeowners have used chlorpyrifos. It works against a variety of insects, including fire ants, termites, cockroaches, spiders, fleas and ticks, and can be found in approximately 825 registered products. According to Mike Shaw, Dow AgroSciences' global policy leader for chlorpyrifos, all outdoor residential uses, except for fire ant mounds and mosquito control (professional applicators only), will be eliminated, as well as outdoor, non-residential uses except for golf courses and residential medians. An EPA release stated, "[The] agreement will halt the manufacture of chlorpyrifos by December 2000 for nearly all residential uses. It will require that virtually all of those residential uses be deleted from existing product labels prior to that time, including uses for home and garden sprays, uses to control termites in completed houses and uses on lawns."

Although new production of the chemical is to stop by the end of the year for virtually all non-agricultural uses, actual retail sales will not be required to end until Dec. 31, 2001.

Congress Approves Ergonomics Restriction

On June 22, the Senate added language to the Labor Department's fiscal 2001 spending bill to stop OSHA's fast-moving ergonomics rule, setting up a showdown with the Clinton administration, which has already threatened to veto the measure. Sen. Michael B. Enzi (R-Wyo.), chairman of the Senate Health, Education, Labor and Pensions Subcommittee on Employment, Safety, and Training, introduced the Senate amendment.

The 57 to 41 vote in favor of the ergonomics amendment now means both the House and Senate versions of the spending bill that covers the departments of Labor, Health and Human Services and Education contain a restriction on the OSHA rule. The House narrowly passed its Labor-HHS bill June 14 after an attempt to remove the OSHA restriction was defeated 220-203 (30 OSHR 590).

President Clinton has threatened to veto either bill if it were to include restrictions on the OSHA rule, which is a top priority of the Labor Department. The administration also argues that the bill under-funds job training and other priority programs.

The proposed rule, which is designed to protect workers from musculo-skeletal disorders, is slated for completion by the end of the Clinton administration. The National Arborist Association has thrown its support behind industry groups, charging that the agency is moving too fast in a regulatory area fraught with debate over what methods actually protect workers from repetitive motion injuries.

Enzi told colleagues during floor debate that the amendment was not meant to halt work indefinitely on the rule. Because it is attached to an appropriations bill, it could delay OSHA's work only through fiscal 2001, which ends Sept. 30, 2001.

In expectation of the amendment, the Office of Management and Budget issued a statement June 22 reiterating the administration's strong opposition to any move aimed at further delaying a final ergonomics standard. Labor Secretary Alexis M. Herman said she would recommend that President Clinton veto the spending bill if the Enzi amendment is included.

Although GOP lawmakers agreed to let the rulemaking go forward in fiscal year 1999, Senate Republicans returned last fall in an attempt to halt the ergonomics rule in the fiscal 2000 Labor spending bill. GOP senators ultimately retreated, fearing that Senate Democrats would filibuster the bill.

Peter Gerstenberger is vice president of business management, safety & education for the National Arborist Association.
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Are Foreign Workers One Answer to Tree Care Labor Problems?

By Grace Glover-Dunne

Ten years ago, Pete Schepis, vice president of Loyet Landscape Maintenance in St. Louis, Mo., had a constant labor shortage. He spent much of his time finding, hiring and training workers, only to have to start the process over again at the beginning of each season. “The market for laborers was tight in St. Louis in the early '90s,” says Schepis. “Today, it’s virtually nonexistent.”

Landscape contractors are not alone in their plight. Tree and lawn care specialists who also rely heavily on skilled or semi-skilled laborers are finding it increasingly difficult to find, and keep, reliable workers. A robust economy and a strong national housing market are increasing the demand for these specialist services. According to a 1998 Gallup Survey, 24.2 million U.S. households spent a staggering $14.6 billion on professional landscape, lawn care and tree care services in 1997. By 2002, over 35 million U.S. households are expected to purchase one or more of these services.

In the 1980s, Bob Wingfield had an irrigation business in Dallas, Texas. He knew first-hand the constant pressure to find workers, and had resorted to hiring illegal aliens. In 1988, having been hit by the INS for the ninth time, he knew something had to change. “I went from poacher to gamekeeper,” says Wingfield. “I saw a need for a new type of service.”

Wingfield started Amigos Labor Solutions, Inc., which has supplied thousands of workers to the green industry all over the United States.

Amigos works in partnership with its clients, each with a clear set of tasks and responsibilities. Through the H-2B Program, which is sponsored by the U.S. Department of Labor and the INS, laborers can be brought legally from Mexico to work in the United States for up to ten months.

What is the H-2B Program?

Section 101 (a) (15) (H) (jj) (b) of the Immigration and Nationality Act authorizes the admission of aliens to perform temporary or seasonal nonagricultural work for employers in the United States. The H-2B non-immigrant visa category is perfect for tree care workers whose jobs require less than a bachelor’s degree and whose period of work is less than one year.

An employer who wishes to employ alien labor through the H-2B program must first apply to the U.S. Department of Labor (DOL) for a “labor certification.” This certification is the DOL’s finding that:

- the employer is offering terms and conditions of employment that will not adversely affect similarly employed U.S. workers
- sufficient qualified U.S. workers will not be available at the time and place needed to perform the employer’s work. As we all know, it today’s economy this is not difficult to demonstrate.

The application may not be filed more than 120 days before the date workers are needed, but should be filed at least 60 days before in order to receive certification in time to get the foreign workers to your shop. Once the application is accepted, you and the Labor Department will attempt to recruit qualified, eligible workers in the United States. If you can demonstrate that U.S. workers cannot be found, you will receive a labor certification for the jobs that remain unfilled.

Once you have a labor certification, you may petition the Immigration and Naturalization Service (INS) for admission of qualified alien workers. A separate certification and petition are required for each job, such as groundperson or climber trainee, but there is no limitation on the number of workers in an occupation who may be requested on a certification.

It is your responsibility to recruit the alien workers who meet the training and experience requirements on the labor certification. Neither INS nor DOL has any involvement in locating foreign workers. You may choose to do this yourself, or you may decide to hire a personnel-consulting firm that specializes in this area. If INS approves your petition, the aliens recruited must apply for visas to enter the United States.
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60' w.h. Hi-Ranger overcenter, single stick control, rear mt. flated, 2000 IHC 4700 DT466 dsl, a/b, 6x4 trans., brand new & ready to go.

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Program Requirements

- Applies to "non-agricultural" occupation
- Applies to unskilled workers (less than a college degree required)
- Jobs must be temporary or seasonal (generally 10 months)
- Aliens must be non-immigrants (must be permanent residents of home country)

What Must You Do?

1. File Temporary Labor Certification (TLC) application with State Employment Service
   - Offer "prevailing" wage
   - Describe job, performance standards and entry requirements in detail
   - Describe efforts made to obtain U.S. workers
   - Justify the seasonal or temporary need for the workers

2. Engage in required U.S. worker recruitment
   - State agency will specify required advertising
   - Advertisement must describe job exactly as on the TLC
   - Employer must interview and make job offers to all qualified U.S. workers
   - Justify with specificity the lawful job-related reason for each refusal to hire

3. Certification determination by USDOL Regional Office
   - Reviews and approves or disapproves job offer and employment requirements
   - Reviews and approves or disapproves of domestic worker recruitment and reasons for not hiring
   - If approves, issues labor certification for difference between number of workers needed and number of U.S. workers hired

4. Obtaining worker after receiving labor certification
   - Petition INS for admission
     (must remake the case for seasonal or temporary need)
   - Approved petition is cabled to consulate
     (or port of entry in visa-waiver countries)
   - Employer presents aliens at consulate, who go through normal admission procedures
   - Workers admitted to work for period for which employer is certified and for the employer to whom certified

5. Employer responsibilities after admission
   - Employ workers only in certified job
   - Pay required wages
   - Do not discriminate in pay, work assignments, etc. in favor of H-2B employees
   - Aliens are responsible for their own housing, meals, transportation, etc., but as a practical matter employer assistance may be necessary
   - Must pay return transportation of any alien who is terminated prematurely

Alien Qualifications and Responsibilities

1. Must be permanent residents of the foreign country and intend to return home
2. Must work only in authorized job for authorized employer
3. Must depart when job ends
4. Must possess any employment requirements imposed on U.S. workers, such as experience
of the year, which fits well with tree care employer’s schedules.

“We bring 40 to 50 workers up in mid- to late February and they return to their families in time for Christmas,” says Schepis.

Amigos files all the necessary paperwork, locates dependable workers in Mexico and ensures that their documents are in order. The employer’s responsibilities include placing an ad in their local newspaper to establish that local labor is not available, paying the prevailing wage (between $7 and $9 in most states) and supplying adequate housing.

Schepis houses his workers in trailers in a trailer park they bought some years ago. Other employers have found inexpensive apartments for their laborers. All say providing housing and access to local merchants present no major obstacles.

Initially, employing foreign laborers does not save the client money. The savings come in having little or no turnover, keeping training costs to a minimum. “The first year, I requested four workers,” says Ed La Flamme, owner of La Flamme Landscape Services in Bridgeport, Conn. “Ten years later, three of those original four are still with us. They have a strong work ethic and are highly motivated.”

Wingfield adds, “There is a clear financial incentive for them to come here. U.S. wages are like a pot of gold. They’re also loyal, dependable and have a personal incentive to succeed.”

La Flamme turned to foreign laborers because he simply couldn’t find enough workers domestically. “I worked with local and state authorities, attended job fairs and ran newspaper ads constantly. It was a mess,” he recalls.

While most workers speak little or no English, communicating with them does not present insurmountable problems. La Flamme requested that one in four laborers be able to speak English. Schepis’s foremen all speak English.

With the U.S. economy strong and growing steadily each year, the supply of manual laborers is dwindling. Factoring in the man-hours it takes to find, train and maintain a labor pool a growing number of green industry employers are turning to foreign help.

“We have been locating, certifying and placing foreign workers with U.S. employers for 12 years; for one fee, a company can solve its labor needs with an almost unlimited supply of dependable, loyal employees,” says Wingfield. For more information, contact Amigos at (214) 634 0500 or visit their Web site at www.amigos-inc.com.
**Corona Clipper** introduces a new model to its series of Professional Aluminum Handle Hedge Shears, the AH 6930. Its long tapered blade and end curvature are ideal for high-volume cutting. The combination of shorter compact handles and the 8 1/2-inch forged blades give optimum balance and weight distribution, which reduces fatigue, delivers better safety and provides outstanding performance. The overall length is 19 1/4 inches. It features forged high-carbon Coronium steel blades; forged-in bumper cups and Neoprene ShockStop bumpers; light weight; high strength; elliptical aluminum handles and non-slip, ergonomic grips. For more information, contact John Reisbeck or Kay Mathis at Corona Clipper, 800-847-7863 or visit their Web site at www.coronACLipper.com.

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**Cummins Engine Company, Inc.** announces its new RoadRelay 4. This in-cab, real-time system, available to the Dodge Ram market, provides performance, maintenance, safety, optional GPS and routing information. “Our customers will get useful data to help them run hard and get the best performance from their engines,” said Cummins Director of Engine Data Information Systems, Ann-Kristin de Verdier. It can be mounted on the floor, on or under the dash and has a bright, easy-to-read, digital screen. It offers instantaneous digital read-outs of engine load, fuel economy, fuel rate, coolant temperature, oil and boost pressures, battery voltage, vehicle speed, RPM and more. For more information, call 800-343-7357 or visit their Web site at www.cummins.com.

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**SwapLoader** releases the SL-400 hook-lift hoist with a rated capacity of 40,000 pounds. It lets you use your tandem-axle truck chassis as a dump truck, flatbed, water tank, van body, liquid tank, etc. It lets you “swap” bodies in a matter of minutes from the safety and comfort of the cab of your truck and lets you put the power where and when you need it for versatility and productivity. Features include dual lift cylinders, low pressure hydraulics, slide-through body locks, sliding jib for ease in mounting and dismounting bodies, heavy-duty rear pivot section, large beveled rear rollers and a rugged formed Z-rail mainframe. For more information, visit their Web site at www.swaploader.com or call 888-767-8000.

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**Hustler Turf Equipment** introduces a tractor-mounted Edger attachment to the ShortCut line of riding mowers. The edger blade is not powered, thus eliminating the risk of thrown objects either striking a bystander or damaging property. It is possible to edge as fast as the tractor can drive, up to 7.5 mph, and one operator can edge for miles without fatigue. Add the BAC-VAC catcher for an immaculate finish. With a body length of 62 inches, the ShortCut is shorter than comparable walk-behind mowers, making maneuverability in tight mowing conditions and trailer loading a snap. For more information, contact Excel Industries at 800-395-4757 or visit their Web site at www.excelhustler.com.

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**RedMax-Komatsu Zenoah** introduced the new EB7000 backpack blower with the FreeFlow Air System that overcomes the tendency high performance blowers have to clog at the air intake screen, which can lead to over-heated engines or burnt bearings. The air intake surface area is increased 10 times and does not restrict air, even when buried in a pile of leaves. The EB7000 has many features for tough commercial use, including a larger fuel tank for longer running time, noise level reduction of over two decibels and a contoured, air-conditioned back pad for operator comfort. For more information, call 800-291-8251 or send e-mail to sales@redmax.com.

