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

Holiday Greetings! When Sue Barton first mentioned that my column was due for our quarterly newsletter, my thoughts were that I have so much to say, and the D.N.L.A. has so much going on, where do I begin? I know the same holds true for many of you. It's a frantic, but wonderful time of year.

Thanks to U. of D. Cooperative Extension, we experimented with a different format for the Ornamental & Turf Workshop this year. It was held on two consecutive Thursdays, November 1st and 8th, at the Hockessin Memorial Hall. This year's format included discussion and problem solving by the attendees. More than 165 people attended the two day event. Attendees could attend one or both days. A good time was had by all.

The Delaware Horticulture Industry Expo is just around the corner. The two-day event will be held on January 16th and 17th at the Modern Maturity Center in Dover. New for this year will be a merger with the Delaware Pesticide Conference which is usually held several weeks after the DHIE, at the same location. The purpose of the merger is to better meet the educational needs, and time constraints, of our members. Featured topics include "Perennial Combinations" by Cole Burrell; "Sell More...Sell More Easily"; "What's Hot and What's Not"; "Tree Health Care"; "The Truth About Mulch"; "Professionalism With Pesticides", and the ever popular CNP Prep Session. Please try to join us.

In October, Jamie Jamison of Brandywine Nurseries brought to D.N.L.A.'s attention an appendix of New Castle County's amended Unified Development Code. Appendix 3 of the code contained a list of invasive exotic plants

that were not to be planted under any circumstances on sites needing county approval. D.N.L.A. quickly asked several members of our organization, and Delaware's Invasive Species Council to review the list and make recommendations regarding plants to be removed from the County's invasives list. Those individuals included: Gary Schwetz, DE Center for Horticulture; Rick Lewandowski, Mt. Cuba; Rick Darke, Rick Darke Consulting; Steve Castorani, Gateway Garden Center and North Creek Nurseries; and Sue Barton, U. of D. After reaching a general consensus, Steve Castorani, Sue Barton, and I met with New Castle County officials. NCC officials agreed to remove the recommended species from the invasives list. They also asked for the group's input regarding their list of recommended plants. This is a prime example of how D.N.L.A. and its members can work together to make a difference.

On October 23rd, ten individuals sat for the Certified Nursery Professional core and/or specialty exams. Congratulations are in order for the following individuals:

New CNP's:

Heather Insley
Countryside Lawn & Landscape, Inc.
Garden Center Specialist

Christopher Bohinski
Newark Agway
Garden Center Specialist
Turfgrass Management Specialist

Phillip Scalzi
Ashland Property Mngment & Landscaping Co.
Turfgrass Management Specialist

Robert Owens
Delaware River and Bay Authority
Greenhouse Production Specialist

Thomas Keulmann
Old Country Gardens, Inc.
Garden Center Specialist

New Specialties Added:

Paula Krakowski Wright
Delaware River and Bay Authority
Turfgrass Management Specialist
Nursery Production Specialist

Patrick Hogan
Delaware River and Bay Authority
Nursery Production Specialist

Len Brinsfield
Delaware River and Bay Authority
Garden Center Specialist

Welcome New Members:

Covering Ground
17 Cripple Creek Run
Milton, DE 19968
(302) 644-8286

Winterthur Museum, Garden and Library
5105 Kennett Pike
Winterthur, DE 19735
(302) 888-4625

FROM THE PRESIDENT
Steve Sterling
Delaware Nursery and Landscape
Association

How time flies. It is hard to believe that it has been two years and my term as president is coming to an end. It has been a very educational and enjoyable experience.

Valann, Executive Director of DNLA, is an exceptional asset to the association. In addition to her regular responsibilities, over the past several years she has been representing DNLA on various councils. Because she is so organized and involved, it has made my term as president an easy one.

I encourage anyone interested in being on the Board of Directors to contact Valann. The election will be held in January at the DHIE. Meetings are held approximately eight times a year.

I look forward to seeing everyone in January at the expo.

U of D NEWS
Susan Barton
Extension Specialist

Enhancing Delaware Highways, the joint roadside vegetation venture with the University of Delaware, the Delaware Center for Horticulture and the Delaware Department of Transportation has been given a boost by secretary of transportation, Nathan Hayward. Secretary Hayward attended a tour of current roadside plots this fall. He was so enthusiastic that he challenged the research team to double the number of statewide plots in 2002. This represents a transition from research to implementation. Secretary Hayward believes a reduction in roadside mowing and an increase in planting would improve the beauty of Delaware roadsides and ultimately reduce management costs.

Current plots feature predominantly native plants that will survive under some fairly tough conditions—standing water, highly compact soil, steep slopes and low fertility, to name a few. We've used a combination of trees, shrubs and herbaceous perennials. Large masses of colonizing shrubs, while too aggressive for most garden situations, work well to out compete weeds and invasive on the roadside. With herbaceous forbs and grasses, plugs work well to create shapes and masses for a more designed effect in key areas, but seed has been effective for larger spaces. Seed establishment requires patience, with warm season grasses and most forbs taking three years to mature and become evident in the mix. During the first year, the plots almost always look like failures, but by year three we are seeing a good mix.

We are trying to use locally grown plants and seed, so this initiative offers a real opportunity to the Mid-Atlantic nursery industry. We have been working with some great local suppliers,

but our demand for native plants and seed continues to increase. I'd like to encourage seed collectors, propagators, liner growers and field and container nurseries to work together to meet this increasing demand!

The first contract for the Blue Ball Project, a large DelDOT project in the area of Routes 141 and 202, is going out to bid in early 2002. The contract includes a major landscaping component. We tried to convince DelDOT to use a contract growing system for the plants, since it will be hard for a contractor to locate the plants we've specified in the sizes and numbers on the plan. We were not able to get this in place for the first contract due to time constraints, but the project manager is enthusiastic about using contract growing for the rest of the project to be planted over the next 7 or 8 years. We'll keep you posted on any new developments as we continue to negotiate.

At a recent UDBG meeting, Carol Krawczyk suggested we plan an irrigation and lighting field day. We'd bring in a contractor to speak on both subjects and do some installation demonstrations. The field day would be open to undergraduate students and industry professionals. What do you think, would a day like this be useful?

This summer, as part of a grant from the USDA Forest Service, John Ritterson developed an Asian Longhorn Beetle (ALB) educational display. We have produced two copies that sit on a long table and can be carried in a 3' by 5' box. Look for this display at educational meetings throughout the year. There is currently no control for ALB, so it is critical that everyone be on the lookout for this pest. If we can identify it and destroy infected trees quickly, we may be able to stop its spread into Delaware and nearby states. If you know about an event where we should set up this display, let me know (Susan Barton, 831-2531).

TRANSPORTATION PROMOTES INVASIVE PROBLEMS

**Susan Barton, Extension Specialist
University of Delaware**

At a recent conference in Nebraska entitled “Restoring Native Ecosystems,” I heard an excellent talk on “Nature Out of Place” given by Jason Van Driesche, coauthor of a book by the same title. He explained that isolation allows for diversity. In fact, the isolation of the continents has allowed more than twice as many species evolve as would have if the land had been in one mass. The natural conclusion is then that the loss of isolation, in our current global age, leads to the loss of diversity. I also recently had the opportunity to review the New Castle County invasive species list—species banned from county landscape projects—and discuss this issue with several colleagues. A large part of our discussion centered on the potential for spread of invasive species. So, I started thinking how much the invasive species issue revolves around transportation.

Jason Van Driesche explained how transportation technology has accelerated the invasion of exotic species with an increase in globalization. Up until about 500 years ago, people lived locally, people and cargo moved rarely and only a few agricultural crops were introduced intentionally. Few species were introduced unintentionally and those introductions required a special spread mechanism, such as the clinging seed of a species like burdock.

As humans entered the “age of sail” we began to travel with large cargo and high speed. Plant seeds were transported in soil used as ship’s ballast. A slightly easier lifestyle promoted the sale of plants as ornamentals, but only as seed. Purple loosestrife was probably introduced to the United States during this period.

With mechanized travel, we began to saturate the landscape with people and the species they brought with them. We could afford to bring more and we were able to spread society out beyond the reach of rivers. Steel hulled ships used water for ballast, resulting in the introduction of exotic aquatic plants and animals in ballast water. Farmers and ranchers spread further away from cities and spread many agricultural weeds.

We are currently headed towards a homogenization of the planet with the speed and volume we travel. Distance is now irrelevant to movement of goods. Containerized transport has resulted in sealed units that aren’t opened until they reach their final destination. Invasions from containers can start in many places simultaneously instead of just from one port. The Asian Longhorn Beetle is an example of an exotic pest that came to the U.S. on untreated Chinese packing crates.

So, what barriers do we have left? Only the ones we choose to create. The nursery industry has an important role to play in educating the public about the dangers of invasive species and in proactively growing a plant palette that improves rather than degrades local ecosystems.

One approach is to evaluate the ability for spread of each potential problem species. Species that spread by seed are more likely to cause problems than those spread by asexual means. While English ivy is a terrible problem in localized woods (such as Arden, DE), for the most part it spreads vegetatively. Ivy, planted as a groundcover in an urban backyard, is unlikely to become an invader. The woods in Arden are overrun by ivy because so many homes are adjacent to wooded areas. Over a period of many years, the ivy has slowly spread and invaded the woods. Norway maple, on the other hand, is a prolific seeder. Seedlings from street trees in the city of Wilmington have spread into

nearby Brandywine Park and become established resulting in large sections of the park that are nothing more than monocultures of Norway maple.

