

In This Issue

2	Association News
3	Welcome New Members
3	From the President
4	U of D News
5	More Asian Longhorn Beetles Found in NJ
6	Asian Beetle Infestation is Wider Than Thought
7	Bradford Pear
8	Bidding Large Construction Projects
13	Virburnum Leaf Beetle
15	Cold Hardiness Evaluation of <i>Cornus kousa</i>
20	Prevent Girdling Roots at Transplant
21	Safety Incentive Programs – Do they work?
24	Getting Landscape Plants Ready for Winter
26	Fall Consumer Trends Survey
27	Understanding Your Balance Sheet
29	Pesticide News
30	Research Briefs
32	Publications
33	Calendar

Board of Directors

Executive Director	Valann Budischak	888-448-1203
Past President	Bruce Paulish	653-9336
President	Wendy Rezac	734-2060
Vice-President	Joe Wick, Jr	653-9000
Treasurer	Norm Hedrick	284-9677
New Castle County Rep	Tony Lemper	292-1847
Kent County Rep	Rexene Ornauer	734-2060
Sussex County Rep	John Wiest	629-8799
Directors-at- Large	Steve Sterling	653-7060
	Jay Windsor	875-2457
	Naomi McCafferty	239-7719
Board Support Members	Susan Barton	831-1375
	Tracy Wooten	856-7303
	Lynn Harrison	698-4500

Editor: Susan Barton, Extension Specialist, University of Delaware
 The DNLA Newsletter is produced with the assistance of University of Delaware Cooperative Extension.

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

Happy New Year! I realize that the green industry never grinds to a halt, but hopefully this newsletter finds you able to take a brief breather from the blur of 2004. For many of our members, January and February is “show time.” Suppliers and growers are bustling from trade show to trade show – exhibiting and meeting with customers. Many of our landscapers and garden centers attend the trade shows to place orders, and to see the many new products and plants available for 2005. I hope you are planning to make the Delaware Horticulture Industry Expo & Annual Pesticide Conference one of your trade show/conference stops. It’s right around the corner – January 12th & 13th at the Modern Maturity Center in Dover. Please contact me if you need more information.

The DNLA received many fine entries for the 2004 Landscape Awards contest. The judging took place in October. Congratulations to our winners! They will be honored at the DHIE. The winning entries were submitted by the following:

Deanna Pillarelli of Garden Escapes, LLC located in Newark, DE
Naomi McCafferty of Farm Meadows Nursery located in Hockessin, DE

The Delaware Plant of the Year Nominating committee, once again provided the DNLA with many outstanding nominations for the 2005 Delaware Plant of the Year. Committee members nominate plants based on the following criteria: hardy in Delaware; few diseases and insect problems; non-invasive; adapts for a variety of landscape uses; possesses horticultural assets such as flower, fruit, leaf, habit, structure, attractiveness to wildlife, etc.; currently under-used in Delaware landscapes;

readily available from Delaware growers, nurseries, and garden center outlets. Based upon their input, the board on directors voted to select the following as the 2005 Delaware Plants of the Year:

Woody selection: *Thuja plicata* ‘Green Giant’
Herbaceous selection: *Aster oblongifolius* ‘October Skies’

Informational sheets with photographs of the plants will be available at the DHIE.

On a more somber note, the DNLA would like to express their deepest sympathy to the families of:

- Mrs. Jack Ellingsworth of Forest View Nursery who passed away on October 26th
- Mr. Robert Papetti of Bobtown Nursery who passed away on March 20th

CNP Update: On October 19th, four individuals sat for the Certified Nursery Professional core and/or specialty exams. Congratulations are in order for the following individuals:

New CNP:
Susan Selph
Covering Ground
Landscape Design Specialist

New Specialties Added:
Robert Owens
Delaware River and Bay Authority
Turfgrass Management Specialist

C. Donald Stump
J.B. Landscaping
Turfgrass Management Specialist

WELCOME NEW MEMBERS

Terry Struve

409 Grove Avenue
Wilmington, DE 19809
(302) 764-8859

Jonny Nichols Landscape Maintenance

Jon Nichols
640 Bison Road
Dover, DE 19904
(302) 697-2200

New Moon Nursery, LLC

James Brown
1492 Kirkwood Pike
Kirkwood, PA 17536
(717) 529-3870

Gardening Matters

Betsy Gant
361 Kesselring Avenue
Dover, DE 19904
(302) 734-1396

Salesianum School

Don Savard
1801 North Broom Street
Wilmington, DE 19802
(302) 654-2495

FROM THE PRESIDENT

Wendy Rezac

Happy Hanukkah,
Happy Holidays,
Merry Christmas,
Seasons Greetings and
Happy New Year!!!

Just a quick hello to everyone! Hope everyone is having a busy and prosperous fall and early winter. It's hard to believe an entire year has come and gone. I am looking forward to an exciting 2005. I hope to see many of you at the Delaware Horticulture Industry Expo & 15th Annual Pesticide Conference, January 12th and 13th. Be sure to put the dates on your calendar! Thanks to everyone for helping to make 2004 another good year for the DNLA

Wendy A.W. Rezac



U of D NEWS
Susan Barton, Extension Specialist

The new Ornamentals Short Course Schedule for 2005 has been set. Here are the offerings for this spring:

This year we will be offering the popular series “**Troubleshooting Landscape Problems**” in New Castle County. All sessions will be held from 3:30 to 5:30 PM in the New Castle County Extension Office.

- Session 1: Troubleshooting principles**, Feb.1
- Session 2: Identification & Sampling**, Feb.8
- Session 3: Cultural Problems**, Feb. 15
- Session 4: Insect Control**, Feb. 22
- Session 5: Controlling Wildlife**, March 1
- Session 6: Disease Control**, March 8
- Session 7: Weed Control**, March 15

HORT 101 for Start Ups - February 16 and 24, 7 – 9 PM, Kent County Extension Office, Dover

Problems with Leylands, Alternatives and Plant Stress , February 2, 7 – 9 PM, Research and Education Center, Georgetown

Business Planning and Hort Business Mentoring, February 17, 7 – 9 PM, Kent County Extension Office, Dover

Improving Your Record Keeping, February 23, 7 – 9 PM, Kent County Extension Office, Dover

Landscape Design for Delaware, March 3, 5-7 PM, New Castle County Extension Office, Newark

Landscape Drainage/Water Management, March 3, 7 – 9 PM, Kent County Extension Office, Dover

First Detector Training (SOD, ALB, EAB,

MSB), March 8, 9-10 AM, Research and Education Center, Georgetown

Problems in New Developments – Lecture, March 9, 7 – 9 PM, Kent County Extension Office, Dover

Turf and Landscape Weeds, March 14, 7 – 9 PM, Research and Education Center, Georgetown

First Detector Training (SOD, ALB, EAB, MSB), March 15, 9-10 AM, Kent County Extension Office, Dover

First Detector Training (SOD, ALB, EAB, MSB), March 17, 9-10 AM, New Castle County Extension Office, Newark

Insect and Disease Update, March 23, 7 – 9 PM, Research and Education Center, Georgetown

Landscape Drainage & Water Management, April 5, 6:30-8:30 PM, New Castle County Extension Office, Newark

Rain Gardens, April 13, 7-9 PM, Kent County Extension Office, Dover

Rain Gardens, April 19, 6-8 PM, New Castle County Extension Office, Newark

Problems in New Developments – Site Visits, date and time to be announced, Kent County

All short courses cost \$5 (except the first detector training) and require preregistration. To register, call the county extension office where the course is offered.

New Castle County – 831-2506
Kent County – 730-4000
Sussex County (Research and Education Center) – 856-7303

MORE ASIAN LONGHORNED BEETLES FOUND IN NJ

Anoplophra glabripennis (Asian longhorned beetle) has infested numerous trees in the area of Carteret, NJ, and officials have taken measures to keep the pest from spreading.

A Carteret resident reported finding a beetle in a 'Crimson King' male on Aug. 2. Later investigation revealed the tree was infested, according to New Jersey Secretary of Agriculture Charles Kuperus. Subsequent investigation uncovered the infestation of numerous trees in a wooded area near a commercial zone on the border of Carteret and Rahway, NJ. The trees were infested with both adult beetles and eggs.

On Aug. 17, another residential tree was found infested near a county park in Carteret after tree climbers, surveyors and specialists began their first day of inspecting properties within a 1-mile radius of where the first beetle was found on Aug. 2. The second infested tree was found about a mile from the first, on the outer edge of the quarantine zone established to keep firewood and other wood trimmings from being relocated.

"We want to make sure that any wood that may be infested with the beetle does not get moved out of the area," said Carl Schulze, director of the New Jersey Department of Agriculture's (NJDA) Division of Plant Industry.

The Asian longhorned beetle has caused serious tree losses in New York State and the Chicago area, but has been found attacking trees only once before in New Jersey. In October 2002, an area within 1 mile of a 9-acre site in Jersey City was quarantined to prevent the spread of the insect. More than 100 infested trees at the site were removed to eliminate the beetle at that

time. "The [NJDA] is taking protective measures to ensure that the pest does not spread to other areas," Kuperus said. "These precautions are necessary because this beetle could cause devastating damage to Northeast forests if allowed to spread."

Measuring about 1 to 1 ½ inches long, *A. glabripennis* has a shiny black exterior with white spots. Its common name comes from the pest's long antennae, which are banded black and white. The beetle typically attacks one tree and migrates to others when the population becomes too dense.

Female beetles chew holes in the bark, where they lay 35 to 90 eggs at a time. The young hatch in 10 to 15 days and are at first white and grublike. They burrow beneath the tree bark to the cambium layer and feed there for several weeks until they enter the woody tissue of the tree. Once the beetles are deep inside the plant, applying pesticides does little to eradicate them. Usually trees need to be cut, chipped or burned to eliminate the problem.

Orange dots painted on trees in the affected area indicate the tree has been inspected and should not be seen as a sign of infestation or that the tree will be removed.

This important information about ALB found in New Jersey is reprinted from the PlantHealth section of American Nurseryman, September 15, 2004.

Even more troubling is the following article that appeared on August 18, 2004 in the Philadelphia Inquirer and was reprinted in Urban Forestry News, Vol. 13, Issue 2, Fall 2004.

ASIAN BEETLE INFESTATION IS WIDER THAN THOUGHT

Tom Avril, Inquirer Staff Writer

Two weeks after the troubling discovery of a single northern New Jersey tree infested by the Asian Long-horned Beetle, federal and state plant experts are dealing with a problem that is far more widespread. As of yesterday afternoon, the estimated toll was up to 70 trees, and tree climbers had lots more ground to cover. "That's a conservative guess," said Barry Emens, head of the beetle eradication program in New Jersey for the U.S. Department of Agriculture. The newly discovered trees are mostly in Rahway, Union County, about a mile from the original infested tree found August second in Carteret, Middlesex County. It was yet another sign that the beetle, which had not been detected in the United States for nearly two years, is a stubborn opponent.