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Mertz, Inc. introduced the Boxer, the first stand-on mini-skid on rubber tracks with a 24 hp Honda V-Twin engine. The unique track widening system changes the track width from 30 inches up to 42 inches and less weight with minimum ground pressure that is disbursed evenly over the tracks allowing landscapers and contractors to travel with confidence over delicate lawns and other prepared surfaces. The Boxer offers a complete array of attachments including augers, tillers and trenchers. For more information visit their Web site at www.mertzok.com or www.boxerok.com or call 800-654-6433.

A new guidebook to sawing and manufacturing lumber is now available through Wood-Mizer Products. Written for both hobbyist and professional, it contains basic, practical information on how to saw and dry lumber efficiently with minimal loss and downfall. Produced in collaboration with forestry expert Gene Wengert, the three-part guide From Woods to Woodshop, covers sawing techniques, drying methods and includes a valuable resource guide. The easy-to-read 19-page manual has more than a dozen illustrations and charts. “With a resource like this, most operators will spend less time trying to figure out the answers and more time producing,” said Darlene Guzman, Wood-Mizer Customer Service Manager. Contact Wood-Mizer Products at 800-553-0219 for additional information or visit their Web site at www.woodmizer.com.

Dr. Alex Shigo speaks for 2 hours on arboriculture, including: pruning, mulching, planting, watering, fertilizing, topping, tree wraps, sunscald, mycorrhizae, weedwhip damage, frost cracks, compaction, cluster plantings, and a lot more!

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Shigo Honored

Padua University in Italy recently honored Dr. Alex Shigo in recognition of his work “to better understanding of tree biology and tree care.”

Padua University, established in 1222, is one of the oldest and most famous universities in the world. Galileo Galilei taught there for 12 years, and Andreas Vesalius carried out his signature studies of human anatomy at Padua.

Shigo received the award at the conclusion of a three-day workshop on tree biology in Merano, Italy.

Safety in Two Languages

Bandit Industries is now offering a Spanish Operational Safety Video for their entire line of hand-fed tree and brush chippers. Both English and Spanish versions will be provided free of charge with each new unit delivered. All current Brush Bandit chipper owners are entitled to receive a free copy as well. Additional Spanish videos are available at a cost of $30 each. To receive your free Spanish Operation and Safety Video or to purchase additional copies, contact 800-952-0178 or 517-561-2270; Fax: 517-561-2273; E-mail: brushbandit@eclipsenet.com.

Spike Herbicide

Dow AgroSciences now offers Spike 80DF herbicide, a dry flowable formulation for railroad, utility and highway users. Unlike wettable powders, Spike 80DF immediately disperses upon contact with water. Matt Benson, customer agronomist, explains, “The advantage is that it mixes with water without agitation, offering applicators increased efficiency and ease of use.” It offers control of annual and perennial grasses, plus herbaceous weeds and woody brush. This non-selective herbicide avoids sudden brownouts and can be applied using broadcast or spot applications. For information, visit their Web site at www.dowagro.com/ivm or fax your request to the Customer Information Center at 800-905-7326.

Answers to July Crossword Puzzle

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July 2000/E. Leif Gruelen

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24
TREE CARE INDUSTRY - AUGUST 2000
Purple Ash Roots Respond to Subsurface Feeding of Mycorrhiza Inoculum and Nitrogen Fertilizer.

Steve Jiracek MS
Professional Arborist
Helena, CO

Michael Amarantus PhD
Adjunct Professor of Forest Science
Oregon State University

Fig. 1
Purple Ash percent mycorrhizal colonization following subsurface feeding of mycorrhizaROOTS™ and nitrogen fertilizer

Fig. 2
Purple Ash dry root weight following subsurface feeding with mycorrhizaROOTS™ and nitrogen fertilizer

SUMMARY

Ball and burlap Fraxinus americana (Autumn Purple Ash) trees were evaluated for their response to subsurface feeding of mycorrhiza inoculum with root biostimulant (mycorrhizaROOTS™) and nitrogen fertilizer (Coron® 28-0-0) on difficult sites in the Colorado front range. There were 3 treatments: (1) subsurface feeding of mycorrhizaROOTS™, (2) subsurface feeding of mycorrhizaROOTS™ and Coron®, (3) Control. Two root ingrowth cores were installed around each of twelve trees following planting in fall 1998 and excavated in fall 1999.

Trees treated with mycorrhizaROOTS™ & Coron® had 9 times higher mycorrhizal colonization percentage compared to controls. Trees treated only with mycorrhizaROOTS™ had 12 times higher mycorrhizal colonization compared to controls. Control trees were poorly colonized.

Increases in root growth were also dramatic. Purple ash trees treated with mycorrhizaROOTS™ & Coron® had greater than 3 times the dry root weights in excavated root ingrowth cores compared to controls. This study indicates that subsurfaces feeding of purple ash ball and burlap trees following outplanting with mycorrhizal inoculum and root biostimulants can greatly improve root growth and mycorrhizal colonization.
Analyzing the Competition

By Mary McVicker

How are your competitors doing? What are your competitors doing?

Keeping an eye on your competition is an important part of managing your tree care business. Everything you ever learned about succeeding by focusing on making your business the best is true—as long as you also know what’s going on down the street.

It’s a fact of business life that if you’re going to be competitive, you need to know as much as possible about what your competition is doing. Most arborists know a lot about their competitors, but the information is often incomplete, vague, and consequently, not as helpful as it might be. What they need is more complete and specific information and a more structured analysis. I don’t mean a formal report where the flowery business school language overshadows the value of information. A structured analysis helps put the competitive picture in focus, and it has the added benefit in helping define one’s own position.

Many in the green industry have a negative view of competitive analysis. They think, “we’re all in this industry together. I’m not going to spy on other companies in town.”

Yet, knowing more about what plans the competition has may help you follow the direction the industry is heading. You can’t keep up with every new trend, but you sure don’t want to be left behind. Simply knowing what others in the industry are doing will help you discover gaps in the market that aren’t being filled. Competitive analysis can pay off in many ways, but particularly with planning efforts.

The starting point

Analyzing the competition is largely a matter of questions and answers. The starting point is to determine the kind of competition and who constitutes that competition. From that you can get a list of competitors you want to track. Be sure your list has a range of sizes and markets, in addition to those businesses that are most like yours.

Assemble your list of competitors, which should include:

♦ businesses you consider your most direct competition
♦ businesses you predict will be more competitive with you
♦ businesses that seem interesting for whatever reason. This may be one where you know the owner well, or that seems to be doing some innovative things, or just one that piques your interest.

Some background information on each business is useful: a brief (very brief) history, how the company is owned and the management/operating structure. Information about major customers is helpful. If a competitor has one major client, that client defines that arborist’s market share. Consider the geographic location and “type” of customers your competitors work for: homes, organizations, businesses, municipalities, individuals (age, income level). A pattern will begin to emerge.

Also look at their marketing. How do they get these customers? How aggressive are they? Do they run promotions? Do the businesses in your area actively seek out new customers or new markets? Do they do anything with educating customers about trees and tree care? Who does the marketing within the business? Is the business involved in research, either directly or indirectly? Are there indications the business is considering expanding, or offering new products or services? If one of your competitors is rolling out an expanded IPM service that is your bread and butter, you better know as much as you can, fast!

Conferences and trade shows—where the emphasis is on
changes, new technologies, practices, and methods—can also yield information about competitors. And, of course, there’s always word of mouth.

In other industries with publicly traded companies, it’s possible to find financial information on competitors. In tree care, it’s not likely.

**Competitors within the context of the industry**

Although you’re tracking your direct geographic competition, you should look at competition within the context of the industry. But one of the elements you’re looking for in your analysis is changes in direction or emphasis for the industry, or, perhaps, changes in direction or emphasis for your business. I always urge businesses to keep an eye on “competitors” in another area who seem to be innovative or particularly successful.

Include some broader questions and issues in your analysis.

- **What is the overall market?**
- **How is that market segmented?**
- **Where are the greatest profits made in the industry?**
- **Who participates in the most profitable segments?**
- **Who has what market share?** (You’ll have to estimate—if not, guess on this one—but it says something about the industry and your business’ niche within the industry.)

And, more particular to your business:

- **Where is my business in relation to the market?**
- **What are its strengths and weaknesses? How do they fit with the market we’re currently targeting? Would another market emphasis be more appropriate?**

All of these questions and considerations make the process look more laborious than it is. Not every question will be pertinent to every arborist. Keep focusing on information that you think would be useful to know about your competition. As a corollary to that, ask yourself what you want to know about your business with respect to your competitors. (You might ask yourself how your competitors view your business.)

**The analysis**

You’re probably not going to get answers to all your questions, but patterns should begin to emerge as you consider your competition. Write down ideas.

How well do you think competitors keep up with the industry? Do their businesses reflect this?

Your analysis will probably have little “hard” data, since resident tree care is dominated by publicly held companies.

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That’s fine; hard data (especially the financial stuff) may be interesting, but you can know a lot about a business without it.

Your end product should be written. It doesn’t need to follow a particular format or be a formal report. Preferences vary. Some arborists will prefer to work with an informal description and commentary. Others may use more of an outline or list form that could include:
1. Company Name
2. History (very brief)
3. Description of business
4. Size and location
5. Owners and key players
6. Description of business operations
7. Market
8. Marketing efforts
9. How current are industry practices, products, services, etc.
10. How competitive with my business
11. Comments (including implications, if any, for my business)
12. Using the analysis

The form of the analysis isn’t as important as how useable the material is. You’re not making an industry survey for someone else—you’re doing this for yourself. Consequently the emphasis should be on your business, and information that tells you something about your business and the industry it operates in.

One of the greatest benefits of analyzing the competition is what the information says about your business’ competitive stance. Timing is important. If you’re going to utilize the analysis in your planning, the analysis needs to be available before your planning process starts. And, of course, you’ll need financial statements for the prior 12 months. The combination of financial statements with an analysis of competition can give your discussion and planning an unanticipated degree of focus and direction.

Updating

You’ll need to keep the analysis up-to-date as the industry, market and competitors change. You should examine your analysis yearly, which is easier than it sounds. After the initial analysis, much of the work has been done, and you’ll have a better idea of what’s involved.

Don’t decide that “nothing’s really changed” and the updating isn’t worth the effort. If it truly is a case where nothing has changed, that should be a conclusion, not an assumption.

Analyzing the competition can provide a different picture of your own business. Certainly it gives you a sense of your business’ position in the community, in the marketplace, and within the industry. To some extent, analyzing the competition forces you to look at your business from the point of view of the competition. The picture may be quite different from what you expect.

Mary McVicker was a tax attorney before leaving to teach and write. She has been a small-business consultant and freelance writer in Brookfield, Ill., for more than 16 years.
Big Al Fontaine sat down in front of the colossal desk, wearing a nervous grin. Behind the desk, directly across from Al, sat a stern-faced man in a dark suit. The man tapped his pencil on the desk, as the overhead lights glinted off his brilliantine hair. Leaning back, the man rubbed the five o'clock shadow on his anvil shaped jaw and slapped a folder of documents on the desk in front of Big Al. "I'm sorry, Mr. Fontaine," he boomed like the voice of doom, "Your past history of 'accidents' is making it a huge risk for us to insure you. Thanks, any was."

It seemed to Big Al that getting insurance might be a hopeless proposition. Walking out of the stainless steel and glass skyscraper (paid for by millions of insurance dollars), Big Al hung his head low, feeling utterly depressed.

We've all been there. We know exactly what Big Al is thinking at this moment. Should I continue without insurance for 'just a little while, until I save enough money?' or 'I won't get caught,' or, let's not forget the ever-popular, "Nothing will happen to me."

But, let's look back at Big Al's unfortunate company history (maybe it's a little like yours). His employee, Max Bunyan, has made several unscheduled trips to the ground via broken ropes, branches, and even an uprooted tree. Chain saws have managed to become airborne, and the poor Widow Carter has suffered every imaginable scenario at the hands of this hapless duo, including Max plowing through her bathroom skylight one morning.

Everyone of those "accidents" could have been prevented-period. Insurance does not help prevent accidents. Training does.

First, learn the ANSI Standard: This fine set of standards was designed for our safety in this industry. Remember, these very conditions—people getting hurt or killed while doing their jobs—gave birth to the standards in the first place. Wow! That's kind of scary, if you think about it. That historical fact tells us that these accident "patterns" were happening often enough to be not only predictable, but also preventable.

Second, apply the ANSI Standard: It won't do your front line people any good to know the standard if they don't apply the knowledge. It's quite possible that adhering to the ANSI guidelines will cost some money. But, investing in new equipment and replacing old, tired "stuff" demonstrates your concern for your folks, as well as a professionalism that represents the tree industry well.

Lastly, teach the ANSI Standard: Safety procedures do not stop with the business owner learning the standards. That is only part of the picture. Workers must know the standards, too. Tailgate safety meetings should be held at least once a week.

Again, it is our front line folks who are actually paying the bills. Let's do what we can to support a safe working environment for them. Staying with a good training/safety program, in addition to strict safety guidelines and policies, will keep your company working on the "high road" of ethics, and as a result, keep the reputation of the tree industry clean and polished— as it should be.

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Mycorrhizal Fungi and Other Microorganisms

By Dr. Donald H. Marx

Urban trees are simply forest trees growing in our urban, manmade landscapes. It is prudent to consider with trees in these landscapes the management of the microbial root partnerships that evolved with trees in forest soil and are still important to tree health wherever they grow. Most of the fine absorbing roots of trees are in the upper 10 to 12 inches of soil. There are beneficial bacteria living on these fine absorbing root surfaces (rhizospheres) that solubilize many essential mineral elements, such as phosphorus, from insoluble mineral sources for eventual uptake by plant roots. Some bacteria fix gaseous nitrogen from the air in soil, decompose organic matter,

The Mycorrhizal Triangle represents the three major criteria that must be present for mycorrhizae to develop. If any of the criteria are not present, then the foundation, or potential for mycorrhizal development, collapses.