The mechanism of seed dispersal can be a further defining factor for the extent of invasion. Heavy seed that must be transported by clinging to animal's skin is the least likely to become invasive. Light seed, spread by wind, is more likely to invade natural areas. But wind blown seed is unlikely to spread more than a few miles from its original source. Seed spread by birds feeding on berries has the greatest potential for spread. Oriental bittersweet and multiflora rose are two prime examples of species that birds have spread throughout regional natural areas. *Euonymus alatus* (burning bush) is another example of a bird-spread species. While this shrub is highly ornamental and widely grown and planted by the nursery and landscape industry, it has the potential for disastrous spread. There are parts of White Clay Creek Park that were shrouded in a red haze this fall because they are so widely populated by burning bush.

No doubt, a voluntary phase out of *Euonymus alatus* by the nursery and landscape industry would be a tough pill to swallow. It is hard to stop growing and selling a plant that is requested by homeowners and widely loved and planted. But it is the right thing to do. It also provides the opportunity for the industry to grow and promote many other great shrubs for fall color. In the future, homeowners can be encouraged to go crazy for *Itea virginiana*, *Clethra alnifolia*, *Fothergilla gardenii*, *Viburnum dentatum*, *Viburnum nudum*, and *Vaccinium corymbosum* (just to name a few!)

It is up to the industry to identify and address the most problematic of the invasive species. It is always better to choose an appropriate course of action rather than have one legislated for you.

OPPORTUNITIES WITH DEVELOPMENT **Susan Barton, Extension Specialist** **University of Delaware**

Delaware is in a building boom. Regardless of the current economic recession, all three counties continue to grow. It seems that everyone wants to live here! This provides a great opportunity for the nursery and landscape industry. I recently heard a fascinating talk by Andy Wasowski, an author and gardener who lives in Phoenix, Arizona. He has written a book about building within a natural ecosystem. Andy and his wife built their house using the concept of a "building envelope." In order to preserve the natural vegetation on their mountainside property (the reason they bought the lot in the first place), they designated an area 5 to 15 feet around the footprint of the house. They put up a temporary fence and all construction, material storage and traffic occurred within that zone. When their house was complete, they planted the "building envelope" zone with native species that matched the surrounding landscape and their house fit easily into the beautiful natural vegetation.

In Delaware, new homes are often constructed in the middle of farm fields rather than nestled into natural woodlands or mountainsides. This provides a great opportunity to create attractive livable spaces for Delawareans.

Developers are often required to set aside portions of a project for open space. These areas of open space can be used to create buffers of natural vegetation to soften the harsh lines of new construction. It is up to the industry to help guide the shape of these buffers. You can sell hundreds of Leyland cypress and white pine or you can expand into a diverse mix of native species like American holly, eastern red cedar, amelanchier, fringe tree, redbud, dogwood, red maple, river birch, sassafras, persimmon and much, much more. You decide!

HEMLOCK WOOLY ADELGID

James F. Stimmel

Pennsylvania Department of Agriculture

The hemlock woolly adelgid (HWA) is presently the most important pest of forest stands of hemlock in Pennsylvania, where it can severely weaken and disfigure even large trees. In ornamental plantings, it shares this distinction with the elongate hemlock scale, also a severe pest of hemlocks. New compounds have been developed to fight this devastating insect, but the high cost of materials and labor for application will likely keep these compounds from seeing extensive use.

Hosts and Distribution: Hemlocks (*Tsuga* spp.) are the only trees affected. This serious pest is found in states in and east of the Appalachian mountain chain from Virginia to southern New England.

Identification: Hemlock woolly adelgids appear as small, white, cottony masses at the bases of needles on small twigs (Fig. 1).

Inside these woolly masses are the tiny, slate-gray, sedentary females. The newly hatched nymphs look much like dark reddish-gray scale crawlers, and can be seen crawling on the white waxy tufts of the adult females. Settled nymphs can be found on the twigs at the bases of needles, and appear as tiny, black creatures shaped like an orange section, surrounded with a white margin of wax (Fig. 2).

Heavy infestations of hemlock woolly adelgid can be spotted from a distance because the trees take on an unhealthy grayish pallor, in addition to an unusually thin canopy.

Life History: Hemlock woolly adelgids overwinter as mature females, typically beginning to lay eggs in late March. Eggs begin to hatch about the middle of April. This first generation feeds and matures by early July. These newly matured females soon begin to oviposit, and the resulting crawlers can be found about mid-July. Many of these migrate to the new growth to feed. The second generation, however, enters an unusual “summer diapause” or dormant period in which development seems to cease. This diapause lasts into the cool weather of early October, when the insects mature and enter the winter season.

Damage: Host trees are injured by the removal of sap from small twigs. Hemlock woolly adelgid sucks sap from the host and, in doing so, injects injurious saliva. Trees lose vigor, drop their needles prematurely, suffer poor growth, dieback, and possibly succumb to attack. Hemlocks both in wild stands and ornamental plantings are attacked.

In other areas of the country – particularly southern New England – researchers have stated that this pest will ultimately kill all hemlocks infested with hemlock woolly adelgid, most often within four years of initial infestation. This has not been the case in Pennsylvania.

While HWA certainly has a negative impact on trees and can cause mortality, we have seen a relatively small percentage of our hemlocks succumb to this insect. Otherwise unstressed, healthy hemlocks can usually withstand HWA attack, trees that succumb to HWA have likely been severely stressed by some other factor, such as drought.

Control Strategies: While several methods of control are effective in combating HWA on individual trees, our arsenal contains nothing that is effective in eliminating this pest from the vast stands of hemlocks common to our forested areas. More traditional approaches to HWA control involve contact-type insecticides, including horticultural oils and insecticidal soaps. These compounds are intended for use against active crawlers or actively feeding and metabolizing nymphs. Note that the growth stages present during the inactive “summer diapause” period essentially cannot be controlled.

A major obstacle in controlling this pest on very large specimen hemlocks is simply that of applying sprays to such large trees and getting complete coverage. An encouraging avenue of control has emerged within the past few years. This involves soil incorporation of Merit® (imidicloprid) insecticide in the root area of infested trees. The systemic action of this insecticide has proven effective in controlling HWA, and this application technique is a practical way to treat very large trees that are too big to spray.

Much work has been done to find and encourage natural enemies to combat HWA. A small lady beetle, *Pseudoscymnus tsugae*, has been imported from HWA’s native range in China, and is currently being tested for control purposes. It is interesting to note that the adelgids, as a family, have no parasites associated with them.

Hemlock woolly adelgid cannot withstand periods of extremely cold weather. It is thought that temperatures of –20F are lethal to this insect.

Ornamental hemlocks that receive nitrogen fertilizers are more susceptible to heavy outbreaks of HWA than those that do not. Apparently, nitrogen-rich sap is beneficial to the adelgids, and the very “healthy” females produce a maximum number of eggs, allowing populations to explode. Therefore, excessive nitrogen fertilization of hemlocks is not recommended. Ensuring that your hemlocks have sufficient water is more important than fertilizing them.

Some other strategies may help control these destructive insects. Since birds can spread HWA crawlers, discouraging birds from visiting your trees may help. Washing unsettled immature adelgids with a water stream will reduce the population somewhat. Some western and Chinese species of hemlock are resistant to the feeding of these insects, and it may be possible to incorporate some of these resistant species in the landscape. As undesirable as this insect is, our hemlocks will likely survive its onslaught. *Pseudoscymnus tsugae*, the lady beetle mentioned earlier, appears to hold promise as an effective natural enemy. I have observed that, in forest stands of hemlock infested with HWA, some trees are not infested, while their immediate neighbors may harbor a significant infestation. Perhaps the area of genetic resistance needs to be investigated more thoroughly, and a resistant variety of Pennsylvania’s state tree will emerge and dominate our landscape.

Reprinted from *Regulatory Horticulture*, Entomology Circular #198, Year 2000. Vol. 26, PA Dept. of Ag., Bureau of Plant Industry

PHOSPHORUS FERTILIZER THAT REDUCES LEACHING

Alumina-buffered phosphate is a new phosphorus-based fertilizer that is designed for use on containerized plants. Phosphorus, bound to aluminum oxide granules is retained in the medium even during irrigation. Researchers at Penn State, Dr. Jonathan Lynch and Dr. Kathleen Brown say this fertilizer will prevent the pollution that occurs when phosphorus leaches from the soilless mix used in the production of containerized nursery plants.

Brown reported that over the course of a season, containers treated with alumina-buffered phosphate had 60 percent less leaching than those treated with phosphorus-based products.

The new fertilizer has benefits for plants, as well, releasing phosphorus only as needed. If a medium is deficient in this nutrient, the phosphorus in the product detaches from the aluminum oxide granules for uptake. If the medium has excess phosphorus, this element becomes unavailable to the plant by binding with the aluminum oxide granules.

More studies are required to validate initial results of enhanced species specific plant growth, better branching and compact growth habit for some bedding plants and increased tolerance of drought stress.

Despite the promising results so far, the product is not yet commercially available.

The preceding article was excerpted from the NewsWatch section of *American Nurseryman*, Sept. 15, 200.

BEWARE OF SOUR MULCH **Mary Ann Hansen, Diagnostician, Plant Clinic Jim May, Research Associate, CSES**

The Plant Disease Clinic at Virginia Tech routinely receives specimens of plants that have been injured by nonliving or “abiotic” phenomena. These specimens are the most difficult to diagnose because no tangible structures of the cause of the problem (e.g., fungal spores, bacteria, nematodes) can be found; only the damage is evident. To further complicate the diagnosis, many abiotic factors cause similar symptoms. For example, both drought and excess water can cause similar symptoms – both damage roots, and the plant wilts and turns brown.

One critical abiotic problem is damage from mulch toxicity. Diagnosis of this problem can be a bit tricky because symptoms resemble those caused by drought, excess water, chemical injury from certain pesticides, or fertilizer burn. Understanding how “sour mulch” damages plants should help you to diagnose the problem.