The insect has destroyed thousands of trees in New York City, Chicago, and Jersey City since 1997, and the USDA Forest Service has spent \$182 million thus far to eradicate it. Maple trees are especially vulnerable to the pest, believed to have entered the United States on packing materials from China, and that has officials in Pennsylvania and other maple-rich states concerned. "Holy mackerel!" said Noel Schneeberger, the Forest Health Program Leader for the USDA Forest Service's Northeast Region, when told of the latest outbreak. "I guess I need to plan a trip up to Carteret now." The new finding came about by chance, after the New Jersey Department of Agriculture held a media event yesterday morning to describe

efforts they were taking in response to finding the single infested tree. A cable television channel ran a segment on the noon news, instructing viewers to call a state beetle hotline if they saw signs of the insect. That happened just an hour later, when a viewer called to say she had seen numerous trees in Rahway with the beetle's telltale markings, Emens said, "That's exciting," Emens said "It saves us a lot of work."

An inspection revealed that the beetles have been at work for at least a year, as the trees bore two kinds of marks: one from the beginning of the beetle's life cycle and one from adulthood. Inspectors found both the oval-shaped wounds caused by beetles laying eggs and the dime-shaped "exit holes" caused by mature beetles burrowing their way out. They also found about 15 actual insects, which live only on live trees and green lumber, and are not a threat to treated wood.

State officials had quarantined the area within a mile of the August second discovery, meaning that no green lumber could be taken out of that area. An additional quarantine area will be established in a one-mile radius of the new discovery Emens said. In addition to maples, the beetle goes after some other hardwoods, including chestnuts, birches, and elms. The insects are shiny and black, with long, curved antennae and distinctive white markings, measuring 1 to 5 inches long. Schneeberger, who works in the Forest Service office in Kennett Square, said it was too soon to predict how far the problem might have spread. Though initially surprised when told of the new discovery, upon further reflection he said it made sense, given the increase in trade with China, where the beetle has decimated millions of trees. "We'll just survey the heck out of a larger area and figure out what it means from there," Schneeberger said.

BRADFORD PEAR

Once a favorite among towns, leafy resident falls out of favor

Nora Koch

Dolly Smith was getting into her car after bowling practice in late October when a sudden gust of wind snapped off a tree limb nearby and sent it flying across the parking lot, striking the 77-year old grandmother dead.

A low-level tornado that touched down had ripped a leafy 20-foot limb from a Bradford Callery pear tree, once the darling of developers and urban foresters because of its quick growth and seasonal beauty.

But four decades after it hit the streets, the love affair with the ornamental pear is over. As Smith's death showed, the Bradford pear, widely planted throughout the mid-Atlantic splits apart easily. And in high winds, its branches can go flying.

In some municipalities, there are standing orders to take down any Bradford pears left from the tree's glory days, notably in the 1970s when 100s were planted along borough streets.

When storms from Hurricane Isabel hit in September, Philadelphia's Fairmount Park Commission received more than 600 phone calls about fallen street trees. Many were Bradford pears.

Grant applications to the Pennsylvania Urban and Community Forestry Council, which offers towns funding to plant trees, are denied if they include a Bradford pear.

"We write back and make it a contingency. We say, 'Please change your tree type,'" said Julianne Schieffer, urban forester at the school's Montgomery County extension offices. To her,

the Bradford pear is "standing firewood."

The tree, a selection of *Pyrus calleryana*, was introduced in the United States in 1960s after it was developed from seeds brought four decades earlier from China.

"When they first came out, they were like the next thing to sliced bread," said Ken Hutz, arborist with Bartlett Tree Experts. The Bradford pear seemed ideal, Hutz said: It grows quickly to a moderate size with a beautiful, symmetrical shape.

In spring, the tree blossoms like a puffy white cloud, and in fall, leaves gradually turn a deep red and stay attached for weeks after other trees have lost theirs. It is tolerant of pollution and road salt, grows well in compacted soil, and resists insects and disease.

"For a while, they were really thought to be the perfect tree," said Mindy Maslin, who runs the Tree Tenders program at the Pennsylvania Horticultural Society. And then, when the first generations began to mature, the perfect tree became the perfect nuisance.

Dolly Smith's death is an extreme example. In that case, a tornado of the weakest grade snapped off the tops of several ornamental pear trees along a bowling alley parking lot.

Limbs weighed down with snow or ice are especially prone to break. And if branches are extremely weak or strained, a light breeze can knock down a chunk of tree. But large limbs can break even without wind or ice.

"I have standing orders to take down any Bradford pears. I want to see them all down," said Stephen H. Dorsey, a state-certified tree expert, arborist for New Jersey. "We keep some trees up at any cost, but that's one that should come down."

BIDDING LARGE CONSTRUCTION PROJECTS

James Huston

J.R. Huston Enterprises

Limbs often grow out at right angles from the trunk, forming extremely weak unions prone to break. Or many limbs may branch out from the same point on the trunk, causing weakness.

Beyond its branching problems, the tree has become an invasive species now that it can cross-pollinate with other new variants of the tree. With Bradford pears sprouting up and invading forests or other areas, it displaces native trees and plants.

There is hope for this fallen tree, which is still considered a smart cultivar on the West Coast. There the climate keeps it from growing as large or getting weighed down by precipitation.

Arborists have developed several hardier selections of ornamental pear, such as the Chanticleer, Red Spire, and Aristocrat.

But the Bradford pear remains popular. “Developers still plant them because they’re cheap,” said Scott Aker, a horticulturist at the U.S. National Arboretum in Washington, DC. Aker said he thought the Bradford pear would be phased out as homeowners remembered their experiences with the tree.

“You know, 10 to 15 years down the road, people will remember that in Isabel, all but one of the Bradford pears on the street cracked and split,” Aker said. “People remember things like that, and the tree gets a bad name.”

Reprinted from Urban Forestry News, Vol. 13, Issue 2, Fall 2004.

Two landscape installation contractors did work in Southern California. Bob did commercial projects while Ken did residential work; both did a little over one million dollars in annual sales or \$100,000 per month. Both were able to double their sales for a short period. Bob did so for one month and Ken did so for a three-month period. This was going to be an incremental increase, which would result in increased sales for the year since they would be able to sustain \$100,000 in sales per month for the remainder of the year. Theoretically, they thought that if they doubled sales and did not increase their general and administrative (G&A) costs, that they should see their 30% gross profit margins (20% G&A overhead plus 10% net profit) bid into the increased \$100,000 in sales turn in to net profit. The theory sounded good. However, both lost money (and lots of it) on the increased sales. Bob lost money for one month while Ken lost money for three months in a row.

What went wrong?

Both companies were comfortable doing \$100,000 of installation work per month. Each company had four experienced crew leaders with the right amount of skilled labor and equipment to handle the normal load of work. While Bob and Ken spent a lot of time in the field supervising crews, they also had a reasonably qualified but under utilized field supervisor who did “some” of the supervising.

When they doubled the workload, Bob and Ken needed eight crews with qualified crew leaders, not the four that they had. Both also had a “delegation” and a “planning” problem. They were doing too much of the supervision. Why have field supervisors if you are not going to let them run the show? The field supervisors were

probably barely qualified for their positions and both owners had to continually manage them instead of focusing on marketing, overall quality control and building the company. When the work load doubled, no one was prepared to handle it. Crew productivity fell through the basement floor because no one planned the daily work load. Crisis management quickly became the norm as crew leaders, who were stretched way too thin, didn't have the correct materials or personnel to do the work. Job profitability vanished almost over night.

“If you build it, they will come”

Large construction projects are a two-edged sword. They cut both ways. They can make you lots of money or they can lose you lots of money, and lots of sleep. However, you have to plan them in great detail. You also have to plan for them. Sudden growth can kill you if you are unprepared for it. You not only have to bid these jobs correctly, you have to have the right company infrastructure (experienced crew leaders and members, equipment, estimating system, job costing, supervision, etc.). Consequently, steady growth is best. This gives you the time to get an experienced team, equipment and systems (infrastructure) in place.

In the 1989 movie “Field of Dreams,” Kevin Costner’s character, Iowa farmer Ray Kinsella, built a baseball field in hopes that the ghosts of Shoeless Joe Jackson and the other seven Chicago White Sox players banned from the game for throwing the 1919 World Series, would appear and play ball once again. Hence the phrase, “If you build it, he (Shoeless Joe) will come.”

In a somewhat similar manner, if you build your company’s infrastructure correctly, sales will in all likelihood follow. Infrastructure should precede revenue. Before you go out and tackle large construction projects, you have to prepare your company for them. Otherwise, your field

of dreams may turn into a field of nightmares. Here are some tips.

Bidding Large Construction Projects

Large may be a relative term. However, for our purposes, I’m going to define a large job as one over \$100,000. For 99 percent of the contractors doing construction projects, this is a “large” job. (*Editor’s Note: While this “large” maybe larger than most of us bid, the concepts still work for “smaller, large jobs.”*) Here are “some” key check points to keep in mind.

1. Do your preparation work:

- Ensure that you have the latest set of plans and addendums.
- Contact the landscape architect (LSA) and discuss the details with them.
- Don’t antagonize the LSA. This will come back to haunt you.
- Build a team with the LSA, owner, general contractor (GC), developer, etc.
- Obtain “written” quotes from subcontractors and suppliers.
- Do a detailed takeoff and use a digitizer or plainmeter.
- Walk the site and look for problem areas (rock conditions, ledge, obstructions, access issues, water sources/issues, drainage, utilities, etc.)
- If you are designing the project yourself, consider all of the above.
- Have your field supervisor visit the site.

2. Bid the project:

- Prepare your bid using a proven software program.
- Break the job into phases and bid the job in the sequence that you will install it if at all possible. This will make the bid easier to analyze and manage. Here are some examples: Site work, Soil preparation, Front yard, Back yard, Hardscape, Models, Common areas, Production lots, Irrigation, Point of

connection, Controllers, Main line, Lateral line, Valves, Heads, Planting, Trees, Shrubs, Sod, Ground covers, Maintenance, General conditions.

Don't forget general conditions as their costs usually comprise 6 to 10% of the price of a project. Be creative with general condition costs. One contractor in New England was bidding a \$500,000 project. Drive time totaled over \$17,000. He decided to rent a house near the project, which saved him over ten thousand dollars in labor and burden cost. Another contractor in the west didn't include load/unload time and drive time in his bids. This cost him over \$40,000 a year.

Have someone, other than the bidder, review the bid.

Let's talk about some potential problems and opportunities for the four main cost categories in a bid; materials, field labor and burden, equipment and subcontractor costs.

Materials

As I mentioned before, always get written quotes for materials and file them in the job folder. When bidding large jobs, inform your suppliers about it and let them know that you need their best pricing if you (and they) are going to get the work. However, be careful. I've seen vendors broadcast to their other customers jobs my clients were bidding, which no one else knew about. All of a sudden, three to four other contractors show up bidding the job because the vendor couldn't keep quiet.

Arrange to pay your vendors when you get paid. This can even out cash flow considerably.

Consider growing your own materials if at all possible and if there is enough time. This can save you significant costs in your bid. If the owner, GC or developer wants to buy the

materials, be careful.

- Don't provide a warranty for them. Or if you do, put the labor, equipment and any other costs in the bid. Be sure to spell out who pays for the replacement materials.
- Bid the job as if you were going to pay for everything, including materials. Include G&A overhead and net profit. Then subtract out only the costs that the owner is going to pay. Why should you lose the G&A overhead recovery and net profit on these items? You are doing all of the work. You deserve these markups and margins.

Be prepared for drought conditions and impeded water sources. Include in your proposal and contract a "drought clause" that states that your bid includes normal watering from predetermined sources on the site. If water is unavailable or if a drought occurs, you will for the extra costs on a time and materials (T&M) basis.