Spores of Phytophthora cinnamomi that have germinated but are aborted in their attempt to infect an ectomycorrhiza. The fungus mantle formed around the outside of this ectomycorrhiza creates a physical barrier to pathogenic root infections and, biologically, limits roots diseases.
produce plant growth regulators that contribute to root growth, increase mycorrhizal development and still others deter root diseases. Many different soil fungi also contribute to the trees' health by decomposing organic matter that increases the availability (solubility) of essential elements. Their presence in soil can also curtail certain root diseases.

In healthy soils and plant rhizospheres, these microorganisms flourish in great numbers in forests because that is where their organic food supplies are the most plentiful. Their carbon diets consist of organic matter on the forest floor and in the soil, as well as chemical exudates and sloughed cells from growing absorbing roots.

The recycling of nutrients by all of these organisms is why natural forest ecosystems do not require additional fertilizers to maintain normal growth, development, and function of the vegetation. The main factors that drive these natural processes are good soil aeration, a periodic supply of available soil water, stable soil pH, adequate quality and quantity of native organic matter to support populations of essential microorganisms, soil temperatures above 35 degrees F, large functional root systems and a canopy producing energy (sugars) for growth. Many of these factors are missing in urban landscapes.

**Mycorrhizae**

Another microbial partnership developed by trees was their symbiotic relationship with mycorrhizal fungi. Over 95 percent of the green plants of the world form mycorrhizae. These unique, root-inhabiting fungi colonize either the outside of fine absorbing roots (ectomycorrhizae) or the inside of the roots (endomycorrhizae). Ectomycorrhizae occur on about 10 percent of the world flora, or about 2000 species of woody plants, including pine, oak, spruce, fir, larch, beech, poplar, pecan, *Eucalyptus* and others. In North America there are more than 2,100 species of ectomycorrhizal fungi; worldwide, there are over 5,000. Most of these fungi produce mushrooms or puffballs. Billions of spores are disseminated by wind from these fruiting bodies that spread the fungi to new locations. Ectomycorrhizae are only found on trees; they don't occur on nonwoody plants. Most can be recognized with the naked eye, since the fungi change the shape, size and color of the colonized roots.

Endomycorrhizae is the most widespread of all mycorrhizal types and contains three groups. Ericaceous endomycorrhizae occur on four or five families in the Ericales, and orchidaceous endomycorrhizae occur only in orchids. These will not be discussed. Vesicular-arbuscular mycorrhizae (VAM) are the third group. Vesicles and/or arbuscules are structures produced by these fungi in or on colonized roots. Over 85 percent of the 300,000 species of vascular plants in the world form VAM. These include most agricultural crops, many grasses, fruit and nut
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trees, flowers, certain hardwoods, and most ornamentals. VAM fungi are ubiquitous in all natural soils that support plants. However, their population density and species diversity vary greatly in different soils supporting different plants. Degraded soils low in organic matter with poor physical structure and compaction contain few of them. Healthy forest soils are rich in them. There are about 150 species of VAM fungi so far identified. Most species can form VAM with a wide array of plant species. Roots are not changed in either color or shape after colonization by VAM fungi, as are ectomycorrhizae. VAM can only be confirmed microscopically. These fungi produce large spores either in or near roots in the soil. Because of their location and relative size, spores are disseminated very slowly to new areas by soil animals and insects.

The host plants supply mycorrhizal fungi with simple carbohydrates (sugars) derived from photosynthesis and also supply other essential organic chemicals, such as certain vitamins and amino acids. Since these mycorrhizal fungi cannot obtain these essential carbon nutrients from any other source, they are dependent on their plant hosts for their survival and growth. In return, the fungi extend mycelia far into the soil, increasing the surface area of the roots to improve absorption of water and essential mineral elements for its plant host.

Plants with abundant mycorrhizae have a much larger surface area for mineral and water absorption than plants with few or no mycorrhizae. It would require approximately 100 times more energy (sugars) from photosynthesis for a tree to form enough absorbing roots to produce the same surface area formed by the mycelia of mycorrhizal fungi. Since plants are not able to produce 100 times more photosynthetic, they developed a dependency on mycorrhizae. Mycorrhizae are able to absorb, accumulate and transfer all of the mineral elements and water to plants more rapidly and for longer periods of time than nonmycorrhizal roots. Mycorrhizae persist longer in the soil than nonmycorrhizal roots; increase the tolerance of their host to drought, soil compaction, high soil temperatures, heavy metals, soil salinity, organic and inorganic soil toxins and extremes of soil pH. They also depress many root diseases (Quarles, 1999 a and b).

In natural forests, many species of mycorrhizal fungi share common tree and other plant hosts and form a continuous, interconnecting network of mycelia on roots between the plants.

**Arboriculture**

In our efforts to domesticate forest trees, we have removed them from their natural forest settings and grow them now in numerous nonforest-like landscapes. Trees occur in these various manmade landscapes following one of two events. Either they existed as a forest tree in the area before manmade development or they were transplanted after development. Roots of preexisting trees are routinely damaged during construction by trenching utilities, constructing drain fields, grading for drainage, by compaction from vehicles, and by the ever-present urban forest floor of grass
Differences Between Mycorrhizal Types

<table>
<thead>
<tr>
<th>Feature</th>
<th>Ectomycorrhizae</th>
<th>VAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognizable with unaided eye</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Large aboveground fruiting bodies</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Wind disseminated spores</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Wash through soil readily</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Most effective propagule</td>
<td>Mycelium/Spores</td>
<td>Spores</td>
</tr>
<tr>
<td>Culturable in lab</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

or concrete/asphalt driveways and sidewalks instead of a forest floor.

Transplanted trees are routinely moved to their new urban environment with less than 10 percent of their original root system developed in the nursery. In reality, these transplanted trees may need 10 years to replace the original lateral and absorbing root systems. Roots not only need large areas for proper development but also they must have soil conditions that contribute to this development.

The soil in urban landscapes have little high-quality, native organic matter needed to feed microbes and to drive natural soil processes. They are compacted with poor aeration and low water storage capacity, and frequently have a creeping soil pH caused by alkaline irrigation water or liming of the grass covering the roots. Many municipalities have irrigation water exceeding pH 8.5, which when used for irrigation will eventually cause a rise in soil pH. Preferable soil pH for most trees is pH 5.0 - 6.0. Soil pH above this range can cause harmful minor element deficiencies and changes in microbial populations. In these settings trees must have the capacity to produce new functional absorbing roots, the soil must contain effective inocula of mycorrhizal fungi needed to form abundant mycorrhizae on new roots and the soil must contain the proper organic matter and associated microbes to carry out essential forest soil processes. If not, then the arborist is forced to maintain these trees with a row crop mentality that involves the abundant use of pesticides and inorganic fertilizers.

**Practical Considerations**

There are practical solutions to some of these microbiological deficiencies in manmade landscapes. Since the late 1970s techniques to inoculate tree seedlings in nurseries with specific mycorrhizal fungi were developed which improved their performance on reforestation and adverse reclamation sites throughout the world.

Research began on application of the mycorrhizal fungal technology on urban trees in the early 1990s. Various authors have reported increased root and mycorrhizal development following soil inoculation with ectomycorrhizal fungi of
established northern red oak in Michigan (Marx, et al., 1995) and in North Carolina (Smiley et al., 1997) and southern live oak in South Carolina (Marx, et al. 1997). Others have reported increased root and mycorrhizal development followed by improved top growth following backfill treatment with ectomycorrhizal fungi of transplanted spruce, pine and beech spp. (Marx and McCartney, 1997) and northern red oak (Rao and Jeffers, 1999) in Ohio and basswood (Garbaye and Curin, 1996) in France. Increased root and mycorrhizal development and improved top growth have also been reported following VAM fungal inoculation of transplanted sugar maple in Ohio (Rao and Jeffers, 1999) and red maple, ash, crabapple and western hackberry in Colorado (Geist, 1998).

Conclusion

A knowledgeable arborist must understand the belowground needs acquired by trees from their former forest environment and design management practices to meet these requirements. Good quality organic matter, mulch over the rooting area, the largest possible volume of quality soil for maximum root expanse, and adequate inoculum of mycorrhizal fungi and beneficial soil/root bacteria are a few prerequisites to healthy root development and function. Inoculants of mycorrhizal fungi and bacteria can be introduced to roots and soil in the nursery, at planting or during tree maintenance. These practices have been shown to improve tree establishment following transplanting and also to improve the belowground health and function of established trees in various manmade landscapes.

It is important to remember that no one technology can cure a complex problem in tree health. This microbial technology should be considered simply as another tool in the arborists’ toolbox. However, arborists should not discard their other tools. A knowledgeable arborist will know what tool to use at the right time and place.

Dr. Donald H. Marx is chairman and chief scientist with Plant Health Care, Inc. This article was excerpted and adapted from a lecture at TCI EXPO ’99 in Indianapolis.

References


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The committee thanks those who commented on the Support Systems drafts. Your input was highly valued!

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The A300 committee also approved a public comment period for the first draft of what will become ANSI A300 (Part 4) Lightning Protection Installation. The public comment period will extend from July 14 to September 12, 2000. Free copies of the Lightning Protection draft will be available as a .pdf file posted to the National Arborist Association’s Web site, www.natlarb.com, or by email requests (Rouse@natlarb.com). A full copy of the draft was printed in the July issue of Tree Care Industry magazine. All fax or hard copy requests will be charged $5.50 shipping and handling.

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It can be difficult for the uninitiated to distinguish between Formosan termites and the more garden-variety isopterans. While identification should generally be verified by an expert taxonomist, the following general descriptions should help to more accurately identify *Coptotermes formosanus* Shiraki in the field.

- **Formosan subterranean termite allate** (*C. formosanus*)
  Allates are the winged reproductives—the future kings and queens intent on establishing new colonies. Allates are yellowish-brown and measure in at about one-half inch in length. In affected areas, huge swarms can be found near light sources on warm still evenings from April through July. Formosan allates can also be recognized by the many small hairs on their wings.

- **Formosan subterranean termite soldier** (*C. formosanus*)
  The soldier caste of the Formosan termite is a small, whitish insect with a disproportionately large, orange-brown head. Soldiers defend the colony with large, curved mandibles and a glue-like secretion secreted from an opening in the head. Formosan termites have a much larger percentage of soldiers per colony than native termite species.

- **Formosan subterranean termite worker** (*C. formosanus*)
  By far the largest percentage of the colony, workers are responsible for the actual damage caused by Formosan termites. Workers are whitish and nondescript—making them very difficult to distinguish from other termite species.

By now most arborists have heard about the damage wrought by the cellulose-hungry Formosan termite—a resilient and highly destructive termite species introduced to the United States from China in the 1960s. This prolific pest has literally gobbled up historic and contemporary neighborhoods across the South. In New Orleans, where the Formosan termite has found particularly favorable conditions, the annual expense of controlling the insect and repairing the damage it has caused is estimated at somewhere around $300 million a year. Part of that sum is earmarked for preventative treatments intended to protect homes and businesses from becoming the next Formosan feast, but most of the money is for damage control—colonies are located and destroyed and the difficult task of restoring damaged property is begun. But how do you replace a tree? Termite colonies are increasingly turning toward living trees for wood, and the urban and suburban forests are sustaining serious damage along the way.

Termites attacking trees is nothing new. Weakened trees and snags have been the preferred fare of termites for millennia—not to mention fallen trees and tree limbs. Native termite species feed mainly on fallen trees and other dead wood: living trees were almost always in the advanced stages of decline before being affected. It’s a different story with Formosan termites. Any small imperfection can become an entrance point for a full-blown attack—even if the tree seems healthy and vigorous. From the scars of a string trimmer held too close to the hidden wounds of included bark, it is a rare tree that is without some sort of physical defect that could provide entry to a horde of Formosan invaders.

And, just like a bad science fiction movie, once the invaders have access to the inner compound, it’s all over. The Formosan subterranean termite, as it is most accurately called, reproduces much more rapidly than native termite species and can quickly establish an extensive system of tunnels connected to a main nest. Feeding and nest-building activity can translate into structural damage as quickly as six months from the initial infestation. While mature colonies of our native termite species may contain several hundred thousand individuals, Formosan termite colonies may contain tens of millions feeding on any available wood within their 300-foot radius.

Photo Courtesy Adrian Jutner

Recognize the Enemy

It can be difficult for the uninitiated to distinguish between Formosan termites and the more garden-variety isopterans. While identification should generally be verified by an expert taxonomist, the following general descriptions should help to more accurately identify *Coptotermes formosanus* Shiraki in the field.

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  By far the largest percentage of the colony, workers are responsible for the actual damage caused by Formosan termites. Workers are whitish and nondescript—making them very difficult to distinguish from other termite species.
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Assessing the Risks

There are several conditions that increase the likelihood of a tree being attacked— the most obvious being the existence of established colonies in the surrounding area. In the United States, the Formosan termite has become established in Hawaii, Louisiana, Florida, Texas, Mississippi, Alabama, North and South Carolina, Georgia, California and Tennessee. Formosan outbreaks are relatively localized where they occur, since the adults are weak flyers and cannot travel far from their birth colony. Tree care workers in southern states should stay alert outside known infestation areas, however, since the pest is constantly spreading to new areas through the transportation of infested wood.

