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Editor: Susan Barton, Extension Specialist, University of Delaware  
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**ASSOCIATION NEWS**  
**Valann Budischak**  
**Executive Director, D.N.L.A.**

Greetings! The season got off to an awfully rainy start but now it's full steam ahead – we hope. We've actually had 9 days in a row without rain. Hope you'll manage to come up for air in time for the DNLA's annual Summer Turf & Nursery Expo at Jonathan's Landing Golf Club, Magnolia, DE on August 13<sup>th</sup>.

Featured talks this year include a permeable pavers installation led by Ross Causey and Shane Robinson. Ross owns Garden Square Landscaping in Kennett Square, PA and is an ICPI instructor. Shane is a sales representative with EP Henry. Bill Haldeman and Mike Weaver of Flintwoods will lead a discussion on the options for wet areas. Flintwoods is home to multiple rain gardens. Lastly...are you up to the challenge? Bob Mulrooney and Brian Kunkel are ready to test your identification skills with an array of pest, disease and weed samples. A dose of fun and education. Hope you can join us!

This spring, the DNLA board of directors voted to become a financial partner in [www.thelandlovers.org](http://www.thelandlovers.org). The DNLA has joined force with the ANLA, ASHS, PLANET, John Deere, and 18 other state associations in supporting this web-based initiative. The goal of the website is to offer information on green industry educational and career opportunities to students, parents and educators. We're pleased to be part of this network! Check it out.

Kudos to Deanna Pillarelli, owner of Garden Escapes. Deanna, a multiple DNLA Landscape Award winner, won the 2008 APLD Harry Schuster Award. This award is presented annually to a person who most reflects the enthusiasm and selfless efforts to further the APLD.

Kudos also to Mark & CeCe Babbitt of Burke Equipment. Burke Equipment was one of 104 Kubota dealers in the US to win an incentive trip to China. The award was based on sales growth, business levels and 2008 Kubota product sales.

On a more somber note, the DNLA would like to express their deepest sympathy to the families of Joseph Jamison and Richard Ornauer. Joe, a founding member of DNLA, member of the DNLA Hall of Fame, and the owner of Brandywine Nurseries, died on May 10<sup>th</sup>. Richard, husband of DNLA board member Rexene Ornauer of All Seasons Nursery & Garden Center, died on June 11<sup>th</sup>.

**REMINDER: Please keep our 2009 Landscape Awards program in mind throughout the upcoming season.** We encourage any member to submit an entry. Applications will be mailed in the beginning of September. The deadline for entries is September 28<sup>th</sup>. We encourage any/every member to submit an entry!

## Welcome New Members:

fraises des bois  
107 Wellington Way  
Middletown, DE 19709  
(302) 378-3633

Gardens Great and Small  
852 Auburn Mill Road  
Hockessin, DE 19707  
(302) 521-5891

J & S Lawn Service  
36261 Zion Church Road  
Selbyville, DE 19975  
(302) 436-4081

Kent Landscaping  
109 S. Main Street  
Camden, DE 19934  
(302) 698-0657

Kessel's Nursery LLC  
49 Pinyard Road  
Monroeville, NJ 08343  
(856) 358-4501

Precision Irrigation  
34650 Hudson Road  
Laurel, DE 19956  
(302) 875-7422

Professional Lawn Scapes  
5321 Beaver Neck Village Road  
Linkwood, MD 21835  
(410) 228-4478

## **New CNPs:**

On March 5<sup>th</sup>, six individuals sat for the Certified Nursery Professional core and/or specialty exams. Congratulations are in order for the following individuals:

Steven Faltenovich  
*Turf Management Specialist*  
Sposato Landscape Co.

Denise Bradshaw  
*Nursery Management Specialist*  
Sposato Landscape Co.

Daniel Watras  
*Nursery Management Specialist*  
Countryside Nursery & Garden Center

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

So far 2009 has been the year of sustainable landscaping. We kicked off the year with the Hort Industry Expo talk on Sustainable Landscaping. Every talk I do this year seems to include at least some aspect of sustainability. I was able to promote sustainable practices at a conference in Rehoboth in January, Delaware Parks training and Master Gardener phone team training in February, a few short courses and a highway vegetation conference on Long Island in March as well as the UD Reunion and Forum and Millersville Native Plant Conference in June. The result of all this talking (I think) is that I have now been contacted by a number of groups who want to implement sustainable landscape practices, specifically reduced mowing and meadow establishment. I have met with the City of New Castle about taking three large areas out of mowing and managing them as meadows. Astra Zeneca is creating meadows on their corporate campus in Wilmington and I am hoping to do some employee training sessions to help people understand the new landscape concepts. The City of Bethany is engaged in a stormwater management project that will probably include alternatives to mowed grass and possible releasing medians in Bethany from routine mowing so they will look like the medians in Seashore State Park. There are a number of people who enthusiastically back the concept. Change doesn't happen quickly but it is encouraging to see it start to happen throughout the state.

The University of Delaware has been implementing sustainable landscape practices on campus for a while. Rain gardens have been installed for storm water management in a variety of locations and Tom Taylor has been using a native plant palette on campus for years. But, we have recently made some significant changes in mowing policies on Laird campus

(around Clayton Hall and the new dorms), mowing only edges around paths and buildings and allowing tall grass to grow in many areas. This saves money and should ultimately result in greater biodiversity and a more interesting landscape. We are hoping to also establish two meadows—one from seed and one from plugs. We will compare the public acceptance of the three different types of meadows (release, seed and plug).

If you haven't already done so, visit the new Sustainable Landscape website housed on the UDBG site under "events and education." (<http://ag.udel.edu/udbg/sl/>). Rebecca Pineo (former UDBG intern and current Longwood Graduate Student) completed this site in January. She has organized sustainable landscape concepts into 5 categories—soils, water, plants, materials and human wellness (based on material created by the Sustainable Sites Initiative, a national group of industry professionals working on sustainable landscape specifications). Each category has its own page with specific recommendations that are backed up by extension fact sheets and other regional publications. Rebecca wrote fifteen new fact sheets this fall to provide more information about concepts on the website. It contains a wealth of information that you and your clients will find useful.

On the education front, we have finished installing interpretive signage at the new Visitor Center landscape on campus. There is a large Sustainable Landscape sign at the entrance and six smaller signs highlighting specific sustainable landscape concepts throughout the garden. Small signs feature information on plant adaptability, use of compost, plants as groundcovers, managing water with rain gardens, attracting wildlife, and the benefits associated with engaging people in the landscape. A flagstone pad surrounding the large sign entices visitors to step off the brick

walkway and read the sign—it really works. Check it out! Many thanks to Tom Taylor for orchestrating this project.

This spring the Enhancing Delaware Highways team finished and introduced the Enhancing Delaware Highways Establishment and Management Manual. It follows the Planning and Concept manual and is designed to provide DelDOT and others with specific recommendations for establishing and maintaining sustainable vegetation along the roadside. Copies are limited but a pdf should be available on the DelDOT website this summer.

One more pest walk is scheduled for this summer:

**IPM Walk\*** –Start in Fischer Greenhouse with a brief discussion of "What is IPM" then tour the grounds of the UDBG in Newark to identify both pests and beneficials in the landscape. July 15 from 6:30 – 8:30 PM. (Cost is \$10) To register, call the New Castle County Office at 302-831-2506.

\*Pesticide credits will be awarded for attendance at this session.

**IT'S BAD BUSINESS TO ONLY LOOK AT  
PROFIT AND LOSS**  
**Howard Hyden**

The idea that the only way to stay in business is to make more money than you spend is still true. Many growers are thinking of only cutting costs and closing greenhouses. We tend to think the horticulture consumer will only buy our products if the price is low. The truth is low pricing is not necessarily the first consideration when making a purchase. Research has demonstrated that many factors go into the selection of one product over another.

**Idea # 1** - Increase the volume of each customer's sale. How many of us have experienced a person in a store handing out free samples of a product? Have you then been one of the shoppers to add that product to your cart? We should work just as hard to increase volume as well as more customers.

**Idea # 2** - Reduce the total cost to the customer. Point a customer to the "specials" table and then recommend some complimentary product. In most sales situations it is merely called "friendly service". This is done with the customer's best interest in mind. It is good business to help someone select the correct plant for a project. If you recommend a substitute that consequently saves them money, you could gain a regular customer. These actions improve business by Positive Word of Mouth (P.W.O.M.)

**Idea #3** - The cost of not training is greater than the cost of training. You are already investing heavily in an employee with salary and benefits. Not making them the best they can be is foolish economy. If you want your company to project a certain image your entire staff must be on the same page. Companies that want to excel should target a percentage of salary to training, possible 2-5%. If training is done properly it will pay dividends.

**Idea #4** - The cost of not carefully evaluating your employees will lower the quality of the entire staff. An interesting analogy is if you don't weed your garden (i.e. get rid of unsatisfactory employees) your company will suffer the same fate as an overgrown weedy garden. It improves morale when all employees realize they are being judged fairly for their efforts.

**Idea #5** - The cost of turnovers is usually greater than most growers or garden center managers realize. We are all aware of how long it takes new employees to get on board, but never translate that into excess expense. Employee turnover can become customer loss.

**Idea # 6** - Positive Word of Mouth. Have you seen the ad on TV that shows a woman using a spray dusting product and extolling its virtues. She is confronted by what looks to be a store manager. The message is that those who use the product are the best sales people. How valuable would it be to your company to have all your customers be sales people, too?

**Idea #7** - Negative Word of Mouth is a problem every company needs to struggle against. The loss of a customer is the loss of revenue and possibly the collapse of the entire business. We all know that we cannot please everyone but an effort needs to be made if only to learn why they are unsatisfied. The cost of acquiring a new account is far greater than the cost of keeping current customers. The question is who is working harder on your accounts; your company to keep them, or your competitor to steal them!

*Excerpted from May 2009 Country Folks  
Grower authored by Howard Hyden, founder of  
Center for Customer Focus.  
[www.howardhyden.com](http://www.howardhyden.com)*

**MARMORATED STINK BUGS**  
**Stanton Gill, Extension Specialist, IPM for**  
**Nursery, Managed Landscapes and**  
**Greenhouses, CMREC, University of**  
**Maryland Cooperative Extension**

One more stinking bug is increasing its population in many east coast, west coast, and parts of the mid-west states- the brown marmorated stink bug, *Halyomorpha halys*. This bug is another gift from the China/Korea/Japan area and was first reported in Allentown, PA back in 2001. Since this first sighting it has invaded New Jersey, Delaware, Maryland, District of Columbia, New York, Ohio, and Massachusetts. It has also been found in Oregon and California.

**Why are we concerned about this bug?**

Good question. It is just another true bug and we have plenty of native species of true bugs. Exotic species such as the marmonated stink bug are especially bad because they do not have all of their natural enemies around to keep the population in check. Their damage is inflicted by sucking mouthparts used to pierce the host plant to feed. Where feeding occurs small, necrotic areas on leaves or on fruit form. Feeding on apples and peaches causes damage to the fruit tissue that result in distorted unappealing fruit. Feeding on plants such as raspberries and blackberries causes fruit to be misshapen or abort. This bug is reported to feed on asparagus, green beans and peppers. In the landscape this bug has been found feeding on crabapples, maple, basswood, sweet gum, redbud, American holly, pyracantha, viburnum, rose and persimmon.

It has not been reported on annuals and perennial flowers so far, but we would be interested if you detect this bug damaging any of your customers' herbaceous species this year. If so contact me at [Sgill@umd.edu](mailto:Sgill@umd.edu). Since it has

been reported damaging peppers and legumes, such as soybeans, we are interested in whether it will damage ornamental peppers and legumes, such as baptisia.

**Highly mobile bug** - Since this bug was first found in Pennsylvania, it has managed to spread itself across the United States very rapidly. In February of 2009 it was found hitch-hiking a ride in a mobile home in Florida. It is now established in this state and we will see what damage it causes in this tropical area. This insect is mobile in the growing season and can rapidly switch host plants. It has been reported on early spring ripening fruit, moves to foliage feeding on other plants, and ends up damaging late season fruits, vegetables, or ornamentals.