Don't forget to include freight charges, time to stage and water materials in holding areas and related equipment costs.

Field labor and labor burden

Bid the correct crew size and average wage rate in the bid. A contractor in Northern California was pricing a large residential design-build project. There were approximately 5,000 hours in his bid. I queried him as to the average wage that he used to bid the project. He said that he used the wage rate for a three person crew. I then asked him what size crew he would use to install the job. He responded that he would use a nine person crew. The average wage for the nine person crew was \$2.00 per hour cheaper than the three person crew used to bid the job. As a result, this contractor over estimated his labor costs by \$13,000 (5,000 hours x \$2.00 =

\$10,000; $\$10,000 \times .3$ labor burden or \$13,000 total. Adding a 20% net profit markup to the \$13,000 cost ($\$13,000 \times .2 = \$2,600$) would cause him to add \$15,600 to his bid, which was unnecessary.

Check your productivity rates. Have your field supervisor or one of your crew leaders check your production rates. Also consider the impact on production that equipment will have.

Most contractors use three person crews for installation work. If additional labor is needed, they simply send two or three crews. This simplifies bidding since the crew average wage usually remains the same.

Equipment

Significant productivity gains have been realized in the green industry the last fifteen years due to improvements in equipment technology. Manufacturers have made great strides in fabrication techniques due to the digital technology revolution that is sweeping the world. However, the green industry has also caught the attention of manufacturers who, only until recently, only made large equipment such as dozer, graders, earth movers, etc. They have realized the excellent market opportunity in the smaller equipment markets. As a result, landscape and irrigation contractors not only have more equipment options, they have more equipment designed specifically for green industry application. Mini-excavators, tracked loaders, mini-skid steers and soil renovators, to name a few, have improved field labor efficiency significantly.

In the early 1990s, a client in New England billed under \$100,000 per year per full-time field crew member. Due to improvements in equipment and its utilization, this contractor now bills over \$150,000 per year per full-time field crew member. In other words, a 3 person crew would bring in under \$300,000 in revenue

in the early 1990s. Today, this same crew brings in over \$450,000 per year in revenue.

A client in Utah was bidding an 80 acre golf course. His bid was well over \$1,000,000 when he asked me to review it. Bidding was tight and he was up against some very large competitors. I introduced him to another contractor who used a Rotadairon soil renovator on a similar golf course site in Idaho. Without even seeing the machine, my client bid it and its improved production rates in his bid. The improved productivity dropped my client's bid by \$50,000 and he won it by about \$15,000. To this day, this contractor swears by this piece of equipment. Study equipment and its effect upon your total labor hours in a bid.

Finally, calculate a cost per hour (CPH) for each piece of field equipment used on the job. Calculate the number of actual running hours that the equipment will be used on the job and multiply those hours by the CPH. This will give you the cost for equipment to include in the bid. Do not put field equipment costs in G&A overhead.

Subcontractors

"If in doubt, sub it out." These are words to live by. If you are uncertain of certain phases or portions of the project, subcontract the work to someone who knows what they are doing.

The contractor in Utah who won the large golf course project, subcontracted over \$500,000 of it to the local irrigation contractor who he knew well and who had done lots of golf work. Normally, my client would have put a 15% margin on the subcontractor's price. However, due to the minimal risk involved and to the tight market, my client only marked up the sub's work by 3%. His choice was whether he wanted 3% of \$500,000 or 15% of nothing.

3. Know your market:

Know your market. A client in New England does over \$3 million in commercial installation work a year. His average gross profit margin (GPM) is approximately 24%. This means that the total of G&A overhead and net profit on a job equals 25%. During the recession of the late 1980s and early 1990s, he would not get any jobs if his GPM on bids was over 18%. Here are some benchmarks to keep in mind.

Commercial installation jobs:

<u>Type work</u>	<u>GPM range</u>
All commercial work	20 to 30%
Open bid work	20 to 25%
Negotiated work	25 to 30%

Residential installation jobs:

<u>Type work</u>	<u>GPM range</u>
All size installation work	30 to 40%
Jobs over \$100,000	30 to 35%
Jobs under \$10,000	35 to 45%

Subcontracted work normally has a GPM of 10 to 20% added onto it. The norm throughout the United States is 15%. Keep these GPM benchmarks in mind as you bid your work. Monitor and track it from job to job. However, if you have a lot of subcontractor costs in a bid, price the subcontracted work separately from the work that your crews will do.

Conclusion

Bidding large construction projects can be fun and they can add to your bottom line, if you know what you are doing and if you have the proper company infrastructure to handle them. Many contractors bite off more than they can chew because they only see the opportunity and not the hidden pitfalls. Old generals choose their battles wisely. That's how and why they

get to be "old" generals. Don't let your ego get out of control. If it does, your company will soon follow. Build your company and its infrastructure in steady, incremental steps.

A few final cautions

If you land some really big jobs, don't forget to keep marketing your company. Otherwise, you might wake up one morning without any backlog and have to start marketing all over from scratch. Also beware of hitching your wagon to a "Sugar Daddy". Remember, it is not a question of "if" you will lose your Sugar Daddy but "when".

This article was adapted from James Huston's book How to Price Landscape & Irrigation Projects. For further information on the products and services offered by J.R. Huston Enterprises, call 1-800-451-5588, E-mail JRHEI at jrhei@jrhuston.biz or visit the J.R. Huston Enterprise web site at <http://www.jrhuston.biz>

**VIBURNUM LEAF BEETLE, A
FORMIDABLE NEW PEST IN THE
LANDSCAPE**

**Paul A. Weston, Senior Research Associate,
Cornell University**

Viburnums, those diverse mainstays of the landscape, have long been considered to be relatively free from pests. Aside from the occasional aphid or looper, most insects native to North America don't bother these sturdy plants. A recent arrival from Europe is changing all that. The viburnum leaf beetle, *Pyrrhalta viburni* (Paykull), specializes on plants in the genus *Viburnum*, and the most susceptible species are killed after being attacked for a few seasons. Fortunately, not all species of *Viburnum* are susceptible. This article will review the history of the infestation of viburnum leaf beetle in North America, the biology of the pest, its relationship to its host plants, and its likely eventual distribution in the U.S.

The viburnum leaf beetle is endemic to Europe and western Asia, and likely made its way to North America on infested nursery stock. The first breeding populations in North America were detected in Ottawa, Ontario (and across the Ottawa River in Hull, Quebec) in 1978. From there, the beetle apparently spread slowly southward of its own accord, first reaching U.S. soil in 1994, where it was found in Maine. In 1996, it was found for the first time in New York State, and has been spreading quickly since. It is now found in 37 of the 62 counties in New York state, several northern tier counties in Pennsylvania, much of Vermont, half of New Hampshire, and the southern half of Maine. It was found in the northeast corner of Ohio in 2002, and most recently in New Haven County, CT and Whatcom County, WA (the latter infestation resulting from spread of a population established in British Columbia in 2001).

P. viburni is a member of the beetle family Chrysomelidae, a group characterized by its predilection for leaves (other members of the family included the elm leaf beetle, Colorado potato beetle, and the lily leaf beetle, to name a few). What distinguishes this species from other chrysomelids, and makes it such a damaging pest, is the ability of both larvae and adults to feed on foliage of the same plants. Larvae, which emerge at the time leaves bud out, skeletonize the young leaves, and adults attack any second flush leaves that may come out later in the season. This repeated defoliation quickly depletes the nutrient reserves of susceptible plants, leading to death in as few as 2-3 years following the start of an infestation.

Viburnum leaf beetles have one generation per year. They spend a good part of the year as eggs, which are laid throughout the summer months and into early fall. These eggs require a significant chilling period before than can hatch, which means that eggs laid in one season will not hatch until the following spring. Egg hatch is well synchronized with leaf emergence in the spring (early May in upstate New York), which ensures that young larvae have access to tender foliage as they begin their life of destruction. The larvae, which are pale yellow with dark spots and bands, proceed through three instars, completing their development by early to mid June. The youngest larvae feed on the undersides of leaves, where they are difficult to detect. This feeding habit, combined with the fact that these small larvae generally scrape only the leaf surface as they feed, makes early detection difficult. When the larvae molt to the second instar, the larger larvae markedly increase their feeding rate and visible damage, with heavily infested plants appearing to become defoliated overnight in the words of many observers. At this stage, larvae begin to feed more on the upper surface of the leaves, where they are easily seen. Their feeding damage is quite distinctive in that they feed on

leaf tissue between the veins, leaving “skeletons” of leaves. The fully grown larvae, which are about 1 cm in length, then crawl down the stems of the host plant to the soil, where they search for a suitable site and then burrow into the soil. There, several centimeters below the surface, they pupate, and remain quiescent for several weeks. In late June to mid July, they emerge from the soil as adults with a hearty appetite.

The adults—drab, light brown insects ranging from 4.5 to 6.5 cm long—feed on the leaves of the same species of viburnum as the larvae. Their feeding damage is distinctly different from that of the larvae. The adults pay less attention to the leaf veins, and instead chew oblong holes through the leaf. When colonizing a new area, they typically start feeding at the bottoms of shrubs, usually in the shade. As an infestation proceeds, feeding spreads through the entire canopy of the plant. Several days after they emerge, the females start to lay eggs on the underside of shoots, typically those of the current year. In preparation for laying eggs, the female chews a hole in the twig, and they deposit 6-12 eggs in the excavation. She then covers the eggs with a mixture of chewed plant tissue, frass, and other secretions. These “caps” are dark brown initially, but fade to blend in with the bark. The caps protrude above the surface of the twig, however, so they are readily visible to the naked eye as a row of bumps on the undersides of twigs (females nearly always lay multiple clusters of eggs on the same twig).

Viburnum leaf beetles feed only on members of the genus *Viburnum*, but not all species are attacked. Based on our observations, the most susceptible species are *V. dentatum*, *V. opulus*, *V. opulus* var. *Americana* (formerly known as *V. trilobum*), and *V. rafinesquianum*. Carolyn Jones of the Elisabeth C. Miller Botanical Garden in Seattle, WA reports that *V. propinquum* is also very susceptible. These are

the first species to be attacked when the beetle is colonizing a new area, and are often killed within several years after an infestation begins. An important factor modifying susceptibility is exposure to sunlight; plants in the shade are invariably more susceptible to the pest than those in the full sun. This is true not only for the susceptible species but the more resistant species as well. Other species of *Viburnum* are eventually killed by viburnum leaf beetle, but these species generally are not attacked significantly until the most susceptible species are destroyed. This group includes *V. acerifolium*, *V. lantana*, *V. rufidulum*, *V. sargentii*, and *V. wrightii*.

A number of species are attacked and sometimes killed by viburnum leaf beetle, but their susceptibility is more variable. This group includes *V. cassinoides*, *V. x carlcephalum*, *V. dilatatum* (‘Oneida’ may be resistant), *V. prunifolium*, *V. rhytidophylloides*, and *V. tinus* (this last species reported by Carolyn Jones). We have seen some members of this group heavily damaged by *P. viburni*, but other members of the same species are sometimes relatively untouched (and cannot be explained by exposure to sunlight). Further observations are needed to ascertain the pattern of susceptibility of this group. Fortunately, a fairly large number of species are resistant to the beetle. This group includes *V. alnifolium* (syn. *V. lantanoides*), *V. bodnantense*, *V. x burkwoodii*, *V. carlesii*, *V. x juddii*, *V. plicatum*, *V. plicatum* f. *tomentosum*, *V. rhytidophyllum*, *V. setigerum*, and *V. sieboldii*. Carolyn Jones reports that *V. davidii* is also highly resistant. When beetle populations are high, feeding damage from adults will occasionally be seen on the upper leaf surface, but this damage is usually trivial (and is more likely to occur on plants in heavy shade).