The proximity of other potential food sources can also contribute to a particular tree's susceptibility to termite attack. Nearby wooden structures may become a staging ground for attack, and trees in the vicinity of an infested home or business should be considered prime candidates for termite damage. Landscaping materials and debris can become home to Formosan colonies as well. Railroad ties, landscape timbers and some mulches provide wood-to-ground contact. A recent study conducted at Cornell University found wood chip mulches, such as utility mulch, particularly appealing to lab-reared Formosans. Downed branches, snags, and piles of dead wood are obvious menu items for dispersing termites seeking a suitable place to start a new colony.

If Formosan termite colonies are known or suspected to exist in your area, special attention should be paid to weakened or diseased trees and trees with physical defects. Unfortunately for the arborist, that covers just about every tree in the urban landscape. Drought stress, soil compaction, microbial or fungal attacks, poor soils, and pollution are just a few of the factors that can weaken a tree's defenses. Under ideal conditions, even a somewhat weakened tree can resist infestation through the production of chemicals in the cambium layer that are repellant to even the most persistent of termites. But these pests are experts at pinpointing the proverbial "chink in the armor" of an otherwise resistant tree and bypassing the tree's defense system. Weak points such as mower or string trimmer wounds, borer holes, included bark, and broken limbs could allow direct access to deadwood inside the tree. Once inside, Formosan termites can freely feed on interior wood, and may eventually hollow out the tree entirely. Depending on the pressure for food in the area, colonies may spread rapidly to neighboring trees—with some neighborhoods in New Orleans reporting as many as 75 to 80 percent of the trees being affected.

Once a colony gains a foothold in a particular tree, the progression from there can be rather unpredictable. In some cases the affected tree may carry on for several years without sustaining serious damage. In others, the tree may sustain significant structural damage within a few months and experience a relatively rapid decline. Nan-Yao Su, a professor of entomology at the University of Florida and Formosan subterranean termite specialist, attributes...
If Formosan termite colonies are known or suspected to exist in your area, special attention should be paid to weakened or diseased trees and trees with physical defects. Unfortunately for the arborist, that covers just about every tree in the urban landscape.

this unpredictability to the insects’ non-native status.

"Termites generally do not kill trees," says Su, "they attack dying or dead trees. If they do kill trees, then, evolutionarily speaking, termites would never have a chance to survive because they would eliminate their own food source. However, since Formosan subterranean termite is an imported species, they may not react to trees in their new environment as they would have in their native habitat. This makes their behavior toward trees in the U.S. rather unpredictable, and perhaps this is why they can cause such damage."

Control

Because damage can be severe and difficult to control, prevention is the first line of defense for the tree care worker. While special efforts should be made in areas where the pest is known to occur, prevention practices should be considered in unaffected areas as well, since new infestations often appear suddenly in areas that are far away from known populations. Removing accumulated dead wood from the immediate area, limiting the use of utility mulch around trees, and taking steps to reduce trunk damage by mowers and trimmers are all practices that will reduce the likelihood of termite infestation.

Chemical prevention is also an option in areas where termites have already gained a foothold. Repellant termicides are available both as soil barriers and direct injections, and are recommended in areas where colonies have become established. Soil treatment with a labeled termicide is necessary where infested trees have been removed to prevent remaining portions of the colony from attacking new plantings.

But prevention may not be enough. Edgar Bordes, director of the New Orleans Mosquito and Termite Control Board, projects the continued spread of this highly invasive species to new trees and structures throughout its potential range.

“We’ve been trying to control termites for 40 years with repellent termicides and preventive measures, but we need to go on the offensive. Using non-repellent baits and other aggressive termicides are the best way to bring down the numbers [of termites], and we have to reduce the termite populations if we are going to have successful control.”

New Orleans has been, by far, the area hit hardest in the United States, and may prove to be just the first major battleground in an ongoing war against the Formosan subterranean termite—with the city’s arborists helping to lead the charge.

David M. Munson is an urban forestry specialist with the City of Charlotte, N.C.
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4th International Symposium on the Tree: Biology and Development
Montreal, Quebec, Canada
Contact: Michel Labrecque 514-872-3182

August 23, 2000
Michigan Turfgrass Foundation Field Day
Michigan State University
Contact: 888-683-3445, ext. 3151

August 25, 2000
Nebraska Arborist Association
Field Day & Tree Climbing Championship
Omaha, NE
Contact: 402-476-3852

September 12-13, 2000
MFPA Summer Meeting
Camp Brighten, MI
Contact: 517-482-5530

September 13, 2000
VA Tech Hampton Roads Ag. Research & Extention Center
25th Annual Field Day
Virginia Beach, VA
Contact: 757-363-3906

September 14, 2000
Annual Lawn and Ornamental Conference
Texas Chapter, Professional Lawn Care Association of America
Contact: Heath Moore 800-458-3466

September 15, 2000
Troubleshooting in the Landscape
Identifying/Solving Tree & Landscape Problems
University of California Riverside
Doubletree Hotel, Ontario, CA
Contact: 909-787-5804

September 16, 2000
ISAO 12th Annual Tree Climbing Championship
Cobourg, Ontario, Canada
Contact: 888-463-2316

September 20-22, 2000
14th Annual Texas Tree Conference
Growing our Community Forests
Waco, TX
Contact: 512-451-6588

September 21, 2000
Nebraska Arborist Association
Tree ID Workshop
Omaha, NE
Contact: 402-476-3852

September 25-27, 2000
ISA—Pacific Northwest Chapter
21st Annual Training Conference
Boise, Idaho
Contact: 503-874-8263

September 26-27, 2000
National Arbor Day Foundation
Trees, People and the Law Conference
Nebraska City, NE
Contact: 402-474-5665

October 1-4, 2000
Society of Municipal Arborists
Year 2000 Annual Conference
Holiday Inn South
Lansing, MI
Contact: 517-482-5530

October 5-7, 2000
Nebraska Arborist Association
Climbing and Pruning School
Lincoln, NE
Contact: 402-476-3852

September 20-22, 2000
14th Annual Texas Tree Conference
Growing our Community Forests
Waco, TX
Contact: 512-451-6588

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Fax: 603-314-5386; E-mail: Garvin@natlarb.com

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Aerial Lift, Inc.
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Altumnats, Inc.
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Quality equipment, innovative solutions and a dedicated team builds customer satisfaction. Morbark chippers, Rayco grinders, Big Shot line delivery system, Cobra Dynamic cabling, and a large selection of arborist supplies.
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Excavator mounted tree grinders, grinding from the top to the ground. The most versatile, cost efficient tree grinders on the market today.

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Used chippers, stump grinders, aerial lifts, chipper trucks, log trucks and crane trucks.

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Educational information for the professional arborist.

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STIHL Inc. produces a wide variety of dependable, portable power tools and accessories including chain saws, trimmers and brush cutters for commercial and residential applications.

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Kan-Du Stump Grinder: fast, efficient, economical and proven reliability—hydraulically controlled, self-propelled, easy to operate, 48 inch working width, yet will pass through a 29-inch opening.

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Saw chain and other arborist equipment and supplies.

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SwapLoader hoists, hydraulic hoists and swappable truck bodies (e.g. allows a dump truck to become a flat bed truck & vice versa).

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Manufacturer of the Hi-Ranger XT-5 Series aerial tree trimmers. Add a hydraulic lift to provide up to 75 feet of working height.

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Jonsered power products, Olympey power products and chain saw safety equipment.

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Professional firewood processing equipment; splitters, conveyors, and processors.

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A complete, low-cost package for arborists and landscape contractors backed by a leading insurance company. Loss control program. Dedicated claim department. Lowest cost/best coverage available. Please have your insurance agent contact us for more details, or call directly.

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Introducing our newest stump cutters and tub grinder equipment and accessories to the tree care market along with Auto Feed II & Auto Sweep, brush chippers and tree spades.

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Manufacturer of the most complete line of braided tree ropes. Plus safety lanyards, tree saddles, blocks, rope brakes, flipelines, sewn bags, rigging & slideline kits. A subsidiary of Wall Industries.

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D **isula destructiva** is the fungus that causes the disease called dogwood anthracnose. It is a disease that appeared in the 1970s and caused the loss of many a poor dogwood tree, especially in some of the eastern and western states. The name should not be confused with spot anthracnose, a completely different disease which is considerably less destructive.

**Symptoms**

Once leaves unfold, the first symptom will be small tan leaf spots that tend to be congregated toward the tip half of the leaf. As the leaves mature, the diseased spots enlarge and can coalesce to develop into large tan blotches that tend to be oriented down the veins and along the mid-vein (Fig. 1). Irrespective of size, the outer part of both the smaller leaf spots and larger blotches is often purple. The blight can advance to kill the entire leaf, the leaf petiole, and some of the stem. Many infected leaves will drop prematurely, although leaves that are killed rapidly are likely to remain attached through the winter and possibly into spring.

Similar spots and blotches described on the leaves can develop on flower petals (Fig. 2). Small dark lesions develop on fruit. Fruit infections can lead to infection of seed and are the reason seed should not be collected from trees in the woods or from infected trees in the landscape.

The fungus can grow from leaves into small twigs. Some twig infections will be confined to the twig, while some will advance into the main stem and cause cankers, especially on epicormic

---

**Figure 1.** Tan leaf spots and large tan blotches with purple borders are common symptoms caused by dogwood anthracnose.

**Figure 2.** Purple lesions caused by dogwood anthracnose on flower petals.

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**Dogwood Anthracnose Symptoms & Controls**

*By Warren Copes*
Generally speaking, for sanitation to be effective you must notice and remove all infected tissue within the first week of its appearance (or sooner) to eliminate all possibility of conidia being produced in and spread from newly developed lesions. Once leaf spots are detected, at least one infection period has already occurred. Diligent removal of diseased tissue will probably be necessary for three weeks or more. An extended period of vigilence is needed ...

Climatic Conditions that Favor Development

Trees planted in full sun with good air circulation will have the least problem with dogwood anthracnose, while drought-stressed trees grown in shady areas or any tree that receives overhead irrigation will be more prone to anthracnose. On the other hand, drought-stressed trees grown in sunny, open sites may grow poorly but probably will not experience an increased anthracnose problem. Use of drip or micro-sprinkler irrigation systems will avoid wetting leaf surfaces. In hilly and mountainous areas, trees on southern exposures and/or at higher altitudes will tend to have fewer problems with disease.

Free moisture, as dew, rain or irrigation, is necessary for conidia (spores) to infect plant tissue. A low evaporative potential in the tree canopy further favors infection and is part of the reason disease is commonly high in the tree's interior. While infection occurs between 34 and 85 F, it will more likely occur at moderate temperatures within this range.

Infection by _D. destructiva_ is favored by cool, wet spring and fall weather but can occur at warmer temperatures later in the year if plant surfaces are wet for extended periods. Severe disease development appears to be associated with multiple days of extended leaf wetness and favorable temperatures, and not just an isolated day of those conditions. Intense light and high leaf temperatures reduce infection, overall lesion size, and the production of spores. Fungicides will be most effective if applied prior to conditions that favor infection.

Spread

Within the dead tissue of a leaf spot, branches on the trunk. When a tree sustains a moderate to high disease incidence over 2 to 3 years, the lower portion of the tree will contain numerous dead branches and branches with leaves only toward the terminals (Fig. 3). Tree death can also result. Dieback of epicormic branches result in trunk cankers that contribute to death of trees. Bark must be whittled off with a knife to see the discolored (dark brown) wood below (Fig. 4). Varietal susceptibility, environmental conditions, and aggressiveness of the fungal isolate are factors that affect the final outcome.

Similar Symptoms

_Sepatoria_ leaf spot and spot anthracnose also cause leaf spots. Spot anthracnose develops in spring and fall, similar to dogwood anthracnose. Spot anthracnose leaf spots can also be a small tan to gray leaf spot with a purple to black border, but the leaf spots usually stay small—less than 1/4 inch in diameter—and the middle of the spot falls out by summer, resulting in a shot-hole effect. Septoria is favored by warm temperatures in conjunction with wet plant surfaces, therefore develops in the early part of the summer. Septoria leaf spots tend to be more angular in shape and are a darker brown than leaf spots of dogwood anthracnose.

Dying leaves and twig dieback can be caused by root problems, such as drought or root rot, and from physical damage to the trunk. Any problem that causes rapid death of leaves can result in leaves that remain attached. Consult other sources for more information on these maladies.

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petal spot, or blighted stem, the fungus produces masses of conidia. The conidia are easily and commonly picked up in water, then spread in splashing rain drops and in water run-off over the edge of leaves and petals and down branches. Conidia get stuck to and carried on the body of lady beetles (Hippodamia convergens) and probably on other insects and possibly on the feet of birds. By whatever means, conidia are spread to healthy leaves, flowers or stems. Conidia do not survive long once dispersed and require moisture to infect healthy dogwood tissue. The fungus survives as conidial masses in fruiting structures (acervuli) produced in lesions and as mycelia in plant tissue associated with lesions.

Table 1. Susceptibility ratings of dogwood species and varieties. The low, medium and high ratings used in Tables 1-3 were arbitrarily assigned in an attempt to maintain a relative consistency between the different disease ratings used by the scientists cited.

