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

The “Summer of ‘99” –another one for the history books! The drought and subsequent water restrictions proved costly for most of our members. It forced many businesses to focus on other aspects, such as hardscaping and water gardening, to bide time until the rain came. Hopefully we are now able to stumble to the finish line of 1999. If you haven’t had the chance yet, please read the letter sent to all members regarding the drought, and the actions taken by the Green Industry Task Force. As the letter states, the Task Force is comprised of several D.A.N. members. These members deserve hearty thanks for the many hours they worked, and continue to work on behalf of the industry.

The Summer Expo was held on Thursday, August 19th at Garrisons Lake Country Club in Smyrna. We had another year of fun, education, and beautiful weather. More than 150 people enjoyed the exhibits, seminars, pig roast, and discussion held by Secretary of Agriculture Jack Tarburton. Following the expo, 53 golfers took to the course in our 2nd Annual Golf Tournament. The Green Season’s team won this year’s tournament. The team was comprised of Wayne George, Dave Coker, Mike Scott, and Frank Everett, Jr. Congratulations!

The Ornamental and Turf Workshop and Delaware Horticulture Industry Expo (DHIE) are quickly approaching. The Turf Workshop is set for Tuesday, November 9th at Hockessin Memorial Hall. The DHIE will be held on January 12th and 13th at the Modern Maturity Center Annex in Dover. Both promise to be exciting events. Hope to see you there.

Welcome to our new members:

First State Inc.
New Castle, DE
(302) 328-0280

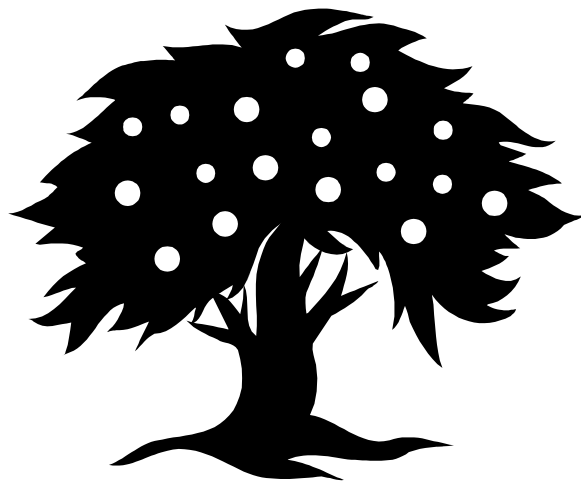
L & F Landscaping – Nursery, Inc.
Newark, DE
(302) 733-0559

Bear Trap Dunes Golf Course
Ocean View, DE
(302) 537-7203

MBNA America Bank—Deerfield
Wilmington, DE
(302) 452-5954

Baywood Greens
Millsboro, DE
(302) 947-9836

Turf Equipment and Supply Co., Inc.
Jessup, MD
(410) 799-5575



FROM THE PRESIDENT
Naomi McCafferty
Delaware Association Nurserymen

Our whole state was impacted by the drought this past summer. Northern New Castle County's predicament was even more severe because of the harsh mandatory water restrictions. As D.A.N. president, this meant spending several hours a day working on drought issues.

Like all of the D.A.N. members, the drought and the water restrictions meant making adjustments to my business. I had to change the way we displayed and maintained plants at my garden center. We experienced a major drop in sales of green goods, which prompted changing the schedule of the retail staff. My landscaping crew spent the summer constructing retaining walls and paver patios. Other area landscapers installed drip irrigation, fences, or did tree work.

How did your company handle the drought? Does your business need to diversify to survive adverse weather and slow sales in your primary areas? What is the best way to diversify? I suggest starting by educating yourself on the latest products, techniques, and business systems. Research new subjects. Network with peers. You can do both at the D.A.N. expos. This year, the winter expo includes a discussion panel on ways to diversify your business. There are opportunities out there for everyone, but you must be open to new ideas. Don't just work hard; work smart too.

"The good things which belong to prosperity are to be wished, but good things that belong to adversity are to be admired." --Seneca

U of D NEWS
Susan Barton
Extension Specialist

We are almost finished with the short course program for 1999, but there are a few great short courses left. Jay Windsor and Derby Walker will be teaching "Diagnosis and Control of Insects and Weeds on Woody Ornamental Plants" at the Research and Education Center in Georgetown on October 5 and 7 from 3-5 PM. You also have a great opportunity to meet our new Landscape Architect and Landscape Design Professor, Carol Krawczyk. She is teaching Principles of Landscape Design on October 12, 14 and 19 from 7-9 PM in the Worrihow Hall Design Studio in Newark. If you want to register, call Dot Milsom at 831-2531.

A graduate student in our Food & Resource Economics Department is currently analyzing the results from surveys conducted at three garden centers (Farm Meadows, Gateway and Waterloo) with TreesAddLife displays this spring. He will also conduct surveys in October. We are collecting feedback from customers at the three local garden centers and from employees at each of 25 pilot sites. These survey responses will help us evaluate the success of the campaign and determine how to proceed to promote TreesAddLife on a wider scale.

Delaware roadsides have been planted with 16 pilot sites to study new methods of roadside vegetation. Enhancing Delaware Highways is a joint program sponsored by the Delaware Department of Transportation, Delaware Center for Horticulture and University of Delaware. We have been working on the roadsides for a year now to develop installation and maintenance guidelines for roadside vegetation. We are looking for strategies that maintain a sense of regionalism with native plants and reduce maintenance costs associated with

regular mowing or intensive seeding of annual wildflowers. In some cases, we've planted shrub masses that will eventually out compete invasive roadside species like multiflora rose and Russian olive. We are also trying perennial herbaceous seeds and plugs along with warm season grasses. At some sites, we have just stopped the mowing and are allowing natural succession to take its course with careful monitoring for invasives. When we plant, we are using a palette of tough native species. The Delaware roadsides represent a significant quantity of land. When DelDOT adopts some of these new strategies there will be a significant demand for these native plants. You may want to consider building inventory in some of these species for 2004 and 2005. If you are interested in receiving a list of the species we are using, please call Val Budischak (610-274-2166) and she will mail or fax it to you. If you already carry some of these plants and would like to be a vendor for this project, let me know (302-831-1375). We are very interested in increasing native plant capacity in the industry!

We have started to plan a great series of short courses and workshops for 2000! By December, you should receive a flyer entitled Ornamental Horticulture Programs for 2000. We will include four major tracks—Business Management Track, Pest Management Track, Production Track and Landscape Track. Here is a preview of the first few offerings:

Building Your Presence on the World Wide Web	January 11, 13 & 18 (1-3 PM)
Entrepreneurship in Horticulture	February 9, 16, 23 (7-9 PM)
Pests Below the Ground	February 15 (1-4 PM)
Introduction to Commercial Nursery Production	March 1, 8, 15, 22 (7-9 PM)

**OVERWINTERING HERBACEOUS
PERENNIALS**
Susan Barton
University of Delaware

This article is based on a poster presented by Jeffery K. Isles from Iowa State University at the 1999 ASHS meeting in Minneapolis, MN.

A survey was conducted to identify and characterize the effectiveness of overwintering methods used to protect container-grown herbaceous perennials in USDA hardiness zones 3 through 8. Survey questionnaires were sent to 634 firms involved in growing and/or selling container-grown herbaceous perennials identified from the Perennial Plant Association Membership Directory. Completed questionnaires were received from 293 individuals (46.2% response rate) in 38 states, the District of Columbia and six Canadian provinces.

Acclimating – Research doesn't support the belief that late-season fertilizer application decreases plant cold hardiness but most (68.4%) growers don't fertilize after September 15. Water stress has been shown to enhance cold hardiness of many plants but less than half the respondent's reduce water application in the fall. (Except in zone 7 where 57.7% indicated reducing fall irrigation.)

Cultural practices – Most respondents indicated that they removed dead or dying foliage and applied a rodenticide prior to implementing overwintering procedures.

Overwintering systems – 71% of respondents use some form of structureless overwintering system. They consolidate container to container and cover with a single or several layers of insulating materials.

In zones 3, 4 and 5 respondents used a thermal

blanket plus a layer of poly. In zones 6, 7 and 8 most respondents use only a single layer of poly. 12.3% of respondents use poly huts (low profile poly houses). More respondents (52.9%) use poly houses. Of those poly house users, 66.5% use no additional protection and 31% use a thermal blanket. Poly houses with inflated double poly covers were used by 30.7% of poly house users and 72% of those use heaters to keep root zone temperatures above freezing.

Covering and uncovering – In the fall, respondents try to cover plants as late as possible but before root or crown damage might occur. In late winter or early spring respondents remove or vent the covering to prevent excessive or etiolated vegetative growth but this must occur after danger of injurious low temperatures have passed.

In zones 4 and 5, 71% of respondents cover their plants in November. In zones 6, 7 and 8, 54.4% cover in mid-November to mid-December. Covering is based on species, with the least tolerant plant covered first. Covering is also based on system, with houses and huts covered first, then application of thermal blankets followed by structureless systems last. The reverse order is used for uncovering in the spring.

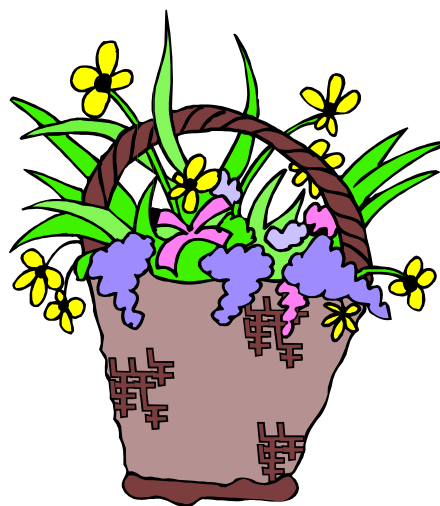
Uncovering in zones 6, 7 and 8 occurs for most respondents (46.7%) in early to mid-March. Unseasonably high temperatures may force managers to uncover/vent and recover several times before the cover is removed completely. In zones 3, 4 and 5 most (59%) respondents uncover from mid-March to mid-April.

Plant loss – 81% of respondents reported only minimal plant loss due to overwintering. Excessive moisture inside or underneath the winter protection device (50.2%) as well as low temperatures and animal damage (33.4%) were cited as the most frequent reasons for loss.

Perimeter plants were also cited as most likely to suffer low temperature injury.

The following perennial genres were cited as most difficult to overwinter. The genres are followed by the number of respondents citing that genus as most difficult.

Iris (n=45)
Delphinium (n=28)
Lavandula (n=27)
Papaver (n=27)
Lupinus (n=23)
Asclepias (n=22)
Phlox (n=22)
Dianthus (n=20)
Coreopsis (n=18)
Anemone (n=17)
Campanula (n=15)
Gaillardia (n=14)
Hosta (n=14)
Alcea (n=13)
Digitalis (n=13)
Echinacea (n=12)
Platycodon (n=11)
Scabiosa (n=11)
Hemerocallis (n=10)
Perovskia (n=10)



**DUTCH ELM DISEASE RESISTANT
TREES - ARE ELMS COMING BACK?**
Bob Mulrooney, Extension Plant Pathologist
University of Delaware

This article was adapted from an article by Dr. John Hartman in Kentucky Pest Alert.

Dutch elm disease, caused by the fungus *Ophiostoma ulmi*, and its aggressive counterpart *Ophiostoma novo-ulmi* (sometimes referred to as American elm disease), has eliminated American elm trees from many Delaware landscapes in past decades. Dutch elm disease is still a threat to the large stand of majestic American elms on the University of Delaware campus in Newark. Nationwide, there is interest in bringing back the American elm. The following material was adapted and summarized from an article from the proceedings of the recent Third International Elm Conference written by Keith Warren of the J. Frank Schmidt & Son Co.