**Damage** - When the brown marmorated stink bug feeds on beans it causes the seeds within the pod to be malformed or not form at all. On fruit crops, the feeding causes small necrotic spots. If peaches or plums are damaged early in the season it causes distorted growth of the fruit called cat-facing. Fruit damaged later in the season have lesions that look like water soaked spots on the surface. If they are crushed they have a distinct slightly minty foul odor that is difficult to get off your hands. The taste is awful if you handle a bug and get this flavor in your mouth. Leaf feeding is characterized by light-colored stippling or lesions. The lesions sometimes coalesce and turn brown over time.

This bug also overwinters as adult insects, usually in people's houses or offices. The adults enter homes in the fall where they seek shelter sites to spend the winter. The bugs are harmless to humans and will not bite people, but they become a nuisance. In spring they will migrate outdoors to mate and lay eggs.

**Recognizing the insect** - The brown marmorated stink bug looks much like any other stink bug with a typical shield shape. It is

usually about 1/2-5/8" long and 3/8-1/2" wide and is mottled gray to brown. To differentiate marmorated stink bug from other stink bugs, look for the presence of alternating light and dark banding on the exposed side of the abdomen when viewed from above.

Females lay barrel-like eggs in clusters on leaf surfaces. The young nymphs are yellow to brown with black and red markings. As nymphs mature the banded antennae and legs in adults is evident.

**Life cycle** - The brown marmorated stink bug emerges from over-wintering sites such as houses and offices in April through May and feeds on developing fruit or leaves in spring. They mate and egg laying starts in May. Females lay eggs in clusters of 25-30 eggs, which are found from May through August on leaf undersides. One female can lay several hundred eggs in her lifetime. The nymphs pass through 5 instars with each stage lasting 5-7 days. The summer generation adults start to show up in late July and will present through the fall. There is one generation/year in this area

**Tracking** - We are interested in tracking where this bug shows up in the U.S., and also what new plants are damaged. Report them at a Rutgers University website- <http://njaesRutgers.edu/stinkbug/report.asp>. If you find feeding on herbaceous flower species contact me at [Sgill@umd.edu](mailto:Sgill@umd.edu) or 310-596-9413.

**Control** - Systemic insecticides such as acephate (Orthene) or imidacloprid should control feeding nymphs or adults on foliage. Evaluate if the population is high enough to warrant treatment. Synthetic pyrethroids such as Bifenthrin (Talstar) or permethrin (Astro) will also control nymphs and adults.

*Excerpted from Free State Nursery News, Spring 2009*

## WILDLIFE AND THE BUILT LANDSCAPE

**Elise Hansen Tripp, Senior Environmental  
Scientist, Fishbeck, Thompson, Carr &  
Huber, Grand Rapids , MI**

*Editor's note: I know this article is long, but read it! It is the best wildlife and landscape article I have read in a long time.*

Wildlife includes any non-plant organism, such as insects, birds, fish, and animals. Development activities create an altered landscape that may or may not provide the necessary habitat to support wildlife. Wildlife's presence over time is determined by whether the landscape contains the elements needed for it to thrive and complete its life cycle. The cumulative effect of land development over long periods of time and over large geographic areas results in widespread, large-scale wildlife impacts. Therefore, during the landscape design, construction and maintenance periods, think about the effects these phases will have upon wildlife, and take appropriate measures to manage and modify these impacts.

**Wildlife in the natural world** - In nature, a wildlife community evolves slowly, forming an intricate and balanced web of associations. Like plants, wildlife is responsive to the landscape's physical condition-its landform, vegetation, and water bodies. Wildlife species fill specific niches and perform certain functions. These functions include pollinating flowers, distributing seed, breaking down (eating) plant material, and controlling population size of organisms lower on the food chain.

The food chain is an important component in nature's web of associations. It describes the feedings relationships between species: who eats what, and is then eaten by whom. The food chain begins with organisms that construct complex carbohydrates, the primary producers:

plants, bacteria, and algae. The next step up the chain is the herbivores (plant eaters), which consume primary producers in order to obtain energy and biomass. Following herbivores are carnivores, which eat meat, and omnivores, which eat either plants or meat. Within the food chain, links exist between carnivores, with larger animals subsisting on smaller ones. Finally, the last association in the food chain contains organisms that consume dead biomass: the detritivores, scavengers, and decomposers. These break biomass back down into simpler forms, such as humus, CO<sub>2</sub> and water.

Sunlight powers the food chain, which is essentially an energy transfer mechanism. As each animal consumes the next lowest link in the food chain, energy embodied in the eaten organism is released, providing fuel that supports the consumer's metabolism. However, much of this energy is lost or consumed in various forms, such as feces, movement and heat. Therefore, each predator in the food chain must consume much prey in order to support its life. As a result, native ecosystems support more omnivores than carnivores (Lyle, 1999). If top-of-the-food chain carnivores are not present, the population of lower level animals may burgeon, provided sufficient habitat resources are present.

All wildlife requires four essential landscape elements: food, water, cover, and territory (Henderson, 1987; Stein 1997). Each wildlife species has a unique set of requirements with regard to these elements. These requirements may change as an individual species goes through different life cycle phases, such as an insect's larval, pupa, and adult stages. Some organisms are specialists, with rigid and specific habitat requirements, while others are generalists, adaptable to various foods and types of cover. When designing for wildlife habitat, the landscape design must supply all of the required elements to support a species throughout its life cycle. It must also provide

these elements within a certain distance so that the animal can safely access them.

A landscape that supports diverse wildlife must contain plants that provide a varied and balanced diet: grasses for grains and greens, shrubs and groundcovers for fruit, flowering plants for nectar and seed, and trees for fruit and nuts. The *food* palette must support the desired organisms throughout all seasons. Studies show that wildlife diversity is directly proportional to plant diversity, due to the food and shelter that plants provide. Plant choice can either encourage or discourage the presence of wildlife. Lyle (1999) deems oaks and pines as the most valuable woody plants for wildlife, followed by blackberry, wild cherry, and dogwood. Lawns, on the other hand, provide little wildlife value, other than forage for geese, deer, and rabbits. Many weeds, such as ragweed, pigweed, and panic grass, are an important source of seeds for birds, although they might not be considered an acceptable component in either the native or built landscape.

Tallamy (2007) provides startling evidence of the varying capacities of native and non-native species to provide food for native insects. Through an extensive literature review, he estimated the number of Lepidoptera (butterfly and moth) species that feed on native woody species. Oak (*Quercus* sp.) hosted the most lepidopterans- 517 species, followed by willows (*Salix* sp.) (456 species), cherry/plum (*Prunus* sp.) (448 species), and birch (*Betula* sp.) (413 species). In contrast, the hosting capacity of alien plants is significantly less, both compared to native species and to the number of herbivores supported in the alien's homeland. For example, *Eucalyptus stellulata*, which was introduced to the United States 100 years ago, supports one herbivore species in North America and 48 species in its native region. *Phragmites australis* (common reed), introduced over 300 years ago, supports 5

herbivores in North America and 170 herbivores in its homeland. This data suggests that native insects require native plant species for food. The availability of food for these herbivores has significant ramifications for the rest of the food chain, since it limits the size of the herbivores' population, and therefore the size of each successive rung up the food chain.

The second essential component in a wildlife habitat is *cover*. Cover provides protection from weather extremes, the eyes of predators, and anything else that poses a threat. Cover supplies shelter, an escape route, a refuge, and a place to rest. It offers a nesting or roosting location. It must be adequate for wildlife to successfully rear their young. It can be located in or under vegetation (living or dead), or in small spaces found in rocks, buildings or underground. Cover is an essential ingredient that enables wildlife to complete its life cycle.

The third requirement in wildlife habitat, *water*, varies in importance from species to species. Browsers, such as deer and rabbits, receive all the water they need from the leaves of plants. Some animals need a source of drinking water, while others require a larger body of water. Bodies of water attract many types of wildlife, including songbirds, wading birds, small mammals, small reptiles, amphibians, and insects. In general, flowing water is more attractive to wildlife than still water.

The final habitat requirement, *territory*, is the least understood. Territory is the spatial area that an individual animal needs to successfully live its life- the space it needs to find a mate and adequate food. It is usually based upon the competitive relationships between animals of the same species. Animals have various means to establish the territory boundaries, usually through applying scent. A result of territorial behavior is even distribution of a population over available space (Lyon, 1999). The degree

of territorialism varies from species to species. Those species with a high degree of territorialism appear to be at a disadvantage in environments dominated by human beings.

### **Wildlife management in the built landscape -**

The built landscape consists of a human ecosystem assembled within a short period of time. This landscape vastly differs from the slowly evolving native landscape. While remnants of the site's native ecosystem may persist in a degraded form, the internal balance between wildlife is disrupted or gone. Landscape development improves habitat for some species, degrades and eliminates habitat for others, and creates appropriate habitat for exotic and domesticated species. As a result, adapted animals thrive and reproduce- potentially overrunning the landscape, damaging vegetation and buildings, and interfering with natural and human functions. Managing these species requires outside intervention to keep their populations in check.

Generalist species, such as many birds and mice, easily adapt to the built landscape. Many introduced species, such as starlings, English sparrows, black rats, and Norway rats, also thrive in the built landscape because they are adapted to disturbed environments. In addition, adaptive mammals, such as raccoon, opossum, and skunks are common in the developed landscape, and may have destructive impacts.

**Designing for desired wildlife -** Landscape design that aims for diverse, balanced, interacting wildlife populations is more complex than designing for plant communities. The first step is to target the wildlife populations that are both desirable and undesirable. The presence of wildlife may be valued and welcomed because of the human and natural functions it provides. Many designed landscapes feature plants that attract songbirds, hummingbirds, and butterflies, wildlife that people enjoy watching. Designs

that provide habitat for pollinating insects should be encouraged, due to the beneficial ecological and economic impact they may have on a regional scale. In addition, landscape design may also include water features to support frogs and fish.

Once desired wildlife species are identified, the landscape design must incorporate the required elements (food, water, cover, and territory) to support them. This requires an intimate knowledge of the specific requirements for the targeted species to thrive and reproduce. Such information is available from a variety of sources, including state Department of Natural Resources, and nonprofit organizations such as the National Audubon Society, the Wildlife Habitat Council, and Ducks Unlimited.

Tallamy (2007) stresses the importance of including plant species that provide both food for insect larvae and nectar for adult insects. Integrating a diverse array of native species into the plant palette provides the foundation for a balanced wildlife community, in which no one member of the food chain dominates another. The insect herbivores are kept in check by dozens of insect predators, parasites and diseases. These, in turn, are eaten by birds, amphibians, and small mammals.

The next step when designing for wildlife is to evaluate the site's natural features to determine which areas already contain high quality habitat, and which have the potential for habitat enrichment. A variety of steps may be taken to enrich these environments to increase the diversity of wildlife (Streeter, et al, 1979), including to:

- Increase the diversity of plant species in seed mixes
- Use different seed mixes for different locations onsite
- Use native species in the seed mixes
- Grade to develop topographic variation

- Reestablish drainage patterns
- Leave water-collecting depressions; these will initially be small potholes of marshes, and ultimately mesic meadows or forest pockets.
- Vary plant community structure across the site (meadow, shrub thicket, woods)
- Transplant various age classes of trees and shrubs

Additional strategies to attract wildlife include installing nest boxes, feeders, birdbaths, waterfalls, and ponds (Henderson, 1987). Retaining dead snags and brush or rock piles onsite provides wildlife with cover. An effective means to protect existing wildlife is to establish a vegetated buffer around critical habitat.

The greatest species richness for wildlife will be found in riparian areas and at the transitional zone between two different types of environments (such as woods and meadow). These zones, known as ecotones or the edge effect, support species from both environments and some that are different from both (Lyle, 1999). The built landscape contains many edges: lawn to landscape bed, lawn to unmowed meadow, lawn or meadow to woods or shrub thicket, meadow to storm water detention basin, built landscape to native landscape. These edges foster opportunities for people and wildlife to interact, either through simple observation, or through possible confrontations (vehicular collision, or animals eating valued landscaping plants, ransacking garbage, or damaging buildings).

#### **Designing to control unwanted wildlife -**

There are many valid and noteworthy examples of unwelcome wildlife presence in the built landscape. Wildlife may be destructive to buildings (woodpeckers, raccoons), and vegetation (deer, rabbits, squirrels, moles). It can pose a danger to site operations (such as birds at airports) or danger to human life (bees,

wasps, venomous spiders and snakes). It may defecate in public areas (geese). It can simply be a nuisance (skunks).