Mulching garden or landscape plants with bark, straw, leaf, or sawdust mulch can be beneficial to plants in a number of ways. Mulch not only helps conserve moisture around plants, but also serves as a barrier to weed growth and can be an effective method of weed control. It is generally beneficial to plant growth as long as it has been composted properly and is applied properly to the plants. Proper application of mulch includes not applying it in too thick of a layer and avoiding direct contact with the base of plant stems especially those of tender herbaceous plants. When organic material used for mulch has been composted improperly, the result can be “sour mulch,” which is toxic to lawns, bedding plants, and newly planted shrubs.

Toxicity of sour mulch is caused by by-products of the decomposition process, such as methane,

alcohol, ammonia gas, or hydrogen sulfide gas, that build up to levels toxic to plant growth. Symptoms of mulch toxicity occur within 24 hours after application and include marginal leaf chlorosis, leaf scorch, defoliation, and/or death of plants. Methane, alcohol, and other toxic by-products of composting may build to toxic levels in piles of organic materials subject to anaerobic conditions (i.e., low in oxygen and containing over 40 percent water). Large piles, such as those accumulated at lumber mills or those used to compost mulch by companies that manufacture it, can develop pockets low in oxygen and high in water content. Reputable companies turn the windrows when necessary, thus avoiding low oxygen/high moisture conditions. Hardwood barks are especially high in cellulose so special care should be taken to compost this type of mulch properly. Pine bark contains mostly lignin instead of cellulose and is not as prone to forming toxic by-products. Pine bark that consists of less than 10 percent sapwood does not have to be composted before use. Properly composted organic material should be mostly lignins with little or no cellulose.

The only way to protect plants from mulch toxicity is to avoid using toxic mulch. Although most companies that manufacture mulch and compost are concerned with producing a quality product and would not knowingly sell an inferior or dangerous product, it is possible to purchase toxic mulch. Therefore, it is important to be able to recognize toxic mulch before you apply it around plants. Good mulch generally smells like fresh-cut wood or garden soil. Sour mulch may smell like vinegar, ammonia, sulfur, or silage. If you are unsure of the smell, you can have the pH of the mulch tested. Sour mulch is very acidic, and usually has a pH of 1.8 to 3.6, whereas properly composted organic material has a pH of 6.0 to 7.2. The pH of sour mulch is too low to be neutralized by liming; however, the pH of the mulch usually does not change soil

pH around plant roots significantly.

Diagnosis of mulch toxicity after it occurs can be difficult because the toxins that cause the damage dissipate quickly after they cause the damage and cannot be detected. However, pH of the mulch can still be measured and is a good indication of sour mulch. Circumstantial evidence is often the easiest means of diagnosis – if plants develop any of the symptoms listed above within 24 hours of mulch application and no pesticides or fertilizers have been applied recently, damage is due most likely to mulch toxicity.

Removing the mulch is usually not much help at this point since the damage has already been done, and the toxins have dissipated. Plants often recover from the damage by putting out new growth.

Excerpted from *The Virginia Gardener*,
September/October 2001,

GROWING HYDRANGEAS IN CONTAINERS

Dick Bir, North Carolina Extension

In North Carolina, two native species, *Hydrangea arborescens* (smooth or wild hydrangea) and *H. quercifolia* (oakleaf hydrangea) are commonly container grown. Popular cultivars include ‘Annabelle’ and ‘Alice’ or ‘Snow Queen,’ respectively. In addition, at least two non-native species with multiple varieties--*Hydrangea macrophylla* var. *macrophylla* (bigleaf, florist or French hydrangea); *H. macrophylla* var. *normalis* (lacecap hydrangea); and *H. macrophylla* var. *serrata* (mountain hydrangea) and *Hydrangea paniculata* var. *grandiflora* (peegee hydrangea) are commonly grown in North Carolina. Common cultivars include *H. macrophylla* var. *macrophylla* ‘Nikki Blue’, *H. macrophylla* var. *normalis* ‘Veitchii’, *H. macrophylla* ‘Preziosa’ and *Hydrangea paniculata* ‘Tardiva.’

Excellent quality plants can be grown if attention is paid to basic cultural practices. However, not all of these species grow well under the same conditions. All cultural practices must be met, not just some, to grow the best quality plants. A day or two of carelessness may not kill the crop but it may reduce quality to the point where plants are not salable.

Light: *Hydrangea arborescens* and *H. paniculata* can grow well in full sun and may become leggy if grown in dense shade. However, both use large quantities of water when grown in full sun and should not be allowed to wilt. As a result, some growers produce these plants in light shade or in areas where plants will receive afternoon shade.

Hydrangea macrophylla and *H. quercifolia* should be grown under at least 30% shade except in the coolest areas of North Carolina.

Most are grown under 50% or greater shade in the coastal plain and piedmont.

Water: Hydra, Greek for water (as well as a many headed monster slain by Hercules), are the first five letters of the species name. Hydrangeas need abundant supplies of available water in order to grow and develop properly. *Hydrangea arborescens* and *H. paniculata* need less water than *H. macrophylla* or *H. quercifolia* when grown under similar conditions. Although tolerant of moisture stress, both drought tolerant species will drop older leaves after bouts of moisture stress. Many cultivars of *Hydrangea macrophylla* and *H. quercifolia* will produce large, lush leaves in deep shade with abundant moisture and fertilizer. However, unless there is adequate air drainage, problems with powdery mildew, slugs and even gray mold may develop. If the potting medium is kept constantly saturated, root rot diseases are likely to develop. A key to growing good quality hydrangeas in containers is to keep the roots wet enough but to too wet.

Potting Mixes: Standard pine bark based potting mixes have performed well for hydrangeas across North Carolina. Individual growers add sand and/or sphagnum peat and other amendments in order to manage irrigation properly. Except where all pH management, calcium and magnesium needs are met through the irrigation water, dolomitic limestone is generally added to the potting mix. Liming rates suitable for azaleas, camellias or rhododendrons are generally used for blue flowered *Hydrangea macrophylla* and all *H. quercifolia*. *Hydrangea arborescens*, *H. paniculata* and the pink flowered *H. macrophylla* are usually limed to a pH more suitable for other deciduous shrubs, i.e., around pH 6.5. However, both *H. arborescens* and *H. paniculata* are tolerant of acidic potting mixes. Chlorotic foliage can be expected in all of these hydrangea species if pH gets too high. Avoid excess liming of potting

mixes and check irrigation water for pH, lime and salinity.

Fertilizers: Greenhouse and florist hydrangeas have been grown using completely soluble liquid fertilizers for years. However, the most commonly used practices in NC are overhead irrigation together with controlled release fertilizers (CRF) applied following potting or in the spring. The CRF should last throughout the growing season, so choose a release pattern to fit the crop and the climate, i.e., 180 days in the mountains and 270 days or longer in the coastal plain and piedmont.

Rates of CRF application depend upon the size of the plant, irrigation techniques and the plant species/cultivar. Rarely are high rates of fertilization needed when growing any but the *macrophyllas*. *H. macrophyllas* will respond to the high label rate and tolerate even higher rates of fertilizer application but rates higher than those listed on the label are usually not economically beneficial.

If chlorosis becomes a problem with any species, check for causes. It is not uncommon to spray chelated iron solutions or use a fertilizer containing extra iron when growing hydrangeas in containers but lack of iron may not be the reason for the chlorosis. Treat symptoms but find causes.

Blue flowered *H. macrophylla* will not flower blue without available aluminum, iron and acidic potting mixes. Most often, spraying or irrigating with an aluminum sulfate solution can enhance the blue color of normally blue flowering cultivars that appear lavender or pink when grown in containers. Once planted into most NC soils, as soon as roots extend into the native soils, the flower color will become the appropriate blue. Pink-flowered *H. macrophylla* should have no aluminum or native soil available to the roots. In addition, potting mix

pH should be maintained at pH 6.5-6.8.

Pests: The biggest problems with container grown hydrangeas involve too much or too little light and water. Next is over fertilization and growing plants too close so that inadequate airflow occurs.

Occasionally mites, caterpillars, grasshoppers, beetles and slugs are a problem but rarely do they occur on container grown plants that are not too crowded, potbound, moisture stressed and/or sunscalded. Pest problems are usually easily managed with labeled pesticides if other cultural problems are kept under control.

Pruning: All of these shrubs grow rapidly in containers and may need to be encouraged to branch to fill the pot. Generally hedge clippers is the pruning tool used in commercial nurseries, i.e., liners are hedged. Large, full liners should be put in containers. Even then, a mid season pruning is often necessary to increase plant density. This is most frequently done right after the propagation crew has taken all the cuttings they need for next years crop.

Flowering will occur on most of these plants when they get large enough. *Hydrangea arborescens* and *H. paniculata* will usually flower the season they are planted into 3-gallon pots and allowed a full season's growth. Despite the alleged fact that *Hydrangea macrophylla* and *H. quercifolia* form flower buds one year but do not flower until the next year, it is not uncommon to see flowers on plants of these species undergoing rapid growth in a container nursery under shade. These plants will revert to "normal" flowering patterns by the second year they are in the landscape.

Reprinted from *VNLA Newsletter*,
September/October 2001.

DAYLILY RUST DISEASE

Joyce G. Latimer, Extension Specialist,
Greenhouse Crops, Virginia Tech

The Virginia Department of Agriculture and Consumer Services' Office of Plant and Pest Services cautions daylily hobbyists, gardeners and growers to be on the alert for a new foliar disease of daylilies, *Puccinia hemerocallidis*, that goes by the common name daylily rust.

Raised pustules and orange/rust powdery spores characterize daylily rust. Individual spores are microscopic and difficult to see without strong magnification, but in mass, the spores are easy to see with a hand lens. Early infection of the rust may resemble daylily leaf streak, but over a period of several days pustules will erupt when the disease is present. Once formed, the spores can spread rapidly for miles by wind and people.