The American elm, because of its tolerance to urban growing conditions and its favorable form, was the dominant street tree in the U.S. in the early part of this century. Because Dutch elm disease all but eliminated this tree from the landscape, efforts have been underway for years to find replacement elms. The USDA has been a major force in finding resistant elms. Nurseries like J. Frank Schmidt & Son, Dick Ammon and others have many disease-resistant elms in some stage of production now, with several already available for planting. Just remember that while Dutch elm disease has been the major disease problem on elms in Delaware, elm yellows, also known as elm phloem necrosis, has been identified in Delaware (near Mt. Cuba) and in nearby southeast Pennsylvania (Longwood Gardens). So there is still some risk in planting American elms resistant to Dutch elm disease because they are susceptible to elm yellows. Elm yellows has

not spread and I have not seen the disease for 10 years, so the risk of elm yellows infection is low, but it does exist. It has never been diagnosed in Newark or on the University of Delaware campus, which has a large population of old American elms.

The elms of horticultural importance in the U.S. belong to four main groups: Chinese elm (*Ulmus parvifolia*); other Asian elms (*U. Pumila*, *U. Japonica*, *U. Wilsoniana*); European (*U. Glabra*, *U. Carpinifolia*, *U. x hollandica*) and European-Asian hybrids; and American elm (*U. americana*). Some of the cultivars used in the nursery trade that are resistant to Dutch elm disease are discussed below. Consult with horticultural and nursery professionals for more details of these disease-resistant cultivars.

Chinese elm (*Ulmus parvifolia*) group: Chinese elm, often called lacebark elm, is Dutch elm disease resistant and has desirable horticultural characteristics such as exfoliating bark. But it reaches only half the height of the American elm, so it should be used differently in the landscape.

- ‘Allee’ elm has a form more upright than the species, but it is smaller, growing 50 ft. This cultivar may be one of the most desirable selections, because, along with ‘Athena’ it combines good hardiness with good bark characteristics.
- ‘Athena’ elm grows to about 30 ft. with a rounded head.
- ‘Central Park Splendor’ elm grows to about 40 ft. and is perhaps the hardiest of the Chinese elm selections. It will be available in the year 2000.
- ‘Dynasty’ elm grows fast, attaining a height of 40 ft.
- ‘King’s Choice’ elm has experienced some branch breakage problems due to its fast growth.

- ‘Drake’, ‘Sempervirens’, ‘Ohio’, and ‘Pathfinder’ are also listed as Chinese elm cultivars.

Other Asian elms (*U. Pumila*, *U. Japonica*, *U. Wilsoniana*) group: Unlike the Chinese elm, the Siberian elm (*U. Pumila*) is not a desirable landscape tree because its brittle branches like to break in storms, it is susceptible to elm leaf beetles, and has other undesirable traits. However, in breeding programs, improved selections and hybrids using this and other Asiatic elms have resulted in some very good Dutch elm disease-resistant cultivars.

- ‘Accolade’ elm, an *U. japonica* x *U. wilsoniana* hybrid comes close to duplicating the American elm form. It grows to a height of 70 ft. and in addition is resistant to elm leaf beetles. It will be available in 2000.
- ‘Canada Charm’ elm, to become available in 2000, is similar to Accolade, but perhaps not quite as good.
- ‘Prospector’ elm grows to 40 ft. and also resists elm leaf beetle. It is an *U. wilsoniana* selection.
- ‘Discovery’ elm is a very cold hardy *U. japonica* selection.
- ‘Vanguard’ elm is heat and drought tolerant. This tough tree is a complex hybrid of Asiatic elms and grows to a height of 45 ft. It will be available in 2000.
- ‘Triumph’ elm is a cross between ‘Vanguard’ and ‘Accolade’ growing to a height of 55 ft. It is attractive both as a young and a mature tree. It will be available in 2000.
- ‘Sapporo Autumn Gold’, ‘New Horizon’, and ‘Cathedral’ elms, hybrids between *U. pumila* and *U. japonica*, are available in the trade. ‘Jacan’ is another

disease-resistant *U. japonica* selection.

European (*U. glabra*, *U. carpinifolia*) and European-Asian hybrids group: European elm breeding programs produced several Dutch elm disease resistant selections that have been hybridized with Asiatic types to produce many of the hybrids in use today as American elm replacements.

- ‘Pioneer’ elm is a hybrid between the two European elms and grows quickly to a height of 50 ft.
- ‘Homestead’ elm is a complex Asiatic and European hybrid that develops a good street tree form to a height of 55 ft.
- ‘Frontier’ elm has a god vase shape and burgundy-red fall color. This *U. carpinifolia* x *U. parvifolia* hybrid grows to 40 ft.
- ‘Commendation’ elm is a complex hybrid growing into an upright form to about 60 ft. It will be available in 2000.
- ‘Patriot’ elm is a complex hybrid that will be available in 2001. It grows to 50 ft. and has an upright vase shape.
- Other complex hybrids in this group include ‘Regal’, ‘Urban’, and ‘Vegata’ elms.

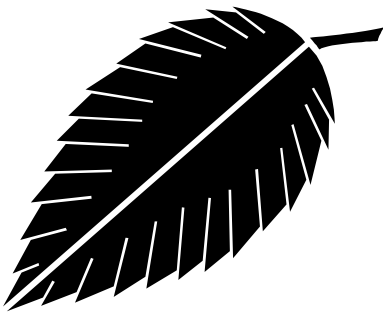
American elm (*U. americana*) group: There is great interest in and demand for American elms with resistance to Dutch elm disease. Unlike their Asiatic counterparts, American elms are still susceptible to elm yellows disease (elm phloem necrosis), and of course all elms are susceptible to some canker diseases and other problems. Nevertheless, resistance to Dutch elm disease is the important feature driving the release of these new elms. Look for these cultivars.

- ‘Valley Forge’ elm has the best disease tolerance of the American elms and will

grow to 70 ft. with the typical vase-shaped form. It will be available in 2001.

- ‘New Harmony’ elm has the second best disease tolerance and may have a somewhat better form than ‘Valley Forge’, also reaching a height of 70 ft. It is also expected to be available in 2001.
- ‘Jefferson’ elm is a national park service selection that has not been widely tested. It is expected to reach a height of 50 ft. and will be available in 2002.
- ‘Washington’ has a similar history to ‘Jefferson’ and also has not been widely tested.
- ‘Princeton’ is an older cultivar with good disease resistance and good horticultural characteristics.
- Other disease resistant American elms include ‘Independence’ and the “American Liberty” group. The latter are seedling selections and may vary in their form and disease resistance.

Although we may have to wait a few years for some of the new disease-resistant elms, several are available. Now is a good time to plan to introduce some of them into our landscapes and along our streets, at least on a trial basis. American elm was the best of the urban street trees. Let’s hope they can make a comeback.



EVALUATION OF FUNGICIDES FOR CONTROL OF POWDERY MILDEW ON FLOWERING DOGWOOD, 1998

**Bob Mulrooney, Extension Plant Pathologist
University of Delaware**

This test was conducted at the University of Delaware Botanic Garden in Newark, DE on trees that were 7-10 ft, grown from seed and purchased locally. Trees were sprayed approximately every two weeks beginning on May 15 when powdery mildew was first observed. The application dates were May 15 and 29, June 16, July 7 and 23, August 5 and 25 for a total of 7 sprays. The fungicides were applied to run-off with a CO₂ back-pack sprayer equipped with a single hollow cone nozzle. Experimental design was a randomized complete block with five replications. The initial powdery mildew rating was made on June 29, followed by rating the number of terminals infected on July 7. The final powdery mildew and aesthetic ratings were made on October 2, five weeks after the last fungicide application. The season was wet and cool early and became very dry from mid-July to the end of the season.

Data show that all treatments provided very good control of powdery mildew, a level that would be acceptable in a landscape setting. Observations made in September indicate that powdery mildew is responsible for much of the premature red coloration of infected flowering dogwoods in the landscape. Bayleton did not provide as much residual control as the other treatments when measured five weeks after the last treatment, but was not aesthetically detrimental. No phytotoxicity was noted for any treatment.

Treatment and rate/100 gallons	Aesthetic Rating ¹	PM Rating ²
Lynx 45 WP 2.22oz	1.2a ³	1.6a
Cleary's 3336 50 WP 12oz +Latron B-1956 .12 % v/v	3.2c	1.6a
Banner MAXX 1.24 ME 8 fl oz	1.4a	1.3a
Eagle 40 WP 6 oz	1.6ab	1.1a
Bayleton 25 WP 4oz	2.4bc	1.6a
Control	8.0d	4.7b

¹Aesthetic rating, overall appearance of plants. 1=excellent, 5=poor and defoliated. Rating made on October 2.

²Powdery mildew rating based on Horsfall-Baratt Rating where 1=0%, 2=0-3%, 3=3-6%, 4=6-12%, 5=12-25%, 6=25-50%, 7=50-75%, 8=75-87%, 9=87-94%, 10=94-97%, 11=97-100%, 12=100% of leaves colonized by the powdery mildew fungus. Rating made on Jun 29.

³Means within a column followed by the same letter are not significantly different, Duncan-Waller *k*-ration *t* test, *k*=100.

**PRACTICAL BIOLOGICAL CONTROL
FOR HEMLOCK ADELGID**
Stanton Gill, Cooperative Extension
Service, University of Maryland

There is good news for nurserymen who raise hemlocks. Mark McClure of the Connecticut Experiment Station has found a predator ladybug in the remote sections of Japan that feeds voraciously on adelgids. The beetle is called *Pseudoscymnus tsugae*, and is small in size (about the size of a poppy seed). The beetle is very hardy and a female will lay up to 4000 eggs in its lifetime. The larvae and adults will feed on hemlock wooly adelgid and the pine adelgid. The beetle will cannibalize it's own species when hosts are not available.

In the spring of 1998, the New Jersey Department of Agriculture released over 70,000 of these predatory beetles in hemlock stands throughout Northern and Central New Jersey. The results will be evaluated over the next three years. In trials conducted in Virginia and Connecticut, *Pseudoscymnus tsugae*, reduced hemlock wooly adelgid by 47 - 100%. This predator ladybird beetle is the most promising biological control that has been developed to reduce hemlock adelgid populations.

Hemlock wooly adelgid was first reported in Eastern Virginia in the early 1950's. Since the original discovery of this pest, it has spread up the east coast to Vermont and New Hampshire and south to North Carolina. The adelgid inject a toxin into the hemlock. The damage first appears as needle discoloration which progresses into branch desiccation. The adelgid can defoliate a tree in two to five years. The adelgid crawlers are abundant in March through June when wind, birds, and forest animals readily disperse them. Moving infested nursery plants also facilitates the spread of the pest.

For the last ten years, several landscape architects have avoided including Eastern Hemlock (*Tsuga canadensis*) and Carolina Hemlock (*T. caroliniana*) in landscape plants because of the susceptibility to damage from adelgid.

In 1993, a west coast nursery supplied us with western hemlock (*Tsuga heterophylla*), and the mountain hemlock (*T. mertensiana*) for an evaluation planting at the University of Maryland Central Maryland Research and Education Center. Both of these species of hemlock are grown from Northern California to Southeastern Alaska where they have co-existed with hemlock adelgid for over 70 years with little or no significant injury. The western hemlock has dark foliage that is closer to taxus foliage rather than to eastern or carolina hemlock. The mountain hemlock looks similar to a spruce in its growth habit. Both species did well in the first year, overwintering with little or no injury. In the second year, a hot, humid summer caused total loss of the planting. These two species may be resistant to adelgid but unfortunately they are not suited for growth here in Central Maryland.

A USDA team consisting of Alden Townsend, Margaret Pooler, and Susan Bentz, at the Glen Dale Experiment Station, are conducting a long term breeding program to develop a hybrid hemlock that will have a natural resistance to damage from hemlock adelgid. They are crossing eastern hemlocks (*Tsuga canadensis* and *T. caroliniana*), with Asian species including chinese hemlock (*T. chinensis*), northern japanese hemlock (*T. diversifolia*) and southern japanese hemlock (*T. sieboldii*). The development of adelgid resistant varieties offers one of the best options for the future. It should be emphasized that it may be a relatively long time before the nursery and landscape industry see the benefit of this great effort.