To control unwanted wildlife in the built landscape, the landscape designer must manipulate or eliminate essential habitat requirements (Cecil, 2008). If one of these habitat requirements is missing, wildlife will migrate to an area capable of meeting its needs, or die. For long-term wildlife management, habitat manipulation is more effective than direct population reduction, because wildlife populations will rebound if habitat requirements are present. An obvious first step is to not plant food-producing vegetation in areas where the presence of animals can endanger public health and safety, such as airports, electric power stations, and high-traffic areas. Plant species to avoid in these areas include those that produce large quantities of fruit, berries and nuts.

Inserting appropriate buffers at the ecotone may mitigate unwanted wildlife effects. For example, if deer may cause browsing damage on foundational plantings, installing a buffer of vegetation that deer dislike at the woods' edge may discourage them from foraging closer to site buildings. A park-like buffer of non-native vegetation between native woods and turf may also act as an impediment. As a last resort, installing a fence will restrict larger wildlife from accessing the developed site.

Variable approaches may be employed to create a more hostile environment near buildings and public areas, while retaining or instilling high quality habitat in more remote locations onsite. Understanding wildlife behavior aids in implementing appropriate measures. For example, planting a buffer strip of tall, unmowed vegetation along the edge of a water body discourages geese from moving from open water inland. Geese prefer to land in open areas where they can see potential predators, and so

avoid tall grass or brushy vegetation that may harbor threats. Conversely, turf planted to the water's edge provides a safe source of abundant food. Site design may also require physical barriers to prevent birds from nesting in building crevices or animals from burrowing in unacceptable locations.

**Wildlife and the sustainable landscape** - In summary, the sustainable, built landscape does not seek to recreate authentic native ecosystems, but rather to insert human function into a landscape without compromising natural biological and physical functions. The presence of wildlife in the resulting landscape may be encouraged or discouraged, depending on the design's desired functions. The challenge for the landscape designer that values wildlife is to design for acceptable habitat while discouraging wildlife that could be destructive or unwanted.

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*Excerpted from The Michigan Landscape May 2009.*

## COMMONLY OBSERVED BENEFICIAL INSECTS

**M. Bess Dicklow, Extension Plant Pathologist  
University of Massachusetts**

The single largest factor that prevents plant-eating insects from overwhelming ecosystems is the fact that they are consumed by other insects. These benign insects can be divided into two general groups—predators and parasites. Predators kill smaller or more helpless insects, usually for a single meal. Parasites are organisms that make their home on or in the bodies of other living organisms (hosts). Some of the best known predators are dragonflies, aphid-lions, ground beetles, lady beetles, flower flies, and predaceous bugs. The most valuable parasites are the tachinid flies, different families of wasps (Ichneumon, Braconid, and Chalcid), and egg parasites.

Adult dragonflies are known to consume mosquitoes, flies, beetles, moths, and wasps. Aphid-lions are also known as lace-wings because of their gauzy, delicate wings and consume aphids and other small, soft bodied insects or their eggs. Larvae of ground beetles devour caterpillars, small soft bodied insects, slugs, and pupating insects. Adults range in appearance to shiny black to green with small heads, large protruding eyes, long spiny legs, and thread-like antennae. The ladybug is familiar to most and is small, shiny, and red to orange with or without black spots. Their diet consists of aphids, mites, mealybugs, scales, whiteflies, small caterpillars, beetle grubs, and insect eggs. Flower fly adults resemble yellow jackets or bees, but differ in having two wings instead of four and very large eyes. They hover above flowers and their larvae feed on aphids, mealybugs, scales, and other soft-bodied insects. Predaceous bugs such as the assassin bug or soldier (stink) bug feed both as larvae and adults on aphids, leaf-hoppers, small caterpillars,

mealybugs, and other soft bodied insects.

Tachinid flies resemble large houseflies without bright colors and with bare bristles on their antennae. They lay their eggs on the skin of their hosts or on foliage where they may be ingested. They paralyze caterpillars of moths and butterflies, feeding on muscles and fatty tissues. Parasitic wasps comprise the largest and most frequent and effective parasites. They are small to moderate sized wasps with a sharp ovipositor which is used to deposit eggs. Many of the wasps are exclusively egg parasites. Others parasitize scale insects, aphids, and leaf or stem borers.

Natural enemies can be conserved in the landscape by using insecticides in a selective manner as part of an Integrated Pest Management (IPM) program. Spot applications and the use of low toxicity, short-residual materials (soaps, horticultural oils) or materials with the least non-target effects will help to protect beneficial insect populations. Careful monitoring of both pests and their natural enemies can result in effective pest control.

*Excerpted from Growline March 2009*

## PRUNING CLEMATIS

Jennifer Kujawski, Horticulture Consultant

Few gardeners can resist the allure of clematis: the exotic, velvety texture and bold colors of large-flowered varieties of the fragrant delicacy of small-flowered types. Clematis adds an exciting dimension to the perennial garden, tumbling over walls and climbing up trees or structures. However, left to its own devices, this beauty can become an unattractive, tangled mess, looking like “a disemboweled mattress,” in the words of eminent British gardener Christopher Lloyd.

Pruning is a must to keep clematis looking attractive in the garden. Technique and timing depend on clematis flowering habits. Experts have divided the genus into three general pruning groups based on whether flowers form new growth, old wood, of both.

**Group 1** - Clematis plants in Group 1 flower from summer through fall near the ends of new shoots. Pruning is best accomplished in spring before growth begins. Shear all stems back to the lowest pair of strong buds, to about one foot from the ground. Prune less severely if keeping growth in check is not important; plants will ramble higher over supporting structure.

*Plants in Group 1:* *C. integrifolia*  
*C. recta*  
*C. tangutica*  
*C. terniflora (paniculata)*  
*C. texensis*

**Group 2**- Clematis plants in Group 2 bloom early in the season in leaf axils of the previous year’s stems. These plants may need only light pruning after growth begins in spring to clean out dead and tangled stems. To control growth of vigorous Group 2 types like *C. montana* or *C. armandii*, prune plants as soon as they have

finished flowering by cutting flowered wood to within a few inches of the main body of woody stems.

*Plants in Group 2:* *C. alpina*  
*C. armandi*  
*C. macropeetala*  
*C. montana* ‘Wisley’

**Group 3** - Clematis plants in Group 3 bear flowers throughout the season on both new and old stems. They offer an early flush followed by a profusion of blooms later in the summer. Prune these plants in one of several ways:

- (1) Cut back entire plants severely every few years in spring before growth begins, but understand that this will sacrifice early blooms in the pruning year, including the only double blooms on some double-flowered varieties;
- (2) Divide individual plants in half and prune only half of each plant in alternate years; or
- (3) Prune lightly in spring to clean out dead stems and again after early season flowering, cutting back only those stems that have borne flowers.

Be cautioned: there are some rouges that do not fit neatly into a particular group. Watch these plants in the garden for a few years before attempting to prune or refer to a guide for developing a pruning strategy. Two excellent references are *Clematis* by Christopher Lloyd with Tom Bennett (1989) and *The Pruning Book* by Lee Reich (1999).

*Plants in Group 3:* *C. x Jackmanii*  
‘Nelly Moser’  
‘Henry’  
‘Will Goodwin’

*Excerpted from Garden Clippings (Volume 28, Number 1) March 2008*

**KEEPING ROOTS WHERE THEY  
BELONG-UNDERGROUND  
(TO STAKE OR NOT TO STAKE- THAT  
IS THE QUESTION)**

**Dr. Bonnie Appleton, Virginia Tech  
HRAREC**

For successful tree establishment, trees must stay upright while their roots grow into the soil. Root establishment includes angled downward growth of larger structural roots along with lateral growth of fine absorbing roots. Mechanical stabilization during this period may or may not be needed, but should never be mandated until multiple factors are considered. This applies regardless of tree production or harvest method- bare root, balled in burlap (B &B), containerized, or container-grown.

When deciding whether to specify some form of tree stabilization, consider the following factors that will help you decide if the tree would benefit from mechanical stabilization:

- **Site conditions**- strong, particularly unidirectional winds; soils that remain wet; soils with high sand content; steep slopes; other plants or buildings that buffer or redirect the wind.
- **Tree sizes and conditions**- trees that are tall or have several inch caliper trunks; trees with spreading crowns; trees with weak trunks from crowding at the nursery or from being staked during production; trees grown in sandy field soils; trees with limited root depth due to tree seedlings or liners being planted too deep in the field or containers; trees with cracked, broken or loose, root balls; trees harvested and planted bare root.
- **Planting practices**- when wire baskets are completely removed or are vertically split and laid down in the planting hole, trees with soilless, sandy, or loose root balls may move too much.

- **Maintenance practices**- use of lawnmowers and string trimmers up close to tree trunks (mulching and tree guards are better alternatives if staking isn't necessary for any other reason).
- **Site uses**- near playgrounds or recreation fields; near high-traffic sidewalks; near curbs and parking areas; near other areas where people or vehicles may impact trees.

One or more of these factors may indicate that stabilization be considered, but do not use stabilization to compensate for poor quality nursery stock or improper planting practices.

If tree stabilization or trunk protection isn't deemed necessary, don't anchor, stake, or guy. If in doubt, leave trees unstabilized for a few weeks, and then reassess based on actual landscape performance. Most above ground stabilization products and methods are unattractive and visually distracting. People and equipment may become entangled in them, and tying streamers or flagging on guying as warning is generally inadequate because these materials rarely persist long. In addition, mowers, and string trimmers may hit low stakes and guys, or root ball anchoring products, if these material are not included in mulched areas.

Above ground stabilization can detrimentally affect tree growth. Tree trunks will girdle or be abraded by improper guying or guying left attached too long. If trees are staked or guyed too rigidly or too high, trunk movement or flexing will be reduced or restricted. When tree trunks don't move, hormones that promote increased trunk caliper and taper, and root growth, are not distributed downward, resulting in tall, thin trees with reduced root systems.

Tight guying or stake attachment can compress stems and restrict downward movement of

sugars. This restriction leads to root starvation as sugars accumulate in an enlarged or “sink” area above the guying. This usually results in suckers and low branches developing on trees, often death of the top. Asymmetrical trunk development can occur due to shading by stakes. Rigidly staked trunks can snap off just above staking attachment or guying, or when stabilization is removed due to decreased flex response to the wind.

If some form of stabilization is needed, the correct method, product, installation, and maintenance are crucial. For trees less than 6’ to 8’ tall, or under 2” caliper, only one support, be it a 2” x2” wooden stake, or a metal or fiberglass pole or post, placed towards the prevailing wind, may be needed. For larger trees, two stakes or poles may be needed, generally positioned such that their attachment or guying is perpendicular to the prevailing wind. Trees over 6” may require three or more equidistantly placed short stakes, duckbill soil or land anchors, or wooden beam or concrete block deadmen, again with appropriate attachment or guying. All installed outside the rootball to a depth of at least 18” to 24” into the soil to prevent them from pulling loose.

Guying or attachment, whether to short or tall stakes or poles, should be wide, smooth, nonabrasive, flexible or elastic, and if possible, photodegradable. The old standard hose-covered wire shouldn’t be used (the hose degrades and shifts) nor should string, rope, fishing line, or electrical cord. Hose-covered wire replacements include- black poly chain lock (Forestry Suppliers, Jackson, MS), the soft Army green strapping called Arbor Tie (Deep Root Partners, San Francisco, CA), and Cinch Belt, a rubber strap with a plastic belt piece (V.I.T. Products, Escandido, CA).

If wire guy lines, attached by strapping around the tree, are used, desirable line flexibility can

be obtained by installing compression springs rather than turnbuckles to tighten the lines. Attachments may, as with some of the new commercial products, surround but not touch tree trunks. The two products of this nature that we tested, - Tree-Mate-O (T-Mate-O, Charlestown, IN) and Reddy Stake (Decorations for Generations, Turlock, CA)- performed well, causing no damage and allowing adequate flex for stem callipering.