“To combat this challenging problem, people need to be vigilant and adopt strict gardening standards, particularly regarding cleanliness,” said Frank Fulgham, Program Manager of the Department's Office of Plant and Pest Services. “Check your plants daily, if possible, since the disease grows rapidly. Clean garden tools with a solution of 5 teaspoons of household bleach in a gallon of water.”

Flugham recommends several courses of action for anyone discovering rust on their plants. One option is to destroy the affected plants. Fulgham notes that it is not necessary to destroy any plants that do not exhibit symptoms of the disease. Another option is to carefully remove infected foliage on which rust has been detected. For both options, it is extremely important to follow up by applying a fungicidal treatment (according to label directions) to the beds containing all remaining plants that could be affected by daylily rust.

Flugham advises wearing disposable gloves, and sealing all discarded plants and leaves, as well as the gloves worn during the operation, in a plastic bag that will be taken to the dump. He cautions, “Do not put any plants or leaves affected by daylily rust in a compost pile and be sure to clean and disinfect garden implements used in the treatment.”

Fungicides known to be effective against rusts AND labeled for use on daylilies include: Systhane® (mycobutanil), Strike® (triadimefon), Banner Maxx® (propiconazole), Heritage® (azoxystrobin), and Contrast® (flutalonil) [all systemic]; Daconil® (chlorothalonil) and Dithane® (maneb, mancozeb) [both protectant/contact]; and combinations of these. Most broad spectrum contact and systemic fungicides are somewhat effective against this rust. If they choose, homeowners can call a commercial pesticide applicator (company) to apply the pesticides.

Field studies indicate that there is a considerable range in susceptibility among the daylily varieties grown here, with some being very susceptible and others largely unaffected. So far, affected varieties include, but are not limited to these: Attribution, Pardon Me, Gertrude Condon, Crystal Tide, Colonel Scarborough, Starstruck, Joan Senior, Imperial Guard, Double Buttercup, Big Blue, Nordic Mist, David Kirchoff, and Stella D'Oro. New infections arise in as little as 2-3 days on susceptible varieties.

The herbaceous perennial, *Patrinia*, is an alternate host of *P. hemerocallidis* and allows sexual reproduction of the fungus. Six species of the perennial are sold and grown across the U.S. as ornamentals. The widespread presence of *Patrinia* could allow the fungus to complete its life cycle and increase the severity of the infection. Therefore, it is very important to

monitor *Patrinia* for any signs of rust and to follow the same treatment plan as for daylilies. The movement of diseased stock through daylily hobby clubs is contributing to the daylily rust problem. Members' traveling back and forth through the states – particularly to Florida where the disease has been reported – trading and selling plants to one another and other people, make it impossible to track affected plants and to stop the proliferation.

According to Fulgham, the Virginia Department of Agriculture and Consumer Services does not consider daylily rust a regulated pest because the fungus spreads too quickly for inspectors to be able to identify sources, and because there is no Virginia law that restricts the sharing of plant material. "The widespread occurrence of this disease would render any type of regulatory or quarantine action fruitless now," he added.

For additional information, contact the Virginia Department of Agriculture and Consumer Services' Office of Plant and Pest Services at 804/786-3515.

Reprinted from *VNLA Newsletter*,
September/October 2001.

THE IMPORTANCE OF QUALITY IN COMPOST

**Francis R. Gouin, Professor Emeritus,
University of Maryland**

If your primary purpose for composting is volume reduction, you should not attempt to market your product to the ornamental horticultural industries. If your purpose for composting is to manufacture compost for the horticultural industries, it is important that you establish standards that will result in the highest quality compost possible. If some of the compost you produce cannot meet the highest possible standards, it can always be marketed at a lower price to horticultural industries with less demanding needs; however, this is a smaller market.

The ornamental horticulture industry is the second largest economic agricultural industry in this country. It utilizes vast quantities of peat moss, barks, topsoil and fertilizers in the production, establishment and maintenance of ornamental plants. Except for topsoil, the most commonly used sources of organic matter used by these industries are peat moss and milled pine bark which are generally void of nutrients essential for plant growth, and most instances must be imported and are not always readily available. These industries also utilize large quantities of fertilizers, especially water soluble and slow-release fertilizers that are costly.

What distinguishes the ornamental horticulture industries from all other horticultural and other agricultural industries is that the plants it produces must be capable of continuing growth after sale and that once established in the landscape they will increase in value with time. Therefore it is important to know that these horticultural crops are high value crops and growers and users of compost cannot afford losses.

The quality of compost used by most of the horticultural industries is highly dependent on the crops to be grown and the cultural methods used. There are some ornamental horticultural crops that demand heavy use of organic materials to replenish soil lost in harvesting and marketing. The harvesting of a single acre of nursery stock by digging with a ball of soil around the roots (balling) results in the loss of 200 to 250 tons of top soil with each crop. This means that repeated harvesting of such fields rapidly depletes the native topsoils and reduces production efficiency for succeeding crops. Because the compost is being added to soil, it need not be of the highest quality.

Thus ornamental horticulture can utilize two different qualities of compost—lower quality compost for crops produced in soil and higher quality compost for plants grown in containers or to be used in the installation and maintenance of landscapes. The compost that is used by home gardeners must also be of the highest quality. In addition to requiring compost of the highest quality, these industries also demand that the compost be uniformly consistent.

The reason why growers who produce their crops in soil can utilize a lower grade of compost is because most soil contains clay and clays can buffer (commonly known as cation exchange capacity) many of the antagonistic compounds and adverse C: N ratios found in lower grades of compost. Such compost may contain high or low pH's, excess soluble salts, alcohols, high levels of tannic acids and or acetic acid and above acceptable maximum C: N ratios, etc.

Because most potting mixers have a very low cation exchange capacity, the amendments added must be within the tolerable range for plants to be grown. This means the pH must either be near ideal or easily adjusted, soluble salt levels must be known and only sufficient

compost added to meet maximum tolerable level, the compost must have a C: N level that will not compete with nitrogen needs of the plants and that the compost be free of alcohols and contain minimum levels of cellulose and hemicellulose and low levels of tannic and/or acetic acids. In addition, compost particle size should not exceed ½" in length and moisture concentration should be between 45% and 50% to facilitate handling and to minimize dust problems.

Since the compost or the potting medium made with the compost is likely to be viewed by many and used with bare hands daily, weekly or monthly it must be stable, mature and uniformly consistent. It should contain minimal man-made inert objects (less than a total of 2%) and be free of glass-shards, rusty-metal, and objectionable odors. Premium compost should be dark brown to black with an earthy odor.

Standards for premium quality compost may appear high, but it is important to remember that these industries will utilize the compost for many different uses by a wide variety of people with varying degrees of experience. These markets are already being served by the peat moss and milled pine bark industries, who are capable of providing a uniform and consistent products free of hazardous materials. Also growers are well experienced in the use of peat moss and milled pine bark in the production and maintenance of their crops. If the compost that you produce is inferior to the products that already exist, you will not have a market. Compost is in direct competition with peat moss and milled pine bark for the same market and being the new kid on the block, you must prove that the compost that you manufacture is superior and its use is profitable.

The feedstock from which compost is made affects uses. Feedstock that is lime dewatered should not be used for making compost for the

ornamental horticultural industries.

In addition to supplying quality compost, as a producer, you must also be capable of providing a growing program. Since most composts are rich in nutrients, it is important that growers modify their cultural program to maximize the use of nutrients in the compost and to prevent over-fertilization problems. Therefore, successful marketing of compost necessitates developing and providing a growing program that will result in producing the highest quality plants of a wide variety of plant species, with minimal effort and use of commercial fertilizers and pesticides.

Success in marketing compost is dependent on establishing and maintaining quality standards. This means either utilizing a commercial laboratory or establishing a quality standard laboratory of your own. It means following the same recipe for blending feedstock and method of composting. Marketing also requires providing storage to maintain the compost quality and protect the compost from outside contamination by weed seeds and insects. Adequate storage also enables compost producers to maintain a readily available supply that can be delivered as specified by the buyer. The ornamental horticulture industries are highly seasonal, thus it is important that compost producers be capable of meeting peak demands by either providing adequate storage and/or create incentives for selling compost at other times when demand is normally low, if sufficient storage is not available.

Success in composting requires a thorough understanding of the industry's needs, coordination within the composting facility and determination that the compost produced is of consistent and uniform quality.

Reprinted from *What's Cooking*, Fall 2001 (a publication of the MidAt. Composting Assoc.

SEASIDE ALDER RESEARCH
William R. Graves, Dept. of Horticulture
Iowa State University

A description of the distribution of seaside alder (*Alnus maritima* Muhl. Ex Nutt. [Betulaceae]) first attracted me in 1996. I was intrigued to learn that plants of this rare species had been documented only on the Delmarva Peninsula (in southern Delaware and adjacent portions of the Eastern Shore of Maryland) and over 1,100 miles away in southern Oklahoma. The next year, a third population in northwestern Georgia (one swamp in Bartow County) was discovered. The origin of these small, disjunct populations, all of which grow in soils saturated with water, is a fascinating topic my students and I continue to address. In the meantime, support from the Landscape Plant Development Center has helped us (most data are from graduate students Jim Schrader, Sarah Gardner, and Heidi Kratch) to resolve horticultural questions. Some of these are listed below, along with key findings:

What is the landscape function or ornamental value of seaside alder? Plants of the species develop into large shrubs or small trees, almost always with multiple trunks. In nature, clumps of numerous stems appear in the middle of standing water, so plants should function well in managed landscapes prone to periodic flooding or uniformly wet soils. Plants in Oklahoma exist as monocultures on islands in the middle of fast-moving waterways. This suggests roots of the species prevent erosion. Leaves of seaside alders are very dark green during the summer. Unlike other alders used in the Midwest, good autumnal leaf coloration appears possible. Combinations of yellow, orange, and red have been observed on some individuals as coloration progresses during some autumns. A golden-brown is typical of most plants regardless of whether other colors precede it. Seaside alder is the only North

American member of its genus not to bloom in spring. Separate female and male flowers develop on plants late in the summer. Only the male inflorescences are readily noticeable. They are yellow catkins that sway in the breeze and create quite a show with the dark green foliage behind them. The cone-like structures (strobili) that result from the development of the female flowers can be found on plants throughout the year and provide some sinter interest.