Life cycle

Hemlock adelgid completes two generations of development per year on hemlock. In March through April, adults of the overwintering generation lay 50 to 300 eggs, each in a cottony mass on the young twigs. Nymphs (called crawlers) hatch from these eggs over several weeks in April through May. Within a few days, they settle on the twigs near the base of needles. A stylet (needlelike) mouthpart is inserted at the base of a needle. The adelgid remains in place throughout its development, maturing in June. Mature females lay eggs in June through July. The crawlers settle on the new tip growth and are generally unnoticeable. Feeding on the hemlock resumes in October and continues during the winter with the adelgid maturing by spring.

Chemical control

Several pesticides are registered for control of hemlock woolly adelgid. For small nursery or landscape, trees a thorough foliar application with horticultural oil, insecticidal soap, diazinon, fluvalinate, imidacloprid, and malathion will give effective control. If the predacious ladybird beetle is brought into Maryland, then only use insecticidal soap or horticultural oil, since these will have minimal impact on the beneficial organism. On trees that are greater than 80 foot in height, spray applications are not feasible. Applications made in September or May-June are the most effective. We have tried trunk and soil injection with imidacloprid (Merit) and obtain excellent control with both applications methods.

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END OF THE SEASON PEST MANAGEMENT

Bob Childs

UMASS Extension Entomologist

Now that the growing season is nearing an end and our thoughts turn to the projects associated with fall and winter, it becomes all too easy to ignore clean-up opportunities for some of our major landscape and nursery pests. The following are some of the more common pests that can (and perhaps should) be managed now.

The **red-headed pine sawfly** can be a late season feeder. This common defoliator of pines, primarily mugo, can feed well into October in the milder climate of coastal areas and inland during warm falls. Last autumn remained dry and warm well into October and this pest created unexpected injury. This hymenopteran species is a yellow caterpillar with a reddish colored head in the immature (and damaging) stage. Susceptible plants should be monitored visually now for the insects' "sudden" appearance and defoliation. Insecticidal soap can be effective on the younger and smaller larvae but may not be effective at all once they are larger. *Bacillus thuringiensis* (B.t.), of course, will not work given that these are members of the hymenoptera (wasps, etc.) and not the lepidoptera (butterflies and moths). Numerous chemical pesticides are labeled for this pest and in cases of small, isolated populations; caterpillars can be pruned out or handpicked from the plant. Their injury usually does not kill the host but they can greatly diminish a plant's aesthetic value.

The **andromeda lacebug** on Japanese andromeda (*Pieris japonica*) can cause unacceptable levels of piercing-sucking injury, especially for those plants in more sunny locations. These pests cause yellowing to appear on the upper leaf surface but the lacebugs themselves are only found on the leaf

undersides. This insect is very near the end of its activity period for this year and leaf undersides should be visually monitored for the presence of active lacebugs before any treatments are applied this fall. Look closely, the cast skins from their molting may be lined up along the veins but no actual lacebugs may be present at this time; use magnification to determine their presence. This pest overwinters as an egg embedded in the foliage and there are no treatments for egg management. Wait until next April/May to begin regular visual monitoring and treat when populations become apparent. Mountain andromeda (*P. floribunda*) lacks the extremely delicate foliage and flowers of *P. japonica* but it is still an excellent alternative choice due to its strong resistance to this pest.

Both the **eastern spruce gall adelgid**, primarily on Norway and white spruces, and **Cooley spruce gall adelgid**, on blue spruce, are out of their galls now and overwintering as immature females at the base of the buds on healthy shoots. Magnification will reveal their presence and any need for management. Horticultural oils work extremely well for these pests and a summer oil can be used now as long as there will not be freezing temperatures for 24-48 hours after application. Bear in mind, of course, that oils do cause blue spruce to lose its blue color for several months. Heavy infestations from these adelgids can cause heavy shoot death over a number of years.

Many **scale** species can still be treated with horticultural oils at this time of year when appropriate temperatures prevail. Susceptible plants should be monitored and treated, if deemed necessary. Look for some of the following specific scale species. **Pine needle scale**, though especially on mugo pines, does affect other pines as well. The **juniper scale** can be found attacking many varieties of juniper. This is a tiny species and must be

monitored closely and carefully. Oftentimes, infestations begin low on the plant and give the affected foliage an off-color. Euonymus scale will overwinter on both the stems and leaves of certain evergreen *Euonymus* while it only overwinters on the stems of deciduous species. Any scales on the fallen leaves of deciduous *Euonymus* will die over the winter.

Hemlock woolly adelgid continues its spread. One of the best management strategies for this serious pest is still the use of horticultural oils. Multiple applications over time, may be required to bring it under control. Once managed on a host plant, one needs to implement a regular monitoring system to prevent reinfestations. The other successful strategy is the use of the chemical imidacloprid (Merit). This works as a soil injection as well as a trunk injection. However, it may be getting too late in the season for proper uptake and Merit applications may need to wait until the spring. This pest has been dormant since July and should have resumed feeding and development in October. It will remain very active throughout the winter so any effective management now could be very beneficial.

Disclaimer: Where trade names are used for identification, no product endorsement is implied nor is discrimination intended against similar materials. The authors have assembled the most reliable information available at time of printing. Due to constantly changing laws and regulations, UMASS Extension can assume no liability for recommendations.

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INDEPENDENT CONTRACTORS REDEFINED:

HERE WE GO AGAIN

**James P. Sargent, Business Mngment Agent
Penn State Extension**

The Federal Courts and The Internal Revenue Service have revisited an area of the law that has had an increasingly significant impact upon the green industry--defining the independent contractor. Many companies have consultants, technical service providers and other professionals, who, from time to time, render services to the business or its clients. Determining whether these individuals are employees, or, as we would prefer, independent contractors is an important issue. This is an issue that could result in additional expenses for the company if they are excluded as independent contractors and deemed employees. The additional expenses include, but are not limited to, employer contributions for Medicare, FICA, and workman's compensation. In addition, the Internal Revenue Service could fine the agency for failing to withhold income tax.

In addition to Federal regulations, it is important for the business to become familiar with individual state's definitions. Most states define an independent contractor as one who accomplishes a specified task for a specified price and retains the right to control the manner in which the work is accomplished. Federal requirements are broader and harder to pin point. While there is still no one determining factor the IRS and the Federal Courts look to, the following considerations are the latest issued when making such a distinction: (If you remember, IRS had a list of 20 items that they used in determining the distinction between an independent contractor and an employee).

1. The degree of control exercised over the worker. The more control a business maintains over the worker, the more likely it is

that the worker should be considered an employee. If the individual is given freedom in the production of the work, they are more likely to be considered an independent contractor.

2. The relative investments of the worker and the “employer”. The courts and the IRS will look to factors like the amount of time, energy and individual tailoring the individual needs to input to fulfill the needs of the company. And, on the other hand, the courts will consider the relative return the individual receives for the effort put forth. The more specialized the work is, the more likely the relationship will be characterized as “employee/employer”.

3. How the opportunity for profit and loss is determined by the “employer”. Courts tend to favor pre-established fee schedules for professionals who are performing specific tasks for a client. The more removed the Profit Loss Statements of the two entities are, the more likely the individual performing the task will be viewed as an independent contractor.

4. The skill and initiative required in performing the job. The more specialized the skill the individual possesses, the more likely the individual will be viewed as an independent contractor. In addition, the courts will consider how frequently the agency needs the particular skill to run their business. The more occasional the skill is required, the more likely the ruling will favor an independent contractor outcome.

5. The permanency of the relationship. All independent contractor agreements should be put into writing with a specific length of time the relationship is expected to last. The shorter the term, the more likely the individual is an independent contractor.

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SOIL AMENDMENTS AND MULCHES IN TREE PRODUCTION

Understanding Soil Organic Matter

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Composts and mulches can be used successfully to improve tree vigor and health. Unfortunately, these organic amendments can be applied such that negative effects are the end result. Many factors contribute to success or failure in these soil organic management practices. This paper reviews the most critical factors that must be considered by agriculturalists.

Fresh versus composted organic matter: Most fresh plant materials cause negative effects on plant growth and/or health for some time after application. For example, freshly ground wood used as landscape mulch increases water retention in soils, immobilizes nitrogen resulting in poor growth and increases Phytophthora root rot. Fresh straw mulches have similar effects.

Composted yardwaste prepared from ground wood and grass clippings has the opposite effect. It improves plant growth, improves both drainage and water retention and provides for biological control of Phytophthora root rot. The same results have been obtained with tree barks.

Vetch plowed into soil as a green manure increased Pythium damping-off of lettuce if the crops were planted within the first week after plowing. However, 10 days after plowing when the green manure is fully colonized by soil microorganisms, the disease is suppressed and biocontrol prevails.

Why do fresh amendments or mulches have these temporary negative effects? Fresh plant tissues incorporated into soil release sugars, proteins and other water-soluble nutrients when they first begin to decay. This stimulates many

plant pathogens as well as other soil microorganisms. Fresh organic matter undergoing high rates of decomposition also binds water making it “slippery” and this increases the water content of soil.

As soon as the organic matter is partially decomposed and competition for food begins among soil microorganisms, beneficial effects begin. Pathogens now are suppressed or killed and beneficial microorganisms thrive. Including mycorrhizae. The structure of the soil is improved which results in improved water retention as well as drainage.

Soil fertility is affected. While organic matter decomposes, fulvic acids are formed. These end products are resistant to decomposition and polymerize to form humic substances in soils. Fulvic and some humic acids remain dissolved in soil water early during the decomposition process. They chelate trace elements such as iron, zinc, manganese, copper, etc. and improve the availability of these elements in soils. This is one reason why manures and sludges “green up” grass so readily.

Highly stabilized sources of organic matter such as that in muck soils or peat, as well as humic substances in mineralized far soils, do not provide these same beneficial effects. Pathogens typically cause heavy losses in such soils unless pesticides are used.

Are all composts equal? Composts prepared from manures and sewage sludges tend to release significant quantities of nutrients for plant growth. They also may be high in salt for the crop. However, since the nutrients are released over several years, large amounts can be applied relative to the same amounts of nutrients in fertilizers. One half bushel of these products per tree gives positive effects on some tree crops.

Composted manures and sludges contain large quantities of fine particles and tend to stimulate the germination of weed seeds. These types of materials should be incorporated into the soil during soil renovation. They are not ideal as mulches.

Hardwood bark tends to consist of large particles and it also immobilized nitrogen unless composted first. The best procedure is to nitrify this material with manure or composted sewage sludge (15% by volume) poultry manure (30-60 lbs/cubic yard) or urea (2 lbs per cubic yard). It should then be composted in windrows at temperatures of 120°F at 50-70% moisture content for 6-8 weeks. This product is very effective if applied as a mulch at a volume of one or more bushels per tree.

Composted yard wastes also enhance soil fertility and have provided biological control of diseases caused by several soil borne plant pathogens. The fine particles (less than one inch in diameter) screened out of composted yard waste make excellent soil amendments for topsoil preparation. The coarse fraction (greater than 1 inch in diameter) makes excellent mulch.

Timing of Application: Fresh undecomposed materials and composts high in salinity must be applied in fall or winter when pathogens and the crop are least active to provide beneficial effects later. Composted sewage sludges and manures high in salinity applied in the spring or summer when *Phytophthora* and *Pythium* are most active, often increase disease pressures rather than provide control. Application of these products in the late fall or mid winter allows for leaching of salts and provides positive rather than negative effects. Many producers of composts have learned to monitor and control the salinity and fertility effects of composts. It is possible today, therefore, to use these products beneficially at any time of the year and avoid negative side effects. Do not use more

compost than fertility guidelines call for.