When specifying stabilization, match methods and products to their intended function or identified need. Leave stabilization in place until new root growth adequately anchors the tree. This time period is probably better decided by those who maintain the trees rather than those developing the planting and will vary depending on the tree size and condition, installation time of year (generally more root growth occurs in spring than in fall), and soil and site conditions. A 2” caliper tree planted in warm, sandy Florida soil may need stabilization for only 6 months whereas the same tree planted in cooler, heavier Minnesota soil may need 1 year of stabilization. If stabilization is removed and trees fail, either the stabilization period was too brief or there is an underlying tree root or site condition that additional stabilization time won’t correct. If stabilization is needed for more than one growing season it should be inspected and adjusted to prevent tree damage.

Necessary, correct stabilization means using the right method and product, in the right place, under the right conditions, with removal at the right time. There are plenty of good products from which to select, so we should no longer have to endure seeing trees either being strangled by guying, or holding up stakes that have been rotted or broken off.

*Excerpted from VNLA Newsletter  
November/December 2008.*

**PROBLEMS WITH PLASTICS**  
**Dr. Arthur Cameron, Department of**  
**Horticulture**

**Mr. Thomas A. Dudek, Extension Educator**  
**Extension Michigan State University**

Around the world, millions of tons of plastic are used each year to mulch crops, cover greenhouses, poly overwintering structures and to construct a variety of plant containers and plug trays. Plastics are light weight and versatile and have a multitude of uses in crop production and landscaping. However, the fate of plastic in our environment is a serious issue that should be resolved. Unfortunately, our “green” industry is not so green when it comes to reusing and recycling the vast quantity of plastic generated. Landfills are not an appropriate option, and burning can release a number of potentially dangerous compounds into the atmosphere and is banned in most communities. Containers can be reused, but there are issues related to disease pathogens and the lack of standard sizes. Greenhouse coverings and mulch films cannot be reused, since they deteriorate under UV radiation. Another complicating factor is that several different types of plastics are used in the horticulture industry, including low density polyethylene, high-density polyethylene, polypropylene, and high-impact polystyrene. To maintain the highest quality of the recycled product, these need to be carefully sorted and handled separately. Even if properly sorted, various contaminants including soil and organic matter reduce the quality of recycled plastic compared to virgin material. Every time plastic goes through the recycling process, contaminants and structural degradation reduce the quality of the plastic, such that it is difficult or impossible to manufacture the same product again and again. The list of problems goes on and, to date, more plastic is burned or put in landfills than is recycled or reused.

The market for recycled plastic can be extremely volatile as it was in 2008, with a sharp spike in price followed by a precipitous decline. As expected, this has largely followed the price of crude oil over the same time period. Currently, prices are extremely depressed and plastic recycling plants that were recently planned are now on hold. The cost of collecting, sorting, cleaning, transporting, grinding, and melting combined with reduced quality due to even minor amounts of contaminants impacts the quantity of plastic recycled. Waste management companies typically make more money putting plastic into landfills than they do selling it to recycling companies. Under these circumstances, it may require legislation rather than financial returns to stimulate and encourage recycling efforts for horticultural plastics.

**Plastic Types**

There are several different types of plastic used in the international horticulture industry. The price for virgin and recycled starting material for each varies, as does their value for species purpose. Recycle is affected by the original resin, contaminants of any sort, and any change in structure caused by heat or UV radiation.

**High-Density Polyethylene (HDPE)**

*Uses:* HDPE is commonly used for constructing nursery containers, specifically those used outdoors for trees and shrubs. Outside of agriculture, the most important use for HDPE plastic is for milk containers manufactured through the process of blow molding. HDPE is also used to manufacture fuel tanks for vehicles, various other screw top containers (e.g. bleach, shampoo, and motor oil), and come types of irrigation pipes. HDPE is valued since it resists breakage and does not break down quickly under UV light. It is both thermally and chemically resistant and thus has been extensively used in containers for pesticides.

*Reusing and Recycling:* HDPE-constructed plant

containers must be properly sterilized. The disease *Thielaviopsis* has spores that can persist for years and can infect a subsequent crop if not completely eliminated by appropriate sanitation procedures. *Thielaviopsis* is a serious root disease of a wide range of ornamental plants. There are many different container designs, and so it is difficult or perhaps impossible for growers to reuse containers unless there has first been a good deal of sorting. Recycle HDPE is typically not reformed into containers, but rather is made into plastic timber for landscaping, picnic tables, and even railroad ties. Compared to wood, plastic lumber can be very heavy but is becoming more popular each year. Generally, milk containers are commonly recycled, while other containers made from HDPE are not. Nursery containers are more difficult to recycle into plastic lumber since dirt and other contaminants can reduce the value of timber if not completely eliminated.

### **Low-Density Polyethylene (LDPE)**

*Uses:* This relatively inexpensive plastic is used to cover greenhouses, nursery overwintering structures and as a plastic mulch. When double layered, it is effective as a cover and thermal barrier for greenhouses. It has proven effective as a mulching material for diverse food and ornamental crops such as strawberries, vegetables, field grown cut flowers and even herbaceous perennial plants. It is also commonly used for various types of plastic bags.

*Reusing and Recycling:* LDPE films are not typically reused, though they can be recycled and the secondary product can be made into products such as trash bags and plastic timber. When used as mulch, the trapped soil reduces the quality of the recycled plastic. Some plastic recycle companies specialize in developing wash line systems for cleaning these plastics, and a wide range of specialized systems have been developed. Still, washing is an extra cost and many plastic recyclers do not have this

equipment, which reduces the number of options available to growers. When used as a greenhouse cover, LDPE films break down due to UV radiation, which also limits the usefulness in recycled products. Unless baled, LDPE film has a very low bulk density and is inefficient to transport. If at all possible, LDPE films should first be baled before transporting. Several types of balers have been successfully developed, and can be rented or purchased. In some cases, recycling companies will provide the baling equipment for a limited amount of time when growers are removing field mulch or greenhouse coverings. In the state of New Jersey, there is a statewide effort to aid growers on the recycling of LDPE.

### **Polypropylene (PP)**

*Uses:* Polypropylene is commonly used to construct plant containers, especially those used for greenhouse production of house plants, herbs, annuals, potted flowering plants and bedding plants. It is favored since it is generally durable, lightweight and resists breakage. However, it eventually becomes brittle, especially when exposed to UV light, and is best used indoors or for quick crops. PP is also used for auto parts, food containers, and dishware. Spun-bonded polypropylene (sometimes referred to as woven polypropylene) is used as row covers for frost protection, as a moisture barrier for buildings, and as disposable water repellent clothing.

*Reusing and Recycling:* Reusing PP containers is possible, but carries the same warnings about *Thielaviopsis*, which can persist as spores. Also, PP can get brittle if exposed to UV radiation. Virgin PP is white, whereas recycled PP will always be darker, or even black due to contaminants, which in some applications presents a barrier.

### **High Impact Polystyrene (HIPS)**

*Uses:* HIPS is commonly used for molding the

trays (flats) used for seedlings and small plants. Pure solid polystyrene is colorless, but generally plug trays are black since they are constructed from recycled plastic. These are inexpensive and extremely lightweight. Polystyrene is also used in cafeteria trays, various cases and toys. Expanded polystyrene, known as Styrofoam, has long been used for small plant containers such as forestry seedlings and vegetable transplants for large commercial growers.

*Reusing and Recycling:* HIPS trays can be reused, but again caution should be used due to the need to control root disease pathogens. Growers can accumulate HIPS trays if they purchase and transplant small plants from a plug producer. HIPS trays are extremely light, difficult to compress and come in a multitude of designs. Unless they are all of the same design, they do not stack or nest. The trays may be clean, but the inserts are typically dirty. Some plastic companies are promoting the fact they are using recycled HIPS can be used again and again. This will be limited by the extent of contamination and the ability of recyclers to completely clean the plastic before melting. Companies that collect and produce can melt HIPS and form it directly into thin sheets which can be molded directly back into trays. This eliminates a step in the recycling process and enhances the financial return. Expanded polystyrene is generally more difficult to recycle, and has a reputation for accumulating in the environment.

### **Recycling Horticultural Plastics**

*Collection:* Horticultural businesses are often responsible for finding suitable recycling companies for their plastic. Some states, such as New Jersey, offer help to connect growers with recyclers for a specific plastic, in this case, LDPE. In many states and other countries, there is no such state-led facilitation, and growers may have difficulty finding suitable companies.

Many recycling companies require a minimum amount of plastic before pick up. This requires that a grower store plastic until an adequate amount has accumulated, or that several growers band together and combine their plastic. This is possible, but to date, the low value of the plastic has not provided adequate incentive, and most is deposited at landfills. Localized collection sites, preferably with capacity to bale and to grind plastic, would be ideal.

Many American communities offer curbside pickup for PET (polyethylene terephthalate) and HDPE (milk containers). However, few offer curbside pickup of horticulture pots and containers for home gardeners. Curbside collection alone does not verify that the plastics are properly recycled. They can be directed to landfills or shipped to China.

Recycle drives using volunteers are still an important means of collecting plastic and directing it to appropriate recycling companies. These have been organized by communities, botanic garden centers and retail greenhouses. They generally require large amounts of coordination and volunteers, and may require subsidization, depending on the amount of plastic collected, the density of packing, and the distance to the recycler.

At the Missouri Botanic Gardens in St. Louis a program has been developed so gardeners can return plastic to one of several retail nurseries. The plastic is then transferred to the Missouri Botanic Gardens facility where it is sorted, cleaned and ground. This successful program has been in place for over ten years. Recently, there have been some pilot programs from some of the big-box retailers to collect and recycle plastic containers and trays from gardeners, which is very encouraging.

### **The Future**

Cradle-to-grave or closed loop recycling is a

concept where the burden of recycling is placed on the companies that sell the plastic in the first place. Obviously, this may add to the cost of the initial product, but could help close the loop. The problem remains that most plastics used in horticultural industries are not of the same quality when recycled as they were when they were first put into use. Until new technology is discovered, this will continue to be a major drawback.

As a result of the plastic problems, many researchers and growers have proposed the use of biodegradable pots as a substitute for plastic. They can be made from a variety of plant and animal-based materials including rice hulls, digested cow manure, corn stalks, wood fibers, and keratin. More commercial options have become available, although they are most often heavy and cumbersome, which means they take more space and cost more to ship.

Biodegradable pots are being used more for fast crops in order to reduce the chances that the pots will degrade before the crop is sold. Researchers around the world are looking for better solutions, but the percent of biodegradable pots utilized at this time is very small compared to plastic.

*Excerpted from The Michigan Landscape.*

## ENVIRONMENTAL QUALITY INCENTIVE PROGRAM

The following is a guide to help nursery growers successfully apply to the Environmental Quality Incentive Program (EQIP) to implement conservation practices.

Growers understand better than most people the value of production practices that conserve natural resources and protect the environment. They also know implementing those practices can be expensive because the initial cost can only be recovered from the sale of the plants. To better support growers' effort, the 2002 Farm Bill increased the funding available to assist growers with the expense of initiating conservation practices. One of the programs funded by the Farm Bill is the Environmental Quality Incentives Program (EQIP).

EQIP is a voluntary program administered by the Natural Resources Conservation Service (NRCS) that provides payments to eligible growers for a wide range of practices at their nurseries. Among the practices for which growers can receive payment are integrated pest management, erosion control, conservation of water resources and nutrient management.

If you have had little experience with the Farm Bill, NRCS, or government conservation programs, taking advantage of these opportunities may seem challenging. This guide is intended to be a grower- friendly aid that will help you successfully negotiate the steps to applying for EQIP payments . Here are the four basic steps:

**Step One-**Contact your nearest NRCS office and tell them you want to apply for EQIP. They will schedule a time for you to meet with NRCS staff to start your application. The application process is confidential. As part of this initial step, the NRCS District Conservationist or a

conservation planner will help you fill out an application form to see if you are eligible. The application form asks basic questions about your nursery. Be sure to submit the application form directly to the District Conservationist as soon as possible, because the date of submission will be used as part of the selection process if more funds are requested than are available.

**Step Two-**Work with NRCS to complete a site-specific conservation plan for your operations. The District Conservationist (DC) or a conservation planner working with the District Conservationist will come to your nursery to help you identify practices that are eligible for EQIP or similar programs. The goal is to work together to design a plan that makes sense for your nursery, both for resource conservation and maintaining your production.