Can seaside alder survive with its roots out of standing water? Yes. The first field trial we established with this species was installed with the help of Jim Schrader in 1998. Nine rows, each with 30 seedlings from Oklahoma, were planted along a slope on the campus of Iowa State University in Ames. One row (#9) was planted in a low area that provided a constant supply of standing water. The eight other rows were parallel to row #9 at increasing distances from the water supply. No irrigation was provided after seedlings were established. The figure below shows the mean increase in height of the shoot system and the mean width of the canopy in September, 2000. The least significant difference (LSD) values indicate by how much any two means (n=3) must differ to be different statistically at the 5% level of

confidence. Plants with roots constantly in standing water (row #9), and those in the two adjacent rows (#7, #8) showed the most gain in height. The trend was similar for canopy width; the rather narrow width of plants in row #9 may have been due to effects of competition from other riparian species. We measured soil moisture content in the upper 2.4 inches of soil periodically. Some results collected after an extended drought are shown at the top of the figure. Despite mean moisture contents as low as 9%, drought did not kill any seedlings. The most growth was associated with plants in row #8, which were in soils that contained 29% water despite the drought. Based on this trial and others conducted by Sarah Gardner, we conclude that seaside alder can withstand a wide range of soil moisture content but will grow the fastest in consistently wet soil.

It is easy to germinate seeds of seaside alder?

Yes. It is best to collect seeds of seaside alder between mid-November and mid-January. (Note: This rare species has protected status throughout Maryland and in at least some areas in other states; permits are required to collect seeds in these locations.) The seeds form in strobili, woody structures that resemble small

pine cones, and require two seasons to mature. Curiously, seeds germinate better if collected before they are exposed to the coldest temperatures they normally face during winters in their native habitats. After collecting the strobili, physically remove the seeds and cold-stratify them for at least a few weeks. Stratification hastens germination and makes seedling development more uniform. Sow seeds very shallowly. Germination of stratified seeds should be evident within one week. We consistently find lower rates of germination among seeds from the Delmarva Peninsula than among seeds from Georgia or Oklahoma.

Can softwood stem cuttings of seaside alder be rooted? Yes. Rooting success is linked to plant maturity and time of year. Results are best for cuttings collected shortly after new stems stiffen (June). Cuttings from juvenile plants root at about 100%, while cuttings from plants on which flowering has occurred show more moderate success that varies with the plant from which cuttings are obtained. Use of IBA at 0.3 or 0.8% in talc increases rooting.

Will this species be cold-hardy north of where it is found naturally? Yes. We have planted hundreds of seedlings from all three populations in Ames, Iowa (north edge of USDA zone 5). Additional plantings have been made by Jim Schrader as far north as Bemidji, Minnesota (zone 3). While low temperatures may have contributed to the few deaths that have occurred, we suspect low temperatures in these zones are only potentially lethal for poorly established plants installed late in the autumn. Jim Schrader and I conducted a study of twig hardiness last fall, winter, and spring to assess acclimation, mid-winter hardiness, and deacclimation. Twigs collected from plants in all three native populations were studied, along with twigs from plants of all populations that we established in Ames. Our data indicate that cold stress in mid-winter, as well as during the onset

and cessation of the winter season, should not limit the use of seaside alder in the United States.

Are there differences between plants from the three native populations? Yes, many of them. We have found many subtle but consistent differences in the shapes and sizes of the strobili and leaves. Plant form also varies. Individuals from Georgia generally become tall, narrow plants foliated most heavily at the top of the canopy, while plants from Oklahoma develop a stockier habit with dense foliage throughout the canopy. Foliar differences found in the wild also are evident on plants from all three populations when grown in a common environment.

Considering its common name, is this species salt-tolerant? I suspect that seaside alder may be a misleading name and spent six months on sabbatical leave this past winter to study how salt affects this species. The work was done with Professor Jack Gallagher and his associates at the Halophyte Biology Laboratory of the Graduate College of Marine Studies, University of Delaware. Their facilities at Lewes are close to indigenous seaside alders that occur in estuaries. We conducted four experiments and plan to report the findings in the *Journal Wetlands* after final data are collected within an estuary later this year.

Does seaside alder “fix nitrogen” like other alders? Root nodules that contain nitrogen-fixing bacteria (*Frankia*) have been observed on seaside alders, and the fixation of nitrogen in these nodules has been confirmed. Although the function of the symbiosis has not yet been characterized under conditions in managed landscapes, it is reasonable to assume that their capacity to metabolize atmospheric nitrogen fixed by *Frankia* in their roots will permit seaside alders to perform well on nutrient-poor soils where other woody plants fail. Heidi

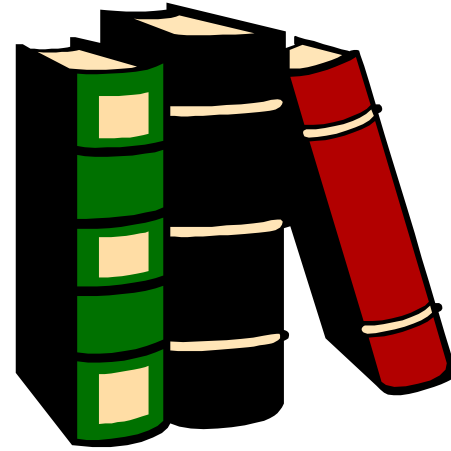
Kratsch is busy learning how root-zone environmental conditions where plants are native, and those in managed landscapes, affect the symbioses.

Will seaside alder be weedy or invasive outside of its native habitat? This seems unlikely. Plants in the wild appear restricted to small ecological niches and have not spread rapidly. Young seedlings in the wild are extremely rare. This may be due in part to dispersal of seeds in winter, and the sensitivity of seeds to low temperature. Although we think the likelihood of invasiveness is nil, Jim Schrader has established long-term trials to test this.

Is seaside alder available commercially? Sunshine Nursery of Clinton, Oklahoma, sells seaside alders, and Environmental Concern of St. Michaels, Maryland, has offered the species. I'd appreciate learning of other sources readers may know. We hope to begin distribution soon of at least one superior selection from our trials.

Reprinted from *Landscape Plant News*, Volume 12, No. 3, 2001.

Editor's Note: The UDBG sold seaside alder in the 2001 UDBG Plant Sale.



Publications

Small Business Resource Guide 2001 (IRS Publication 3207) is the result of a cross-government effort to provide businesses with information that will help them understand their federal tax requirements and other topics. A coalition of federal agencies have updated this third edition to a CD-ROM to provide one-stop service to small businesses. The CD-ROM contains federal tax and other government regulatory information based on the life cycle of a business, and features tax forms, instructions, and publications needed by business owners.

To get your free copy, call: 1-800-829-3676 and ask for Publication 3207

Insects and Gardens: In pursuit of a garden ecology. Written by Eric Grissell, a garden writer and research entomologist, this innovative book explains insect biology and the important role of insects in garden ecology. It is not a manual for pest control. This 345-page hardcover is available for \$29.95 from Timber Press (800-327-5680 or www.timberpress.com/bugs).

Pesticide News

The next Pesticide Applicator Training dates are: Dec 17-18 at the Kent Co. Office. This info is announced at:
<http://www.udel.edu/pesticide/Cal.htm>

FACING PRODUCT RESTRICTIONS: PREPARING FOR CHANGE IN THE MID- ATLANTIC REGION OF THE UNITED STATES

**Kyle Miller, Market Development Specialist,
BASF**
James Walter, Ph.D., Rohm & Haas

Product selection is clearly among the most critical decisions impacting a professional turf management program. Turf managers develop lists of preferred products based on their experience and individual needs. Occasionally, however, product selection can be influenced by other factors, such as restrictions on current products. New regulations are now compelling turf professionals to familiarize themselves with some of the newer products that have emerged in recent years.

A report published recently by the Michigan State University Cooperative Extension Service provides some guidance on one of these newer products. For example, the MSU article suggests that, for grub control, diazinon can be replaced with halofenozide, one of the newer chemistries offering reliable grub control and a variety of end-user benefits.

Halofenozide affects a hormone in grubs that accelerates the molting process in the larva stage, causing a premature, fatal molt. This hormone is found only in grubs and targeted insects, so it cannot affect nontargeted species, including earthworms, bees and mammals.

Halofenozide provides flexibility in the timing

of grub treatments. It has both preventive and curative activity, and applications can be made from just prior to egg-lay to the second instar. For preventive control in the Mid-Atlantic region of the United States, under normal weather conditions, halofenozide should be applied between June 1 and August 1. However, in the event of early-season drought conditions in the Mid-Atlantic states, application may need to be delayed for 1 to 2 weeks to accommodate the later flights of most grub species caused by drought.

Keeping abreast of newer products can provide important benefits to lawn care operators and landscaping contractors. By considering newer compounds for grub control, such as halofenozide, they may be able to use a more effective material that requires no special change in equipment and offers a broad window of application.

Halofenozide is marketed under the brand name MACH 2® turf insecticide. MACH 2 is a registered trademark of RohMid L.L.C. Always read and follow label directions.

The preceding pesticide news item was a news release provided by DUDNYK Integrated Marketing Communications in Horsham, PA.