Optimum depth of mulch layer: Most mulches should be applied at a 2" inch depth to provide weed control. Some landscapers apply mulches to a depth of 4-6". Woodchips applied to a depth of 4" decreased colonization of trees by mycorrhizae in a reforestation trial in Alberta. A 2" deep layer enhanced tree establishment and colonization by mycorrhizae over the control. Many reports have shown that mycorrhizae are stimulated by organic amendments if the correct amount of material is applied, and this also promotes plant health and vigor.

How long do effects last? The disease suppressive effect of composted hardwood bark lasts well into the third year. The lignin (dark material) and waxes in bark resist decomposition, thus the long-term effect. Composted yard wastes (wood, grass clippings) break down much more rapidly because the principal material is cellulose, which breaks down rapidly. However, a two-inch deep layer of mulch lasted well into the fourth year on strawberries at The Ohio State University. Composted manures and green manures decompose more rapidly. The length of time that each product lasts depends on the chemistry of the original material and many other factors.

Summary: Mulches and composts if used properly provide beneficial effects through any of several mechanisms. It is best to apply composted products. Raw products should be applied in the late fall or winter. Do not apply more available mineral nutrients in the mulch than the amount required for the crop. Compost or manure analysis complete with soil analysis and crop need should form the basis for application rates. The frequency of application varies from crop to crop and product to product.

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IRRIGATION SYSTEM FOR FLORICULTURE CROPS

Thomas M. Blessington, David L. Clement, Rondalyn M. Reeser, and Corey E. Reeser
Central Maryland Research and Education Center

When selecting an irrigation system for your floriculture crop, judge watering requirements by substrate look, feel and weight. To avoid the problems associated with under or over watering, water thoroughly with every irrigation. Symptoms of under watering include; wilting, slowed growth, smaller leaves and possible leaf burn. Symptoms of over watering include; excess growth, soft growth, possible root damage, and wilting easily under strong light.

Watering Systems

- Water is primarily supplied to system through water mains installed underground or overhead.
- Two inch PVC pipes are commonly used in 20,000 sq. ft. greenhouses, and 3 inch pipes for a 50,000 sq. ft. greenhouse.
- Double water mains may need to be installed for fertilizer application.
- Most systems can be automated.
- Water efficiency can be improved with use of pulse watering system, where plants receive maximum water without runoff, i.e. boom watering.

Hand Watering

- Not economic due to labor costs.
- Beneficial for spot watering.
- Water supplied through hand held hose.
- Install water breaker on end of hose.

Perimeter Watering

- Plastic polyethylene or PVC pipe run along bench edges.
- Water is sprayed under foliage through

- nozzles that are staggered along the pipe.
- Nozzles can spray 180°, 90°, or 45°.
- Water is projected farther into bed by 90° and 45° nozzles.
- Attach nozzles by holes punched into pipes.

Twin-Wall Watering

- Good for long or sloping benches.
- Constant water pressure exists along tube.
- Tube consists of two sections:
 - -Outer chamber
 - -Inner chamber
- Water first enters the tube in the outer chamber through a special pipefitting connected to the water supply.
- Water moves down the length of the tube until it reaches the end, where it then begins to enter small pores along the tube leading to the inner chamber.
- Once water enters the inner chamber, it runs along a zig-zag path for a short distance, then turns around 180° and heads back to a small hole opposite the original pore entrance.
- Each hole has its own inner chamber.
- Water is forced out the small hole, where it begins watering the crop.
- The zig-zag channel creates water pressure to force out any blockage that may occur.
- Tubes are made from black polyethylene and are 10 or 15 mils thick.
- Exit holes are available every 2 or 4 inches with a slightly higher flow rate for the 2-inch space.
- Place tubes 8 inches apart along the surface of the bench.

Tube Watering

- Run polyethylene microtubes from water supply to each individual pot.

- Attach emitters are attached to end of tube.
- Supply water by ¾-inch polyethylene or PVC pipes that run along center of bench.
- Attach tubes to pipe through drilled holes.
- Consistent tube length is required.
- Level benches ensure even watering.
- Method can also be used for hanging plants.

Overhead Watering

- Apply water through 360° nozzles attached to top of riser pipes.
- Nozzles may be designed to rotate 360°.
- Attach riser pipes periodically to a pipe that runs along center of bed.
- Riser pipes reach well above plant tops.

Boom Watering

- Apply water through nozzles on a water-pipe boom stretching the width of the greenhouse.
- Run boom along rails attached down center of greenhouse.
- Propell boom by an electronic motor.
- Can be programmed to water one side only or to skip sections of the greenhouse.
- Good example of pulse watering.

Mat Watering

- Good for several pot sizes.
- Place polyethylene sheets on benches.
- Place a 3/16- ½ inch thick moist mat on top of the sheets.
- Place pots on the mat, so they take up water through holes on the bottom through capillary action.
- Pots must have bottom holes.
- Once pot is lifted from mat, capillary action is broken; rewater pot from top to reestablish capillary action.

- Benches should be level to insure even watering.
- To prevent algae, place perforated polyethylene on top of mat.
- Supply water to the mat with watering tubes placed 2 feet apart down the length of the bench.

Ebb-and-Flood Watering System

- Place pots in a level, water-tight bench.
- The bench has channels in the bottom and a hole in the center for the water to enter and exit.
- Install a filter and a tee valve in the hole.
- Pump water into bench to a level of ¾ to 1 inch over 10 minutes.
- Allow pots to sit in water for 10-15 min.
- Drain out water over 10 minutes.
- Easy to change pot sizes.
- High humidity may cause problems.

Flood Floor Watering System

- Pave greenhouse floor with a slight slope towards the center on either side and a lip that runs along the perimeter.
- Install a drain hole in the center.
- Install hot -water heating pipes to speed up the time needed to dry the floor to lower relative humidity.
- Flood greenhouse with water.
- Time required to flood greenhouse will vary.

Trough Watering

- Place troughs containing one row of plants parallel down the greenhouse with spaces in between to reduce humidity and promote dryer foliage
- Slightly slope troughs so the water drains into a gutter where it is returned to a holding tank.

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THE IMPACT OF BANS ON WATERING LANDSCAPE PLANTS

American Nursery & Landscape Association

“Americans are going to have to learn that the era of cheap, plentiful water is over.” That statement reflects a consensus among authorities on this vital resource.

The problem is not a scarcity of water, but the fact that the nation’s water resources are badly out of balance. Some sections of the country suffer from a surplus while others are parched. In some areas citizens build dikes to halt floods and mudslides, while elsewhere families wonder where they will find water for next week’s baths and their communities report less than a month’s supply of water in their reservoirs.

In the United States, 82 billion gallons of water are taken from groundwater supplies each day; and only 61 billion gallons are replaced through rain or run-off - a daily deficit of 21 billion gallons.

The problem is real. It is acute. It is permanent. And long-range solutions must be found.

The 0.089% Solution

In many areas where water scarcity exists, a first corrective measure (too often the only step taken) is to ban the use of water in caring for living plants in the landscape. Facts show this to be inappropriate.

Of the 82 billion gallons of water consumed each day in the U.S., just 7.3 billion gallons are for domestic use. And of that amount, only 1% is utilized in irrigating landscape plants. *In other words, under one nineteenth of one percent of the nation’s water is devoted to maintaining environmental quality through green, growing plants.*

This document explores the impact of landscape watering bans . . . on the environment . . . on property owners . . . and on the landscape industries.

Impact on the Environment

Recent studies have shown that energy savings from a properly landscaped home can be as great as 40% . Where winters are cold, a barrier of trees at the north and west sides of a building shield it from chilling winds to effect fuel savings up to that amount over the same house without the trees.

Trees and other living plants perform the same kind of energy-saving service in hot months, too. Planted on the west and south of the building where they shade walls and windows, they can make a cooling difference that averages about 8 degrees.

Vines growing on a masonry wall (or on a trellis if walls are wooden) achieve the same effects by providing insulation in cold months and intercepting the sun's heat in hot weather. Living plants are nature's dust traps, with leaf surfaces that clutch a steady flow of filth from the atmosphere and hold it until rain washes it back into the earth. And in the process of creating needed oxygen, those plants absorb huge quantities of carbon dioxide from the air--a process on which our lives depend.

Today's environmental condition calls for so much that is given through living plants-- purification of the air, stabilization of the soil, clean waters, noise abatement, contributions to mental and emotional well-being, and more.

In return for all the benefits they bestow, however, living plants in the environment require a certain amount of water. Most of the recent drought-affected areas (chiefly the northern tier of the United States) have

landscapes that require from one inch to two inches of rainfall every 10 days. When that does not occur, supplemental watering is necessary to sustain their life.

But only about 5% of the water taken in by the roots of trees and other woody landscape plants is used for growth and development. The remainder is transpired into the atmosphere. It has been estimated that the transpiration of a single mature tree can equal the atmospheric cooling effect of five average room air conditioners operating 24 hours a day.

Impact on Property Owners

In 1980 there were 48.2 million owner-occupied single-family dwellings in the United States. 35.6% of these were in Southern region; 28.8% in the North Central region; 17.3% in the Northeast, 9.2% in the Southwest; and 9.1% in the Northwest.

The average residential landscape today is valued at \$13,076 (based on the average U.S. home sale price of \$93,400).

This means the economic value of the 48.2 million residential landscapes in the U.S. is over \$630 billion.

Most of this economic value has been invested in deciduous and evergreen trees and shrubs. These investments were made as homeowners landscaped their yards to increase the economic value of their homes. (One study published by the U.S. Forest Service shows the presence of trees and other living plants on a property can increase its value from 5% to 30%).

Depending on the age, size, species, cultivar and root system of these plants, among other factors, they can and do suffer water stress during periods of drought. The damage that results can frequently be latent, but eventually will kill the

plant.

Aside from all the environmental values and enhancements to the quality of life they provide, living plants in the landscape are a major financial investment at risk of needless loss with a ban on the limited watering they require.

Impact on the Landscape Industries

The landscape industries include firms that sell lawn and garden products, design and install landscapes, maintain and care for landscapes, and produce and sell nursery stock. These industries employ over half-a-million persons and sell nearly \$16 billion annually in products and services. In 1981, over 90% of those firms were located in drought-affected areas.

The limiting of water use in the landscape endangers the economic viability of not only nursery firms, lawn and garden retailers and landscape contractors, but all the service firms involved in landscape maintenance activities as well. Rather than risk an economic loss of plants that cannot be watered, individuals and firms will forgo the investment--and the entire landscape industry will be damaged. It is a small benefit that nursery firms might be permitted limited watering during a ban, if the living plants cannot survive once installed in a landscape.

Recommendations

A ban on plant irrigation during a period of water stress has an unpredictable effect because of a number of variable factors--composition of the soil, total dissolved salts in the water, absolute amount of water, available oxygen, plant species, air and soil temperatures, air relative humidity, wind velocity, light intensity, and root/shoot ratios of the plants. Because this is true, each landscape must be judged independently of others as to its water requirements.

A uniform statewide—even countywide—ban on landscape watering does not distribute the risk in a reasonable manner. Each homeowner or landscape firm must make a watering decision depending on the area and specific plants in question. In view of the great environmental and financial values involved, this appears to represent the most practical approach.

But an extensive consumer education program on proper irrigation practices to conserve water must accompany this policy. Some of the points important to property owners will be these:

- Irrigation of plants with less frequency but with heavy application is much better for the plants than more frequent but lighter application—this saves water too.
- Water trees and shrubs with a hand-held hose or container to direct the water on the root area.
- Apply water slowly, in a “trickle” method to avoid run-off.
- Mulch living plants to avoid moisture loss through evaporation or run-off.
- Only irrigate those living plants that require irrigation—and only when the need truly exists. (Many consumers tend to water their lawns during drought conditions. Lawns may turn brown but will survive for long periods without supplemental moisture—unlike woody plants in the landscape.)