<table>
<thead>
<tr>
<th>Cornus species</th>
<th>Common name</th>
<th>Susceptibility</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. alba L.</td>
<td>Siberian dogwood</td>
<td>low</td>
<td>1</td>
</tr>
<tr>
<td>‘Bloodgood’</td>
<td></td>
<td></td>
<td>6,9</td>
</tr>
<tr>
<td>‘Elegantissma’</td>
<td></td>
<td></td>
<td>6,9</td>
</tr>
<tr>
<td>C. alternifolia L.</td>
<td>pagoda dogwood</td>
<td>low</td>
<td>1,6,9</td>
</tr>
<tr>
<td>C. amomum Mill.</td>
<td>silky dogwood</td>
<td>low</td>
<td>1,6,9</td>
</tr>
<tr>
<td>C. augustata</td>
<td></td>
<td>low</td>
<td>6,9</td>
</tr>
<tr>
<td>C. controversa</td>
<td></td>
<td>low to high</td>
<td>6,9</td>
</tr>
<tr>
<td>C. florida L.</td>
<td>flowering dogwood</td>
<td>med. to high</td>
<td>1,3,4,5,6,9</td>
</tr>
<tr>
<td>‘Cherokee Princess’</td>
<td></td>
<td>high</td>
<td>6,9</td>
</tr>
<tr>
<td>‘Appalachian Spring’</td>
<td></td>
<td>low to med.</td>
<td>8</td>
</tr>
<tr>
<td>C. kousa (Buerger ex Miquel) Hance</td>
<td>Chinese, Korean, Japanese dogwood</td>
<td>low to high (refer to Tables 2 &amp; 3)</td>
<td>1,2,3,4,5,6,9</td>
</tr>
<tr>
<td>C. kousa var chinensis</td>
<td>-Not a valid variety-</td>
<td>high</td>
<td>6,9</td>
</tr>
<tr>
<td>C. kousa x C. florida</td>
<td></td>
<td>med.</td>
<td>4,7</td>
</tr>
<tr>
<td>‘Aurora’</td>
<td></td>
<td>low</td>
<td>4</td>
</tr>
<tr>
<td>‘Celestial’</td>
<td></td>
<td>low to med.</td>
<td>4,7</td>
</tr>
<tr>
<td>‘Constellation’</td>
<td></td>
<td>med.</td>
<td>7</td>
</tr>
<tr>
<td>‘Galaxy’</td>
<td></td>
<td>med.</td>
<td>4,7</td>
</tr>
<tr>
<td>‘Ruth Ellen’</td>
<td></td>
<td>low</td>
<td>4,7</td>
</tr>
<tr>
<td>‘Stellar Pink’</td>
<td></td>
<td>low</td>
<td>4,7</td>
</tr>
<tr>
<td>‘Stardust’</td>
<td></td>
<td>low</td>
<td>4,7</td>
</tr>
<tr>
<td>C. mas L.</td>
<td>Cornelian cherry dogwood</td>
<td>low</td>
<td>1,6,9</td>
</tr>
<tr>
<td>C. nutalli pacific dogwood</td>
<td></td>
<td>high</td>
<td>other literature</td>
</tr>
<tr>
<td>C. racemosa Lam.</td>
<td>gray stem dogwood</td>
<td>low</td>
<td>1</td>
</tr>
<tr>
<td>C. sericea L.</td>
<td>red-osier dogwood</td>
<td>low to high</td>
<td>1,6,9</td>
</tr>
<tr>
<td>(= C. stolonifera)</td>
<td>yellow twig dogwood</td>
<td>low to high</td>
<td>1,6,9</td>
</tr>
<tr>
<td>‘Flaviramea’</td>
<td></td>
<td>low</td>
<td>6,9</td>
</tr>
<tr>
<td>‘Isanti’</td>
<td></td>
<td>med.</td>
<td>6,9</td>
</tr>
<tr>
<td>‘Kelseyi’</td>
<td></td>
<td>med. to high</td>
<td>6,9</td>
</tr>
<tr>
<td>‘Ruby’</td>
<td></td>
<td>low</td>
<td>6,9</td>
</tr>
</tbody>
</table>

*References
Control

Varietal Susceptibility. The easiest control for the effort is to plant a species of dogwood that is tolerant of dogwood anthracnose. Disease susceptibility ratings for dogwood species are less meaningful than ratings done on varieties, because susceptibility can differ between varieties of one species. This has been observed between the varieties of *C. alba*, *C. kousa*, and *C. sericea (=C. stolonifera)*.

Disease susceptibility of some varieties has been tested; the reports provide a valuable guide for tree selection (Tables 1, 2, & 3). However, most varieties have never been formally tested. Susceptibility lists, including the one in this article, should be used with caution. Disease susceptibility trials are most useful when varieties are planted in statistically valid designs at sites in several regions and climates. Consistent susceptibility ratings are more dependable, while ratings that vary may or may not be realized at a specific location. Similar inconsistencies will hold for observational information that originates from plants grown in the landscape. Two reasons for the different responses of one variety is disease pressure will not be equal at each site and cultural practices of one grower may minimize disease development.

On sites that are less suitable for anthracnose, tolerant species and varieties should be able to develop properly with minimal disease management input—even if a low level of disease develops. If characteristics of susceptible varieties are desired, they should be planted in sites with high sun intensity and only one to a few individual(s) should be planted in that location. Of course, a more intensive control program can be used. Multiple varieties can be combined very effectively if many dogwoods are desired.

Site Selection and Preparation. Dogwoods prefer partial shade over full sun, but the later can be tolerated. Sun penetration and air circulation are important to hasten drying of plant surfaces and decrease the likelihood of new infections. Avoid locations with moderate to heavy shade, especially when planting varieties susceptible to anthracnose. Good drainage does not directly affect anthracnose but it is necessary for root growth needed to promote growth and development of a healthy tree.

Select healthy trees from garden and nursery centers. Do not transplant seedlings or trees from roadside or forest areas. Dig and loosen soil to the depth of the root ball and at least twice as wide as its diameter. Place the root ball so the top of the pot’s media is level with the soil’s surface. For approximately 4 weeks after planting, apply water several times a week to allow roots to become established in the native soil. After that, a weekly watering will suffice.
Management Practices. Dogwood trees should be irrigated during dry periods, because drought stressed trees are more susceptible to dogwood anthracnose in subsequent seasons. However, avoid overhead sprinklers that will wet the foliage and limbs and encourage further development of the disease. Soaker hoses or micro-irrigation sprinkler heads are preferred. Apply 1 to 1 1/2 inches of water to thoroughly wet the soil profile and repeat water applications every 7 to 10 days.

Fertilization is necessary to promote a quality plant that will survive many years. Healthy trees are less likely to develop disease problems, although good health will not eliminate the pos-

Table 2. Disease susceptibility of *Cornus kousa* varieties as reported by Byther (Citation #7 in Table 1). The disease severity rating was based on a scale of 0-10 and derived by the addition of the average rating of leaves and flowers. Each rating was based on a scale of 0-10. The low, medium, and high ratings used in Tables 1-3 were arbitrarily assigned in an attempt to maintain a relative consistency between the different disease ratings used by the scientists cited.

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Beni Fugi'</td>
<td>1.5</td>
<td>'Silver Cup'</td>
<td>4.0</td>
</tr>
<tr>
<td>'China Girl'</td>
<td>2.9</td>
<td>'Ed Mezett'</td>
<td>7.0</td>
</tr>
<tr>
<td>'Lance Leaf'</td>
<td>0.0</td>
<td>'Satomi'</td>
<td>7.0</td>
</tr>
<tr>
<td>'Milky Way'</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Porlock'</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Snow Bird'</td>
<td>0.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Speciosa'</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Summer Majesty'</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Tsukobo-no-nine'</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Wilton'</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Disease susceptibility of *Cornus kousa* varieties as reported by Ranney et al. (Citation #4 in Table 1). The disease severity rating was a scale based on a 100 percentage range and derived by the multiplication of percentage of infected leaves and percentage of area affected on infected leaves. The low, medium, and high ratings used in Tables 1-3 were arbitrarily assigned in an attempt to maintain a relative consistency between the different disease ratings used by the scientists cited.

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Steeple'</td>
<td>0</td>
<td>'Big Apple'</td>
<td>24</td>
</tr>
<tr>
<td>'Milky Way'</td>
<td>1</td>
<td>'China Girl'</td>
<td>35</td>
</tr>
<tr>
<td>'Milky Way Select'</td>
<td>1</td>
<td>'Greensleeves'</td>
<td>55</td>
</tr>
<tr>
<td>'Gay Head'</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Julian'</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Temple Jewel'</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Elizabeth Lustgarten'</td>
<td>14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Figure 5. Remove dead twigs infected with Discula destructiva.

Figure 4. Trunk cankers below the bark that resulted from Discula destructiva infecting epicormic branches.

sibility of disease. Fertilizer rates and timings should be based on a soil analysis for that landscape. If a standard fertilizer rate is applied in the spring without the use of a soil test, be aware that over-fertilization can increase severity of anthracnose.

Research results involving fertilizer rates have been inconsistent, but an application of 3 pounds of nitrogen or 5 pounds of phosphorus per diameter inch of tree trunk broadcast between the drip line and trunk reduced incidence of anthracnose in one experiment. The reduction in disease from nitrogen or phosphorus will probably only be noticeable in years that disease pressure is low to moderate. This does not imply the suitability of one rate for all soils; thus, soil analyses are recommended. In the same trials, an application of balanced fertilizer (N-P-K) or a treatment of lime did not markedly influence disease incidence.

In the fall, after natural leaf drop has occurred, leaves should be raked, infected limbs pruned slightly above a node in healthy wood at least 4 inches below the last mark of discolored (brown) vascular wood, and infected fruit removed (Fig. 5). Removal and disposal of diseased plant tissue is done to remove the source of fungal spores.
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that would otherwise cause new infections next spring. It is unlikely to be 100 percent effective, but should have a large impact, especially if performed in conjunction with all other cultural controls.

Diseased parts should not be piled nearby or at the back of a lot, because these sites are still close enough that insects or wind-driven rain could carry spores back to the trees. Diseased plant tissue should be disposed of by completely covering with soil, burning if not prohibited by local ordinances, or transporting to lawn refuse disposal facilities. Composting should be effective, but the exact lethal temperature has not been determined. In regions with cool fall climates, the leaf pile may not generate enough heat to kill fungal spores.

Timing of Chemical Applications. A list of currently registered fungicides can be obtained from a variety of publications, county agents, or suppliers. The total number of applications needed will vary with the susceptibility of the dogwood species and variety, site, region, seasonal weather pattern, and whether the objective is to achieve maximum disease control or limited control sufficient to maintain a healthy tree of normal longevity that exhibits some disease symptoms. The maximum level of control will be obtained by treatment first at bud break, then every ten to 14 days until dry weather conditions predominate. The interval between fungicide applications and rates will be on product labels. A reduced program may include an application at bud break and two more treatments, possibly at 21-day intervals. No additional sprays may be applied unless it is a particularly wet year in May and June. If rainy conditions become prevalent in the fall, an additional fungicide application can be sprayed to protect next year’s buds. Disease pressure at a location will dictate the type of spray schedule needed. With tolerant species and varieties, a control program may consist solely of cultural controls such as sanitation.
Removing Diseased Tissue

Can removal of diseased tissue be used as the main component of an IPM program to control dogwood anthracnose?

Sanitation is commonly recommended after the fall leaf drop occurs. The purpose is to eliminate sources of conidia that will cause infections next spring—an important component if sanitation is to be effective. Sanitation may also be used at other times of the year. The ideas presented here are not recommendations, as they have not been tested in research trials. The purpose is to provide conceptual ideas that can be tried by those who want to use IPM practices to avoid application of fungicides.

Precautionary warnings: Sanitation is more likely to succeed on sites where dogwood anthracnose is not already a serious problem. To be effective, all diseased tissue must be removed promptly. The practice would require persistent weekly attention. If removal of diseased tissue is being done and development of numerous lesions require removal of a lot of leaves, the practice should be stopped because stripping off too many leaves will be more damaging than the disease (Fig. 6). If dogwood anthracnose becomes too severe, consider removing the tree and planting a tolerant variety.

Generally speaking, for sanitation to be effective you must notice and remove all infected tissue within the first week of its appearance (or sooner) to eliminate all possibility of conidia being produced in and spread from newly developed lesions. Once leaf spots are detected, at least one infection period has already occurred. Diligent removal of diseased tissue will probably be necessary for three weeks or more. An extended period of vigilence is needed because:

♦ all infections may not have occurred at the same time
♦ each infection could progress at a different rate before causing a recognizable leaf spot or stem blight
♦ some diseased tissue may still be present in the tree providing a source for continued spore production.

It is easy to miss a leaf with a single leaf spot or a small, infected twig. Weekly scouting should continue even if no new infections are found.

Another option. The type of sanitation described above can be used in conjunction with a limited fungicide program. To reiterate, sanitation is more likely to be effective and practical if the number of diseased lesions are low and it does not require removing a large number of leaves. One approach would be to use a limited number of treatments (two to three) early in the year; remove infected leaves, fruit and stems after dry weather conditions become prevalent during the summer; and again after the fall leaf drop occurs.

Warren Copes is an assistant professor (Extension Pathologist) at Washington State University Puyallup Center.
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Using or Selling All of Your Street Waste

Strategies that cut costs
By Steve Sandfort

Customers would bring their own mauls, wedges, chain saws and power splitters to make the wood easier to haul away.