Research Briefs

Turf:

Tall fescue and perennial ryegrass responses to stress. Tall fescue exhibited better tolerance to heat stress, both alone and in combination with drought stress, by maintaining higher photosynthetic rate, leaf photochemical efficiency, evapotranspiration, leaf relative water content, cell membrane stability, and root growth than did perennial ryegrass. These physiological responses could be used as stress indicators in selecting for heat- and drought-tolerant species or cultivars of cool-season grasses. Simultaneous drought and heat stress were more detrimental than was heat stress alone for both of these cool-season species, suggesting that sufficient irrigation during hot summers could help turfgrass to better survive heat stress by maintaining favorable leaf water status and photosynthesis. (Y. Jiang and B. Huang)

Preceding brief excerpted from HortScience 36(4):682-686. 2001.

Loss of fertilizer granules due to mowing. The loss of some greens-grade fertilizers through mowing was significant, particularly for fertilizers with lower water solubility. Following fertilizer application, turf was irrigated with 6.4 mm of water over a period of 15 minutes. A second 6.4 mm irrigation was applied the day after treatment and mowing was resumed 2 days after treatment. This regime was not adequate to prevent the mower from picking up fertilizer. More water-soluble, finer granular fertilizers, as well as liquid fertilizers, have the lowest potential for being lost through routine mowing. Increased irrigation would probably reduce the loss of the more water soluble fertilizers. (C.F. Mancino, D. Patrunak and D. Wilkinson).

Preceding brief excerpted from HortScience 36(6):1123-1126. 2001.

PGR increases storage life of Kentucky bluegrass. A preharvest treatment of trinexapac-ethyl (a plant growth regulator) appears to increase storage life of Kentucky bluegrass sod. Application of 0.23 kg/ha in June, 10 or 14 days prior to harvest, effectively reduced temperatures within sod stacks, sustained tensile strength longer, and improved posttransplant quality. (N.L. Heckman, G.L. Horst, R.E. Gaussoin and K. W. Frank)

Preceding brief excerpted from HortScience 36(6):1127-1130. 2001.

Bentgrass decline during the summer. Decline in turf quality occurred in the summer so 1997 and 1998. The declines in turf quality and growth could be associated with decreasing photosynthesis and increasing respiration, leading to carbohydrate depletion. Use of heat-tolerant cultivars such as 'L-93' could help maintain quality turf and reduce management costs during summer months. Any cultural practices that promote carbon production through photosynthesis or reduce carbon consumption through respiration would be beneficial for maintaining the quality of creeping bentgrass during the summer. (X. Liu and B. Huang)

Preceding brief excerpted from HortScience 36(6):1131-1135. 2001.

Container Production:

Ronstar and Rout residues in container nurseries. While Ronstar (oxadiazon) and Rout (oryzalin plus oxyfluorfen) were found in irrigation water, their concentrations were so much lower than toxic levels for sensitive plants (by orders of magnitude) that the risk to nursery

plants from recycled pre-emergent herbicide in the irrigation water is essentially zero. Oxadiazon and oxyfluorfen are highly stable and relatively immobile in the substrate. They are potentially dangerous since they are so persistent. But the major hazards from using these chemicals are probably to nursery staff, particularly from the concentrations of oxadiazon and oxyfluorfen that persist on the growing area from in situ application, and in the upper layers of the substrate. To minimize risk, application should only be made to plants that are close-packed (pot-to-pot) rather than spread out on the growing area. To minimize exposure, nursery staff should wear protective clothing, including suitable footwear and especially gloves, not only when applying the gervicide, but also when handling (i.e. spacing out, and preparing for sale) the pots. (P.B. Goodwin and S. Beach)

Preceding brief excerpted from HortScience 36(5):900-904. 2001.

Bald cypress fertilization. There is a need to grow bald cypress in containers to a larger size than traditionally used on reclamation sites to circumvent deer and rabbit damage. The best container growth was achieved with composted pine bark amended with 8 lbs/yd³ CRF (controlled release fertilizer; 19N-2.6P-8.8K; 8- to 9-month release). Lime is not needed. (L.E. Hinesley, S.A. Smith and A.M Wicker)

Preceding brief excerpted from J. Environ. Hort. 19(3):109-113. September 2001.

Greenhouse production:

Temperature effects on flowering of *Campanula carpatica* ‘Blue Clips’, ‘Deep Blue Clips’ and *Campanula* ‘Birch Hybrid.’ This popular garden perennial is often grown as a flowering potted plant. Increased temperature has been shown to reduce flower size and

number. This research shows that high temperatures before the visible bud stage (VB) do not reduce flower number (although in some cases flower size is reduced), but high temperatures after VB result in smaller and fewer flowers. Increasing the daily light interval (DLI) after VB increased flower size and number but increasing the DLI before VB did not affect flower size and number. (G.Niu, R.D. Hiens, A. Cameron and W. Carlson)

Preceding brief excerpted from HortScience 36(4):664-668. 2001.

Improving growth and reducing N loss in greenhouse production of geranium. The nutrient efficiency of greenhouse irrigation systems was increased if 50% or 100% of the fertilizer was supplied by controlled release fertilizer (CRF). Fertilizer with 100% continuous liquid feed (CLF) caused higher concentrations of nutrients to be released to the environment with no increase in growth or quality. The nutrient retention of CRF was greatly increased with the use of ebb and flow (EF) irrigation as compared to hand, microtube, or capillary mat irrigation. EF irrigation produced large, high quality plants and released small volumes of run-off with low nutrient content. By using water-efficient irrigation systems together with nutrient-efficient fertilizer sources, the potential for ground and surface water contamination could be greatly reduced. (J.K. Morvant and J.M. Dole and J.C. Cole)

Preceding brief excerpted from HortScience 36(6):1022-1026. 2001.

Paclobutrazol drench controls late season stem elongation of poinsettia. Paclobutrazol drenches applied in late October or early November are an effective tool for controlling late-season stem elongation of ‘Freedom Red’ poinsettias grown under natural photoperiods. These late-season applications have the least

risk for negatively affecting bract size while still reducing stem elongation in the last few weeks of the crop. (J.E. Faust, P.C. Korczynski and R. Klein)

Preceding brief excerpted from HortTechnology 11(4):557-560. October-December 2001.

Using photosensitive films for height control of lisianthus. Selective reduction of FR wavelengths from sunlight using the YXE-10 FR-absorbing film reduced the height of lisianthus by 10% ('Florida Blue') and reduced internode length by 10% and 19% ('Florida Pink' and 'Florida Sky Blue', respectively) without affecting the development of flowers or flower quality. However, the height reduction of lisianthus cultivars was less than that for some of the other crops that have been tested previously. Therefore, depending on the height reduction required, light manipulation alone may not be sufficient to attain height reduction. A combination of growth regulators with photosensitive films could reduce the frequency and the amount of growth regulating chemicals needed to attain the desired height reduction, thereby reducing chemical exposure and decreasing environmental impacts. (S.B. Wilson and N.C. Rajapakse)

Preceding brief excerpted from HortTechnology 11(4):581-584. October-December 2001.

Maintaining vegetative potted purple velvet plants. The purple velvet plant (*Gynura aurantiaca*) has commercial potential as a potted plant due to its attractive purple foliage, if the malodorous flowers can be avoided. This research concluded that purple velvet stock and finished plants should be grown under 8-h photoperiod and 60% shade (230 to 305 $\mu\text{mol}/\text{m}^2/\text{s}$ maximum light intensity) to maintain vegetative growth and reduce flowering. Both 8-h photoperiod and 60% shade were required for greatest percent of vegetative growth (94%)

as 16-h photoperiod and shade resulted in 27% vegetative shoots and 8-h photoperiod and high light intensity resulted in 79% vegetative shoots. Long days of 12-h or greater should be avoided. Ethephon sprays were not commercially useful. (L.C. Pallez and J.M. Dole)

Preceding brief excerpted from HortTechnology 11(4):590-595. October-December 2001.

Growth regulators to control canna height. Height control of canna is desirable during production, shipping and retail display. Cutless applied at 15 and 30 ppm was effective in controlling height of canna lily without any detriment to the overall floral display. B-Nine/Cycocel treatments were inconsistent and Sumagic exhibited effective, but excessive height control, reducing plant marketability. (L.L. Bruner, G.J. Keever, J.R. Kessler, Jr. and C.H. Gilliam)

Preceding brief excerpted from J. Environ. Hort. 19(3):114-119. September 2001.

Using growth retardants on salvia and scabiosa. Intensive production methods and the onset of warmer spring temperatures can cause rapid and excessive elongation of flower spikes of 'May Night' salvia and 'Butterfly Blue' scabiosa. Foliar application of the plant growth retardant Florel was effective for both species in maintaining compact size and quality. In florescence height was reduced linearly as Florel concentration increased from 250 to 1000 ppm. While Florel somewhat delayed flowering of both species, an added benefit of its application to the salvia was a corresponding increase in the numbers of inflorescences produced. B-Nine applied at 5000 ppm suppressed the height of salvia and increased inflorescence numbers equal to the 250 ppm application of Florel, but it had no effect on scabiosa. In contrast, 20 ppm Sumagic moderately suppressed the height of scabiosa, but had no effect on salvia. (T.J.

Banko, M.A. Stefani and M.S. Dills)

Preceding brief excerpted from *J. of Environ. Hort.* 19(3):145-149. September 2001.

Floriculture:

Prolonging vase life of tulips. Trehalose (a nonreducing disaccharide—in other words a sugar) plus CAP (a germicide) is effective in prolonging vase life without abscission, water loss, or elongation of cells in tulip tepals, but slight wilting occurs in the leaves. (M Iwaya-Inoue and M. Takata)

Preceding brief excerpted from *HortScience* 36(5):946-950. 2001.