Information of this nature is available through agricultural agents, the nursery industry, and numerous other sources. The same expenditure of time and money involved in announcing and enforcing a ban on watering of environmental plants could support its broad dissemination.

Summary

A uniform state or regional ban on irrigation of environmental plants may appear to save water in the short run; however, the amount of water usage devoted to this purpose is well under one-tenth of one percent of the nation's total consumption. Its limitation places a severe economic risk on a large number of property owners, commercial firms, and the landscape industry as a whole. The ecological impact from the loss of the living plants would be immeasurable.

Each landscape is different, and the property owner must make an independent decision to irrigate based on the needs of the area and the types of plants involved, the economic value of the landscape, and the availability of water. Property owners can be educated to make these water conservation decisions wisely.

The loss of landscape plants due to water stress will have an economic and environmental impact many times the importance of any water that might otherwise be saved. Certainly, the risks are too great.

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DRY WEATHER CAN INITIATE LONG-TERM LANDSCAPE PROBLEMS

John Hartman
University of Kentucky

Editor's Note: This summary of conditions in Kentucky is similar to our experiences in Delaware and provides good information about what to expect with landscape trees and shrubs in the future.

A brief glance at un-irrigated landscape trees, shrubs, and lawns as well as at farm crops confirms that we are experiencing a very dry period in most of Kentucky. Although rainfall in some parts of eastern Kentucky brought temporary relief last week, the over-all situation remains grave. Watering restrictions are in force in most areas. Unfortunately, higher-than-normal temperatures have accompanied drought for much of the summer. In the landscape, seedlings and recently transplanted trees and shrubs have been at greatest risk because they lack extensive root systems.

Most of us are familiar with wilting and leaf scorch symptoms associated with dry weather. Leaves of drought-stressed plants close their stomata, which reduce their rate of photosynthesis. Depending on species, they may not recover their former photosynthesis capacities, even when irrigated following drought. Reduction in photosynthesis may not kill a tree, but it means fewer carbohydrates are made and stored for future use. In addition, leaves of many trees and shrubs are beginning to turn yellow or brown and are dropping to the ground. Some species increase their production of leaf abscission chemicals in response to drought. Fewer leaves means less water loss.

Diseases such as bacterial leaf scorch may show enhanced symptoms during times of drought. In addition, there are some diseases of landscape trees and shrubs that normally do not appear

until after the drought has occurred. Drought-related predisposition to attack by opportunistic pathogens can occur even when drought stress symptoms are not obvious. The role of water stress in encouraging opportunistic plant pathogens is unclear. It is possible that the stress condition interferes with the plant's defense against such pathogens, or possibly, the reduced carbohydrate reserves leaves the plant little energy to fight invasion by pathogens.

Certain fungi such as *Hypoxylon*, an oak pathogen, and *Armillaria*, which attacks many woody plants are influenced by drought stress. Similar relationships to drought may exist with other fungi such as *Thyronectria*, cause of honey locust canker, *Cytospora* or *Valsa*, causes of cankers on prunus, poplar, willow, maple, spruce and other conifers, *Sphaeropsis*, cause of pine tip blight and *Botryosphaeria*, cause of cankers of many woody plants. Symptoms of these cankers may not appear until the season following the dry weather.

Thus, it is important to continue watering woody landscape plants, so long as local watering restrictions allow it. Further information on this subject is available in U.K. Extension Publication ID 89, *How Dry Seasons Affect Landscape Plants*.

Reprinted from University of Kentucky Newsletter.

THE ALIENS ARE AMONG US....
Jim Parkhurst, Extension Wildlife Specialist
Department of Fisheries and Wildlife Sciences

Throughout the last decade, we have witnessed a tremendous increase among landowners in the amount of interest in and actual on-the-ground implementation of management efforts to improve the quality of their lands. One area where substantial activity has occurred falls within what we might generically call "wildlife habitat improvement."

People enjoy wildlife for a variety of reasons: viewing, photographing, hunting, feeding, or just knowing that they are out there; and many landowners have made great strides toward creating the kinds of habitats that will allow them to pursue the types of activities related to wildlife that they desire. However, in the rush to create that "perfect" habitat, we often tend to overlook some of the subtle consequences that may result from our actions. I believe most people today do recognize that any purposeful tinkering they impose upon a system will cause associated ripples back through that system. We have all heard and recognize that jingle of "...for every action, there is an equal and opposition reaction." Well, this is especially true when we start tinkering with habitats. Although we may have specific objectives relating to what we want to create or improve for the benefit of a specific species (or group of species), we tend to forget that, as a direct result of the action we take to "help" that species, other animals will be affected negatively. The specific habitat needs of these other resident animals can no longer be satisfied by the "new" habitat. Therefore, as a part of any sound management planning effort, consideration also must be given to the potential existing benefits that might be lost while you eagerly anticipate the new benefits obtained as a direct result of your habitat improvement work.

An area of growing concern relates specifically to one type of tinkering that we routinely undertake, namely the use of plant materials to “enhance” a site. How we use plant materials in habitat work can take many forms. Landowners have long been interested in creating food plots as a means to attract wildlife or provide increased opportunity to view animals. Alternatively, in cases where properties have been disturbed as a part of conducting other management practices (e.g., timber harvest) there is need to quickly revegetate and stabilize these areas before erosion problems arise. Finally, there may be a simple desire to add a couple of new “wildlife” plants to the home landscape with hopes that some new critter might show up. The concern today lies in the selection of plant materials we choose to use. In recent years, there has been an alarming increase in our reliance upon exotic (non-native) species to fulfill these needs. Early on, few people recognized the impact these exotics were having on the native flora, but now we can see very clearly the negative consequences of our previous actions. Certainly no one needs to be reminded of what impact kudzu (*Pueraria lobata*) or tree-of-heaven (*Ailanthus altissima*) can have on the ecology of a site. In some areas, these plants have taken over completely or placed the survival of the native flora in jeopardy. And, as we learn more about biodiversity and what this ecological concept truly encompasses, the devastation inflicted by invasive exotics becomes clear.

Recently, Robert Paratley, curator of The University of Kentucky Herbarium, published an excellent overview article on the effects of invasive exotics that all landowners should learn more about. He paints an ominous picture of problems down the road, one where the problems inflicted upon our landscapes unfortunately seem to be getting worse instead of better. Certainly, the headline cases involving kudzu and purple loosestrife (*Lythrum*

salicaria) are fairly well known by most landowners. However, a large number of plant materials commonly used in habitat improvement projects over the years fall into the same list of exotics. Few landowners realize that most honeysuckles (*Lonicera spp.*), most lespedeza (*Lespedeza spp.*), Russian and autumn olives (*Eleagnus angustifolia* and *E. umbellata*), and fescues (*Festuca spp.*) species promoted since the 1950s for wildlife enhancement - are exotic, and sometimes invasive, species. Mr. Paratley identified a number of characteristics that describe exotics, including the following:

- They produce small, but numerous, seeds.
- They reproduce within the first years of life.
- Most are capable of both seed and vegetative reproduction.
- Most seeds produced are dispersed widely by animals.
- They have very few specific or unique germination needs.
- These plants often are self-pollinating.
- They have few, if any, close relatives native to this county.
- They are capable of surviving a wide north-to-south gradient of conditions.
- They have been introduced on a very large scale.

Given this impressive list of competitive advantages, it is obvious why they have become so successful in areas where they have been introduced why there is growing concern over the effects these plants will have on our native ecosystems. Animals that are dependent upon native plant species may suffer as these plants become scarce or vanish.

My purpose in bringing this issue to your attention is twofold: (1) we need to raise level of awareness among landowners, natural resource

managers, consultants, and others involved in management planning about the serious consequences resulting from the invasion of exotic plant materials in this country, and (2) when habitat “improvement” objectives are being fulfilled, we need to make our selections for plant materials from among those items that are indigenous to this area, rather than from those outside the system. Once established, these exotics are extremely difficult to remove or control. It is far better to never let them achieve a foothold than to try to eradicate after the fact. Biodiversity is an important concept, but its emphasis is, and should be, on diversity within the native system, not diversity based on the import of exotic biological material.

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AMERICANS SPEND RECORD \$16.8 BILLION ON PROFESSIONAL YARD AND GARDEN HELP IN 1998.

With a backdrop on continued economic growth and a strong national housing market, more than 21 million U.S. households spent a record \$16.8 billion on professional landscape/lawn care/tree care services in 1998, according to a just-released Gallup survey. This represents a \$2.2 billion increase on total spending over the previous year and a 32 percent increase in the average amount spent by each household on these professional services.

Spending on landscape installation and construction activities accounted for the largest increase, both in total dollars spent nationwide (\$6.3 billion) and average amount spent per household (\$2,630, up 48 percent). “This new data supports the growth our landscape members have experienced in their own markets,” observed ANLA President Ed Porter, Porter Farms, McMinnville, TN, adding that “a strong economy, home sales, and increased appreciation of practical benefits of a professional landscaping” are the “fundamentals” behind these spending increases.

The American Nursery & Landscape Association (ANLA), the Associated Landscape Contractors of America (ALCA), the International Society of Arboriculture (ISA), the National Arborist Association (NAA), and the Professional Lawn Care Association of America (PLCAA) sponsored the Gallup survey. It was conducted in cooperation with the National Gardening Association (NGA).

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IDENTIFYING PLANT AND PEST PROBLEMS USING COMPUTER AND INTERNET RESOURCES

Robert D. Berghage

The Internet is finally beginning to live up to its promise and an increasing amount of useful information is available on the World Wide Web to anyone able to access it. Green industry professionals can find everything from basic fact sheets on plant problems to pesticide recert. meeting announcements, to online training programs, to unique business opportunities.

For most green industry users, the Internet can provide both basic information and a connection to fellow professionals through e-mail and list servers. The latter function can be very helpful in diagnosing problems because you can tap into knowledge of experts from around the globe. Eventually, entrepreneurs in the green industry will conduct more and more of their business over the Internet.

Finding the information you want can be the most frustrating part of using the Internet. One of the best ways to locate information is through links from pages you like. The following web sites are a few good starting points.

The Pennsylvania State University:

Trial Gardens -
<http://garden.cas.psu.edu/garden/index.html>

Plant Disease Facts -
<http://www.cas.psu.edu/docs/CASDEPT/PLANT/ext/fact.html>

Pesticide Education Program -
<http://www.pested.psu.edu>

PA IPM website -
<http://www.cas.psu.edu/doc/casdept/ipm/index.html>

Pen Pages - <http://www.penpages.psu.edu>

World Campus -
<http://www.worldcampus.psu.edu/pub/index.shtml>

Pennsylvania Department of Agriculture:

Bureau of Plant Industry can be accessed through the Department site
<http://www.pda.state.pa.us>

Delaware Department of Agriculture:

This website is currently under construction
<http://www.state.de.us/deptagri/deptagri.htm>

Other sites:

National IPM homepage -
<http://www.reeusda.gov/nipmn/>

Northeast IPM network -
<http://www.nysaes.cornell.edu/ipmnet/index.html>

Cornell IPM Ornamentals and Turf
<http://nysaes.cornell.edu:80/ipmnet/ny/ornamentals/>

Cornell pesticide education program -
<http://pmep.cce.cornell.edu/>

Biological control -
<http://www.nysaes.cornell.edu:80/ent/biocontrol/>

Reprinted from Regulatory Horticulture, Spring 1999, Vol. 25.



Pesticide News

Insecticides:

ADEPT (diflubenzuron) - Uniroyal -Added to their label on ornamentals the prohibition of usage on poinsettias, hibiscus and Reiger begonia.

BIO-ORGANIC (natural tree oils) - Eco Smart Tech - A new insecticide based on essential oils the company is developing for the homeowner and for the turf and ornamental market.