For your meeting with NRCS, you will want to have available:

- Pest and nutrient management records from the past three years
- A layout or aerial photo of the nursery
- A list of areas where you have conservation concerns
- A list of plants grown and rotation schedules, if applicable

The District Conservationist or planner will help you identify practices that make sense for your operation and will help you identify which resources (such as soil, water, air, etc.) those practices will address. In doing so he or she will also help you determine whether your application is likely to have priority for funding under EQIP. As a general rule, growers who are able to apply multiple practices that improve more than one resource, have a higher priority for funding.

Here are some practices to consider for your conservation plan. You may think of other practices that may also be applicable.

- Pest management
- Field border

- Riparian buffer/Filter strips
- Irrigation water management
- Critical area planting
- Composting facility
- Nutrient management
- Grassed waterway
- Cover Crops
- Ag chemical handling facility
- Windbreaks
- Residue management

**Step Three-** Complete the application. Once you have developed the conservation plan for your nursery, you and the District Conservationist or planner will complete your application. If you qualify as a Limited Resource Producer or Beginning Farmer, you will be eligible for higher payments.

**Step Four-** Submit the application to NRCS. Once you have completed your application, it will be ranked with other applications in the state based on the number of points it has received. The NRCS District Conservationist will contact you about whether or not your application is funded. If your application has been selected for funding, you will complete and sign a contract stating the payments and your obligations.

*Excerpted from Free State Nursery News, Winter 2008.*

**EVALUATION OF FUNGICIDES AND  
ADJUVANTS FOR THE CONTROL OF  
BLACK SPOT AND POWDERY MILDEW OF  
ROSE, 2008.**

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

This field trial was conducted at the University of Delaware Botanic Garden in Newark, DE. Bare root hybrid tea roses were planted in the spring of 2001, 4 ft apart on center. Each plot consisted of two plants; pairs were 8 ft apart on center and rows were spaced 10 ft apart. Weeds were controlled with glyphosate and Surflan as needed, and the beds were mulched with composted woodchips for additional weed control and water conservation. No supplemental irrigation was supplied. Each rose plant was fertilized twice during the season, spring and mid-summer with 6 oz 10-20-20. Japanese beetles were controlled by two applications of carbaryl (Sevin SC) as needed. Fungicides were applied to run-off with a CO<sub>2</sub>-powered backpack sprayer equipped with a single-hollow cone nozzle (D4 and D-45 core) at 50 psi. Fungicide applications were initiated on 8 May and repeated every 13-15 days ending 26 Aug for a total of 9 sprays. There were no symptoms of black spot or powdery mildew at the time of the first application. The plots were rated on 20 Jun, 15 and 31 Jul, 18 Aug, and 2 Sep.

The growing season began normally for May which was wet. Rainfall was sporadic and in general low for most of the rest of the season. Powdery mildew developed early and incidence fluctuated the rest of the season depending on the weather conditions. Pageant 38WP 18.0 oz was very effective for control of black spot throughout the season. By mid Aug control began to break for the 12.5 oz rate of Pageant plus the adjuvant Capsule. Trinity plus both adjuvant treatments controlled black spot early in the season but by the 18 Aug rating black spot control had reached an unacceptable level. All the treatments for black spot were significantly better than the unsprayed control. Trinity without adjuvant provided the least amount of powdery mildew control on 20 Jun. No phytotoxicity was observed for any treatment in this test, but the 18 oz rate of Pageant did leave a noticeable white residue on the treated leaves.

## Research Briefs

### Propagation

**Overwintering stem cuttings of *Stewartia pseudocamellia*.** Rooting hormone application, rooting media and overwintering temperature affect overwintering success of stem cuttings. The better hormone application for *Stewartia pseudocamellia* cuttings is a quick dip in 5000 mg/L KIBA solution followed by powder application of 300 mg/L Hormodin #2. The best media is Perlite + Perennial Mix (1:1, by volume) as the best media for successfully overwintering newly rooted cuttings. All newly rooted cuttings should be overwintered within a temperature range of 3 to 5°C. (A.Nair, D. Zhang and J. Smagula)

*Excerpted from HortScience 43(7):2124-2128, December 2008.*

### **Subirrigation of red oak seedlings.**

Subirrigation can be effectively used to grow northern red oak seedlings in containers with improved growth and morphology compared with that obtained with overhead systems. Subirrigation results in equal or better plant growth and nutrient at increased water use efficiency with zero leaching losses. (M.L. Bumgarner, K.F. Salifu and D.F. Jacobs)

*Excerpted from HortScience 43(7):2179-2185, December 2008.*

### **Propagation of eastern redbud by stem cuttings.**

Clones of redbuds are normally propagated by budding or micropropagation. *Cercis canadensis* 'Flame' (strongest performer in the study) can be propagated by taking semi-hardwood cuttings during the summer and treating with K-IBA at 10,000 mg/L (ppm). Clones responded differently in this study and it is unlikely that a single propagation method by stem cuttings will work for all selections of eastern redbud. (J.M. Wooldridge, F.A. Blazich

and S.L. Warren)

*Excerpted from J. Environ. Hort. 27(1):12-16. March 2009.*

**Germination of *Rhododendron vaseyi*.** Light was required for germination and continuous light (24 h) resulted in the highest germination for two populations of pinkshell azalea collected in Western North Carolina. Alternating temperatures (86/68 F) yielded higher germination than a single temperature (77F). Both populations germinated at approximately 50%. Because of their small size and light requirement, seeds should be simply dusted on the surface of a germination medium. (A.V. LeBude, F.A. Blazich, L. C. Walker and S.M. Robinson)

*Excerpted from J. Environ. Hort. 26(4):217-221. December 2008.*

## **Container Production**

**Peat substitutes for container production of *Camellia japonica*.** This study evaluated the ability of four organic (local green compost, coconut fibers, coconut “peat” and pine bark) and one inorganic (pumice) materials as partial peat substitutes for sustainable production of *Camellia japonica* (an acid-loving woody plant). Except for the negative effect of green compost, during the cultivation period (2 yrs), the alternative materials did not affect or slightly improved the plant development and the ornamental characteristics compared with the standard substrate. Choice of peat substitute depending on local costs and availability. (F. Larcher and V. Scariot)

*Excerpted from HortScience 44(2):312-316.*

**Aqueous ozone for use in recycled irrigation water.** The phytotoxic threshold of five woody perennial nursery crops to applications of aqueous oxone was investigated to determine if aqueous ozone could be used for remediation of recycled nursery irrigation water and for

pathogen control. Species tested were *Salix integra*, *Weigelia florida*, *Spiraea japonica*, *Hydrangea paniculata* and *Physocarpus opulifolius*. Plants were subjected to 6 weeks of overhead spray irrigation with five aqueous ozone treatments levels. Low residual ozone levels (31.2 uM/L or less) did not affect growth. At these levels, pathogens could be controlled in the irrigation system. The use of aqueous ozone in this fashion could also aid in dramatically reducing chemical residuals on crops by reducing the input requirements of traditional chemical controls. More research is required to develop solid recommendations for growers. (T.Graham, P. Zhang, Y. Hheng and M.A. Dixon)

*Excerpted from HortScience 44(3):774-780. 2009.*

## **Pine tree substrates as a container medium.**

Pine tree substrates (PTS) are produced from loblolly pine trees that are ground (with or without bark, limbs, needles, and so on) in a hammer mill. This work provides evidence of increased microbial activity and N immobilization in PTS compared with pine bark (PB) and peat-lite (PL). Increased N immobilization in PTS explains the lower nutrient (primarily N) levels observed in PTS during crop production and justifies the additional fertilizer required for comparable plant growth to PL and PB. This work also provides evidence of less NO<sub>3</sub>-N leaching in PTS compared with PL or PB during greenhouse crop production despite the higher fertilizer rates required for optimal plant growth in PTS. (B.E. Jackson, R.D. Wright and M.M. Alley)

*Excerpted from HortScience 44(3):781-790. 2009.*

**Light-weight aggregates for use in perennial bare root liner production.** Dividing and bare rooting perennials grown as ground covers and sold as bare root liners can be labor intensive

and destructive to plant roots. Results from this study indicate that HydRocks® and Profile™ provide suitable or better growing conditions for *Ophiopogon japonicus* and can decrease harvest time between 30 and 50 % with less root damage when compared to other substrates. (J.M. Pickens, G.B. Fain, J. L. Sibley, C.H. Gilliam and J.W. Olive)  
*Excerpted from J. Environ. Hort. 27(1):1-6. March 2009.*

**Root pruning during production of container oaks.** Air root pruning, copper hydroxide, and other systems designed to reduce root deformations in containers do not eliminate root defects; mechanical root pruning may remove more defects. Root of *Quercus virginiana* ‘SDLN’ Cathedral® live oak circles less when root balls were sliced top to bottom in six places each time trees were potted to a larger container size. Slicing root balls did not eliminate all circling roots; removing the entire edge of the root ball each time trees are potted into a larger container size and when planting in the landscape may be necessary to effect removal of all root defects. *Editor’s note: live oak is a vigorous species that is not hardy in DE, but the comparison between various root control systems and slicing root balls may apply to vigorous species hardy to the mid-Atlantic.* (E.F. Gilman, C. Harchick and S. Wiese)  
*Excerpted from J. Environ. Hort. 27(1):7-11. March 2009.*

**Clean chip residual substrate can be used as a container medium for the production of woody nursery crops and perennials.** Clean chip residual (CCR) is a forest residual material, a by-product of in-field harvesting of small – diameter (10-30 cm, DBH) pine trees for ‘clean chips’ used in paper manufacturing. Plants grown in CCR had comparable growth to plant grown in pine bark. Loropetalum, buddleja, crapemyrtle and azalea were tested in this study. In another study that included a variety of

herbaceous perennials, plants grown in CCR amended 4:1 (by vol) with peat moss (PM) had similar growth responses to plants grown in 100% pinebark (PB) and PB:PM (4:1 by vol). (C.R. Boyer, C.H. Gilliam, G.B. Fain, T.V. Gallagher, H.A. Torbert and J.I. Sibley)  
*Excerpted from J. Environ. Hort. 27(1):56-62. March 2009 and J. Environ. Hort. 26(4):239-246. December 2008.*

**Landscape performance of annual bedding plants grown in pine tree substrate.** Annual bedding plants were grown in ground pine tree substrate (PTS) produced from loblolly pine trees or in ground pine bark (PB) and then transplanted into the landscape and grown with 3 different fertilizer rates. Visual observations throughout each year indicated that all species, whether grown in PTS or PB, had comparable foliage quality. With few exceptions, dry weight and plant size for all species increased with increasing fertilizer additions, regardless of the substrate. N immobilization may be somewhat of an issue with PTS, but not to the extent expected. These results indicate that the utilization of PTS as a substrate for the production of landscape annuals may be acceptable in the context of landscape performance. (R.D. Wright, B.E. Jackson, M.C. Barnes and J.F. Browder)  
*Excerpted from HortTechnology 19(1):78-82. January - March 2009*

## **Greenhouse Production**

**Daily light integral influences growth of Cyclamen.** Increasing daily light integral (DLI) promotes flowering and improves plant quality of cyclamen. Supplemental lighting to increase DLI can be useful in greenhouse production of potted cyclamen in temperate climates from late fall until early spring when the DLI delivered to crops is less than 10 mol/m<sup>2</sup>/day. There was little to no effect of increasing DLI about about 12 mol/m<sup>2</sup>/day. (W. Oh, I.H. Cheon, K.S. Kim

and E.S. Runkle)

*Excerpted from HortScience 44(2):341-344.*

**Poinsettia production in pine tree substrate (PTS).** Results indicate that 100% PTS can be a successful greenhouse substrate with similar plant growth and shrinkage as a traditional peat substrate if additional fertilizer is supplied or if substrate physical properties are adjusted to be similar to those of peat (screened with 2.38 mm screen). The addition of 25% peatmoss to PTS screened with 4.76 mm screen yielded equally good results. Because PTS is produced from freshly harvested trees, it, unlike many compost-based substrates, is a clean material free from undesirable components like glass, metal, weed seeds, pathogens and heavy metals. The ability to grind PTS to various particle sized to achieve desired physical properties excludes the need for additional amendments (perlite, vermiculite, PB, etc.) that are required for commercial peat substrates. The low bulk density of PTS could be important for shipping, since weight increases shipping costs. (B.E. Jackson, R.D. Wright and M.C. Barnes)