Because the eggs of *P. viburni* require a chilling period of several months, the southward range

expansion of the pest in the US. is likely to be limited by warm winter temperatures. The precise chilling requirements are not known, but we have found that eggs held at 5° C are not capable of hatching if the chilling period is less than 4 months. Thus, it seems likely that parts of the southern U.S. will be too warm to allow the insect to complete its life cycle. However, large portions of the U.S. are conducive to development of viburnum leaf beetle as long as susceptible viburnums are present.

Small-scale infestations can be managed by pruning out egg-infested twigs anytime between October and April, but larger scale infestations will likely require the use of pesticides. A variety of foliar sprays can be used to kill adults or larvae, but the most effective treatment by far is soil application of imidacloprid. When applied in this manner, nearly complete control can be expected for up to two years (NOTE: soil application of imidacloprid is illegal in some areas, so check your local regulations). Biopesticides and natural enemies look promising as well, but research is not complete on these control options. We are also investigating the possibility of importing natural enemies from the home range of viburnum leaf beetle for release in this country, but considerable background work needs to be done to ascertain the soundness of that approach.

Viburnum leaf beetle is in North America to stay. Plant propagators, nursery operators, and landscape managers will all need to adjust the way they do business with viburnums to adapt to this most unwelcome guest in the landscape.

*Reprinted from Landscape Plant News
Volume 15, No. 3, 2004*

COLD HARDINESS EVALUATION OF *CORNUS KOUSA* PROVENANCES **Anthony S. Aiello, Morris Arboretum of the University of Pennsylvania**

Plant Exploration Background

For the past quarter-century one of the primary missions of the Morris Arboretum has been domestic and international plant exploration and introduction. The goals of this plant exploration program are to:

- Broaden the genetic pool of known species
- Extend hardiness and increase vigor
- Broaden adaptability to difficult microclimates
- Increase insect and disease resistance
- Conserve rare species
- Select improved horticultural forms
- Evaluate and introduce appropriate new species

In pursuit of these goals, in the late 1970s the Arboretum identified regions around the world with climates similar to that of Philadelphia and we have been systematically targeting these areas for plant exploration and collection. As a result since 1979 we have participated in 18 plant collecting trips, to the following areas:

- Korea: 1979, 1981, 1984, 1989, 1991
- China: 1981, 1991, 1993, 1994 (2), 1995, 1996, 1997, 1998, 2002
- Southern Appalachian Mountains: 2000
- Armenia: 2002
- Republic of Georgia: 2004

These collecting trips have resulted in a living collection that contains over 4,600 plants of wild-collected and documented origin, representing 936 taxa. Our collection has broad

holdings in woody plants suitable for the Mid-Atlantic region of the United States and particular strengths in confers, *Hamamelis*, *Acer*, *Magnolia*, *Ilex*, and *Quercus*.

It is within this context of plant exploration that the Morris Arboretum holds a collection of *Cornus kousa* from known provenances across the natural range of the species in Japan, Korea, and China. Anecdotal information indicates that the *Cornus kousa* from Korea grows in areas with extremely cold winters. With this in mind, we decided to examine the cold hardiness of Korean kousa dogwoods and a study was begun in late 2000 using freezing tests to examine the lowest survival temperature of stem tissue of plants grown from seed collected in Japan, Korea, and China. The purpose of this paper is to provide background on the introduction of *Cornus kousa* into the United States and to present the results of three years of freezing studies on the trees of known wild-collected origin.

Cornus kousa

Cornus kousa is a small flowering tree widely-used throughout much of the eastern and southern United States. It provides a beautiful counterpart to our native flowering dogwood, *Cornus florida*, with both species being wonderful additions to any garden. Both trees exhibit showy flower bracts, with *C. florida* blooming before its leaves in late-April to early-May, and *C. kousa* blooming after its leaves have emerged, usually in June. Because of their differences in blooming time, both are very useful garden plants and E.H. Wilson wrote that, "...Although these dogwoods of North America and the Orient are close relatives they are very dissimilar as garden plants and There is room for both and no necessity for invidious comparisons" (Wilson 1926). Wilson went on to write of *Cornus kousa* var. *chinensis* that, "...some experts acclaim this the finest gift of

China to western gardens...certainly it ranks high in the realm of beauty among hardy flowering trees" (Wilson 1926). Wilson's comments have stood the test of time, with more recent authors extolling the beauty and usefulness of kousa dogwood (Jaynes *et al.* 1993, Orton 1993).

Scientific and popular literature is replete with information on the problems with the native dogwood, including dogwood anthracnose (*Discula destructive*) and powdery mildew (*Microsphaera pulchura*) (Santamour *et al.* 1990, Ranney *et al.* 1995). With a combination of environmental and pathological factors leading to 'dogwood decline' in our native dogwoods in the past few decades, there has been increased interest in evaluating and utilizing kousa dogwood (Orton 1985, Ranney *et al.* 1995). The disease and insect resistance of kousa dogwood led to a hybridization program using *C. florida* and *C. kousa*, resulting in the development of the Rutgers University Stellar series of hybrids, such as Aurora^R, Constellation^R, and Galaxy^R (Orton 1990).

Despite the great focus and large number of cultivated varieties of these two highly ornamental species and their hybrids (Jaynes *et al.* 1993, Santamour 1985), little if any work has been done on increasing their cold-hardiness. Flowering dogwood is grown generally into USDA hardiness zone 5b and kousa dogwood grown occasionally in zone 5a (Flint 1997). Targeted plant collecting holds great potential for expanding hardiness but prior to the 1980s introductions of *Cornus kousa* from known locations were limited.

Kousa dogwood was first sent to the United States from Japan in 1961 by George Rogers Hall, who was living in Yokohama, Japan: Hall's shipment of seed was grown in the Boston garden of Francis Parkman in Jamaica Plain, near the present day site of the Arnold

Arboretum (Spongberg 1990). The end of the 19th century brought further introductions of kousa dogwood from Japan into the United States; kousa dogwood was offered for sale in the 1890s by Parsons & Sons, Company of Flushing in Log Island, New York, and the Yokohama Nursery Company of Japan. The National Plant Germplasm System's (NPGS) online Genetic Resources Information Network (GRIN: <http://www.ars-grin.gov/npgs/searchgrin.html>) shows additional introductions of kousa dogwood from Japan in the early 1990s.

In 1907 *Cornus kousa* var. *chinensis* was first introduced from Hubei Province in central China to the United States by E.H. Wilson of the Arnold Arboretum (Wilson 1916). More recent introductions from China include those from the 1980 Sino-American Botanical Expedition (SABE) to Hubei Province. This introduction of Chinese kousa dogwood (SABE 1316) is known to be held at 7 institutions (Dosemann and Tredici 2003). *Cornus kousa* var. *chinensis* was also collected on the 1996 North America China Plant Exploration consortium (NACPEC) expedition to Shaanxi and Gansu (QLG 026 & 246). A number of young trees from the NACPEC collections can be found growing at the Morris, Morton, Holden, and U.S. National Arboreta, the Chicago Botanic Garden, and Longwood Gardens.

As far as can be determined, there are no known records of *Cornus kousa* being introduced from Korea in the first half of the 20th century. Neither J.G. Jack nor E.H. Wilson, both of the Arnold Arboretum, collected kousa dogwood on their respective 1905 and 1917 trips to Korea. The first known introduction of *Cornus kousa* from Korea into the U.S. came from Drs. Richard Lightly and Edward Corbett's highly productive 1965 expedition (P.I. #316695 and #317223). So far I have determined that only three known trees remain from this trip: one at

Dr. Lightly's residence, and one each at the U.S. National and the Arnold Arboreta (National Arboretum #30230 and Arnold Arboretum #1195-68). In the 1980's teams of plant collectors from American institutions made several trips to South Korea. Among their numerous collections were several of *Cornus kousa*, including those shown in Table 1. Additional plants of Korean origin can be found at the Morton, National, and Holden Arboreta, Botanic Garden of the University of Copenhagen, and the Sir Harold Hillier Gardens and Arboretum.

The collection of *Cornus kousa* at the Morris was assembled to represent the diversity of the species and to evaluate performance among known provenances of kousa dogwood. Given the limited introduction of kousa dogwood from the northern extremes of its range, the lack of previous testing of kousa for cold hardiness, and the information on potential hardiness of the Korean plants, we decided to compare cold hardiness among plants of known origin from China, Korea, and Japan. Knowing that the Bernheim Arboretum had amassed a field trial of a large number of *Cornus kousa* cultivars a research project was initiated in the winter of 2001-2002 to examine potential differences in cold hardiness of provenances of *Cornus kousa* held at the Morris Arboretum by conducting freezing tests of twig samples.

Table 1. Accessions of *Cornus kousa* planted at the Morris Arboretum and used in this experiment.

Taxon	Morris Arboretum Accession #	Source
<i>Cornus kousa</i>	86-007*B	1998 Expedition to Korea,
	86-007*E	Northwestern Coast
	86-007*J	Korea, Kyonggi-Do, KNW 243
<i>Cornus kousa</i>	86-016*A	1984 Expedition to Korea,
	86-106*F	Northwestern Coast
	86-016*B	Korea, Kyonggi-Do, KNW 278
<i>Cornus kousa</i>	86-115*B	1984 Expedition to Korea,
	86-115*C	Northwestern Coast
	86-115*F	Korea, Kyonggi-Do, KNW 1003
<i>Cornus kousa</i>	88-043*A	1987 Warner and Howick Expedition to Japan
	88-043*F	Japan, Honshu (Aomori), WH645
<i>Cornus kousa</i> var. <i>chinensis</i>	83-042*A	1980 Sino-American Botanical Expedition
	93-049*J	China, Hubei, SABE1316

Materials and Methods

Thirteen *Cornus kousa* plants representing five accessions growing at the Morris Arboretum were selected to represent plants collected across the species' native range (Table 1). Fifty-five terminal 8 to 10 cm long stem samples for each accession were collected and processed on three dates (December, January, and March) each in 2001-2002, 2002-2003, and 2003-2004.

Stem samples from the Morris Arboretum's trees were mailed overnight to the Bernheim Arboretum for processing. Samples were subjected to the following controlled freezing protocol. Stems were placed into polyethylene bags and were suspended in a microprocessor controlled (Honeywell, Fort Washington, PA) freezer (model 40-9.4; Scientemp, Adrian, MI). The chamber temperature was then decreased to -5°C over 8h and then decreased at a rate of 4°C/h (Haynes *et al.*, (1992) to a minimum test temperature of -39°C. Five replicate bags were removed from the chamber at 3°C intervals and were placed immediately in a walk-in cooler and held at 5°C for 24h. Stems were then incubated in the sample bags for 7 days at approximately 21°C before evaluation. Temperature was monitored by an Omega HH506R Digital Thermocouple Thermometer (Omega Engineering Inc., Stamford, CT). Air circulation inside the chamber was provided by an internal fan. Control stem samples were prepared as described above and held at 2°C.