Cincinnati has 1,000 miles of streets and almost 100,000 street trees. Our forestry program began in 1982, and still successfully follows several philosophies, three of which are:

1. Don’t landfill wood
   The mechanics of how to avoid landfilling wood are interesting, but most important are the philosophies used to write the ordinance that governs and encourages what we have done for almost 20 years. From day one, Forestry has preached the philosophy that “all wood is good.” Never landfill—always sell or recycle.
   When Tim Jacob and I created our ordinance and program, landfilling wood never crossed our minds. With degrees in forestry, we were experienced in selling and harvesting timber and in salvaging wood damaged by catastrophes. For this
reason, a city forestry program should encompass the thinking of at least one forester.

2. Keep sole control of all money

Foresters across the country were frustrated with how Congress funded the US Forest Service. For years, when the Forest Service sold timber from our national forests, revenue went straight into the general fund in Washington. The Forest Service then had to compete with other federal agencies and beg Congress for tree planting funds. Tim and I did not want our small program to be caught in this same trap, working to sell wood that would fund police, fire or other departments. We felt it was vital to keep sole control of all of our program’s money.

The city council agreed and unanimously approved Municipal Code sections 743-17 – Compensatory Payments that states, “No person shall remove any public tree without replacing such tree with a tree of equivalent dollar value in the vicinity of the removed tree. The value of a tree shall be determined by the director in accordance with urban forest regulations considering the species, size, condition and location of the tree. If no suitable location exists in the vicinity of the tree removed or if the replacement tree is of lesser value, the person causing the tree to be removed shall make a compensatory payment to the City of Cincinnati equal to the difference in value between the tree removed and any replacement tree. Any public tree that is determined by the director to be damaged, but not sufficiently to justify its removal, shall be considered to be devalued. The amount of devaluation shall be paid to the City by the person causing the damage. Compensatory payments shall be paid into a fund established for that purpose and restricted to use for urban forestry programs.” (Italics added.)

Thankfully, Council also passed section 743-31 - Disposal of Urban Forest Products mandating that, “The director may sell wood and other forest products generated during urban forestry operations which are not needed by the City. Monies generated from compensatory payments, permit fees, donations, gifts and the sale of urban forest products and wood of public trees shall be used solely for the purpose of enhancing the street tree

Other Exciting Wood Waste Options

In early May I had the pleasure of participating in the Wood Waste Utilization Conference sponsored by National Arbor Day Foundation. Not only was the Foundation’s Lied Conference Center in Nebraska City, Neb., beautiful, wood chip fired boilers supply all of its hot water, heating and air conditioning!

Another speaker, Jim McGannon, City Forester of Colorado Springs, Colo., related his system for using all of his wood wastes. McGannon set aside an adequately sized, secure, paved wood yard right in the Public Works complex in the center of town. Forestry’s in-house tree crews bring all street and park tree wood to that yard. Then it’s hands off.

Forestry contracts with a local businessman who is responsible for operating the facility, separating the wood, processing it with his own equipment, advertising his products and selling them. The city gets a cut of the sales revenue, which McGannon uses to plant trees. Slick! He has been successful with his program for around 15 years, and under similar circumstances you might be, too. If you want to know the real nitty-gritty of this excellent program (and how some 20 years ago Colorado Springs put a screeching halt to all tree topping on all property) talk with Jim McGannon at 719-385-5942, or E-mail him at jmcgannon@ci.colospgs.co.us.

I also met Mike Robb, a very innovative engineer with the King Coal Furnace Corporation in Bismark, N.D. He builds a mobile, biopower, modular energy system that just might meet your needs. Power city hall with wood!

Mobile means you can drive it to your wood. Biopower means it will very cleanly burn coal, wood, or biomass. Modular means it generates low-pressure steam in a small, fluidized bed combustion chamber (no certified boiler operator needed). That steam is fed into a unique Millenium Engine that spins a shaft at 1200 rpm. That spinning shaft can directly drive a chipper, hog, hammer mill, etc., or a 2.5 to 5-megawatt electric generator. Running 24 hours per day, a 2.5-megawatt system will consume 60,000 tons of wood waste per year and power a small factory. Excess electricity can be sold on the open market. The Millenium Engine looks nothing like those huge, double-cylinder, high/low pressure, reciprocating steam engines that drive 30-foot long Pitman arms turning bright red paddlewheels on historic riverboats. It looks more like a Pratt and Whitney, WWII, radial aircraft engine, but it is made of the most modern, off-the-shelf components and is digitally controlled by computer.

During 30 years of practicing forestry I have seen all sorts of wood-to-energy systems. Some burned chips; some sawdust pellets; some even “burned” wood into a gas that could power internal-combustion engines and heating systems. So far, King Coal’s system looks like one of the best. It certainly merits investigating whether you should partner with a local energy consumer who is tired of high energy costs. To obtain more information, contact from Mike Robb at 701-255-6406; E-mail: kingcoal@btigate.com; or E-mail him at jmcgannon@ci.colospgs.co.us.

I am certain NADF will coordinate another wood waste conference. I urge you to attend. If innovative, solutions, such as those created by Colorado Springs and King Coal, do not open your eyes, Arbor Day Farm’s wood-powered Lied Conference Center certainly will.
Wood was sold in 18-inch long pieces. Customers would load wood themselves and pay $50 per cord.

3. All street tree planting and maintenance, including 24-hour emergency response, will be performed by contracted tree service and landscape companies.

Once these basics are in place, what you do with your tree wastes is mostly determined by economics. In many areas, such as Cincinnati, where coal, natural gas and fuel oil prices are traditionally low, it is usually not feasible to consider wood-to-energy systems.

In 1981, we asked our Urban Forestry Board to gather together representatives from landfills, tree services, electric utilities and potential wood-using industries to study the local situation. After eight months of extensive work, they concluded that our only options were firewood, mulch and saw logs. Other forms of energy were far more inexpensive and convenient, and inexpensive sources were already in place to provide wood for sawdust that could compressed into pallets. We were either in the firewood and chip mulch business or, as repugnant as it was to us, destined to throw our wood away.

For many years, we were successfully in the firewood, chip and mulch business. About five years ago, we stopped selling wood. The main reason was that Ohio banned yard wastes, including unprocessed wood, from landfills. This led local tree services and other businessmen to begin wood, chip and mulch sales on their own properties. Coupled with this, our firewood market suddenly fell off after several warm winters and a slew of major storms created a lot of free wood. Nevertheless, I would like to share the details of our program in case some of you might find conditions more favorable in your area.

Our Program

We decided first that if day-to-day, single-tree removals resulted in wood too big to be chipped, our contracted tree service would leave the wood neatly stacked in 18-inch long pieces for anyone to take. We also told Cincinnati Gas and Electric that their crews could do the same, which they instantly did, reducing their line-clearance costs. If no one took this free firewood within two weeks and we began to get complaints, we’d call through our list of people we knew burned a lot of wood. On
rare occasions when we still has excess—such after a storm had created an oversupply—we'd pay a tree service or other city agency to move it to our wood yard. Chips were given to any person, community garden, volunteer group and company or city agency that asked. This system is still working well.

Since most of our pruning and street tree removals are accomplished during preventive maintenance between October and March, it once took us 10 years to visit all 50 communities under our jurisdiction. However, our cycles are now down to six years. With community volunteers, we would choose a temporary wood yard centrally located to the community in which we were working. Ownership of the yard is not as critical as its physical attributes:

- It must be paved, without parking bumpers. This allows all-weather, safe access for tree trucks, wood buyers, chipping equipment and cleanup crews.
- It must be large enough for our tree services to unload piles of firewood pieces on one side and piles of wood chips on the other, while still allowing plenty of space for clear traffic flow of wood buyers.
- It must be secured with a sturdy chain-link fence to eliminate dumping and theft of wood.

Cincinnati police were always extremely cooperative in watching our wood yards and putting a stop to problems. If there were no federal, county or city-owned properties available, we approached private property owners, usually industries. We were never turned down and always thanked the owner in our promotional literature.

Since contractors are always fully insured (as was the city staff that sold the wood and cleaned the yard), Forestry was rarely asked to be co-insured in case a wood buyer were injured. This was easy and inexpensive—around $500 per year. Agreements to use wood yards temporarily have never been complicated.

Forestry staff conducted wood sales periodically on Saturdays, depending on how fast contractors filled the yard and how fast buyers emptied it. The cycle averaged three weeks. When our contractors pruned or removed street trees, they would post abutting homes and businesses with notice of the work and upcoming wood sales. Each notice had a map to the wood yard, explained the rules of buying our wood and gave our Firewood Hotline number. We mailed notices to all previous customers, giving our yard's location and date of the sale. Their addresses were taken from copies of cash receipts provided with each transaction during the past year. We also sent notices to all newspaper community calendars and, via interoffice mail, to each city department for posting. A couple of large signs with the Hotline number were always prominently displayed on the chain link fence, which really helped if the yard could be seen from a major thoroughfare.

When we opened our gates promptly
at 8 a.m., there were usually 30 to 50 trucks waiting in line to fill up; the record, I believe was close to 90. Two of us worked each sale, measured quantities of loaded wood, took cash or checks and issued receipts.

We sold wood “as is” (18-inches long by any diameter), “load your own” for $50 per cord. An 8-foot long, standard pickup truck loaded to the top of the bed can carry roughly ½ cord, worth $25. We have sold loads as small as the trunk of a VW Beetle all the way up to a 40-foot semi trailer filled to the brim by a front-end loader.

Calculating the cost was simple. We would pull out the tape measure (be sure to measure all three dimensions), calculate the number of cubic inches, divide by the magic number of 221,184 (number of cubic inches in a cord), multiply by $50, then round up to the nearest $5 to minimize making change.

Customers were allowed to use their mauls, wedges, chain saws and power splitters. No one was ever injured—beyond the occasional muscle pull or mashed finger. We sold load-your-own chips for $10 per truckload, regardless of truck size. Even our own tree planting contractors bought wood chip mulch from us, because we specify that locally produced, rough wood chips—not commercially produced bagged mulch—must be used around each of the 4,000 street trees planted annually.

The gates were locked promptly at 4 p.m., and we smiled all the way to the bank, remembering the funniest things those colorful customers did that day. We should write a book! The staff loved to work those sales, because it was fun. We got to know good people. We generated money used to plant trees. And, most importantly, all of us enjoyed a refreshing change of pace from the weekday routine. Selling wood was an important morale builder.

We always used every penny of wood sales revenue to plant trees in communities where preventive maintenance generated the wood. We also think it is important to educate voters that good forestry involves harvesting and selling trees, as well as planting more trees than are removed. They could see this cycle right on the streets where they lived.

Most trees removed from our rights-of-way have too many defects to sell as saw or veneer logs, or they are no-value species such as silver maple or Siberian elm. However, on two occasions we sold street tree logs on the stump and converted the tops into firewood and chips. One case involved a residential street lined with 40, root-rotted red oaks averaging almost 40 inches diameter.

After The F.A. Bartlett Tree Expert Company and electric crews topped those oaks below the wires, our highest bidding logger brought his trucks on site, showed Bartlett exactly where to cut the trunks and helped lower them into his trucks. A similar sale involved 50 large white ashes from another residential street eight years later. In each case, we sold around 31,000 board feet and earned enough to grind all stumps and replant the street with 3-inch caliper river birches that have thrived in the wet soil.

When we sold firewood and chips, our program realized around $30,000 annually, which included $15,000 we didn’t spend on tipping fees at the landfill plus $15,000 in cash generated by the Saturday sales. Each year, we had minor expenses to promote the sales and pay the Highway Maintenance Division to clean our wood yard with a street sweeper.

We did experience a couple of warm years when we had to contract with a company to grind our surplus firewood into chips. And, yes, each year there was usually one small dump box containing hollow trunks filled with steel rods or concrete that had to be landfilled for a couple of dollars. These expenses were deducted from sales revenues.

Successful sales of wood waste led us to bidding our community preventive maintenance work in two ways:

1. A price per tree pruned and a price per tree removed (including bringing all wood and chips to the city’s wood yard)
2. The same unit prices—with contractors keeping the wood.
Wood/Chuck continues to supply residential, commercial and utility contractors, and has for over 30 years. Join us on the road to success.
In most cases, bids were less if the companies kept the wood, a reverse of prior bidding trends. In virtually all cases, we elected to let the tree services keep the wood. After calculating the revenue we expected to earn minus our costs in selling the wood and cleaning the yard, we found that letting the contractors handle things was less expensive. This is still the practice today. Financially we are better off, but our staff sure misses those fun days in the wood yard. And, we still watch out for high-value saw logs to sell.

What's ahead? Many cities are already covered in piles of rough wood chips that go unused for mulch. Perhaps storms have caused a temporary surplus. More likely, however, those cities talk the recycling talk (with curbside collection of paper, glass and plastic), but when it comes to mulch, they often do not walk the walk.

They might use rough mulch around playgrounds, trees, flowerbeds and trails. But when the first person complains, rough mulch is instantly replaced with “more attractive” commercial mulch purchased at a significant expense from out-of-state suppliers. Too many cities are afraid to take a little heat trying to change public perceptions. Only a few have had the courage to do what is right by saying, “No! We refuse to purchase one more bag of mulch while we are generating our own wood chips and dumping them at some out-of-sight place in a park. We’ll use only our chip mulch until our citizens begin to accept it, learn to like the looks of it, begin using it on their own properties and shun bagged mulch.”