Increase flower longevity and reduce bud drop of miniature roses with high production temperatures. High production temperatures (29 C day/24 C night) increased postproduction flower longevity and decreased post production bud drop. In ‘Meidanclar’ the high production temperature increased incidence of malformed flowers. This practice would be unsuitable for commercial production of this cultivar. Perhaps temperatures slightly below the extreme used in this experiment might increase flower longevity without causing malformation. (J.A. Monteiro, T.A. Nell and J.E. Barrett)

Preceding brief excerpted from *HortScience* 36(5):954-954. 2001.

Landscape:

Using paclobutrazol to promote root growth at transplanting. This study with potted elm seedlings demonstrated that PBZ may be useful in stimulating regenerated root elongation and reducing water stress of transplanted trees. Additional studies to determine appropriate rates that will produce similar results with larger trees

without prolonged topgrowth reduction are needed. (G.W. Watson)

Preceding brief excerpted from J. of Environ. Hort. 19(3):119-122. September 2001.

Pansy tolerance to preemergent herbicides.

Pansies are used increasingly in the landscape to provide color throughout the fall, winter and early spring. Five herbicides currently on the market, Corral 2.68G, Treflan 5G, RegalKade 0.5G, Regal Star 1.2G, and Factor 65WDG, did not injure any of the container-grown pansy cultivars evaluated. Herbicides causing severe injury or shoot dry weight reduction include: Rout 3G, Pendulum 60WDG, Surflan 4AS, Gallery 75DF, and Princep 4L. In addition, Pennant 5G was safe on pansy but not currently labeled for this use. (J.E. Altland, C.H. Gilliam, J.R. Kessler, Jr., E.M. Wallace and A.M. Riggs)

Preceding brief excerpted from J. of Environ. Hort. 19(3):123-127. September 2001.

Deer repellents. Putrescent egg-based products (Deer Away®) are more effective than other products tested in this study, though none of the products demonstrated complete feeding deterrence under heaving feeding pressure. (C.H. Coker, E.H. Simonne, L. Merritt, D.J. Eakes, M.K. Causey, J. Owen and J. Osborne)

Preceding brief excerpted from J. of Environ. Hort. 19(3):158-162. September 2001.

Marketing:

Consumer preferences for edible flowers.

Survey participants rated flower color as the most important factor when selecting edible flowers with a mixture of all three colors (blue, yellow, and orange) being the most desirable. Cluster analysis of the responses resulting in three distinct groups—likely buyers (61%), unlikely consumers (23%) and persuadable

garnishers (17%). (K.M. Kelley, B.K. Behe, J.A. Biernbaum and K.L. Poff)

Preceding brief excerpted from HortScience 36(4):800-804. 2001.

Study of consumer preferences among residents of single-family dwellings in New England. Respondents cited relaxation and enjoyment as the most important reason to garden followed by improving outdoor living spaces. Exercise was considered a less important reason to garden with an increase in property value cited as the least important reason to garden by most respondents. Respondents cited independent garden centers as the most important source of gardening information, with other important sources including magazines, friends and mail order catalogs. Garden departments of large chain stores were not cited by many respondents as important sources of gardening information and only 24% of respondents had confidence in information received from these garden departments as compared to 89% with moderate confidence in information obtained from independent garden centers. The most important product and service attributes of retail establishments were well-maintained plants, informative signage, knowledgeable staff, and a wide selection of plant material. Gardening chemicals and fertilizers were purchased more frequently at mass merchandisers due to price. But respondents preferred to purchase high-value, long-lived plants at independent garden centers due to higher plant quality and access to knowledgeable staff. When making plant purchases, plant appearance was the most important consideration. Evidence of new growth, the presence of dark green foliage, and knowledge of a northern-grown source were important. (M.H. Brand and R.L. Leonard)

Preceding brief excerpted from HortScience 36(6):1111-1116. 2001.

Insects:

Leafhopper control on dahlia. Dahlias have gained increasing popularity as a field grown cut flower crop, but some years high leafhopper populations ruin the flower yield. The following treatments were applied: Merit 75WP applied once at the beginning as a soil injection around the base of the plants; Flagship applied once at the beginning as a soil injection; and Azatin XL applied as a spray until runoff. All treatments performed equally well compared to the control plants. If growers are willing to make weekly applications of Azatin XL, the levels of protection from potato leafhopper appears to be good. Since this material acts mainly as an insect growth regulator, application would have to be started when potato leafhopper nymphs are first detected on the plants for the most effective control. Single applications, applied as a soil drench or injection of Merit or Flagship appear to give good levels of control for the growing season. (S. Gill, S. Klick and P. Shrewsbury)

Preceding brief excerpted from GrowerTalks , August 2001.

Controlling root aphids. Root aphids are being found with increasing frequency feeding on the root systems of herbaceous perennials. Small populations are not a problem; however, when populations become high, the plants are reduced in vigor, and customers will definitely see the white wax. MD researchers tested several potential treatments. All the treatments applied as soil drenches gave good control. Orthene applications gave the best control, with close to 100 percent mortality of root aphids. BotaniGard gave close to 96 percent control. Submerging the rootballs in insecticidal soap for a 30-second duration delivered very poor control (less than 30 percent). Submerging them for 60 seconds gave control of close to 70 percent and

submersion for 90-120 seconds gave 95 percent control. Submersion dissolved the white wax, which is most noticeable to customers during the transplant process. Even though the chemicals controlled the aphids, they did not dissolve the wax. The heaviest populations of root aphids have been found on plants in the aster family. Copper treated pots have been suggested as a treatment for root aphids. One week after transplanting infested plants into copper pots there was no reduction detected in the root aphid population. After one month, there was a reduction in root aphids, but the population was not completely controlled. The grower is now placing new plugs directly into copper treated pots to see if these plants are less likely to develop problems with root aphids. This practice is under current evaluation. (S.Gill)

Preceding brief excerpted from Greenhouse Product News, November 2001.

Resistance of boxwood varieties to boxwood leafminer. A field survey of boxwoods revealed high levels of resistance in *Buxus sempervirens* ‘Handsworthiensis’ and *B. sempervirens* ‘Vardar Valley’. High levels of susceptibility were found in *B. sempervirens* ‘Myrtifolia’ and *B. microphylla* ‘National’. Other cultivars exhibited intermediate levels of resistance. (G.d’Eustachio and M. Raupp)

Preceding brief excerpted from J. of Environ. Hort. 19(3):153-157. September 2001.

Entomopathogenic nematodes control black vine weevil in perennials. Studies conducted with two formulations of nematodes on three species of perennials provide strong evidence that *H. bacteriophora* control black vine weevil larvae in containers. The advantages of using entomopathogenic nematodes include excellent control, no EPA labeling required, no restrictive re-entry interval, safe application for applicator

and minimal non-target effects. These nematodes are relatively easy to apply and readily available from commercial suppliers. Disadvantages of nematodes include thermal limitations to survival and infectivity, the need to use nematodes shortly after purchasing since their storage interval is limited to 6 months or less, and a greater expense when compared with conventional pesticides. (S. Gill, J. Lutz, P.Shrewsbury and M. Raupp)

Preceding brief excerpted from J. of Environ. Hort. 19(3):166-170. September 2001.
New Plants:

‘Florida Silver’—a semi-dwarf heat-tolerant lisianthus. ‘Florida Silver’ is a white flowered lisianthus. This group of Florida cultivars now includes a pink flowered (‘Florida Pink’) and two blue flowered (‘Florida Blue’ and ‘Florida Light Blue’) cultivars. The most important and distinguishing attribute of all the Florida cultivar-group cultivars as compared with other dwarf and semi-dwarf commercial lines is their heat tolerance. Florida cultivars are intended to be used as bedding plants or for flowering potted plants. Treatment with growth retardants is necessary for production of Florida cultivars in <4-inch-diameter pots. One to three plugs per 3- to 4-inch-diameter pot is recommended for optimal marketing display. (B.K. Harbaugh and J.W. Scott)

Preceding brief excerpted from HortScience 36(5):988-989. 2001.

×*Sinocalycanthus raulstonii* ‘Hartlage Wine’. This shrub is a cross between *Sinocalycanthus chinensis* and *Calycanthus floridus*. The flowers have broad petals like *Sinocalycanthus* rather than the strap-like petals of *Calycanthus*. They are weakly fragrant and maroon fading to wine red. The plant has been named in honor of JC Raulston, Director of the North Carolina State Univ. Arboretum

(subsequently renamed the JC Raulston Arboretum), who directed the successful intergeneric hybridization before his death. (F.T. Lasseigne, P.R. Fantz, JC Raulston and G.B. Straley)

Preceding brief excerpted from HortScience 36(4):765-767. 2001.

Verbena ‘Homestead Purple.’ This verbena was selected in a private garden near Athens, GA for its early rose-colored flowers and coarse, lobed foliage. Plants begin to flower as soon as the ground warms and remain reproductive until frost. They form a clump 14 to 18 inches high and about 3 feet across. Full sun and well-drained soil are needed for optimal flower production. ‘Homestead Purple’ is cold hardy to about -12 C (USDA Zone 6). (A.M. Armitage, J.S. Greer and J.M. Garner)

Anthurium ‘Show Biz.’ This anthurium produces numerous attractive light red spathes and has a compact branched growth habit making it suitable for pot production. ‘Show Biz’ is patented. Plants were released to several Florida tissue culture labs for propagation and distribution. Inquires regarding participating laboratories may be obtained by writing to the Florida Foundation Seed Producers, Inc., P.O. Box 309, Greenwood, FL 32443. (R.J. Henny and D.J. Norman)

Preceding brief excerpted from HortScience 36(6):1140-1141. 2001.

Calendar

December 12, 2001 – Grounds Manager’s Winter Seminar. Warrington Motor Lodge, Warrington, PA, Contact: Scott Guidser (215)345-3283 – Pesticide update credits will be provided.