FLORAMITE (bifenazate) - Uniroyal - Received EPA registration to control mites on ornamentals in fields, shade houses, interiorscapes, landscapes, greenhouses and nurseries

MERIT 75 (imidacloprid) - Bayer - Added to their label the control of cutworms.

ORTHENE (acephate) - Valent - EPA has registered a new pelleted formulation called Orthene 97. It is easier to mix and reduces the potential of worker exposure. Also, it is low in order.

Fungicides:

DEGREE (fenhexamid) - SePro - Recently received EPA registration to use on ornamentals to control botrytis.

DEFIANT WDG (thiram) - UCB Chemicals - A new formulation, recently introduced, to control turf disease and as an animal repellent.

HERITAGE (azoxystrobin) - Zeneca - Added to their label on ornamentals and turf, the usage to control root diseases, leaf, tip and flower blight, leaf spots, downy mildew and rusts.

Fumigants:

Methyl Bromide Phase-out Amended

Effective July 1 ... EPA's final rule revising the phase-out regulations that govern production and importation of methyl bromide. The amendment reflects changes in U.S. obligations under the Montreal Protocol, and international agreement recently adjusted by the signatory countries. To conform with the Montreal Protocol's schedule for industrialized nations, the EPA issued the following schedule for production and consumption of methyl bromide:

- 25 percent reduction in baseline levels for 1999
- 50 percent reduction in baseline levels for January 1, 2001
- 70 percent reduction in baseline levels for January 1, 2003
- 100 percent reduction in baseline levels for January 1, 2005, with emergency and critical use exemptions permitted under the Montreal Protocol.

Even sooner, EPA plans to publish a process to exempt quantities of methyl bromide used in the U.S. for quarantine and preshipment. The proposal is on the Web at: <http://www.epa.gov/fedrgrtr/EPA-AIR>. Click on June 1, 1999, and select "Protection of Stratospheric Ozone..." Contact: Tom Land, 202-564-9185, or the Ozone Hotline, 1-800-269-1996.

EPA Turns Toward Tolerance Reassessment of Non-ops

Pesticides other than OP's are coming up for reregistration. Real world data are essential for regulatory decision-making. This fall EPA will make several reregistration decisions for non-

Ops, including the products listed below. To inform EPA of any critical uses you have for a product, contact the product's chemical review manager, who also is listed.

- Tillam/pebulate -- Patty Moe, 703-308-8011
- Phaltan/folpet -- Christians Scheltema, 703-308-2201
- Captan -- Kathryn Boyle, 703-305-6304
- Lampricide/niclosamide -- Laura Parsons, 703-305-5776
- Eptam/EPTC -- Jamul Mixon, 703-308-8032
- TPTH/triphenyltin hydroxide -- Loan Phan, 703-308-8008
- Bendiocarb -- Diane Isbell, 703-308-8154
- Carzol/formetanate hydrochloride -- Michael Goodis, 703-308-8157

EPA's advice to growers: tell registrants about your critical uses; don't assume that registrants already know.

Research Briefs

Propagation:

Rooted cuttings and seedlings of *Stewartia pseudocamellia*. When vigorous-growing 18-month-old seedlings were used as stock plants, softwood stem cuttings (taken in early June) were rooted in high percentages (90%) with low auxin concentrations (100 ppm IBA). The propagation window can be extended into August if cuttings are first treated with a basal dip in 0.1 M. ascorbic or caffeic acid before being given a basal quick dip in a 100 ppm IBA solution. Cuttings from both propagation times can be successfully overwintered. Based on the results of this study, seedlings grew more vigorously than rooted cuttings. However, a final recommendation on whether seedlings are superior to rooted cuttings must wait until long-term performance results are available. (D.K. Struve and L.M. Lagrimini)

Excerpted from J. Environ. Hort 17(2):53-56. June 1999.

Shading during rooting improves propagation of oak and maple taxa.

Subjecting cuttings to low irradiances (93% shading relative to outdoor ambient solar radiation) for 10 days or more while in a fog humidified polytent rooting chamber resulted in the highest percentage rooting of cuttings for four of six species tested. Treating cuttings with a duration of low irradiance while rooting is an uncomplicated, environmentally responsible, and low-cost technique that should enable growers to increase production and diversity of selected woody plants. (J.J. Zaczek, C.W. Heuser, Jr. and K.C. Steiner)

Excerpted from J. Environ. Hort. 17(3):130-133. September 1999.

Optimizing seedling production of Atlantic white cedar. There is great demand for transplants of Atlantic white-cedar (*Chamaecyparis thyoides*) for wetlands restoration. Production of planting stock in greenhouses provides greater opportunities to manipulate environmental factors and optimize growth, compared to conventional outdoor nurseries. Optimal seedling growth of Atlantic white-cedar can be achieved by utilizing a day/night cycle of 86/72F with long-day conditions. (L.G. Jull, F.A. Blazich and L.E. Hinesley)

Excerpted from J. Environ. Hort. 17(3):107-113. September 1999.

Comparing rooting media for softwood stem cuttings in a subirrigation system. Results of this study indicate that mixtures of peat and perlite can be used successfully as a rooting medium to root softwood cuttings of many woody species in a system of subirrigation with minimal mist, and that varying the ratio of peat to perlite can be a practical means of adjusting the pH and moisture content of the rooting media. The ability to manipulate these factors may be critical to a plant propagator who is attempting to root cuttings of plant species that might be sensitive to the pH or moisture content of the rooting medium. (G.J. Giroux, B.K. Maynard and W.A. Johnson)

Excerpted from J. Environ. Hort. 17(3):147-151. September 1999.

Soaking in cold water can replace stratification for *Cedrus* sp. Soaking *C. deodara* seeds in aerated water at low temperature mainly improved the uniformity of seedling emergence. It increased the final emergence percentage only slightly above that of stratified seeds but that may be significant with the low germination rates of *Cedrus* sp. Results in this and previous studies suggest that

cold soaking can replace stratification completely in seeds that require a short period of stratification, but only partly in seeds with longer stratification periods. (D. Brand and J. Riov)

Excerpted from HortScience, 34(5):935. August 1999.

Greenhouse production:

Enhancing post-production growth of potted *Alstroemeria*. An application of resin-coated fertilizer to marketable plants prevents chlorosis, increases fresh weight, and if low to moderate rates of formulations with N-P ratios of at least 6:1 are applied, does not inhibit flowering. A medium rate of RCF, supplying N at 0.8 to 1.2 kg/m³ is adequate. (A. Chiari, G.C. Elliott and M.P. Bridgen)

Excerpted from HortScience 33(4):657-659, 1999.

Growth of pansies in an ebb-and-flow system. Pansies can be successfully produced in an ebb-and-flow system if the leachate EC is maintained between 164 to 256 mg/L N). Daily subirrigation with solutions with an EC_{fert} higher than 0.6 dS/m increased the EC of the growing medium throughout the growing period. Fertilizer EC had some effect on the nutrient composition of the plants. Only P and Mn content of the shoots increased, while K, Mg, and Na decreased with increasing EC_{fert} . These differences did not appear to affect growth. (M. van Iersel)

Excerpted from HortScience 33(4):660-663, 1999.

A naturally-occurring compound for controlling powdery mildew of greenhouse roses. Quaternary benzophenanthridine

alkaloids (QBAs) isolated from plants in the family Papaveraceae are effective for the control of some fungal diseases. Extracts from *Macleaya cordata* were applied to greenhouse roses to treat powdery mildew at 10-day intervals. One day after treatment, visible symptoms of mildew were reduced by 60% by QBA, whereas fenarimol, copper sulfate pentahydrate and piperalin reduced the symptoms by 50%, 75% and 85%, respectively. Subsequent studies demonstrated that a tank mix of QBA and piperalin provided enhanced control of powdery mildew on rose, indicating that QBAs have the potential to be developed as a biorational fungicide for greenhouse use with both fungicidal and fungistatic activity. (S.E. Newman, M.J. Roll and R.J. Harkrader)

Excerpted from HortScience 33(4):686-689, 1999.

Optimum fertilizer rates for double impatiens. For maximum shoot growth with flood irrigation, growers should apply 100 mg/L N when growing 'Purple Magic' impatiens and a fertilization rate between 50 and 100 mg/L N for 'Blackberry Ice.' (B.E. Whipker, S. Dasoju, M.S. Dosmann and J.K. Isles.)

Excerpted from HortTechnology 9(3):425-428, 1999.

Use of Promalin® to control leaf chlorosis on Easter lily. Gradual yellowing, which progresses from basal to upper leaves, is a common disorder and can result in significant reduction in market value. Promalin® (PROM; 100 mg/L each of GA₄₊₇ and BA) can be used to prevent leaf chlorosis induced during greenhouse production. However, excessive stem elongation limits the use of this concentration of PROM at early stages of growth (OK when applied at 80 days after planting or later). Possible alternatives to avoid stem elongation may be to: 1) use lower

concentrations of PROM that prevent leaf chlorosis, but may not cause stem elongation; and 2) apply PROM only to foliage on the lower part of the stem. (A.P. Ranwala and W.B. Miller)

Excerpted from HortScience, 34(5):902-903, August 1999.

Container production:

Lime and micronutrient amendments to pinebark. The greatest growth of all species occurred in bark amended with micronutrients. Amending bark with lime had no effect on growth. Species used in this experiment represent a wide range of landscape trees from seven plant families. Thus the common practice of liming pine bark was found to be unnecessary for many seedling tree species grown in the pH range of these experiments (4.7-5.8), and was even detrimental to growth by raising the pH and making any micronutrients present in the substrate less available for plant uptake. An important consideration was that the experimental irrigation water had Ca and Mg concentrations of 10.2 and 4.2 mg/L, respectively. The dramatic response to micronutrients indicates that lack of micronutrients in pink bark in the pH range of these experiments limits growth, thereby necessitating a micronutrient amendment. The importance of micronutrients may depend on substrate pH. The effect of micronutrients was greatest at relatively high pH (> 5.2) and in combination with liming. If bark pH is relatively low (4.0-4.2) a micronutrient amendment may be unnecessary. (A.N. Wright, A.X. Niemiera, J.R. Harris and R.D. Wright)

Excerpted from HortScience 33(4):669-673, 1999.

Micros required for *K. paniculata* production. This study provides more evidence to confirm the need for micronutrients regardless of substrate pH and the lack of response to lime when container trees are grown in a pine bark substrate. (A.N. Wright, A.X. Niemiera, J.R. Harris and R.D. Wright)

Excerpted from J. Environ. Hort. 17(2):68-72. June 1999.

Nitrogen fertilization of containerized *Thuja* x 'Green Giant.' Applying N as ammonium nitrate (NH₄NO₃) at rates >100 mg/liter (ppm) does not increase shoot dry weight or mineral nutrient uptake. Root dry weight and length do not continue to decrease at N application rates (NARs) >50 mg/liter (ppm). Increasing NAR beyond 100 mg/liter (ppm) N will neither improve shoot growth nor prove detrimental to root growth. Electrical conductivity of substrate solution for treatments that maximized growth were within the recommended range for container-grown nursery crops. Therefore, 100 mg/liter (ppm) N, applied three times weekly, is recommended for maximum growth of 'Green Giant.' (J.J. Griffin, S.L. Warren, F.A. Blazich and T.G. Ranney)

Excerpted from J. Environ. Hort. 17(2):76-79. June 1999.

Pruning liriop foliage during division slow growth. This study indicates that liriop shoots not pruned at division (a common industry practice) produce more roots faster than when the shoots were pruned to a 2 inch height, regardless of root volume. It is also believed that larger root sizes at division may be beneficial if adequate plant material is available for division. (C.K. Hayes, C. H. Gilliam, G.J. Keever and D.J. Eakes)

Excerpted from J. Environ. Hort. 17(3):119-122. September 1999.