Even then, cities will probably generate a small surplus of chips—along with tons of processed wood debris, such as broken pallets and old shipping crates.

As I noted at the beginning, a program in your area will depend upon local economic and political conditions. The market for wood, wood chips and energy varies from region to region. With oil and natural gas prices rising, economics in many areas may again favor burning wood waste to generate energy. Our program to sell wood worked for a number of years, and it will work again if market conditions change. Factor in all of your costs and decide what works best for you.

Steve Sandfort is Supervisor of Urban Forestry in Cincinnati, Ohio.
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... continued on page 84
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continued on page 80
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Public Tree Care Dispute Leads to Court

All arborists in business, no matter how much pride they take in their work, can expect some criticism from time to time. It might hurt the ego for a while, but the damage is usually fleeting.

For an arborist in Evanston, Ill., however, the criticism did more than sting.

When a woman in the Chicago suburb stood up during a televised city council meeting and claimed that arborist Vince Winkler, owner of Winkler Tree Service, Inc., had “half-butchered” trees along the city’s streets, she may have gone too far.

The woman, Mimi Peterson, who followed up her public comments with letters to the mayor and other city officials, also said Winkler had performed “atrocious” and “frightening” work after winning a city contract.

A certified arborist and licensed pesticide applicator, Winkler quickly fought back by filing a $250,000 defamation suit in Cook County Circuit Court against Peterson. Winkler said in the lawsuit that his reputation was irreparably damaged by the comments, according to a report in the Chicago Sun-Times. After the suit was filed, city officials said they would back Peterson in the suit, saying they backed her right to speak out at a public meeting, although they did not make any statement on whether they supported her opinion. Unless a settlement is reached, the case could head to court sometime this summer.

A Million Trees Lost

In what’s rapidly becoming a textbook case of how a plant disease can rapidly spread and devastate an area, the Miami Herald reported that Florida state officials had dispatched 77 inspectors to spread out across Dade County and check every backyard and orchard for infected trees within a 900-square mile quarantine area. Because of the bacteria’s ability to spread through the air, all trees within 1,900 feet of an infected species had to be cut down and burned. In May, arborists were ordered to disinfect all tools and workers after handling any citrus tree, whether or not it was known to be infected with the disease. Crews not following the strict guidelines were subject to stiff fines.

Do Trees Make Good Speed Bumps?

Some traffic safety experts say trees, often connected with traffic accidents, may actually help slow drivers down. According to APBNews.com, cities across the country, including New York City, are considering whether narrower streets lined by more trees may help “calm” traffic. The approach may be a new tool for roadway engineers, replacing ubiquitous stop signs and speed bumps in residential areas. But others have raised concern about the ability of emergency vehicles to negotiate narrower streets and worry that narrower roads will cause more accidents in the long run.

And Detroit Wants Some Back

A century ago, Detroit, Michigan, was known to many in the Midwest as the “City of Trees,” thanks to large parks and boulevards lined with tulip trees. Since then, though, urban sprawl, years of neglect and old age have taken their toll.

But Motown plans to capture some of the green again in time for its 300th anniversary in 2001.

According to the Detroit Free Press, to mark the date of the city’s founding, the city will plant 1,701 trees, mostly the tulip trees that once towered over downtown streets. Local school children are being taught how to care for the newly planted trees.

New Jersey Loves Trees—Really

The Garden State, once one of the worst environments for tree care professionals because of state laws that allowed them to be sued easily for doing municipal work, has done a complete turnaround on tree care.

Three years after passing the Community Forestry Assistance Act, which immunized arborists and volunteer tree care boards from a rash of lawsuits that had plagued the state, New Jersey is now one of the first states to offer residents license plates bearing the slogan: “Treasure Our Trees.”

The plates raised about $70,000 in their first year in circulation, according to the newsletter of the Arbor Day Foundation. The $50 initial cost and $10 annual upkeep goes directly to a fund that provides grants for urban tree care.
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If Only Trees Could Talk ...

It had been one of those weeks: Someone dropped a chain saw from 40 feet, a client's car was damaged while dragging brush past it, flat tires and so on.

We had been struggling with the quintessential language barrier between three new Spanish-speaking employees and ourselves. This particular day was going fairly well. It was mid-afternoon and I felt that it was okay to leave the crew to finish up a few minor remaining tasks on the property of one of our long-term clients.

With the exception of chipping and raking up, only two or three limbs on a Norway maple (Mrs. Smith's favorite) needed to be "lightened up." I took the crew foreman over to the tree and showed him the limbs to be trimmed. Since he had a fair handle of the English language and the branches were low enough to reach up and touch, I felt that things were clear.

You have probably guessed that when I arrived at the office the next morning, one of the calls on our answering machine was Mr. Smith. He was only mildly irritated, but Mrs. Smith ... well trust me when I tell you that they did a bit more than lighten a few low limbs.

I assured my client that I would visit their property to size up the situation. What I found was a first-class pruning. No damage to the tree, but much more than what Mrs. Smith had had in mind! In an effort to smooth the situation over, I offered to invigorate the tree, along with a newly planted dogwood, to encourage the tree to sprout some vigorous new growth.

Several mornings later, I found the following fax:

"I had a nice talk today with the Norway maple on the back patio and told her that the long drink and vitamins she got the other day were provided complements of Hickory High. She asked me to tell you she is most appreciative of the cocktail, and to thank you for it. She went on to say that while her mother (Mrs. Smith) was somewhat shocked with her haircut (leaf trim, perhaps), she (the tree) thought it looked rather smart and was sure it would let the sunlight in to help the grass at her feet.

"That was about all she had to say, but then I don’t have to tell you that Norway maples are not the most talkative of trees. Sit down to talk with a Buttonwood or a young hemlock and yattie, yattie, yattie. They never shut up. Maples, especially Norway maples are a more sober bunch. But when they speak, you know it’s sincere and coming right from the roots. There is no doubt that you made our maple and dogwood trees most happy.

"My position is, and has always been, that if my trees are happy, I’m happy. And so I am.

Thanks for your thoughtfulness."

And so, in spite of all of the trials and tribulations of being in this crazy, stressful, competitive, frustrating business, it never seems to fail. Just when I think I’m losing my mind and feel like throwing in the towel, someone or something happens that gives me back my perspective and inspires me to keep on keeping on.

Helen Riggins is chief arborist for Hickory High Tree Service, Inc. in Pipersville, Pa.
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SMART MANAGER and EXPERT PRACTITIONER seminar series allow you to customize your educational experience to fit your needs - with several sessions offering ISA continuing education units.

SAVE, SAVE, SAVE ... Take advantage of the educational seminars. If you are attending 5 or more seminars ... BUY GOLD!

Registration Procedure

Please photocopy and complete a separate registration for each conference attendee. Registration is REQUIRED to obtain your admission badge.

Register before the Early Bird deadline of October 9 to receive discounts on Trade Show Admission and educational seminars.

All TCI EXPO admission badges will be mailed to attendees who register prior to October 22, 2000. Individuals registering after October 22 must stop by the pre-registration desk located in the Second Street Concourse to pick up their admission badge.
The products and services you need to achieve success with your tree care company are all under one roof. Attend TCI EXPO 2000 and make a difference in your future!
There will be two drawings each day for at least $250 in ARBORBUCKS on the Trade Show floor. Drawings will be held on Thursday and Friday at 12:00 noon and 2:00 p.m. and Saturday at 11:00 a.m. and 1:00 p.m.

ARBORBucks can be used the same as cash to make purchases from participating vendors at the show. There is no cost to enter the drawing. Just complete the survey found in the center of your pocket program.

**Arborbucks participants:**

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Winners must be present to receive ARBORBUCKS cash!

**American Arborist Supplies, Inc.**
- Aerial Lift, Inc.
- John Bean Sprayers
- Bishop Company
- Concept Engineering Group, Inc.
- DICA Marketing Co.
- Green Manufacturing, Inc.
- Growtech, Inc.
- Karl Kuemmerling, Inc.
- MAT-3, Inc.
- Northeastern Arborist Supplies
- Peavey Manufacturing Company
- Rayco Manufacturing Inc.
- Schodorf Truck Body & Equip. Co.
- Trueco, Inc.
- Vermeer Manufacturing Company

**Arborist Skills**

Visit the Arborist Skills areas located on the trade show floor and sign up to receive hands-on instruction. Upon completion, ISA Certified Arborists will become eligible to receive ISA re-certification CEU’s.
Two Special Workshops

TCI attendees are invited to participate in either full-day workshop on Wednesday, November 8, 2000.

Registration Fee $95
Please use the TCI EXPO registration form to indicate attendance at either of these programs.
Register on-line and WIN! (see registration)

Limited enrollment. Early registration is encouraged.

The Bartlett Tree Research Laboratory Tour - Bartlett Staff
8:30 am - 3:30 pm
Second Street entrance
Charlotte Convention Center

The F.A Bartlett Tree Expert Company is widely regarded as a leader in delivering cutting edge, science-based tree care services. Take advantage of this rare opportunity, while EXPO is in Charlotte, to tour the Bartlett Tree Research Lab, the proving ground for the company's innovative services.

Participants will depart at 8:30 a.m. and return at approximately 3:30 p.m. Lunch included.

Business Managers’ Workshop - Jerry Gaeta

Understanding Costs & Pricing Services
9:00 am - 12:00 pm
Room 211
Charlotte Convention Center

What is the relation between estimating, job costing and accounting? In a profitable business, they must work in unison. In this program, Mr. Gaeta will explain the relation of these three important components of business management and show you how they must balance each other.

Lunch not included.

Building Your Employee Benefit Program
1:00 pm - 4:00 pm
Room 211
Charlotte Convention Center

The effective benefits program must be based not only upon what employees need, but what the company can afford. With company financial health and employee satisfaction in the balance, the stakes are high. Mr. Gaeta, himself a green industry employer, will share his first-hand experiences of building a successful benefits program from the ground up.

Jerry Gaeta and two partners own a full service design/build and commercial landscape, irrigation and landscape maintenance firm in Mt. Pleasant, S.C. Jerry is a successful estimator who has bid hundreds of millions of dollars in site development work. He became an associate with Vander Kooi & Associates, Inc. in 1994, and has consulted with many companies in the green industry, developing overhead recovery budgets, teaching the principles of estimating and improving their performance and profits. He was elected “1991 Nurseryman of the Year” by the SC Nurserymen’s Association, the only landscape contractor ever to receive such an honor.
7:30 REGISTRATION OPENS

8:30-9:45 KEYNOTE ADDRESS: MANAGING THE FUTURE - AGE WAVES IN THE WORKFORCE - Robert Tucker
Baby Boomers are turning 50 at the rate of one every eight seconds. Generation X, 17 million Americans, are the force in the workforce today. They are telling their employers that they work under and are motivated by different rules than were Boomers. Now Generation Y is making its presence felt strongly, especially in service businesses like tree care that tend to employ younger workers.

In his upbeat, interactive session, Robert Tucker will explain the most important do's and don'ts regarding Generation X, and help you understand Generation Y's unique requirements.

9:57 TRADE SHOW OPENS
Don't miss a single booth! Wear your walking shoes, because with over 170 exhibitors, there will be a lot of ground to cover. TCI EXPO is the largest tree care trade show in the nation. It will make your business more efficient, competitive, productive, or profitable, you'll find it here. Plus, we've arranged for live demonstrations and plenty of hands-on opportunities with some of the leading names in the arborist industry. Check your show program for times and locations. To keep up with the industry, you won't want to miss a single demo. Bonus: Key demos will be presented in Spanish each day of the show. Bring your Spanish-speaking employees!

12:00 ARBORBUCKS DRAWING - Tree Demonstration Area
Be sure to fill out your entry form and you could be the winner of ARBORBUCKS currency. ARBORBUCKS can be used as cash at any of the participating vendor booths. Here's your chance to win the goods and services you need!

4:00 TRADE SHOW CLOSES

4:00-5:00 NEW TREATMENTS: CLAIMS, THEORIES & RESULTS - Dr. Bruce Fraedrich and Dr. Thomas Smiley
If you couldn't join us for the Bartlett Lab tour, you can still reap the benefit of that organization's "R & D" by coming to hear two of Bartlett's head researchers talk about their ongoing projects and findings.

4:00-5:00 MARKETING TO GENERATIONAL CUSTOMERS - Robert Tucker
In this presentation, Robert Tucker will help you brainstorm new market opportunities in serving the three age waves, help you identify the age waves among your customers, and help you predict and control how an aging population will affect your business.

6:00-7:00 WELCOME RECEPTION FOR ALL ATTENDEES AND EXHIBITORS
Grand Ballroom
Omni Charlotte Hotel
Complimentary hors d'oeuvres
Visit with old friends, make new ones, network, and enjoy an evening of fun with fellow tree care professionals.

See you next year in Columbus, Ohio! November 1-3, 2001
John Ball

much how to do IPM, but how to market the service and make a profit at it. Following the classic IPM methods appears to be a good way of having your IPM program become DOA. But pesticide regulations and public attitudes are changing and clearly IPM can be an excellent profit center. Ball has a number of great success stories as well as some pitfalls to avoid.

ES I - Employer Panel

qualified employees among different racial and ethnic groups. Share the philosophies and some of the strategies that companies of various sizes use to attract and hold onto a culturally diverse workforce.

equipment, technologies and services, and exchanging ideas with your peers. There’s no show like TCI EXPO.