*Excerpted from HortScience 43(7):2155-2161, December 2008.*

**Floral crop production in high tunnels.** High tunnels are well suited for use in the production of floral crops, especially cut flowers. Through he increases in temperature afforded at both ends of the growing season, high tunnels allow earlier and later harvests than are possible in the field. During summer, rain protection and a relatively calm environment provides an ideal growing environment to cut flower crops. Cut flower production allows intensive production on a small land area and provides a high level of income. For these reasons, high tunnels have become a standard part of cut flower growers' farms. Most commonly, they are single-bay structures with roll-up sides, but use of multi-bay complexes is becoming more popular for larger-scale growers. High tunnels are shaded in

summer to lower interior temperatures and enhance production of shade-tolerant species. Overall, techniques of moderating temperature extremes with shading and ventilation, or use of low tunnels inside to increase minimum temperatures are important options for cut flower production. (H.C. Wien)

*Excerpted from HortTechnology 19(1):56-60. January - March 2009*

**Reduced end-of-production fertilization rate (EPFR) increased shelf life of containerized vegetative annuals.** Angelonia, argyranthemum, bracteantha, calibrochoa, diascia, lantana, nemesia, petunia and sutera cultivars were treated with 0%, 50% and 100% of recommended fertilizer rate starting 2 weeks before and continuing until harvest. Results indicate that reducing fertilization 2 weeks before harvest can prolong shelf life of some vegetative annuals. Differences in the length of shelf life and responses to reduced EPFR occurred among cultivars of all the affected species. Reduced EPFR did not increase the shelf life of two species, including diascia and lantana. (S.E. Beach, T.W. Starman, K.L. Eixmann, H. B. Pemberton and K.M. Heinz)  
*Excerpted from HortTechnology 19(1):158-167. January - March 2009*

## **Floriculture**

**Vase-life of Lisianthus extended with peracetic acid.** Post harvest life of lisianthus was extended up to 15% with the addition of sucrose to the vase solution and up to 30% if peracetic acid (PAA) is incorporated into the vase solution. PAA is more useful as a antimicrobial compound than chlorine (e.g., sodium hypochlorite) since it does not have the heath drawbacks. PAA forms biodegradable acetic acid after deomecposition and eventually enters the medium as atomic oxygen. (F.de la Riva, P. Carolina Mazuela, J. Eugenio Alvaro and M. Urrestarazu)

*Excerpted from HortScience 44(2):418-420.*

## **Field Production**

**NAA reduces leader growth of Fraser fir Christmas trees.** Sucker-Stopper RTU (1.5% ethyl 1-NAA) was applied to leaders using the Danish Easy Roller and the German Spruhsystem (application with brushes). The Easy Roller system reduced leader growth the most but leader mortality was unacceptable at concentrations of 20 mg/L or greater. The Spruhsystem caused negligible mortality of leaders. Mechanical shearing produces 1005 dense trees, whereas NAA treatment results in about 50% dense trees. NAA might be useful for producing dense trees with minimal shearing (about half) and for producing more natural, open trees during shorter rotations (about half). Consumers who prefer a more open “European-style” tree and consumers who prefer a dense tree would both find acceptable trees in one field. (M.E. Rutledge, J. Frampton, G. Blank, L. E. Hinesley)

*Excerpted from HortScience 44(2):345-348.*

**Growth response of newly planted Christmas trees with mulch, irrigation and weed control.** Results of this study highlight the overriding importance of controlling weeds to ensure survival and improved early growth of newly planted Christmas trees. Polyethylene mulch improved diameter growth, but response was small relative to effects of weed control or irrigation. Response of trees to mulch color was species-dependent with Fraser fir trees growing better with white mulch than with black. Mulch mats performed as well as polyethylene mulch and could be a suitable option where specialized mulch-laying equipment is not available. Similarly, wood chip mulch may offer a low-cost alternative to plastic mulches. (B.A. Cregg, P. Nzokou and R. Goldy)

*Excerpted from HortScience 44(3):660-665. 2009.*

**Assessment of bare root liner quality.** A choice study at green industry trade shows and extension grower education and outreach venues resulting in 248 completed surveys suggests that high first-order lateral roots is the most important attribute influencing preference for liner products (deciduous trees) followed by uniform liner height and canopy density. Neither price nor region of production substantially influenced product preference. (A. Jeffers, M. Palma, W.E. Klingeman, C. Hall, D. Buckley, D. Kopsell)

*Excerpted from HortScience 44(3):717-724. 2009.*

**Optimal nitrogen rates for field production.** Flowering dogwoods probably would have to be held in the field for a minimum of three years before any enhancement in tree growth if fertilized above the recommended N rate of 250 lb N/A. While the recommended 44 or 130 lb N/A for landscape plantings was sufficient for tree maintenance, enhanced flower bud set and accelerated growth of flowering dogwood would require at least a doubling of N rates, which would not be economically feasible. Due to the negligible growth response of flowering dogwood to a wide range of N rates over a period of several years, the Field Nursery Best Management Practices for fertilization guideline, where per tree N rate increase over time, may be the preferred fertilization program for field-grown flowering dogwood. (A.K. Hagan, J.R. Akridge, K.L. Bowen and C.H. Gilliam)

*Excerpted from J. Environ. Hort. 26(4):204-209. December 2008.*

## **Landscape**

**Above grade planting of three native woody ornamentals with and without organic amendments.** Amending the backfill of the planting hole with organic matter has shown inconsistent results in a variety of studies.

Planting above soil grade (upper 3 inches of the root ball above grade with pin bark mounded around the root ball tapering to surrounding soil grade) enhanced root growth. *Myrica cerifera*, *Illicium floridanum* and *Kalmia latifolia* were grown in root observation chambers with 4 quadrants filled with 4 inches of native soil. The next 4 inches was filled with pine bark, peat, cotton gin meal or more native soil. In most cases roots grew initially into the organic matter (OM), rather than the soil when OM was present. Root growth rates were best in the OM quadrants but differences were greater for *Illicium* and *Kalmia* than for *Myrica* (possibly due to its overall rapid growth rate). This study suggests planting above grade with organic matter may increase post transplant success. (J. Guckenberger Price, A.N. Wright, K.M. Tilt and R.L. Boyd)

*Excerpted from HortScience 44(2):377-383.*

*Editor's note: Results from this study should be interpreted to mean mixing organic matter into backfill soil is necessarily advantageous. This study used loosened soil (even for the native soil treatment) so it doesn't reflect planting into a compacted undisturbed site. It does support what we already know—if you can loosen soil in the entire root zone and mix in organic matter, you will get better growth.*

**Parentage of purple-leaved barberry.** The objective of this study was to determine the degree to which a purple-leaved barberry in a residential landscape can contribute offspring to a surrounding invasive population or initiate a new invasion in adjacent unmanaged areas. Amplified fragment length polymorphism (AFLP) parentage analysis in combination with morphological and spatial information was used to determine the extent to which the cultivated landscape plant had contributed to the surrounding feral barberry population. This work clearly demonstrated that a purple-leaved Japanese barberry in a residential landscape can

contribute seedlings to an invasive population when the landscape plant is grown within a few hundred meters of a suitable habitat. (J.D. Lubell, M.H. Brand, J. M. Lehrer and K.E. Holsinger)

*Excerpted from HortScience 44(2):392-395.*

**Deeper substrates promote better sedum growth on green roofs.** Sedum cover was better and moisture content greater in green roofs with media depths of 7 and 10 cm (2.8 and 3.9 inches, respectively) compared to 4 cm (1.6 inches). Researchers recommend a substrate depth of at least 7 cm. Species exhibiting the greatest absolute cover were *Sedum floriferum*, *S. sexangulare*, *S. spurium* 'John Creech' and *S. stefco*. In general, species that are less suitable are *S. 'Angelina'*, *S. cauticola* 'Lidakense', *S. ewersii*, *S. ochroleucum*, and *S. reflexum* 'Blue Spruce'. (K.L. Getter and D. Bradley Rowe)  
*Excerpted from HortScience 44(2):401-407.*

**Initial stock size influenced tree growth in an urban environment.** This study was conducted to characterized growth response and canopy development of four different caliper stock sized (1 3/4", 2", 2.5" and 3" balled and burlapped trees and a 1 3/4" bare root tree. During the first 2 years of data collection, canopy volume of larger trees generally remained greater than the smaller trees. However, relative growth rate data indicates that smaller trees have a shortened transplant shock period compared with larger trees. Data collected in subsequent years will provide more evidence to evaluate the postulation that smaller trees outgrow larger trees over time. (M. Ross, R. Schutzki and B. Cregg)  
*Excerpted from The Michigan Landscape, March 2009.*

**Incorporated and surface-applied compost affect soil properties and redosier dogwood growth.** Incorporation of yard waste compost has a greater effect than surface application on

soil properties that are immediately related to organic amendment (C, N, and bulk density). There was little difference in infiltration and aggregate stability between the two methods of compost amendment, and in the long run, little difference in nutrient availability besides N. Surface application of compost could provide significant benefits where incorporation is not feasible. The data show significant beneficial effects of surface application and incorporation of compost lasting more than 5 years after application and likely to persist longer. Under the environmental conditions of the Pacific Northwest, compost applications have long-lasting effects in landscape soils. (C. Cogger, R. Hummel, J. Hart and A. Bary)  
*Excerpted from HortScience 43(7):2143-2150, December 2008.*

**Invasive potential of *Viburnum opulus* cultivars.** From this research, 'Roseum' was found to produce prolific seeds that germinated at moderate rates only in the greenhouse and were highly viable according to a tetrazolium test. *V. opulus* and 'Leonards' Dwarf' produced fewer seeds that were highly viable. *V. opulus* germinated at moderate rates, while 'Leonard's Dwarf' germinated at low rates. 'Aureum' and 'Xantocarpum' seeds germinated at moderate rates and were highly viable. Seeds of 'Compactum', 'Losely's Compact' and 'Nanum' failed to germinate or did so at low rates and were moderately viable. At the open landscape and forest sites all cultivars germinated at low rates or failed to germinate. Findings from outdoor germination trials suggest that the cultivars tested may be only weakly invasive. Further long-term studies (5-10 years) are necessary to determine true invasive potential. (J. R. Conklin and J.C. Sellmer)  
*Excerpted from J. Environ. Hort. 27(1):31-36, March 2009.*

**Zinnia cultivars vary in attractiveness to butterflies.** Zinnias are often recommended as

nectar sources in butterfly gardens, but this research showed that the cultivar 'Lilliput' was much more effective at attracting butterflies than 'Oklahoma', 'State Fair' and *Zinnia marylandica* Spooner Stimart, and Boyle 'Pinwheel'. (K. V. Yeargan and S. M. Colvin)  
*Excerpted from J. Environ. Hort. 27(1):37-41, March 2009.*

**Commercial arbuscular mycorrhizal fungal (AMF) products fail to promote mycorrhizal colonization.** Commercial AMF products are sold to improve transplant success, hence growth and improve appearance of woody landscape plants. But these products contain living propagules and are sensitive to storage duration and conditions. In this series of experiments, commercial AMF products consistently failed to promote mycorrhizal colonization in corn, sorghum, trident maple, and sweetbay magnolia. In contrast, viable lab-cultured inoculant of similar species composition promoted high levels of AMF colonization. Commercial products did enhance plant growth and soil fertility, suggesting that non-mycorrhizal ingredients were acting as fertilizers and/or growth regulators. High soil fertility commonly inhibits AMF colonization, so nutritional ingredients are usually counterproductive to the intended function of AMF inoculants. (P.E. Wiseman, K. H. Colvin and C.E. Wells)  
*Excerpted from J. Environ. Hort. 27(1):41-50, March 2009.*

## Turf

**Annual bluegrass control in creeping bentgrass and perennial ryegrass.** Bispyribac-sodium (BPS) is a postemergence annual bluegrass herbicide that was tested in comparison to ethofumesate (ETHO). Perennial ryegrass seedling were tolerant of BPS applied at 25 + 25 g/ha a.i., but ETHO (840 + 840 g/ha a.i.) generally was safer to apply. Given the

potential for BPS to control annual bluegrass in seedling turf, the reduction in perennial ryegrass cover likely would be considered an acceptable risk in situations in which there are annual bluegrass biotypes tolerant to ETHO. (P.H. Dernoeden, S.J. McDonald and J.E. Kaminski) *Excerpted from HortScience 43(7):2186-2190, December 2008.*

**Kentucky bluegrass tolerance of bispyribac-sodium (BSP) for annual bluegrass control.** BSP effectively controls annual bluegrass in other cool-season turfgrasses but limited testing of Ky bluegrass cultivars has indicated low tolerance. This research evaluated 55 Ky bluegrass cultivars and selections. ‘Blackstone’, ‘Serene’, and A98-962 were the most tolerant, exhibiting less than 20% injury and ‘Washington’, 95AN-10 and ‘Avalanche’ were the most susceptible with up to 93% injury. (R.R. Shortell, S.E. Hart, and S.A. Bonos) *Excerpted from HortScience 43(7):2252-2255, December 2008.*

**Kentucky bluegrass establishment and maintenance in the transition zone.** ‘Thermal Blue’ and ‘Dura Blue’ are interspecific hybrids of Texas bluegrass and Kentucky bluegrass bred for more heat and drought resistance for use in the transition zone. A proposed optimum method for establishment included seeding ‘Thermal Blue’ in April at 150 kg/ha and fertilizing with 300 kg/ha of nitrogen and then mowing at 5-cm height. Sod producers may consider using 50 kg/ha because there was little difference in the amount of cover by 10 months after seeding, and quality soon after seeding is not as important as with homeowners or golf courses. Higher mowing heights increase quality scores and decrease clippings. Both grasses were slower to form a dense lush turf than tall fescues. Both require frequent mowing and are susceptible to dollar spot. (T.C. Teuton, J.C. Sorochan, C.L. Main and T.C. Mueller) *Excerpted from HortScience 44(3):815-819.*

2009.