Green Ash grown in aboveground wire containers. Trees were grown above ground in wire baskets lined with either tar paper, vinyl or geotextile fabric. They were transplanted into the landscape 2 years later and planted with the entire basket and liner removed, the wire basket with vertical gashes in the liner or with the entire basket and line in tact. Tree growth was observed for 6 years. Overall, the optimum growth occurred for trees originally grown with tar paper liners, but whose basket and liners were removed before planting. The wire baskets had little or no effect on the roots systems, as roots were not large enough to be restricted or girdled by the openings of the wire basket. (C. Chong and B. Hamersma)

Excerpted from American Nurseryman, July 15, 1999.

Landscape:

Response of Freeman and red maples to drought and flooding stresses. Results suggest that 'Indian Summer' (a Freeman maple) is particularly prone to flooding stresses. There were differing capacities for recovery among cultivars tested, suggesting the potential to select genotypes with superior flood resistance. Whether Freeman maples are consistently more resistant to water stress than red maples under landscape conditions remains unknown, but some red maples showed as much drought and flooding tolerance as some Freeman maples. Freeman maples as a group had less stem elongation, greater root dry weight, lower leaf surface area:root dry weight and higher root:shoot ratios. These traits might be considered advantageous during drought because they represent a potentially more favorable balance between tissues that obtain water and tissues that lose water. (J.A. Zwack, W.R. Graves and A.M. Townsend)

Excerpted from HortScience 33(4):664-668, 1999.

Root growth of red and sugar maple.

Extensive root growth occurs two to four weeks before budbreak for 15 gal. pot-in-pot red and sugar maples in zone 6a climates, although timing between the two events can vary from year to year. Trees must be planted no later than very early in the spring (e.g. February) to take full advantage of establishment before spring budbreak. Root growth sharply slows at the beginning of spring shoot growth. This is not an optimum time to transplant. Root growth begins in the spring as substrate temperatures near 50F and dramatically slows in the fall when substrate temperatures drop to 40-50F for both species. Some nominal root extension occurs throughout the winter for sugar maple, but red maple has almost no root growth at this time. (J.R. Harris and J. Fanelli)

Excerpted from J. Environ. Hort. 17(2):80-83. June 1999.

Use of non-potable water sources on

landscape plants. Effects of low quality water on woody landscape plants in this study indicate some variation in growth and appearance from one species to another. Growth and appearance of twelve species was not reduced by use of medium-quality water (80 mg Na/liter; EC=0.98 ds/m) when compared with growth and appearance of plants irrigated with high quality, potable, water (15 mg Na/liter; EC=0.30 ds/m). Irrigation with low-quality water (120 mg Na/liter; EC=2.10 ds/m) reduced the height of yew and juniper, and the appearance of ash, linden, euonymus and yew while improving growth of honey locust when compared with control plants. All species used in this study have been recommended for use when salinity of water is lower than 0.98 ds/m when salinity of irrigation water is less than or equal to 2.10 ds/m, pear, plum, honey locust, Japanese pine,

Australian pine and barberry will not likely experience reduced growth or appearance. (T.M. Quist, S.F. Williams and M.L. Robinson)

Excerpted from J. Environ. Hort. 17(2):88-91. June 1999.

Seed production of *Miscanthus* species and cultivars. *Miscanthus* has been cited for its invasive self-seeding characteristics. This study evaluated cultivars in different years and hardiness zones for seed set and germination. Thirty types had seed viability of >18%. Taxa with little viable seed, <18%, in this study that may be good selections to promote as non-invasive include: *Miscanthus x giganteus*, *M. sinensis* cultivars 'Autumn Light,' 'Duxueabd,' 'Kirk Alexander,' 'Little Kitten,' 'Morning Light,' 'Rigoletto,' 'Silberfiel,' 'Strictus,' 'Variegatus,' and 'Yaka Jima.' Nurseries should be aware of the potential self-seeding of this genus and be especially careful where field stock or mother plants are grown near open meadows and fields where seedlings could become established in native plant communities. (M.H. Meyer and C.L. Tchida)

Excerpted from J. Environ. Hort. 17(3):137-140. September 1999.

Katsura's response to drought. As a landscape plant, the katsura is valued for its brilliant autumnal leaf color, picturesque form, slightly shaggy bark, and disease and pest resistance. Despite these attributes, use of katsura in the landscape is rare. The reputation of katsura as a drought-intolerant tree may play a role in its limited usage. Researchers in this study concluded that katsura is a drought avoider that abscises leaves to reduce transpirational water loss. Although plants are capable of refoilation after water becomes available, to maintain the greatest ornamental value in the landscape, siting of katsura should be limited to areas not prone to drought. (M.S.

Dosmann, J.K. Iles and W.R. Graves)

*Excerpted from HortScience, 34(5):871-874.
August 1999.*

Tall fescue cultivars vary in their tolerance of drought. This study demonstrated variation in drought resistance among tall fescue cultivars, which was related to their differential responses in photosynthetic capacity and water relations. Of the cultivars tested, 'Houndog V,' 'Kentucky-31,' and 'Falcon II' were more drought resistant than 'Rebel Jr.,' 'Bonsai,' and 'Phoenix.'" (B. Huang and H. Gao)

*Excerpted from HortScience, 34(5):897-901.
August 1999.*

Pest Control:

Supplemental nitrogen effects on azalea lace bugs. The results of this study indicate that supplemental nitrogen fertilization of container-grown azaleas does not affect the injury caused by azalea lace bugs. The results do indicate that lace bugs may preferentially choose plants that have received supplemental nitrogen fertilization over those that have not. Therefore, it may be necessary for landscapers and growers to monitor more frequently for lace bugs on fertilized plants. (C.A. Casey and M.J. Raupp)

*Excerpted from J. Environ. Hort. 17(2):95-98.
June 1999.*

Whitefly and Lace Bug on *Lantana* spp. in the greenhouse. Greenhouse and silverleaf whitefly populations in the greenhouse increased more rapidly on 'Miss Huff,' 'Confetti,' and 'Radiation,' the large-leaf cultivars. 'Dallas Red' demonstrated the least susceptibility of both species of whitefly. Similarly, pest population establishment on the other small-leaf cultivars 'New Gold,' 'Cream Mound,' and 'Lemon Drop' was comparatively

delayed. 'Miss Huff,' 'confetti,' 'Irene,' and 'Pink Caprice' experienced the highest initial lace bug population growth, also suggesting that these large-leaf cultivars may serve as indicator plants for these pests in commercial production or in the landscape. (M.L. Townsend, R.D. Oetting and S.K. Braman)

*Excerpted from J. Environ. Hort. 17(3):99-102.
September 1999.*

Yellow nutsedge control with Manage and the correct surfactant. Efficient yellow nutsedge control can be accomplished with Manage at one-half the standard rate when combined with the correct surfactant. Manage combined with Sun-It II provided the most effective nutsedge control without reducing growth and caused minimal phytotoxicity to the nursery plants tested. X-77 (a non-ionic surfactant, which is the type recommended for use with Manage) added to Manage provided only moderate nutsedge control. (G.L. McDaniel, D.C. Fare, W.T. Witte and P.C. Flanagan)

*Excerpted from J. Environ. Hort. 17(3):111-119.
September 1999.*

Marketing:

Consumer preferences for geranium. Flower color is by far the most important feature in purchasing geraniums. In the overall sample, flower color was 1.7 times more important as leaf variegation and 2.9 times as important as price in the decision to buy. Promotional pricing strategies could increase sales of pink and white geraniums, but would probably not be advisable for red, and lavender geraniums since consumers in these segments would not be responsive to reduced price. A simulated blue geranium yielded both strong negative and positive feelings. The blue flower was the least

avored color but the existence of a blue lover segment comprised of nearly a quarter of the respondents shows that potential demand for a blue geranium could be substantial. (B. Behe, R. Nelson, S. Barton, C. Hall, C.D. Safley and S. Turner)

Excerpted from HortScience 33(4):740-742, 1999.

Horticultural Distribution Centers. A national survey of Horticultural Distribution Centers (HDCs) resulted in a 32.3% response rate with owners representing 68% of respondents. About one-fourth of the firms surveyed (27.4%) were engaged only in distribution activity. However, for all firms, distribution activity accounted for over half (54.2%) of their revenue. The average HDC had annual revenue of \$3.4M. The mean number of full-time employees was about 33, with an additional 16 part-time hourly. Average hourly compensation rate ranged from \$15.67 for manager/supervisor to \$10.58 for staff and \$8.94 for full-time hourly workers. (M.P. Garber and K. Bondari)

Excerpted from J. Environ. Hort. 17(3):134-136. September 1999.

Publications

A Guide to Successful Direct Marketing.

Written by Charles R. Hall and Jeff L. Johnson. 32-pg guide address everything that a direct marketer using a u-pick operation, roadside stand, or farmer's market needs to know to be successful. Cost is \$12. To order: make check payable to T.E.E.F. (Texas Extension Education Foundation) Acct. #5550 and mail to: Tracy Davis, Texas Agricultural Extension Service, Texas A&M University, 4464 Blocker Bldg., College Station, TX 77843-2124, (Phone: 409-845-1772; fax: 409-847-9378; e-mail: tdavisf@tamu.edu).

Planning Your Business (CIS 978). Written by L.D. Makus, the 4-page 1993 fact sheet gives basic information about starting a business including financing, proposing new enterprises, management & marketing. Samples of an income state, balance sheet, and projected income are given. Cost: \$50. To order: contact Connie King, Ag Publications, University of Idaho, Moscow, ID 83844-2240 (telephone: 208-885-7982; fax: 208-885-4648; e-mail: cking@uidaho.edu).

Sprinkler Irrigation System, MWPS-30.

Comprising 246 pages, this reference book is available from Midwest Plan Service and can be purchased from NRAES. This publication provides a planning, reference, and design manual for the application of sprinkler irrigation systems and methods to manage an irrigation system efficiently. It allows you to evaluate water needs and determine a minimum system capacity. Also included are methods to evaluate the water supply and type of springkler system that can best fit your application needs. Can be purchased for \$20.00 plus \$3.50 for postage and handling from NRAES, Cooperative Extension, 152 Riley-Robb Hall, Ithaca, NY 14853-5701. Further information on web: <http://nraes.org>.

NRAES is Natural Resource, Agriculture and Engineering Service, a regional cooperative extension organization.

Campanulas: A Gardener's Guide. Peter Lewis and Margaret Lynch. 1998. Timber Press, \$34.95, hardcover. ISSN: 0-88192-463-6. Includes striking photographs and descriptions of more than 140 species and many cultivars of *Campanula*. For the commercial grower, there is a list of seed sources and considerable information pertinent to inclusion of new campanulas in their inventory of perennial plants.

The Color Encyclopedia of Ornamental Grasses, Sedges, Rushes, Restios, Cat-tails and Selected Bamboos. Rick Darke, 1999. Timber Press, \$49.95, hardcover. ISSN: 0-88192-464-4. Photographs are exquisite and worth the price of the book alone. Six chapters preceding the extensive encyclopedia include beauty of grasses, native habitats, designing with grasses, families, names of grasses and growing and maintaining grasses. This book will be useful to designers, home gardeners, nursery people and educators. Although there are several books on ornamental grasses, the reviewer predicts this book will become the standard reference.

Lilies: A Guide for Growers and Collectors. Edward Austin McRae. 1998, Timber Press, \$34.95. ISBN: 0-88192-410-5. McRae is a professional lily grower and hybridizer, and the book is written for either the gardener or commercial grower in an easily read manner.

Ball Identification Guide to Greenhouse Pests and Beneficials. Stanton Gill and John Sanderson. 1998, Ball Publishing, \$66.95. ISBN: 1-883052-17-3. This book is written and published to assist in the identification of arthropod pests and beneficial insects on crops grown in greenhouses throughout the United

States. This guide to greenhouse pests and beneficials is a must for everybody involved in the production of greenhouse crops. All major pests currently of concern to the greenhouse industry are covered with suggestions for monitoring, preventive and biological control measures.