MPHS - Don Blair

rigging jobs he has worked on in a lifetime as a commercial arborist, equipment specialist, and innovator. Come prepared to laugh, to think, and to take notes for your next rigging job!

ES II - Employee Panel

You can become a better employer if you listen to these panelists elaborate on what those needs are as employees, and as members of distinct cultural communities.

Demonstration Area

currency. ARBORBUCKS can be used as cash at any of the participating vendor booths.

Demonstration Area

drawing. You could be the winner!

**pm**

**CARE TREATMENTS** - Dr. Don Marx

with beneficial bacteria and mycorrhizal fungi.

Dr. Marx, now retired from the U.S. Forest Service, has over 34 years experience working with trees and how they grow. He has contact with scientists all over the world working with trees that helps him on the cutting edge of new and innovative methods.

**ABOUT E-COMMERCE** - Steve Epner

concepts and their potential significance to your business, and he’ll give you enough information to let you start to apply what you learn immediately.

As a technology consultant, Steve has helped guide hundreds of American businesses to the future. He’s been widely published and quoted in various business publications, including the Wall Street Journal.

**GRAM UNVEILED**

members will present details, through a discussion format, of the NAA Accreditation Program for commercial tree care businesses, which is scheduled to launch in 2001.

### Saturday, November 11, 2000

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30</td>
<td>REGISTRATION OPENS</td>
</tr>
<tr>
<td>8:00-9:00</td>
<td>IPM IN THE REAL WORLD - John Ball</td>
</tr>
<tr>
<td>8:00-9:00</td>
<td>IMPLEMENTING A DRUG-FREE WORKPLACE - Brian Farrington</td>
</tr>
<tr>
<td>9:00</td>
<td>TRADE SHOW OPENS</td>
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<tr>
<td>9:30-10:30</td>
<td>FERTILIZATION &amp; PEST CONTROL STRATEGIES - Dan Herms</td>
</tr>
<tr>
<td>9:30-10:30</td>
<td>A WAGE &amp; HOUR LAW PRIMER - Brian Farrington</td>
</tr>
<tr>
<td>11:00</td>
<td>ARBORBUCKS DRAWING - Tree Demonstration Area</td>
</tr>
<tr>
<td>12:30</td>
<td>ISA Certification Exam Check-in</td>
</tr>
<tr>
<td>1:00-4:30</td>
<td>ISA Certification Exam - To sit for the exam, you must call ISA to pre-register at 1-217-355-9411. Application and registration fee must be received at ISA 12 working days prior to exam date.</td>
</tr>
<tr>
<td>1:00-4:30</td>
<td>The ISA Certified Tree Worker/Climber Specialist exam is offered to those arborists with 1 1/2 years climbing experience. The exam is a combined knowledge and skills exam. To learn more about this exciting new certification program, contact the ISA at 217-355-9411 and ask for the ISA Certified Tree Worker/Climber Specialist application and information packet. This exam is being offered by the ISA Southern Chapter. Please have your application into the ISA office in Champaign, Illinois 12 working days prior to exam date.</td>
</tr>
<tr>
<td>3:00</td>
<td>TCI EXPO 2000 TRADE SHOW CLOSES!</td>
</tr>
</tbody>
</table>
**Driving**

**From I – 77 South:**
Exit John Belk Freeway (I – 277) South. Take Stonewall Street Exit. Turn left onto Stonewall Street. Follow Stonewall to College Street (3rd traffic light). Convention Center is on the corner of College and Stonewall.

**From I – 77 North:**
Exit John Belk Freeway (I – 277) North. Take College Street Exit. After exiting, go through the first traffic light and the Convention Center will be on your right.

**From I – 85 South & North:**
Exit onto I – 77 South. Exit John Belk Freeway (I – 277) South. Take Stonewall Street Exit. Turn left onto Stonewall Street. Follow Stonewall to College Street (3rd traffic light). Convention Center is on the corner of College and Stonewall.

**From US Highway 74 West (Wilkinson Blvd):**
Continue on as this turns into John Belk Freeway (I – 277) North. Take College Street Exit. After exiting, go through the first traffic light and the Convention Center will be on your right.

**From US Highway 74 East (Independence Blvd):**
Follow John Belk Freeway (I – 277) South. Take Stonewall Street Exit. Turn left onto Stonewall Street. Follow Stonewall to College Street (3rd traffic light). Convention Center is on the corner of College and Stonewall.

**From the Airport:**
Follow the airport exit signs to I – 77 North. Proceed on I – 77 North to John Belk Freeway (I – 277) North. Take College Street Exit. After exiting, go through the first traffic light and the Convention Center will be on your right.

**Flying**

**US Airways**
US Airways has been selected as the primary air carrier. Special discounts have been arranged on your air transportation. To take advantage of this special offer, please call US Airways’ Meeting and Convention Reservation Office at 1-877-874-7687 and refer to Gold File No. 17171423. Plan ahead and receive an additional 5% discount by ticketing 60 days or more prior to departure.

**Airport Transportation**
For those arriving by air, the Charlotte/Douglas International Airport is located seven miles west of Uptown Charlotte. Arrangements have been made with Carolina Transportation Company, Inc. shuttle service for transportation to Uptown hotels. Look for coupons in your registration confirmation packages. This coupon will entitle you to a conference rate of $14.00 per person, round-trip.

The Carolina Transportation Company ticket booth is located outside of U.S. Airways baggage claim door C. Hours of operations are from 6 a.m. to midnight 7 days a week. You must present your coupon to the representative on duty to receive the reduced rate.
Finding a hotel room

This year the host hotel for TCI EXPO 2000 is the **OMNI CHARLOTTE HOTEL**, located at 101 South Tryon Street (*within walking distance to the Convention Center*). The OMNI CHARLOTTE HOTEL is offering TCI EXPO 2000 attendees a rate of **$112 single/double occupancy**. Valet parking is available for overnight hotel guests at a daily rate of $16. This includes in and out privileges on a 24-hour basis. Self-parking is available for $6 per day and includes in and out privileges. Space is limited, be sure to make your reservation early. This rate will be offered until October 8, 2000. To make your reservation please call the OMNI CHARLOTTE HOTEL at 704-377-0400. **Be sure to reference the National Arborist Association/TCI EXPO room block when making your reservations.**

Alternative accommodations are available at the **Four Points Sheraton** located at 201 South McDowell Street, just a few blocks from the Convention Center. The Four Points Sheraton will offer TCI EXPO 2000 attendees a rate of **$92 single/double occupancy**. Self-parking is complimentary. Reservations must be made by October 9, 2000 in order to guarantee this preferred rate. To reserve your room, please call the hotel at 704-372-7550 and be sure to reference the National Arborist Association/TCI EXPO room block.

Additional accommodations are available at the **Holiday Inn Center City** located at 230 North College Street. The Holiday Inn Center City will offer TCI EXPO 2000 attendees a rate of **$91 single/double occupancy**. Complimentary self-parking is available for overnight guests. Reservations must be made by October 6, 2000 in order to guarantee this preferred rate. To reserve your room, please call the hotel direct at 704-335-5400 and be sure to reference the National Arborist Association/TCI EXPO room block.

**FREE Uptown Shuttle**

The Uptown Shuttle is an ideal way to travel to various locations within the Uptown area. The free shuttle stops in front of the Charlotte Convention Center as well as near many of the Uptown hotels. The Uptown Shuttle runs on a seven minute schedule, Monday – Friday from 7:30 a.m. to 6:00 p.m.
TCI EXPO Goes On-line

For the first time ever, you can register on-line at www.natlarb.com for the world's largest tree care show. NAA offers a secure transaction line, and confirmation of your registration will be received within minutes.

You could WIN
When you register on-line, you are automatically entered to win one of the 200 Arborwear shirts (retail value greater than $50), which will be given out at the show.

This shirt is made of soft, pre-washed 10 oz. canvas for a remarkably comfortable fit. The relaxed room in the sleeves and collar offer unparalleled freedom of movement.

This promotion is only applicable to on-line registrants and winners will be picked at random. Void where prohibited. All prizes must be picked up before the show ends. NAA will not ship unclaimed shirts. All Arborwear LLC products are unconditionally guaranteed.

Registration Procedure
Please photocopy and complete a separate registration for each conference attendee. Register before the Early Bird deadline of October 9 to receive discounts on Trade Show Admission and educational seminars. Registrations received after October 9, not complying with the appropriate fees, will be billed accordingly. Registration is required to obtain your admission badge. Everyone is required to wear a badge issued by the National Arborist Association to enter the exhibit hall and all seminars. Be sure to pre-register and avoid long lines at the registration area.

TCI EXPO Badges
All TCI EXPO admission badges will be mailed to attendees who register prior to October 22, 2000.

Individuals registering after October 22 must stop by the pre-registration desk located in the Second Street Concourse to pick up their admission badge.

PLEASE NOTE: Registrations will be processed but not confirmed until paid in full.

Seminars
Check the box beside each seminar you wish to attend. Be careful not to pick two seminars at the same time. Count the total number of seminar hours indicated next to the seminar titles. Record this number in the space marked TOTAL SEMINAR HOURS.

If you are attending 5 or more seminars . . . BUY GOLD!
To purchase the GOLD CARD, which will give you unlimited access to all educational sessions and the Trade Show, check the appropriate box on the registration form and enter the correct amount in the TOTAL COST line.

Seminar Registration Cancellations
All seminar registration cancellations must be received in writing at the National Arborist Association office. Cancellations received on or before October 27, 2000, will receive a full refund less a $25 administrative fee. Fees cannot be refunded after October 27, however you are welcome to send a replacement. No telephone cancellations will be accepted.
### 1. Registration Form

Name ____________________________

Title ____________________________

Company _________________________

Address ______________________________________________________________

City ____________________________ State _______ Zip _______________________

Phone ___________________________ Fax _________________________________

Signature _________________________ Date _______________________________

### 3. Seminar Selections

**THURSDAY, NOVEMBER 9**
- #1 - 8:30am Managing the Future - Age Waves in the Workforce .................. 1 Hour
- #2 - 4:00pm New Treatments: Claims, Theories & Results ............................ 1 Hour
- #3 - 4:00pm Marketing to Generational Customers .................................... 1 Hour

**FRIDAY, NOVEMBER 10**
- #4 - 8:00am IPM in the Real World ....................................................... 1 Hour
- #5 - 8:00am Hiring From Other Cultures I (Employer Panel) ......................... 1 Hour
- #6 - 9:30am Rigging Challenges & Triumphs ............................................. 1 Hour
- #7 - 9:30am Hiring From Other Cultures II (Employee Panel) ....................... 1 Hour
- #8 - 4:00pm Carbon Allocation & Tree Care Treatments ............................. 1 Hour
- #9 - 4:00pm What You Should Know About E-Commerce ............................ 1 Hour
- #10 - 5:15pm NAA's Accreditation Program Unveiled ............................... FREE

**SATURDAY, NOVEMBER 11**
- #11 - 8:00am IPM in the Real World ....................................................... 1 Hour
- #12 - 8:00am Implementing a Drug-Free Workplace ................................. 1 Hour
- #13 - 9:30am Fertilization & Pest Control Strategies ............................... 1 Hour
- #14 - 9:30am A Wage & Hour Law Primer ................................................ 1 Hour

**TOTAL SEMINAR HOURS** ____________________________

### 2. Source Request

How did you hear about TCI EXPO?
- ☐ TCI EXPO Brochure
- ☐ TCI Magazine
- ☐ Arborist News
- ☐ Other Industry Publication
- ☐ NAA web site
- ☐ Co-worker/Friend
- ☐ Other Trade Show
- ☐ Other

### 4. Registration Options

- ☐ Gold Card - Includes any 8 seminar selections and admission to trade show
  *(Wednesday Workshops are not included in Gold Card option)*

- ☐ Individual Seminars  multiply cost by number of seminar hours _____ X
  - BEFORE OCT. 9, 2000
  - AFTER OCT. 9, 2000
  - $205
  - $250

- ☐ Trade Show Entrance Only - Free with paid seminars
  - $15
  - $25

- ☐ Business Managers’ Workshop *(lunch not included)* - Wednesday, Nov. 8, 2000
  - $95
  - $95

- ☐ The Bartlett Tree Research Laboratory Tour - Wednesday, Nov. 8, 2000
  - $95
  - $95

**TOTAL** $ ____________________________

### 5. Payment Method

- ☐ Check Enclosed
- ☐ MasterCard/Visa/AMEX  AMOUNT $ ____________________________

Card No. ____________________________ Exp. Date ____________________________

Name ____________________________ (as it appears on your card)

Signature ____________________________

### 6. NAA Membership & TCI Magazine Information

1. Is your company an NAA Member Firm? ☐ Yes ☐ No
2. Do you wish to receive NAA Membership Info? ☐ Yes ☐ No
3. Do you wish to receive a complimentary subscription to TREE CARE INDUSTRY (TCI) Magazine? ☐ Yes ☐ No

You must complete all of the information below to receive your subscription:

4. Business/Industry: (Please check one that applies)
   - ☐ Tree Service
   - ☐ Landscape Contractor
   - ☐ Governmental Entity
   - ☐ Property Mgmt.
   - ☐ Consulting Firm
   - ☐ Utility
   - ☐ School/University
   - ☐ Other: ____________________________
...next stop for the

WORLD'S LARGEST
tree care expo

Columbus
Ohio

November 1-3
Greater Columbus Convention Center