December 13, 2001 – New Benefits of Tree Conference. Penn State Great Valley, Contact: Julianne Schieffer (610)489-4315.

January 6, 2002 – “Native Plants and People” 2002 Winter Lecture Series. “Using Native Landscapes in Successful Water Management”. Bowman’s Hill Wildflower Preserve, PO Box 685, New Hope, PA 18938-0685, 2-3 p.m., cost: \$6.00, non-members \$8, call:(215)862-2924, fax 215-862-1846, www.bhwp.org, bhwp@bhwp.org

January 7-11, 2002 – Advanced Landscape Plant IPM PHC Short Course. Department of Entomology, University of Maryland. University of Maryland, College Park, MD. Contact: Debie Wilhoit, 301-405-3913 or <http://www.pest.umd.edu/events/events.html>

January 8 – April 2, 2002 –Tilling the Soil of Opportunity. This class meets Tuesday evening for 13 weeks to explore the entrepreneurial process. Location: Lehigh County Agricultural Center, Allentown, PA, Contact: John Berry (610)391-9840.

January 8-10, 2002 – 2002 Eastern PA Turf Conference and Trade Show. Valley Forge Convention Center, Contact: Pennsylvania Turfgrass Council (717)238-4552. Pesticide update credits will be provided.

January 8-10, 2002 – MANTS, Baltimore, MD; Contact: 800-431-0066.

January 13, 2002 – “Native Plants and People” 2002 Winter Lecture Series. “Restoring the Legacy: The Importance of Locally Native Plants in Your Landscape”. Bowman’s Hill Wildflower Preserve, PO Box 685, New Hope, PA 18938-0685, 2-3 p.m., cost: \$6.00, non-members \$8, call:(215)862-2924, fax 215-862-1846, www.bhwp.org, bhwp@bhwp.org

January 15, 2002 – Eastern Regional Nursery/Landscape Seminar. Location: Delaware Valley College, Doylestown, PA, Contact: Dave Suchanic (610)489-4315. Pesticide update credits will be provided.

January 15, 2002 – VFGA Geranium Production

Seminar. Hilton Richmond Airport, Sandston, VA.
Contact: (540)231-7906, jlatime@vt.edu

January 15-19, 2002 – NCAN “Green Growin’ Show”, Winston-Salem, NC. Contact: 919-816-9118.

January 16-18, 2002 – Growerexpo 2002, Chicago, IL; Contact: (630)208-9080, www.ballpublishing.com
January 16, 2002 – Plants, People and Time: Creating a Place, 12th Annual Symposium, New Directions in the American Landscape. Arboretum Villanova, Villanova, PA. Topics: Your Native Plant Communities: a Regional Overview, Field to Forest: Understanding the Process, Capturing the Visual Essence of the Forest, Field to Forest: Using the Process, A Horticulturist in the Wild: Notable Native Plants. For more information:(215)247-5777, ext. 156.

January 17, 2002 – Plants, People and Time: Creating a Place, 12th Annual Symposium, New Directions in the American Landscape. Arboretum Villanova, Villanova, PA. Topics: Managing Stormwater Gracefully: Planted Solutions for Reducing Runoff, Species Distribution in the Wild: The Human Factor, Planning for the Unplanned: Natural Succession in the Designed Landscape, the Landscapes of Roberto Burle Marx: Integrating Nature, Culture and Art, Why do We Landscape? A Panel Discussion. For more information: (215)247-4777, ext. 156.

January 17 & 18 – Delaware Horticulture Industry Expo and Pesticide Conference. Modern Maturity Center, Dover, DE. For more information call: Val Budischak at the DNLA (888)448-1203.

January 20, 2002 – “Native Plants and People” 2002 Winter Lecture Series. “Butterflies in a Native Habitat”. Bowman’s Hill Wildflower Preserve, PO Box 685, New Hope, PA 18938-0685, 2-3 p.m., cost: \$6.00, non-members \$8, call:(215)862-2924, fax 215-862-1846, www.bhwp.org, bhwp@bhwp.org

January 21-24, 2002 – Professional Horticulture Conference of VA, Virginia Beach, VA; Contact: (757)523-4734, www.phcv.org

January 22 – Feb 28, 2002 – Computer – Aided Design (CAD). Location: Penn State Delaware County Campus, Media, PA, time-6:30 – 8:30 p.m. Contact: Jennifer Siegel (610)892-1309.

January 27, 2002 – “Native Plants and People” 2002 Winter Lecture Series. “Habitats in the Developed Landscape”. Bowman’s Hill Wildflower Preserve, PO

Box 685, New Hope, PA 18938-0685, 2-3 p.m., cost: \$6.00, non-members \$8, call:(215)862-2924, fax 215-862-1846, www.bhwp.org, bhwp@bhwp.org

January 31-February 3, 2002 - ANLA Management Clinic.. Louisville, KY. Contact: ANLA, 202.789.2900; Fax, 202.789.1893; <http://www.anla.org>

February 3, 2002 – “Native Plants and People” 2002 Winter Lecture Series. Native Grasses: The Forgotten Element”. Bowman’s Hill Wildflower Preserve, PO Box 685, New Hope, PA 18938-0685, 2-3 p.m., cost: \$6.00, non-members \$8, call:(215)862-2924, fax 215-862-1846, www.bhwp.org, bhwp@bhwp.org

February 3-5, 2002 – Shade Tree Symposium. Lancaster Host, Lancaster, PA, contact: Penn-Del ISA-Elizabeth Wertz (215)795-0411. Pesticide update credits will be provided.

February 5, 2002 – Eastern Short Pesticide Recertification Conference. Maryland Cooperative Extension. Delmarva Convention Center, Delmar, MD. Contact-Ginny Rosenkranz, (410)749-6141.

February 5,6,7, 2002 – Pennsylvania Landscape and Nursery Conference. Location: The Penn State, University Park, Contact: Jamie Smith (814)863-2189, Dave Suchanic (610)489-4315. Pesticide update credits will be provided.

February 7, 2002 – MGGA Winter Short Course. Maryland Cooperative Extension. Holiday Inn, Timonium, MD. Contact: Hank Doong, (301)937-4166.

February 10, 2002 – “Native Plants and People” 2002 Winter Lecture Series. “Native Plants for Formal Gardens”. Bowman’s Hill Wildflower Preserve, PO Box 685, New Hope, PA 18938-0685, 2-3 p.m., cost: \$6.00, non-members \$8, call:(215)862-2924, fax 215-862-1846, www.bhwp.org, bhwp@bhwp.org

February 13, 14, 2002 – Christmas Tree short Course. Location: Penn State Conference Center, State College, Contact: Penn State Short Course office (814)865-8301, George Perry, (570)622-4225. Pesticide update credits will be provided.

February 14, 2002 – Winter Grounds Manager’s Seminar. Location: Kutztown Grange, Kutztown, PA, Contact: Laura McNutt (610)378-1327. Pesticide update credits will be provided.

February 15, 2002 – The 6th Annual KAFMO/PRPS

Athletic Field Conference. Location: Holiday Inn, Grantville, Contact: Dan Douglas (610)375-8469, ext 212; or KAFMO@aol.com Pesticide update credits will be provided.

February 17, 2002 – “Native Plants and People” 2002 Winter Lecture Series “Herbal Wonders Around Us: Our Native Treasures”. Bowman’s Hill Wildflower Preserve, PO Box 685, New Hope, PA 18938-0685, 2-3 p.m., cost: \$6.00, non-members \$8, call:(215)862-2924, fax 215-862-1846, www.bhwp.org, bhwp@bhwp.org

February 19, 21, 27, 2002 – Estimating and Bidding for Landscape Maintenance. Location: Penn State Great Valley, Malvern, PA, Contact: Jim Sargent (610)489-4315.

February 20-22, 2002 – LCA MD DC VA Winter Workshop, Bethesda, MD. Contact: (301)948-0810, www.lcamddeva.org

February 20-23, 2002 – Mid Atlantic Direct Marketing Conference. Location: Holidome, York, PA, Contact: John Berry (610)391-9840.

February 24, 2002 – “Native Plants and People” 2002 Winter Lecture Series. “Native American Gardening Practices”. Bowman’s Hill Wildflower Preserve, PO Box 685, New Hope, PA 18938-0685, 2-3 p.m., This lecture is free, made possible by sponsorship of the University of Pennsylvania Museum and the generous funding provided by the Commonwealth of PA, call:(215)862-2924, fax 215-862-1846, www.bhwp.org, bhwp@bhwp.org

February 26, 27, 28 & March 1, 2002 – Cut Flower Short Course. Maryland Cooperative Extension. 4H Center, College Park, MD. Contact-Suzanne Klick (301)596-9413.

March 7-10, 2002 – Philadelphia Flower Show, Call: (800)714-3287.

March 13, 2002 – Industrial and Right-of-Way Weed Control. Location: Williamson Restaurant, Contact Scott Guiser (215)3345-3283. Pesticide update credits will be provided.

March 18-22, 2002 – Horticulture Short Course. Location: Penn State Great Valley, Malvern Campus, PA. Contact: Dave Suchanic (610)489-4315.

June 19-22, 2002 – Southeast Greenhouse Conference. June 19-Industry Tour, June 20-22 –Educational Sessions, June 21-22 – Trade Show. For more information call:1-

877-927-2775 to receive a \$15 discount coupon. www.sgcts.org

July 9-14, 2002 – AN & LA Convention, San Diego, CA. Contact: (202)789-2900.

July 23-25, 2002 – PANTS, Ft. Washington, PA. Contact: (610)544-5775

August 2-4, 2002 – Southern Nursery Association Trade Show, Atlanta, GA; Contact: (770) 953-3311, www.sna.org