Following incubation, samples were sectioned longitudinally through the terminal 4cm of the stem. Tissues were evaluated visually for damage with stems showing any oxidative browning in the vascular region considered damaged (Stergios and Howell 1973). Tissues not injured by the freezing treatments remained green throughout the vascular region and were thus rated as alive. The number of stems damaged at each temperature was recorded, and

from these data a percent survival was determined. From this percentage, a lowest survival temperature (LST) was determined as the lowest temperature at which 100% of the stems remained uninjured (Sakai *et al.* 1866). Data were analyzed by using the Statistical Analysis system (SAS Institute, Cary, CN). Analysis was performed using the General Linear Model (GLM). Means of lowest survival temperatures were separated using the Duncan's multiple range test.

Table 2. Results of lowest survival temperature (LST) analysis by country (p=0.001.).

Country	LST	N	Grouping
Japan	-26.3°C	18	A
China	-29.8°C	14	A
Korea	-34.2°C	71	B

RESULTS

Analysis of our results indicated no differences in lowest survival temperature (LST) for the year or month that data were collected. Our analysis indicated differences in LST of accessions from different countries (Table 2). There were no significant differences in lowest survival temperature between plants from Japan (-26.3°C) and China (-29.8°C). Plants from Korea showed significantly lower LST (-34.2°C) than plants from either China or Japan (Table 2)

Further analysis of the data indicated differences in LST among the Korean accessions (Table 3). Accession #86-007 (-36.4C) showed significantly lower LST than #86-115 (-32.3°C) but showed no difference compared to #86-016 (-34.2°C). There was not a significant statistical difference between accession #86-016 and #86-115 from Korea (Table 3).

Table 3. Results of lowest survival temperature (LST) analysis of Korean accessions (p=0.01).

Morris Arboretum Accession #	LST	N	Grouping
86-115	-32.3°C	27	A
86-016	-34.2°C	20	A B
86-007	-36.4°	24	B

DISCUSSION

The results from this experiment indicate greater lowest survival temperature of plants of *Cornus kousa* from Korea compared to plants of either Chinese or Japanese origin. Plants from China were collected at ~32° north latitude, those from Korea from 38° north latitude and those from Japan at 41° north latitude. The southern origin of the Chinese kousa dogwood most likely explains the lack of hardiness found in these plants. Latitudinal differences may not account for the differences in hardiness between plants from Japan and Korea. Although the Japanese plants were collected from the northern-most location of any of the plants in this study, they were collected from an area with a well-tempered maritime climate.

Reports from the 1984 plant expedition to northwest Korea noted that *Cornus kousa* was found growing in areas where minimum winter temperatures routinely reach -30 to -35°C (Paul Meyer, personal comm.). Among the Korean accessions, there is overlap in the lowest survival temperature, most likely representing the natural variation among populations. The evidence presented in this paper supports the field observations that *Cornus kousa* of Korean origin holds potential for greater cold-hardiness and for possibly extending the useful northern limit where this species can be grown.

An interesting sidelight from this investigation concerns the commercially available cultivar *Cornus kousa* 'Little Beauty', selected by the late J.C. Raulston at the North Carolina State University Arboretum (J.C. Raulston Arboretum). Background research found that the original plant of 'Little Beauty' was grown from seed that Raulston received from the National Arboretum in April, 1986 (Raulston 1993). It turns out that 'Little Beauty' was selected from combined seed lots from the 1984 Korea collecting expedition distributed by the National Arboretum (NA #55043 [KNW 2431] and NA#55081 [KNW278], see Table 1). 'Little Beauty' was not included in these freezing tests experiments and while no evidence indicates that this cultivar possesses exceptional cold hardiness, future field evaluations will include 'Little Beauty' as a comparison.

It is the hope of this author that this study provides insight into potentially greater cold hardiness of *Cornus kousa*. Currently kousa dogwood is grown to only a limited extent in zone 5, and is seen rarely in Indianapolis, Chicago, or north. Plants able to withstand temperatures of -35°C (~-30°F), that is hardiness Zone 4a, would represent a significant improvement in the hardiness of this species. To this end, we have selected the most attractive plant from each of our three Korean accessions for further evaluation. The next steps in this project are to propagate and grow plants to sufficient size for distribution to arboreta and nurseries throughout USDA zones 4 and 5 for field evaluation. It is my strong hope that our plant exploration efforts from 20 years ago will increase the useful range of this horticulturally desirable species.

Excerpted from Landscape Plant News, Vol. 15, No., 2004 (Literature citations are available from Susan Barton sbarton@udel.edu)

PREVENT GIRDLING ROOTS AT TRANSPLANT

Rita L. Hummel

**Department of Horticulture and Landscape
Architecture, Washington State University-
Puyallup**

Girdling roots are a common but preventable cause of the decline and death of trees and shrubs in our landscapes. Girdling roots start out as roots that grow around the trunk and/or other roots. Over time these roots grow in diameter and can girdle or strangle the plant. Girdling roots inhibit normal water and nutrient flow thereby stressing the plant and leading to its decline. Trees stressed by girdling roots are more susceptible to disease and insect more susceptible to disease and insect attack. Girdling roots compromise the tree's structural integrity making it more susceptible to blow-down by the wind. Unfortunately, the presence of girdling roots often goes undetected because they remain underground and unseen while the affected tree or shrub slowly declines.

Proper treatment of root systems at every transplanting is essential for long-term success of trees and shrubs. If the circling roots of container-grown trees are not eliminated at transplant, the life expectancy of the tree in the landscape is typically about 10 years. Root girdling can be prevented by straightening and/or removing circling roots while they are still small and flexible. This requires vigilance and attention to detail on the part of all persons involved with the production and planting of trees and shrubs. Nursery growers, landscapers and home gardeners must visually inspect the root system and disrupt circling and kinked roots each time the tree is transplanted to a larger container or into the landscape.

Whenever transplanting a tree or shrub from one container to another or from a container to the

soil, make sure that the root system is free of circles and spread-out into the new growing medium. If the plant has flexible circling roots, loosen and spread them with your fingers at transplant. If the circling roots are extensive or woody, cut or slash them using an old knife or pruning shears. To do this, make four to eight shallow vertical cuts into the root ball, slashing through the exterior woody roots. Use your fingers to loosen the cut roots and spread them away from the container medium. If the circling roots had been cut and spread at transplant, the tree shown in the picture would be alive and healthy today.

Structurally sound, healthy root systems are essential to the long-term survival of trees and shrubs in the landscape. Girdling roots and the failures they cause are preventable if everyone involved with production and planting would straighten and spread the roots at each transplant.

References

- Harris, R.W., J.R. Clark and N.P. Matheny. 1999. *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and vines*. Prentice Hall. Upper Saddle River, NJ.
- Maleike, R. and R.L. Hummel. 1994. *Planting Landscape Plants*. EB1505. Washington State University Cooperative Extension. Pullman, WA..
- Watson, G.W. and E.B. Himelick. 1997. *Principles and Practice of Planting Trees and Shrubs*. International Society of Arboriculture, Champaign, IL.

Reprinted from Landscape Plant News, Vol. 15, No. 3, 2004.

SAFETY INCENTIVE PROGRAMS – DO THEY WORK **Joe Clifford, MBA**

A well-designed safety program pays off in the form of lower accident rates and cost savings...no question about it. But do safety incentive programs work? This is one of the most common questions asked of safety professionals and probably one of the most difficult to answer. There is very little scientific data to support or refute the use of safety incentive programs but anecdotal evidence would suggest that a well-designed safety incentive program can be very effective.

Why implement a program? If a business has the proper foundations in place, a well constructed program can have a number of desirable results. Results include strengthening the existing safety culture, raising the level of safety awareness, reducing frequency and or severity of claim incidents, developing a philosophy of teamwork, improving productivity and efficiency, and encouraging legal compliance. Safety incentive programs can also save money through lower insurance costs, fewer days missed from work due to injuries, lower indirect claim costs and better employee relations.

Ten Elements of a Successful Safety Incentive Program

1. An Effective Safety Program. Successful incentive plans are in place to maintain an attitude consistent with governing safety policy and procedures. If safety procedures and management commitment are not in place, the only possible effect of an incentive program can be short-term success. A safety incentive program should only be considered after all other components of a safety program are already in place. Incentive programs are not safety programs nor are they substitutes for one.

An incentive program itself will not improve safety if the employees do not know how to work safely.

2. Defined Goals. Determine what your objective is and address it. If it is the minimization of losses, focus attention on program elements where losses are being experienced. Define short-term and long-term objectives. Set goals with a method to recognize achievement of the goal, such as a 25 percent reduction in workers' compensation claims overall.

The role of incentives in safety programs is to acknowledge the excellent safety performance of employees and express appreciation for their efforts. Employees should be reminded that the primary value of safety is that they do not become injured or sick. But in addition, their attention to safety benefits the company because it does not lose a key team member and it saves money from reduced workers' compensation costs.

3. Top Management Commitment. Top management support is a must for the success of any safety program and safety incentive plan. Management should be present when the program is unveiled and involved when incentives are awarded.

4. An Assessment of Resources. Review the cost of the program, persons responsible, persons accountable and administration method. An incentive program must be appealing to motivate. Appealing does not have to be synonymous with expensive and complicated. Reasonable but effective awards include items in short supply, such as a reserved parking space for a month, a free lunch for the best team or a social activity such as a company picnic. Attempt to limit the administrative time required to run the program. Safety incentive programs that track dollars, numbers, and requires

calculations, are burdensome and are more likely to fail.

5. Management and Supervisory Buy-In. The supervisor is the most important person in terms of promoting safe work practices. The supervisor usually controls the way work is performed and exerts the greatest influence on employee attitudes. Require supervisor to share responsibility for safety and not leave it in the hands of just one individual.

6. Determination of a Suitable Program. Incentive programs should focus on rewarding safe behaviors or activities rather than focusing just on the number of accidents. Focusing only on the number of accidents may encourage the masking of accidents or their seriousness, so that the employee and/or team may still receive the award. Establishing procedures that reward prompt accident reporting should strictly discourage this behavior. By measuring safe behaviors, you are focusing on the positive rather than the negative.

An example of criteria used in a safety program is listed below. This particular program consisted of each department or crew being reviewed at random three times during the month. Each set of criteria was given a maximum score of ten points. At the end of the month, the department or crew with the highest score received the incentive.

Example Program – Safety Criteria Measured

Safety communication – monthly safety talks are conducted and documented.

Housekeeping – no debris, no equipment and materials out of place, trash properly contained.

Unsafe Acts – safe lifting techniques, lock-outs being utilized, vehicles operated safely.

Personal Protective Equipment – hearing protection, safety glasses, steel-toed boots, seat belts.

Defective Tool or Equipment Use – machine guarding in place, electrical cords, safety devices.

Right To Know – All hazardous substances properly marked and labeled.

Incident Report/Corrective Action Investigation Promptness and Completeness – Incident reported to proper manager during shift it occurred, follow-up investigation and reports completed within 24 hours.

MIOSHA Safety Performance- Recordable injury count, lost workdays.