Total Crop Management of Herbaceous Perennial Plants. Contains a list of over 90 herbaceous perennials with insect, disease and cultural problems, biological and chemical control for diseases, types of sprayers and their calibration, weed management, fertility management, plant height management, and water management. Also, chapters on diagnosis of plant problems, integrated pest management and fungicide resistance management are included. Can be purchased for \$12 through local Extension office or the Central Maryland Research & Education Center, 11975 Homewood Road, Ellicott City, MD 21042. Make checks payable to the "University of Maryland." Publication is a joint effort between University of Maryland Extension faculty & Cornell University Extension faculty.

A Source Guide for Mid-Atlantic Wetland Plants. A total of 83 nursery sources listed with name, address, phone, E-mail, website includes Explanation of Terms, Indicator Categories, Characteristic or Form, Hardiness zone, pH, Hydrology (Tidal/Non-Tidal), Planting and Maintenance Information. This is a 54 page - softcover book, cost \$17.95 (nonmember add \$5.00). Send order to this address: Virginia Nursery & Landscape Association, 383 Coal Hollow Rd; Christiansburg, VA 24073-6721. Phone: 800-476-0055, fax: 540-382-2716, E-mail: vna@swva.net - www.vnla.org. Credit cards accepted.

Days Afield: Exploring Wetland in the Chesapeake Bay Region. Written by William S. Sipple, this 6x9 perfect bound, a glossy

paper-cover book with xiv + 560 pages & 75 photos/illustrations. It represents approximately 1,500 site visits and considerable fieldwork in the Chesapeake Bay Region. Chapters include: freshwater marshes, both non-tidal and tidal, brackish tidal marshes of Dorchester and Somerset Counties, the Pocomoke River and Nanticoke River watersheds. Cost is \$19.95 + \$2 shipping for the first copy & \$.50 each additional copy. For further information contact the author by phone (410-987-4083, e-mail: bsp333@aol.com, or mail to William S. Sipple, 518 Red Bluff Court, Millersville, MD 21108.

Landscape Plants for New Jersey. This 52-page book has over 300 color photos and information written for the State of New Jersey. This book is written in an all-new format and is an excellent sales or training tool. For more information and pricing for NJNLA member and nonmembers, contact: NJNLA, 605 Farnsworth Avenue, Bordentown, NJ 08505. Phone: 1-800-314-4836, (609)291-7070, Fax: 609-291-1121.

The Proceedings. Held in May of 1999, this Congress attracted close to 60 presenters from all over the country. Papers are grouped in general session areas as follows: Agricultural Plastics, Pest Management, Colored Films and Crop Response, Crop Response to Plastic Mulch and Rowcovers, Solarization and Methyl Bromide Alternatives, Greenhouse Production/Fertility systems. Copies can be ordered prepaid at \$35 plus shipping. Order forms are available from the American Society for Plasticulture, 526 Brittany Drive,, State College, PA 16803-1420. Phone: 814-238-7045; fax: 814-238-7051; e-mail: peh4@psu.edu.



Calendar

October 5 and 7 – Diagnosis & Control of Insects and Weeds on Woody Ornamental Plants, Ornamental Horticulture Short Course Series, 3-5 pm, Research & Education Center, Georgetown, DE, Contact (302) 831-2531.

October 6 - Griffin Greenhouse & Nursery Supplies Customer Appreciation Day, Lancaster Host Resort and Hotel, Lancaster, PA. Call (978) 851-4346.

October 6-7 - The National Landscape & Nursery Expo. Baltimore Convention Center, Baltimore, MD. Call (800) 252-4757.

October 7 - Delaware's 3rd annual Recycled Product Procurement Conference. Dover, DE. Call Rob Propes (302) 739-4271.

October 7, 14, 21, 28 - Professional Grounds Management School. A course of instruction in basic grounds management. For more information, Contact Scott Guiser, Neshaminy Manor Center, (215) 345-3283.

October 9 - Gardening Basics: Pruning. Saturday, 10-11:30 a.m. Members \$5, nonmembers \$7. For more information contact Delaware Center for Horticulture, 1810 North Dupont Street, Wilmington, De 19806-3308, phone (302) 658-6262

October 10 - Winterthur Fall Garden Programs: Winter Blooms, Berries and Bark. Join Curator of plants Linda Eirhart as she presents a slide lecture featuring plants with winter interest. Copeland Lecture Hall, 2pm. Followed by refreshments - advance reservations required, cost \$15 - members \$8. For more information and reservations call (302) 888-4600, (800)448-3883, TTY (302) 888-4907.

October 13-15 - National Lawn & Garden Trade Show, Fort Washington Convention Center, Fort Washington, PA contact: Brian Sullivan (203) 845-9117.

October 14 - Perennial Plant workshop: Ornamental Grasses, The Scott Arboretum, Swarthmore College, Swarthmore, PA. Selection, culture and landscape uses. Contact: The Scott Arboretum Offices, Swarthmore, PA 19081-1397; (610) 328-8025.

October 14 & 15 – Pesticide training and certification exam. Department of Agriculture, Dover, DE. Contact Susan Whitney (pesticides@udel.edu)

October 15 - 5th Annual Dance for Plants Benefit. Friday, 7-11 p.m. For more information contact Delaware Center for Horticulture, 1810 North Dupont Street, Wilmington, De 19806-3308, phone (302) 658-6262

October 18 - Tree Climbing School. A practical course on tree climbing and maintenance. Penn State Cooperative Extension Office, Smedley Park, Delaware County, PA. Cost is \$200 (includes text materials and morning breaks) Make checks payable to D.C.C.E. For further information contact: Rick Johnson, Smedley Park, 20 Paper Mill Rd., Springfield, PA 19064-2705, Call (610)690-2655.

October 19 - De Native Plant Society - Monthly on the third Tuesday evening from 7-9 pm at the Aquatics Resource Education Center on Route 9 east of Smyrna, DE. For more information, Contact: Kith Clancy at (302) 674-5187.

October 19-23 - Tree Climbing School, Smedley Park, Delaware County Extension Office. Contact Rick Johnson (610) 690-2655.

October 20-23 - Association of Specialty Cut Flower Growers conference (ASCFG). Worcester, Massachusetts, phone (440) 774-2887.

October 23 - Tree Spree '99 - Saturday, 10:30 a.m. - 4 p.m. Celebrate the benefits of trees at Red Clay Reservation. For more information contact Delaware Center for Horticulture, 1810 North Dupont Street, Wilmington, De 19806-3308, phone (302) 658-6262

October 24 - Winterthur Fall Garden Programs: The Aesthetics of Garden Photography. Dency Kane will present a slide program followed by a book signing for her new book Sanctuary/Gardening for the Soul. Copeland Lecture Hall, 2pm. Followed by refreshments. Advanced reservations required. Cost \$15. Members \$8. For more information and reservations call (302) 888-4600, (800)448-3883, TTY (302)888-4907.

October 25-27 - Wetlands '99 Conference, Annapolis, MD. "Restoration: Applying Restoration Science." Contact: The Association of State Wetland Managers at (518)872-1804; Website:<http://www.aswm.org>

October 27-29 - 8th annual Better Composting School, Hanover, MD. Call Teffeau (410) 827-8056 for more

information.

October 28-29 - AABGA Northeast Regional Meeting, "Managing Yesterday's and Today's Gardens for Tomorrow," Mt. Auburn Cemetery and the Arnold Arboretum, Boston and Jamaica Plain, Massachusetts. Information: Ellen Bennett, (617) 524-1718, ext.125.

November 3 & 4 - "Invasive Exotic Plants -Current Management Strategies," at Swarthmore College. To register contact: Morris Arboretum, Education Dept, 9414 Meadowbrook Ave., Philadelphia, PA 19118, phone:(215) 247-5777 x 156.

November 3-5 - ERNA's Expo, Atlantic City New Convention Center, Atlantic City, NJ., Contact: Lynn Ditizio (800) 376-2463.

November 4, 10, 18 -Professional Grounds Management School. A course of instruction in basic grounds management. For more information, Contact Scott Guiser, Neshaminy Manor Center, (215) 345-3283.

November 6 - Delaware Solid Waste Authority collection of household hazardous waste. Location: New Castle County, Delaware Recycling Center, New Castle. For more information on packaging HHW for delivery to collection sites, call DSWA 1-800-404-7080.

November 8 - "All About Composting" Sussex County Extension Office, Georgetown, DE. Call Helen Waite (302) 645-2156 for more information.

November 9 - "Composting Basics" Del Tech Community College, Owens Campus. Call Jerry Williams (302) 855-5904 for more information.

November 10 - Hanson Lecture - Ornamental Grasses for City and Country, Wednesday, 7:30p.m. Space is limited; early registration is suggested. Members:\$12, nonmembers:\$17. For more information contact Delaware Center for Horticulture, 1810 North Dupont Street, Wilmington, De 19806-3308 or phone:(302)658-6262.

November 13-16 - Conference and expo. Conference sponsored by Professional Grounds Management Society; expo sponsored by Associated Landscape Contractors of America, Professional Grounds Management Society and Professional Lawn Care Association of America. Baltimore Convention Center. Call (800) 395-2522 or fax (410)584-9756, <http://www.alca.org>

November 16 - Building with Trees: Saving Trees at Construction Sites. Philadelphia area, Pennsylvania National Arbor Day Foundation, phone: (402) 474-5655.

November 16 - Environmental Concern. Wetland Planting Techniques, Environmental Concern, St. Michaels, MD. 8:00 AM-5:00 PM, cost \$145. Instructor: Deborah Herr, ASLA. For more information call: (410) 745-9620, fax (410) 745-3517, or e-mail: order@wetland.org. Check Website: www.wetland.org.

November 16 - De Native Plant Society - Monthly on the third Tuesday evening from 7-9 pm at the Aquatics Resource Education Center on Route 9 east of Smyrna, DE. For more information, contact Kith Clancy at (302) 674-5187

November 17-19 - Eastern Native Grass and Grasslands Symposium, Baltimore, MD. Contact: USDA Natural Resources Conservation Service Plant Materials Program and Partners, USDA NRCS, Box 360A Road 1, Rt. 352, Corning, NY 14830-0360; (607) 562-8404.

December 1 & 2 – Pesticide training and certification exam. Kent County Extension Office, Dover, DE. Contact Susan Whitney (pesticides@udel.edu)

December 4 - Delaware Solid Waste Authority collection of household hazardous waste. Location: Pine Tree Corners Transfer Station, Townsend, DE. For more information on packaging HHW for delivery to collection sites, call DSWA 1-800-404-7080.

December 9 - Professional Grounds Management School. A course of instruction in basic grounds management. For more information, Contact Scott Guiser, Neshaminy Manor Center, (215) 345-3283.

January 5-7, 2000 - MANTS, Contact: (800) 431-0066.

January 9-10 - 55th Pennsylvania Landscape and Nursery Conference. Growing, learning, and networking with the best in the Pennsylvania Landscape Industries. The Penn Stater Conference Center Hotel, University Park, PA. For more information on course content contact: Jim Sellmer, (814) 863-2250, E-mail: jcs32@psu.edu or visit the web site for the latest news about the conference: <http://www.cas.psu.edu/docs/CASCONF/horted/reg.htm>

January 11 - Copeland Lecture - The Gardener and Design: Consulting the Genius of the Place. Tuesday, 7:30p.m. Space is limited; early registration is recommended. Members:\$12, nonmembers:\$17. For

more information contact Delaware Center for Horticulture, 1810 North Dupont Street, Wilmington, De 19806-3308 or phone: (302) 658-6262.

January 12 & 13 – Delaware Horticulture Industry Expo, Dover, DE.

February 3-6, 2000 - WNGA/NLA/GCA Management Clinic, Louisville, KY, Contact: ANLA (202)789-2900.