**Mulched maple and oak leaves reduce dandelions in established Kentucky bluegrass.** Mulching leaves (coarse particle size (0.4 – 1 inch<sup>2</sup>) and fine p.s. (< 0.2 inch<sup>2</sup>)) of both maple and oak species into established turfgrass as a leaf litter disposal method will increase spring green-up and contribute to a reduction in common dandelion population. Leaf mulches provide a physical barrier that prevents light from reaching dandelion seeds. Leaf mulches also function as an organic fertilizer, improving the competitive ability of the Kentucky bluegrass, which in turn decreased dandelion seed germination. (A.R. Kowalewski, D.D. Buhler, N. S. Lang, M.G. Nair and J.N. Rogers) *Excerpted from HortTechnology 19(2):297-30. April-June 2009*

### **Insect Control**

**Evaluation of persistence of selected miticides against two-spotted spider mite (TSM).** Translaminar miticides may vary in efficacy against the TSM depending on the life stages (nymph or adult) present. Spiromesifen, in general, was the most effective translaminar miticide against both the nymphs and adults of TSM compared with the other miticides evaluated, although several formulations of etoxazole also provided adequate control of TSM. The persistence and efficacy of translaminar miticides is important to greenhouse growers to protect crops from damage caused by TSM and reduce the frequency of applications needed. However, there are potential negative implications of miticides with extended residual activity such as the development of resistance by TSM populations. (R.A. Cloyd, C.L. Galle, S.R. Keith and K.E. Kemp) *Excerpted from HortScience 44(2):476-480.*

**Systemic insecticides control potato leafhopper on field-grown red maple.** Most red maple cultivars are susceptible to potato leafhopper and injury includes distorted leaf tissue and reduced shoot growth. In a 2005 trial, a one-time drench of Discus or two imidacloprid tablets significantly reduced leafhopper damage to red maple for a 3-year period. In 2006, a one-time drench of Allectus, Discus, Arena, Flagship, and Safari significantly reduced leafhopper damage for 2 years. In most cases, the Discus drench and root dip treatments were initially more effective than the imidacloprid tablets or the gel treatment. However, in general, the efficacy of imidacloprid table or gel treatments increased in subsequent years. (J.B. Oliver, D.C. Fare, N. Youssef, M.A. Halcomb, ME. Reding and C.M. Ranger)  
*Excerpted from J. Environ. Hort. 27(1):17-23. March 2009.*

## Disease Control

**Effect of nitrogen fertilization on three dogwood diseases.** Manipulating N rates proved much less effective than a preventative fungicide program in controlling spot anthracnose, powdery mildew and Cercospora leaf spot on flowering dogwood. (A.K.Hagan, J.R. Akridge and K.L. Bowen)  
*Excerpted from J. Environ. Hort. 26(4):97-203. December 2008.*

**Free chlorine disinfects irrigation water.** This research found that 2.4 mg/L of free chlorine with a contact time of 5 minutes in the nursery irrigation water killed all fungi and oomycetes and was safe for all seven evergreen shrubs tested. Visual injuries on the deciduous shrubs appeared on only some of the plants and were not considered sufficient to render them unsalable. The amount of chlorine used to chlorinate 1000 L of irrigation water with a free chlorine concentration of 2.4 mg/L is 494.4 mL

of 5% bleach, which currently costs \$0.23 U.S. This research provides new information for developing economic water treatment systems to reduce the dispersal of common plant pathogens without affecting the market value of plants. (D.F. Cayanan, M. Dixon, Y Zheng, and J. Llewellyn)  
*Excerpted from HortScience 44(1):164-167. February 2009.*

## New Plants

***Lysimachia christinae* ‘Zixin’:** A new groundcover plant. This plant has a uniform, creeping growth habits. Stems are purple-red with procumbent branches and roots at basal nodes. Leaves are green with a brilliant dark purple-red venation. Small yellow flowers appear in spring and last for about 30 days. The plant is like a colorful carpet. After flowering, ‘Zixin’ had little seed as a result of a considerably low seed-setting rate (0.21%). In the second year of establishment vegetative propagates spread around but exhibited little invasiveness. *Lysimachia christinae* ‘Zixin’ will be trademarked. Inquiries regarding ‘Zixin’ should be sent to [clenlq0206@163.com](mailto:clenlq0206@163.com). (W.Zheng, X. Xu, K. Shao and L. Chen)

*Excerpted from HortScience 44(2):474-475.*

**‘UF-331’ and ‘UF-340’:** dwarf caladium cultivars. ‘UF-331’ (Angel Wing Dwarf Tricolor) has dark green veins and white interveinal areas and is the first lance-leaved cultivar with this pattern. ‘UF-340’ (Angel Wing Dwarf White) has a large number of wide lance leaves with a large, bright, and pure white center surrounded by green margins. Both cultivars have improved performance in container forcing and landscape use compared with other lance-leaved cultivars. Propagation and distribution will be licensed by the Florida Foundation Seed Producers, Inc., (FFSP) P.O. Box 110200, Gainesville, FL 32611. Contact

FFSP for information on tuber availability and propagation agreements. (Z. Deng, B.K. Harbaugh and N.A. Peres)  
*Excerpted from HortScience 43(7):2231-2235, December 2008.*

**‘Pearls and Jade’ Pothos.** This small pothos has leaves with white, gray and green coloration in irregular patches. It was developed by the Mid-Florida Research and Education Center in Apopka, FL. Inquiries regarding licensing may be sent to Florida Foundation Seed Producers, Inc., P.O. Box 110200, Gainesville, FL 32611. (R.J. Henny, J. Chen, T.A. Mellich)  
*Excerpted from HortScience 44(3):824-825. 2009.*

***Penstemon* ‘Sweet Joanne’.** ‘Sweet Joanne’ is recommended for landscape use because of its winter-hardiness (tested in Nebraska), repeat flowering, large attractive flowers, bright green glossy foliage, and attractive plant habit from May to November. It performs best in locations with 6 to 8 hours of full sun. Pruning back the older stalks that have completed flowering will encourage repeat flowering. ‘Sweet Joanne’ can be used for its medium height as either a border or accent plant. The lavender-pink flowers complement other colors found in the garden. ‘Sweet Joanne’ has been licensed to Blooms of Bressingham (P.O. Box 660872, Sacramento, CA 95866-0872), which can be contacted for information about obtaining this plant. (D.T. Lindgren, D.A. Schaaf and K. Todd)  
*Excerpted from HortScience 44(3):839-840. 2009.*

***Penstemon* ‘Dark Towers.** ‘Dark Towers’ can be used in the landscape for its medium height as either a border or accent plant. The reddish purple foliage and dark purple seed pods contrast sharply with green foliage colors in the garden and landscape. The reddish foliage is an attractive feature throughout the year and seed stalks are dark red from June to being cut back

in the fall, winter, or spring. It tolerates high heat and humidity and lower soil moisture content. The only disease observed on ‘Dark Towers’ has been an occasional slight susceptibility to powdery mildew in a greenhouse environment. ‘Dark Towers’ has been licensed to Terra Nova Nurseries, Inc. (P.O. Box 23938, Tigard, OR 97281), which can be contacted for information about obtaining this plant. (D.T. Lindgren and D.A. Schaaf)  
*Excerpted from HortScience 44(3):852-853. 2009.*

**‘Blue Chip’ and ‘Miss Ruby’ *Buddleja*.** ‘Blue Chip’ has a symmetric compact spreading habit and is appropriate for use in the front of mixed plantings or for mass planting. Its violet blue flowers continue prolifically throughout the entire growing season. Because few viable fruit are produced, panicles senesce quickly after flowering and detract little from the appearance of the plant. ‘Miss Ruby’ has an upright globose habit but is also compact and appropriate as a specimen planting or in a mixed planting. It has bright pink flowers. *Editor’s note: Invasiveness of these cultivars was not addressed by the authors. The few viable fruit report for ‘Blue Chip’ probably means this cultivar is not particularly invasive, but there is nothing to indicate potential invasiveness of ‘Miss Ruby’ and readers should be conscious of this issue when growing/planting buddleja.* (D.J. Werner and L.K. Snelling)  
*Excerpted from HortScience 44(3):841-842. 2009.*

**‘Red Dragon’ Ornamental Hazelnut.** ‘Red Dragon’ is a new ornamental hazelnut (*Corylus avellana*) cultivar, released by the Oregon Agricultural Experiment Station in March 2008. ‘Red Dragon’ has red leaves, contorted growth habit and resistance to eastern filbert blight. Grafted trees have a slightly more vigorous and more desirable growth habit (spreading rather than pendulous with moderate branching) than

‘Contorta’. Nurseries interested in propagating ‘Red Dragon’ should pursue a licensing agreement with Oregon State University. A list of licensed nurseries and micropropagators, and additional information is available from S.A. Mehlenbacher. (S.A. Mehlenbacher and D.C. Smith)

*Excerpted from HortScience 44(3):843-844. 2009.*

**Caladium 75-14, a fancy-leaved cultivar for containers and Sunny Landscapes.** Caladium 75-14 is a new spotted, fancy-leaved cultivar. It has shown superior tuber production potentials and with its vigorous growth habit can quickly fill a landscape space with many leaves and resist sunburn. Tuber de-eyeing can improve caladium 75-14’s plant quality when forced in small containers (10 cm in diameter) although this practice is not required for producing pot plants in 20-cm or larger containers. For commercial tuber production, growers are encouraged to use preplant hot water treatment. Information on tuber availability and propagation agreements can be obtained from the Florida Foundation Seed Producers Inc. (P.O. Box 110200, Gainesville, FL 32611). (Z. Deng and B.K. Harbaugh)

*Excerpted from HortScience 44(3):854-856. 2009.*

## **Marketing**

**Online gardening search activities and purchases.** Internet studies with a representative group of Americans show that 27.4% seek gardening information. Online purchasing is probably not significantly high enough (7.4%) to justify most firms launching an online buying website at this time, but most gardening-related businesses should consider at least hosting a website that provides information or links to information for their customers. Online purchases appear to supplement in-person purchases and well designed websites

can give businesses one more opportunity to connect with and remain relevant to their existing customer base. (B.K. Behe, B. Arte and C. Yue)

*Excerpted from J. Environ. Hort. 26(4):210-216. December 2008.*

**Green industry survey of native plant marketing in the Southeastern U.S.** Recent studies have shown that the use of native plants by landscape architects and contractors in the SE US has increased as has the clientele interest level in native plants. Recommendations to increase the use of native species by the landscape industry include increasing the number of nurseries carrying native plants and the quantities and species currently available. A survey was emailed to wholesale and retail nurseries in 6 states to understand how green industry professionals view the opportunities and constraints of the current native plant market. The market for native plants sold could increase if more wholesale nurseries expanded the volume of native plants carried and the diversity of species that are commercially available. To further increase the potential of this market, growers suggest that better and more information sources be provided for the general public, particularly through the use of specific marketing campaigns and point-of-purchase information. This type of information is lacking in many of the states studied in this survey. Nonprofit organization programs such as the NWF’s American Beauties™ collection or state sponsored programs such as the Missouri Grow Native! Program may be effective models that nonprofit, nursery associations, state agencies, or extension organizations could incorporate to better market native plants at the retail level. There is a need for centralized native plant information on a state website. Results also show that presentations and displays at nursery trade shows are another instrument for growers and retailers to learn about new native plants. (R.F.