7. A Method of Motivation for Employees. The program should have reasonable, meaningful & appealing awards. For example, management could have a financial incentive plan tied to cost savings with an employee award program tied to a company-wide social event. Incentives can come in the form of either social recognition or tangible rewards. To change behavior, recognition should be delivered as quickly as possible following the desired behavior. Money is not always the best incentive. Its liquidity allows employees to lose sight of it and cash can be reviewed as an entitlement over a period of time. Tangible awards can be visualized and associated with the goals.

Attempt to tie incentives to something that benefits the employees' family. The family will be a motivator outside of the office. Involve the employees and be creative with the incentive plan and the awards. Give it a theme such as a sport or special event. Call the program something other than a safety incentive program and make it fun.

8. Communication of the Program & the Strategy to Reach the Goal. The incentive plan must be easily communicated and understood by all involved. All employees involved in the program should have a clear understanding of the goals, timetable involved and corresponding rewards.

9. Presentation of the Award(s). Top management should be involved; the event should be highly visible and directly correlated with the objectives of the program. The recognition of awards or incentives should be timely. If the program is based on annual results with an annual reward, it is easy to lose focus of the original objective. Reminders at least every three months serve to keep the program focused.

10. Program Evaluation and Modifications. The incentive plan should be reviewed periodically to ensure its effectiveness. Quality control measures should be in place to determine that it's fair and the measures are consistently applied. Programs will sometimes need to be spiced up by using different incentives or changing the structure of the plan. The type of plan that will work for your organization is dependent on your corporate culture, status of your safety program, communication with employees, top management commitment to the plan and the design of the safety incentive program itself.

Material for this article was provided by CMI (Citizens Management, Inc.). Reprinted from The Michigan Landscape, September/October 2004.

GETTING LANDSCAPE PLANTS READY FOR WINTER

Dr. Bert Cregg

MSU Department of Horticulture

Winter is a critical period for landscape plants in the north and winter injuries are among the most common abiotic plant problems we encounter. Since winter injury is so common in northern landscapes a logical question becomes, can we prevent it? The answer, of course is, it depends. Winter injury in landscape trees and shrubs can be caused by several factors that oftentimes are interrelated. The extent to which we can effectively reduce winter damage depends on the type of winter injury. Below I list the principle types of winter injury, how they occur and what may be done to remedy them.

Freezing Injury

Freezing injury occurs when the temperature of plant tissues drops below the temperature to which the plant is hardy. We typically refer to the winter hardiness of plants in terms of their USDA Hardiness zone. Delaware is comprised of two zones—Zone 7 in the southern part of the state and Zone 6 in the northern section. A couple of important points to remember about hardiness zones: First, the zones reflect the average annual minimum for a given area. So in many years, we will see temperatures colder than the hardiness zone temperature. In fact, the all-time record low is usually about 15°F colder than the hardiness zone.

Second when we talk about the cold tolerance of plants in terms of hardiness zone we're referring to a plants mid-winter hardiness. Plant cold tolerance, however, varies throughout the winter. Zone 5 plants that can withstand -15°F in January and February may be damaged by temps just below freezing in late April. Injury that occurs early in the winter before plants have fully hardened is referred to as "early winter injury". Damage that occurs late in winter or

early spring is termed "late winter injury". Late winter injury is one of the most common types of winter injury in both hardwoods and conifers. Ironically, late winter injury may occur in plants from extremely cold regions since they have adapted to a short growing season and may break bud early in the spring after only a few warm days.

Dealing with Freezing in January

Freezing injury is one of the most difficult types of winter damage to address since plant hardiness and dormancy are largely determined by environmental factors over which we have little or no control such as day/night temperatures and photoperiod. In seedling nurseries heavy irrigation and N fertilization in the late summer and early fall may promote excessive late season growth and delay bud set and hardening. Despite common opinion and intuition to the contrary, there is little scientific evidence that landscape fertilization reduces winter hardiness of trees. In general, the strongest link between nutrition and cold hardiness is improved cold hardiness associated with adequate potassium. Finally, remember that roots are much less cold hardy than shoots, so it is critical to protect roots of containerized plants that over-winter outdoors.

Winter Desiccation

This is another common form of winter injury in the north. Winter desiccation occurs in conifers and broadleaved evergreens on sunny days during the winter when air temperatures are warm enough to cause leaves to transpire and lose moisture but the ground is still frozen so roots cannot absorb water from the soil.

Dealing with Winter Desiccation

Wrapping or screening sensitive plants with burlap or landscape fabric can help to prevent desiccation. Film-forming anti-transpirants may also help to prevent winter moisture loss but require reapplication during the winter.

Salt Injury

Road crews may apply a significant quantity of de-icing salt on roadways in a typical winter. Much of this salt (primary sodium chloride) ends up on roadside vegetation through road spray drift or run-off. De-icing salt can damage vegetation in many ways including direct toxicity from excessive sodium or chloride, osmotic or dehydration stress, reduced cold hardiness, and displacement of nutrients in the soil such as calcium and magnesium.

Dealing with Salt Injury

Screen landscape plants from salt spray and salt splash from roadways. For low growing plants and small trees this can be achieved simply by using snow fencing and landscape fabric though more sophisticated systems have been developed in northern Europe. The impact of road salt may also be reduced through plant selection. In areas prone to high salt exposure, avoid planting salt sensitive species such as eastern white pine, red maple, or hornbeam. In parking lots and walkways alternative de-icing materials such as calcium magnesium acetate (CMA) can help to reduce plant damage.

Snow and Ice Damage

The weight of heavy snow and ice loads can often cause considerable stem breakage.

Dealing with Snow and Ice Damage

Certain plants such as 'Golden Globe' arborvitae are prone to breakage, so avoid planting them along driveways or under rooflines where snow is likely to accumulate. Remove excessive amounts of snow on upright or spreading evergreens by carefully sweeping it from drooping boughs. Use extreme caution if tree limbs are heavily covered with ice. Large branches can break without warning and trying to remove ice is usually not worth the risk.

Frost Cracking and Sunscald

Frost cracking and sunscald are both related to fluctuations in temperature during the winter. Frost cracking is caused by freezing of water in the stem at very cold temperatures and results in a large split in the trunk. Trees are often able to recover though the crack may serve as entry point for decay fungi. Sunscald results in the loss of bark and cambium layer over a wide portion of the trunk. While there is no hard and fast rule as to how much sunscald damage a tree may recover from, any injury that extends over ¼ of the tree's circumference will result in a major defect.

Dealing with Frost Cracking and Sunscald

Thin-barked species such as lindens, sycamore and maples are most susceptible to frost cracking and sunscald. Frost cracking is difficult to prevent. Applying tree wraps during the first two winters after transplanting may reduce sunscald. Recent research at the University of Wisconsin showed that ensuring trees were properly planted and had adequate moisture going into winter also reduced sunscald.

Animal Damage

When times get tough in the winter many animals will begin to feed on landscape plants. The most common damaging animals are deer, mice, and rabbits, though many others can be problems depending on your location.

Dealing with Animal Damage

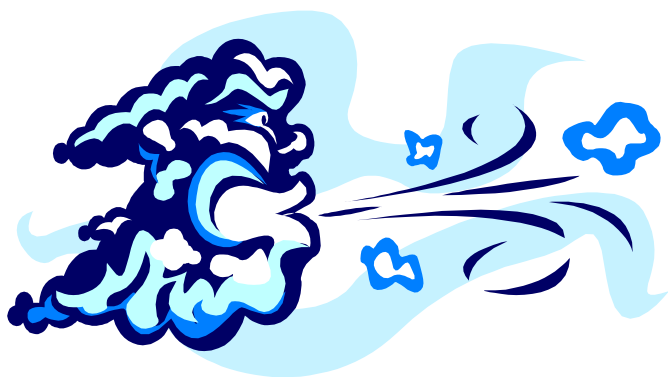
For mice, rabbits and other small animals, a fence made of chicken wire or plastic tree guards may provide adequate protection. Remember that a 12" tall fence will not protect tree stems from rodents after the ground is covered with a foot of snow. Reduce habitat for mice and rabbits by reducing weeds and therefore eliminating cover from predators. Deer are extremely difficult to deal with in a landscape. Many deer repellents are on the

market made from a variety of sources from pepper and garlic oils to predator urine. Almost all repellents suffer from the same drawback in that they wear out and need to be re-applied during the winter. One good rule of thumb is that the best deer repellent systems offend more than one sense.

Summary

Long winters are a cold reality in the north and can potentially damage plants in a myriad of ways. Key points to remember to reduce the impact of winter on landscape plants:

- Keep plants vigorous and healthy going into winter through proper maintenance
- Avoid excessive drought stress
- Provide adequate nutrition
- Reduce exposure to road salt
- Prune to eliminate branches that are likely to break under snow loads
- Select plants that are hardy for your area
- Avoid salt sensitive plants along major roadways.



FALL CONSUMER TRENDS SURVEY **TechnoMetrica**

Between August 17 and August 23, 2004 a computer assisted telephone interview survey was conducted among randomly selected households in the United States. A total of 1,005 surveys were completed by TechnoMetrica for the Garden Writers Association Foundation. The following Executive Summary provides survey results.

Yard & Garden Incidence

- Four in five American households has a yard or garden (80%).
- Among the groups least likely to have a yard or garden include younger Americans (aged 18-24) and those who have not completed high school.

Planned Gardening Purchases

- Among those with a lawn or garden, the most popular planned purchases for the fall season include fall flowers (26%), indoor plants (22%), mulch (21%), trees and shrubs (21%), and perennial plants (20%).
- Healthy levels of purchase intent are also seen for fall decorations (17%), bulbs (15%), and fall vegetables (14%).
- One in five households (19%) have no plans to purchase any of the gardening items addressed.
- Mulch is far more likely to be purchased by Southerners (26%) than their counterparts in any of the other three regions.

- Females are more likely than males to have plans to purchase fall flowers, indoor plants, and fall vegetables.
- Virtually across the board, married couples and households with children are more likely to plan fall purchases than their counter-parts.
- In general, those households with higher incomes (more than \$50K) tend to be more likely to purchase gardening related items for the fall than those with lower incomes (less than \$50K).

Primary Obstacles To Fall Gardening

- The most common deterrent to fall gardening is lack of time. Two in five respondents with a lawn or garden (38%) cite this as their primary obstacle to engaging in fall gardening activities.
- Parents with children under the age of 18 in the household are far more likely to say they “lack the time” as compared with non-parents (49% vs. 33%). Also worthy of mention is the trend that as household income increases, so too does the incidence of time shortage as an obstacle to fall gardening.

For more information contact
www.technometric.com

*Reprinted from VNLA Newsletter,
 September/October 2004.*

UNDERSTANDING YOUR BALANCE SHEET

**Tom Oyler, Wilson-Oyler Group
 Thousand Oaks, CA**

Your company’s balance sheet summarizes how you have performed since your company first opened its doors. At a glance, it will tell you how much money you have made over the years by comparing your company’s total assets to its total liabilities. But, like anything else in life, there is more to a balance sheet than meets the eye.

A balance sheet can tell you, for example, if your equipment is getting too old, how much working capital is available for growth and expansion, and if you may be headed for cash flow difficulties. It conveys this vital information in the form of ratios, or relationships, that you (and your bankers, suppliers, or other interested parties) can use to track current performance and trends. The following are some questions regarding business performance that owners often ask and the answers that a balance sheet can provide.

Q. I think we are having a good year, but will the company have adequate cash flow to meet current obligations?

A. Cash flow health can be measured in one of two ways, either by determining a company’s current ratio or its quick ratio. The current ratio expresses the relationship of 12-month assets to 12-month liabilities. A current ratio of less than 1.25 indicates cash flow pressure, whereas a current ratio of more than 2.25 indicates that a company may be underutilizing its funds. The *quick* ratio measures a company’s most liquid assets versus the total of its current liabilities. An organization’s most liquid assets are its cash and receivables. A quick ratio of less than 1.0 indicates a thin cash position, and a quick ratio of more than 2.0 means that a company is underutilizing its cash reserves.

Q. We have a lot of business and growth potential, but will I have enough capital to support strong growth?

A. Your concern is well grounded. Working capital is needed to support growth, and a fast-growing company may not be able to survive without satisfactory working capital. Determine your working capital by subtracting your company's current liabilities from its current assets.

Q. How much money should we be investing in our company?

A. Again, the balance sheet holds the answer. The ratio of net fixed assets to current assets will tell you how much you have invested in land, equipment, and facilities compared to your company's liquid assets, which are used to fund your working capital. Landscape contractors are generally considered healthy when the net fixed assets to current assets ratio is less than 50-55 percent. When that ratio climbs to more than 55 percent, a company has generally invested more of its resources into fixed assets than it should and could suffer from a situation of tight cash flow.

Q. How much debt should the business carry?

A. That depends on several factors. As a business owner, how much risk are you willing to take? Your balance sheet will reveal your debt to equity ratio (total liabilities versus total equity). If you have less debt than equity, then you are in a position with strong capital. Accruing more debt than equity is not necessarily bad; however, if debt exceeds equity by twofold, it is likely that you are trying to do too much with too little money.

Q. What can the balance sheet tell me about the age of my equipment and fleet?

A. The fixed asset newness ratio (net fixed assets over gross fixed assets) measures the current depreciated book value of a company's

assets against the original purchase price. An extremely high newness ratio may indicate that a company has dedicated too much capital to fixed assets, which may put it under cash-flow stress or debt-service stress. An extremely low newness ratio may indicate that a company is not investing enough in new assets, which may result in more equipment downtime and lower productivity.

Q. A contractor friend recently asked me what my "Return on Investment" (ROI) is for my business. When I told him I did not know and, did not see why I needed to know, he just shook his head. If my business is profitable, why does my ROI matter?

A. Your ROI is the ratio of your net profit to your net worth. There are two good reasons to know this figure. If your ROI is less than what your money can make in traditional investment opportunities, then you may want to consider selling your business and investing your money elsewhere. Conversely, if you have a healthy ROI, then continuing to operate your business (even if there is an attractive offer to sell) may be the financially smart thing to do.

Q. Is there a standard or average ROI for landscape contracting companies?

A. No, there is not. Like with any other investment, the higher the risk, the higher the reward. For example, construction work offers many opportunities to make profits in a relatively short period of time, but there is greater risk associated with the work. This risk factor is compounded by the higher equipment/capital requirement per revenue dollar generated (as compared to maintenance). To offset risks, landscape contractors oftentimes realize a higher profit percentage on construction work than they normally would on maintenance work.

Reprinted from VNLA Newsletter, Sept/Oct, 2004.

Pesticide News

Insecticides

BSN-2060 480C (spiromesifen) – Bayer Environmental Science – Proposed to EPA to register this new active ingredient to use on ornamental plants in greenhouse, shadehouse and nursery settings. Comments must be received by 8-20-04. (FR Vol. 69, 7-21-04).

FORBID 4F (spiromesifen) – Bayer Environmental Science – Proposed to EPA to register this new active ingredient for use on outdoor ornamental plants. Comments must be received by 8-20-04.

FUJIMITE (fenpyroximate) – Nichimo America Inc – A new 5%EC formulation being introduced to control mites and pear psylla on cotton, pome fruits, grapes and ornamentals.

KANEMITE 15C (acequinocyl) – Arvesta Corp – A new product for the control of mites in greenhouses, shadehouses, ornamentals and nursery containers.

PREV-AM (orange oil/borax/surfactants) – Oro Agri Inc – A new organic miticide/insecticide/fungicide being developed for use on berries, fruit and nut trees, vegetables and ornamentals. It controls mites, aphids, thrips, powdery mildew, downy mildew, botrytis and others.

PURE SPRAY 10E (horticultural oil) – Petro Chemical – A new horticultural oil formulation available in the U.S. for use on ornamentals.

Herbicides

ETHO SC (ethofumesate) – Ag Value – A new formulation for use on grass seed crops and commercial sod products.

OVERDRIVE (diflufenzopyr/dicamba) – BASF – A new post-emergence combination herbicide to control broadleaf weeds in roadside, industrial and rangeland areas.

POA CONSTRUCTOR (ethofumesate) – Ag Value – A new formulation for use on turf to control poa annua and other weeds.

SNAPSHOT 2.5TG (isoxaben/trifluralin) – Dow AgroSciences – Added to their label more weeds controlled and the usage on more ornamentals.

Fungicides

ANDANTE (Muscodor albus strain QST-20799) – Agra Quest – Proposed to EPA to register this new active ingredient as a methyl bromide replacement to control soil fungi and nematodes. Comments must be received by 5-14-04. (FR Vol. 69, 4-14-04).

HARPIN PROTEIN (Eden Bio Science) – EPA granted an experimental permit to use this bio-fungicide on 4,942 acres of citrus, cotton, corn ornamentals, peanuts, rice, soybeans, sugarcane and wheat to control post harvest diseases, enhance overall plant health and to improve quality and yield. Authorized for use in AL, AZ, AR, CO, FL, GA, IN, IL, IA, KS, KY, LA, MD, MN, MS, MO, NE, NJ, NY, NC, ND, OH, OK, PA, SC, SD, TN, TX, VA and WA. Expires 4-26-06. (FR Vol. 69, 7-14-04)

HURRICANE (fludioxonil/mefenoxam) – Syngenta – A new combination fungicide that is being developed for use on ornamentals. It gives excellent Rhizoctonia control.

MILSANA (Rymontria sachelinensis) – KHH Bio Science – A new biological fungicide used to control gray mold and powdery mildew on

ornamentals.

SONATA ASO (*Bacillus pumilus* QST-2808) – Agra Quest – Proposed to EPA to establish residue tolerances on brassica, bulb cucurbit, fruiting, leafy, legume and root tuber vegetables, pome and stone fruits, grapes, grasses grown for seed, hops, mint, peanuts, strawberries, sweet corn, tobacco, roses and ornamental trees. Comments must be received by 6-4-04. (FR Vol. 69, 5-5-04).

ZONIX (Rhamnolipid bio-surfactant) – Jeneil Bio Surfactant Co. – Proposed to EPA to register this new active ingredient for the prevention and control of fungi in agricultural, horticultural and turf settings. (FR Vol. 69, 4-28-04).

Miscellaneous

BONZI (paclobutrazole) – Syngenta – Added to their label are 40 new ornamental species for this growth regulator.

KBR-3023 (picaridin) – Bayer – A new product being developed as an insect repellent.

SEPRO – The company has recently acquired Griffin's turf, aquatic, ornamental and nursery products. The products included are Avast (flurodone), Komeen (copper complex), K-Tea (copper complex), Junction (copper hydroxide/mancozeb), Pentathion (maneb), Camelot (copper hydroxide) and Spin-Out (copper hydroxide) for usage in containers. Also included are the turf and ornamental usages for Kocide 2000 (copper hydroxide) and the miticide Vendex (fenbutatin-oxide).

TALPIRID (bromethalin) – Bell Labs – A new mole control compound for use in lawns around homes and in ornamental gardens.

Research Briefs

Propagation:

Virginia mallow (*Kosteletzkya virginica*) can be rooted from leafy or leafless stem cuttings. Virginia mallow can be propagated successfully from stem cuttings. The species typically loses its lower leaves and develops highly branched, open canopies. Our experiments show that stem cuttings with or without leaves can be rooted. The capacity for leafless stem cuttings to root greatly increased the number of potential propagules from a stock plant. Application of talc-based IBA at 8 g/kg is recommended to enhance rooting but is not necessary for root initiation, especially if cuttings have leaves. (C.L. Haynes and W.R. Graves)

Excerpted from *J. Environ. Hort.* 22(4): 173-175. December 2004.

Spinout™ – treated containers reduce root malformation in *Pinus nigra* seedlings. Producing *P. nigra* seedlings in Spinout™ – treated 51 cell plug trays for five months resulted in smaller seedlings than those produced in untreated containers. However, Spinout™ – produced seedlings needed less root pruning to correct root malformations, resulting in greater root growth four months after transplanting. (H. G. Zahreddine, D.K. Struve and M. Quigley)

Excerpted from *J. Environ. Hort.* 22(4): 176-182. December 2004.

Container Production:

Using constructed wetland treated nursery runoff on nursery crops. Runoff collection, treatment, and reuse offers a combined benefit to nursery and greenhouse industries by reducing

the volume of fresh water used for irrigation and limiting the release of nutrients and pesticides to the environment in discharged runoff water. Initial evaluations of constructed wetlands for treating nursery runoff indicated that a single pass through constructed wetlands substantially reduced nitrogen concentrations without increasing salinity. However, long-term experiments suggest that constant recycling of water through constructed wetlands may increase soluble salts to levels that require subcanopy application of irrigation water for effective crop production. Constructed wetlands may provide a viable, simple, low technology method for reducing nutrient loads to comply with environmental standards for discharging nursery runoff, but must be carefully managed if serving as a supply for recycled water. (M.A. Arnold, B.J. Lesikar, G.V. McDonald and D.C. Wilkerson)

Excerpted from *J. Environ. Hort.* 22(4): 1217-224. December 2004.

Landscape management:

Auxins combined with water-retaining polymers increase transplant success of European beech and silver birch. Auxins (plant growth regulators) and water-retaining polymers have been shown to reduce transplant shock by stimulating root growth and preventing root desiccation after harvest and during transit to the planting site respectively. Results of this study show that use of an appropriate commercially available auxin combined with a water retaining polymer gel applied at the time of planting under field conditions can promote root growth, improve tree vitality, and increase pot-planting survival of beech and birch, two transplant-sensitive species. Applications of a water-retaining polymer alone had no significant effect on tree survival rates or tree vitality. (G.C. Percival and S. Barnes).

Excerpted from *J. Environ. Hort.* 22(4): 183-188. December 2004.

Bioplex™ effect on transplant success of non-dormant red oak. Bioplex™ (a type of biostimulant) did decrease short-term transpirational loss of non-dormant red oak seedlings. Root pruning (used to simulate summer digging) significantly reduced transpiration and had a greater effect on transpiration than any Bioplex™ treatment. Bioplex™ treatment had no beneficial effect on seedling dry weight or growth the following spring. (J.D. Sammons and D.K. Struve)

Excerpted from *J. Environ. Hort.* 22(4): 197-201. December 2004.

Use of paclobutrazol (Profile) at transplanting on ‘Green Column’ black maple and ‘Summit’ green ash. Transplanted trees must regenerate roots quickly to establish in the landscape with minimal stress. Profile can increase extension growth and dry weight of regenerated roots of transplanted, field-grown trees under some circumstances. Increasing the rate at which roots elongate and grow back to their original spread could reduce establishment time. The data from this study suggest that a more difficult-to-establish tree, such as black maple may benefit from Profile treatment after transplanting. Profile did not reduce above-ground growth more than transplanting alone, for either species tested. Further study is needed to determine optimum rates and which species might benefit the most. (G. Watson)

Excerpted from *J. Environ. Hort.* 22(4): 209-212. December 2004.

Publications

Industry Guide to Marketing Containers.

With the dramatic increase in container plant sales, state and related weights and measures compliance staff have stepped up their scrutiny of industry marketing practices. These authorities have discovered that some long-time practices in the industry regarding labeling and advertising of containers violate or ignore consumer information requirements. They have warned the industry that it must come into compliance. Those not in compliance can incur stop-sale orders and substantial fines and penalties for misleading or inadequate labeling and advertising.

These guidelines, developed by ANLA with assistance from OFA, HAHS, PMA, and SAF, were developed as an aid to facilitate industry compliance with the least amount of disruption and expense over current industry practices. It is your responsibility to label and sell containers that meet the compliance guidelines. Order your copy from OFA at 614-487-1117 or ofa@ofa.org.

BOXWOOD ENCYCLOPEDIA – An Illustrated Encyclopedia by Lynn R. Batdorf. Comprises 343 pages, with 340 photographs. It contains information on the size, hardiness, habitat, leaf shape, stem characteristics, annual growth, cultivar environments, pests, landscape use, history and nursery and common names for more than 780 cultivars. Order information online at: www.boxwoodsociety.org

Revised “Standard” Available Free from ANLA – The American Nursery & Landscape Association (ANLA) announces the release of the revised 2004 American Standard for Nursery Stock (ANSIZ60.1-2004 – the “Standard”) ANLA will provide the Standard at n/c through their website, 111anla.org. The pdf-format

document can be viewed on-line, downloaded to the user’s computer, or printed. For more information contact Amanda Flynn at (202)789-2900 or aflynn@anla.org.

The Ecke Poinsettia Manual by Paul Ecke III. Everything you wanted to know about poinsettias, but were afraid to ask. This book provides guidance in areas of scheduling, managing height, nutrition, preventing disorders and other key factors in production from start to finish. *The Ecke Poinsettia Manual* is \$9.95 U.A. or \$74.95 CAN and available from Ball Publishing, P.O. Box 9/335, North River Street, Batavia, IL 60510. www.ballbookshelf.com

Encyclopedia of Dahlias by Bill McClaren. Every dahlia lover will gain years of reference and enjoyment from Bill McClaren’s definitive encyclopedia. Cost \$39.95, hardcover, 212 pp, 855 color photos, 8.5” x 11”, ISBN: 0-88192-658-2. (<http://www.timberpress.com/books/isbn/0-88192-658-2>)

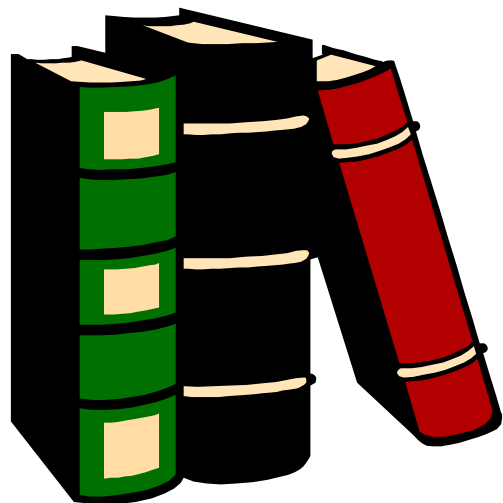
Variegated Trees and Shrubs: The Illustrated Encyclopedia by Ronald Houtman in association with the Royal Boskoop Horticultural Society. This book describes in detail nearly 800 variegated trees, shrubs, and vines available internationally from nurseries. Painstaking in the accuracy of its nomenclature, this volume also includes a scientific discussion of the reasons for variegation as well as an essay on how to design with variegated plants in any garden. Cost \$49.95, hardcover, 340 pp, 762 color photos, 8.5” x 11”, ISBN: 0-88192-649-3. (<http://www.timberpress.com/books/isbn/0-88192-649-3>)

Gardening with Clematis: Design and Cultivation by Linda Beutler. The author treats a multitude of subjects, including growing clematis as companion plants, combining different clematis in the garden, clematis in

containers, manipulating bloom time with pruning, and much, much more. Cost \$34.95, hardcover, 300 pp, 115 color photos, 6" x 9", ISBN: 0-88192-644-2.

(<http://www.timberpress.com/books/isbn/0-88192-644-2>)

2004 American Standard for Nursery Stock – Free Online www.anla.org. Approved by the American National Standards Institute (ANSI) on May 12, 2004, the revised Standard is an essential reference for anyone in the green industry who specifies, grows, distributes, buys, or installs nursery stock. The PDF-line, downloaded to the user's computer, or printed, and horticulture schools and state certification programs can print as many copies as they need.



Calendar

January 5-7 – Mid-Atlantic Nursery Trade Show (MANTS). Baltimore Convention Center. Call (800)431-0066 or fax (410)296-8288; e-mail info@mants.com; Internet www.mants.com.

January 5, 6, 12, 13 –Arborist Short Course, Integrated Management of Woody Ornamentals. Montgomery County Cooperative Extension Office, 1015 Bridge Rd., Collegeville PA. Registration fee: \$225.00. For more information contact: Julianne Schieffer, (610)448-4315.

January 10 – 2005 Eastern Regional Landscape Nursery Seminar, 7:30 a.m. – 4:00 p.m. Sponsored by: Delaware Valley College, PA, Landscape Nursery Association & Penn State Cooperative Extension. Location: Student Center, Delaware Valley College, Doylestown, PA Cost: \$59 per person. For more information call: (215)345-1500.

January 11 & 12 – 15th Annual Landscape Design Symposium. This year's seminar is entitled Linking Parallel Worlds: Landscape Design and the Study of Ecological and Cultural Landscapes.. Villanova University and January 13 & 14 at Connecticut College. Contact Larry Weaner Landscape Design Asso., Inc. 43 Limekiln Pk., Suite #100, Glenside, PA 19038, phone(215)886-9740, fax: (215)886-9028.

January 11 –13 – 2005 Eastern Pennsylvania Turf Conference and Trade Show, Valley Forge Convention Center, King of Prussia, PA. Registration open 11:00 a.m. to 4:00 p.m. For more information contact: PA Turfgrass Council – Christine E. King, (814)355-8010, fax: 814-355-7240, e-mail ptcinfo@paturf.org

January 12-13 – Delaware Horticulture Industry Expo and Pesticide Conference. Modern Maturity Center, Dover, DE. Contact Valann Budischak 610-274-2166.

January 18 – Shade Tree Identification, 10:00 am to 3:30 pm, Leigh County Agricultural Center, Allentown, PA. Cost: \$50 per person, includes lunch/handouts. For more information call (610)391-9840, fax: (610)391-0683, e-mail: lehigext@psu.edu.

February 1, 8, 15, 22, March 1, 8, 15 – Troubleshooting Landscape Problems, Ornamentals Short Course (\$5/class). New Castle County Extension Office, 3:30 to 5:30 PM. Contact NNC Extension, 302-831-2506
Session 1: Troubleshooting principles, Feb.1
Session 2: Identification & Sampling, Feb.8

Session 3: Cultural Problems, Feb. 15
Session 4: Insect Control, Feb. 22
Session 5: Controlling Wildlife, March 1
Session 6: Disease Control, March 8
Session 7: Weed Control, March 15

February 1 – 14th Annual Winter Lawn Care Conference, Holiday Inn-Lehigh Valley, Allentown (Fogelsville) PA, 178-& Rt. 100. For more information call 1-800-577-6801. Cost \$55.00 LCAP member/\$75.00 non-LCAP member.

February 2 - Problems with Leylands, Alternatives and Plant Stress (\$5), Research and Education Center, Georgetown 7 – 9 PM, Contact Sussex County Extension, 302-856-7303

February 2-5 - ANLA Management Clinic, Galt House in Louisville, KY; Contact: ANLA at www.anla.org

February 3 (snow date of February 10). - 4 hour training seminar (10:00 am to 3:00pm with lunch included) on cultural sensitivity in the Latino workforce. The cost is \$20.00 per person, payable in advance or at the door. Location is Training Annex, Lea Blvd & N. Market Street. Contact Paul.Kessler@state.de.us or call 302-761-8225 or 302-761-8219 for more information or to register.

February 15 – LCA Winter Workshop: Landscape Contractors of America MD-DC-VA, at Turf Valley Resort, Ellicott City, MD: Contact: 301-948-0810, lca@mgmtsol.com, www.lcamddeva.org

February 16 and 24 HORT 101 for Start Ups (\$5/class), 7 – 9 PM, Kent County Extension Office, Dover. Contact Kent County Extension, 302-730-4000.

February 16 & 17 – Conifer Identification, Smedley Park, 20 Paper Mill Rd., Springfield, PA. Time: 9am – 3 pm, cost \$50.00. For further information contact the Extension Office (610)696-3500.

February 17 - Business Planning and Hort Business Mentoring (\$5), 7 – 9 PM, Kent County Extension Office, Dover, Contact Kent County Extension, 302-730-4000.

February 23 - Improving Your Record Keeping (\$5), 7 – 9 PM, Kent County Extension Office, Dover, Contact Kent County Extension, 302-730-4000.

March 3 - Landscape Design for Delaware (\$5), 5-7 PM, New Castle County Extension Office, Newark, Contact NCC Extension, 302-831-2506.

March 3 - Landscape Drainage/Water Management (\$5),

7 – 9 PM, Kent County Extension Office, Dover, Contact Kent County Extension, 302-730-4000.

March 8 - First Detector Training (SOD, ALB, EAB, MSB), 9-10 AM, Research and Education Center, Georgetown, Contact Sussex County Extension, 302-856-7303.

March 9 - Problems in New Developments – Lecture (\$5), 7 – 9 PM, Kent County Extension Office, Dover, Contact Kent County Extension 302-730-4000.

March 14 - Turf and Landscape Weeds (\$5), 7 – 9 PM, Research and Education Center, Georgetown, Contact Sussex County Extension, 302-856-7303

March 15 - First Detector Training (SOD, ALB, EAB, MSB) , 9-10 AM, Kent County Extension Office, Dover, Contact Kent County Extension, 302-730-4000.

March 17 - First Detector Training (SOD, ALB, EAB, MSB), 9-10 AM, New Castle County Extension Office, Newark, Contact NCC Extension, 302-831-2506.

March 19-22 – ALCA Student Career Days, University of Maryland, College Park, MD. Contact: 703-736-9666, www.alca.org

March 23- Insect and Disease Update (\$5), 7 – 9 PM, Research and Education Center, Georgetown, Contact Sussex County Extension, 302-856-7303.

April 5 - Landscape Drainage & Water Management (\$5), 6:30-8:30 PM, New Castle County Extension Office, Newark, Contact NCC Extension, 302-831-2506.

April 13 - Rain Gardens (\$5), 7-9 PM, Kent County Extension Office, Dover, Contact Kent County Extension, 302-730-4000.

April 19 - Rain Gardens (\$5), 6-8 PM, New Castle County Extension Office, Newark, Contact NCC Extension, 302-831-2506.