Brzuszek and R.L. Harkess)  
*Excerpted from HortTechnology 19(1):168-172.*  
*January - March 2009*

### **Social Benefits of Plants**

**Impact of interior plants in university classrooms.** Student evaluations were compared between the same courses taught by the same instructor in different rooms (with and without tropical plants). Differences on evaluations were found in the areas of “learning” “enthusiasm (of instructor) and organization (of instructor). Plants had the greatest impact on students in the room that was windowless and stark. This study supports other research showing that plants have value beyond aesthetics in interior environments, including promoting positive feelings in university students. (J.S. Doxey, T.M. Waliczek and J.M. Zajicek)  
*Excerpted from HortScience 44(2):384-391.*

**Landscaping increases home value.** Improvement in landscaping from average to excellent quality increases house sale price by 10.8%, with approximately 30% of the increase in sale value due to added tree cover. When a house is viewed as an investment, the results in this study show that each \$1.00 invested in upgrading an average landscape to excellent quality returns \$1.35 in added property value. It is important to note that, in addition to added value, an improved landscape provides a relaxing and enriching quality for the homeowner and the neighborhood. Moreover, tree cover provides shade in summer and shelter in winter, possibly reducing heating and cooling costs. (A. Stigarll and E. Elam)  
*Excerpted from J. Environ. Hort. 27(1):24-30.*  
*March 2009.*

**Impacts of community gardens in urban Houston.** There were no crime number differences (using reported property crimes from

2005 to Houston Police Department) between the community garden areas and randomly selected areas. However, interviews conducted with community garden representatives showed that community gardens appeared to have a positive influence on neighborhoods, with residents reporting neighborhood revitalization, perceived immunity from crime, and neighbors emulating gardening practices they saw at the community gardens. (M.R. Gorham, T.M. Waliczek, A. Snelgrove and J.M. Zejicek)  
*Excerpted from HortTechnology 19(2):291-296.*  
*April-June 2009*

**Therapeutic influences of plants in hospital rooms on surgical recovery.** Eighty female patients recovering from a thyroidectomy were randomly assigned to either control or plants rooms (viewed 12 foliage and flowering plants) during their postoperative recovery periods. Patients in hospital rooms with plants and flowers had significantly shorter hospitalizations, fewer intakes of analgesics, lower ratings of pain, anxiety, and fatigue and more positive feelings and higher satisfaction about their rooms when compared with patients in the control group. (S-H. Park and R.H. Mattson)  
*Excerpted from HortScience 44(1):102-105.*  
*February 2009.*

# Pesticides/IPM

A new fungicide has been labeled for use on turf and ornamentals in greenhouses, shade houses, container nurseries, retail, conifer and forest nurseries, commercial and residential landscapes, and interiorscapes. **Pageant** from BASF is a combination product of pyraclostrobin (Insignia) and boscalid (Emerald). Those of you that know the vegetable fungicides will recognize Pristine which is the equivalent combination in Pageant.

Bob Mulrooney has tested it for powdery mildew and black spot control on hybrid tea rose and found it to be pretty effective at the high rates for black spot and not very good on powdery mildew.

It has a wide label and could be very effective for the diseases on the label. Need to check the labels for plants with sensitivity such as some grape cultivars, ninebark and Wintercreeper , *Euonymus vegetus*.

The label can be found at <http://www.cdms.net/LDat/ld8JM000.pdf>

Kontos™ Greenhouse and Nursery Insecticide/Miticide is now available to authorized OHP distributors and grower customers. Kontos is the first systemically-active product that controls not only the range of sucking insects, but controls mites as well! That makes Kontos a truly unique product for the greenhouse and nursery market. With active ingredient spirotetramat, Kontos is labeled as both a spray and drench. As a drench, Kontos gives long-term control of sucking insects and mites.

Some of the other features of Kontos:

- Up-and-down systemic activity (xylem and phloem active) to control sucking insects and mites;
- Indoor, outdoor and interiorscape labeling;
- Vegetable transplant labeling;
- Chemigation labeling;
- Activity against immature stages of insects and mites;
- No known cross-resistance

Kontos is packaged in 250 mL (8.45 fl. Oz) bottles with six (6) bottles per case. Consult the label for both spray and drench application rates. As always, specimen labels and Material Safety Data Sheets (MSDS) are available on our web site at [www.ohp.com](http://www.ohp.com)

*(Kontos is a registered trademark of Bayer)*

# Publications

**Online bulb resource available for landscapers** – International Flower Bulb Center in Hillegom, Netherlands has launched the Bulbs in the Landscape Web site to provide landscapers in the U.S. and Canada info about the use of flower bulbs. Divided into 7 sections, the site provides info on common uses and applications including as part of flower mixes, seasonal bulbs, as well as specifics on planning, planting and maintenance. A section with downloadable charts provides details on perennializing bulbs by climate zone, bulb/perennial companion plantings, names of flower bulbs and more. [www.bulbsinthelandscape.org/](http://www.bulbsinthelandscape.org/)

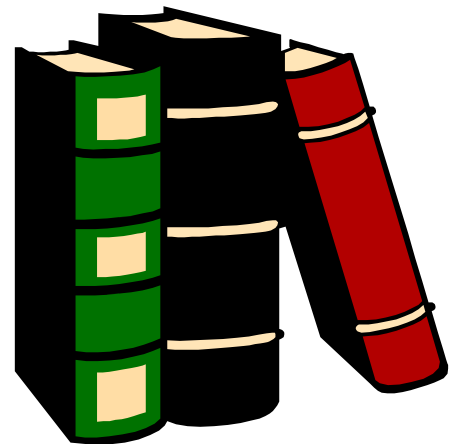
**Ornamental Plants Plus 4.0.** This DVD has 5,855 full color digital photos available for your marketing efforts. It is a powerful information and horticultural reference tool that includes trees and shrubs, vines, groundcovers, herbaceous annuals/perennials, solutions to plant problems, plant care instructions, cultural information, selection criteria, insects and diseases, problem diagnosis. Cost is \$139.95 (\$99 for educators). Contact Michigan Nursery and Landscape Association at 800-879-6652 or [www.mnla.org](http://www.mnla.org).

**What's Wrong With My Plant (And How Do I Fix It?)** by David Deardorff and Kathryn Wadsworth. This reference offers an easy visual system for diagnosing any plant malady and matching it to the right organic cure. It will be extremely useful for garden center diagnostic clinics. It will be available from Timber Press in December 2009. Contact Olivia Dunn at 503-265-0219.

**Broadleaved Shrubs and Shade Trees: Problems, Picture Clues, and Management Options** (NRAES-183) -- an invaluable

resource for novice and experienced home gardeners, master gardeners, students, extension and college educators, landscape professionals, and horticultural consultants.. This easy-to-use, photo-based guide illustrates over 125 problems that affect broadleaved shrubs and shade trees, allowing users to diagnose and remedy problems before it's too late.

The book will be over 210 pages, with 430 color photos. Included are descriptions of 30 abiotic problems, over 30 diseases, over 55 insect pests, seven wildlife pests, and four miscellaneous organisms. The introductory chapter covers diagnostics and nonchemical management strategies. The book was authored by Mary Kay Malinoski and David L. Clement, seasoned experts who have fielded questions on landscape problems for 20 years at the University of Maryland's Home and Garden Information Center. For detailed information on the book, to download a two-page flier, and to place a secure order, visit [WWW.NRAES.ORG](http://WWW.NRAES.ORG). The anticipated list price is \$35 per copy. For more information, call NRAES at (607) 255-7654.



# Calendar

**July 15-** Pesticides, Planting, & Pruning Workshop. Location: Bucky Boyle Park Pump Place & N. Front St. Allentown, PA 18102 , 9:00am- 3:30pm, Cost: \$25, Contact: (610)489-4315 or email [jxs51@psu.edu](mailto:jxs51@psu.edu).

**July 16-** Grounds Manager's Field Day. Location: Temple Ambler Campus, Ambler, PA., 7:45am-2:00pm, Cost: \$35, Contact: Penn State Extension Office (215) 345-3283.

**July 17-** Woody Plant Conference. Location: Lang Performing Arts Center Swarthmore College Swarthmore, PA, 7:30am-5:45pm , Contact: Longwood Gardens' Continuing Education Office (610)388-1000 ext 507 Mon-Fri 8am-4pm.

**July 20-** KAFMO Summer Field Day. Location: Hempfield High School, 200 Stanley Ave Landisville, PA 17538, 9:00am- 2:30pm, Cost: \$25 Registration due July 13, Contact: (717)921-8803.

**July 23-** Penn State Variety Trials. Location: Penn State Research and Extension Center, Landisville, PA, Contact: Penn State Extension in Dauphin County (717)921-8803.

**July 25** - Water Garden Tour, Self-guided tour of area's water gardens sponsored by Gateway Garden Center and the Delaware Center for Horticulture, 9am – 4pm, Cost: \$20, Contact: Marcia Stephenson (320)658-6262x105 or [mstephenson@dehort.org](mailto:mstephenson@dehort.org).

**July 28-** 2009 Summer Horticulture Course for Spanish Speaking Professionals. Location: Montgomery County 4-H Center, 1015 Bridge Rd. Creamery, Cost: \$40, Contact: (610)489-4315 Registration Deadline: July 23.

**July 28-30-** Penn Atlantic Nursery Trade Show-PANTS. Location: Greater Philadelphia Expo Center in Oaks, PA, Contact: Pennsylvania Nursery Landscape Association (717)238-1673; <http://www.pants.com> .

**August 4, 6, 11 & 13** – Pesticide Short Course. Preparing professionals take the PA certified pesticide applicator's exam, Location; Cabela's, 100 Cabela Drive, Hamburg, PA 19526, 9:30am-3:30pm, Contact Nancy Bosold (610)378-1327.

**August 11 & 12-** Complicating Factors in Invasive Plant Management: Circumstances beyond our control? Location: University of Pittsburgh at Johnston, PA, Full 2 day planned event. Contact: (215)247-5777ext 156 or 125

or [jlm@exchange.upenn.edu](mailto:jlm@exchange.upenn.edu) .

**August 13** – Summer Turf and Nursery Expo. Location: Jonathan's Landing Golf Club, Magnolia, DE, 8:30am - 1:15pm followed by golf outing, Contact: Valann Budischak (888)448-1203.

**August 26-28** – APGA Grounds Management Workshop. Turf, Trees and Seasonal Color. Longwood Gardens, Kennett Square, PA. Contact [www.publicgardens.org](http://www.publicgardens.org).

**August 26 & 27-** i-Tree Streets Inventory Training. Location: Penn State Great Valley, Malvern, PA, Contact: Julianna Schieffer (610)489-4315 or [jxs51@psu.edu](mailto:jxs51@psu.edu).

**September 1-**Bucks County Landscape Update. Location: Neshaminy Manor Center, Doylestown, PA, 1:00pm-4:00pm, Contact: Scott Guiser (215)345-3283.

**September 1** - Lehigh County Landscape Update. Location: Schnecksville Fire Company Pavilion, Schnecksville, PA, 4:00pm-9:00am ,Contact: Emelie Swackhamer (610)391-9840.

**September 8-** Chester County Landscape Update. Location: Chester County Government Services Center, West Chester, PA, 12:30-4:30pm , Contact: Cheryl Bjornson (610)696-3500.

**September 8 & 15-** Native Plant Identification, Location: Pool Wildlife Sanctuary, Emmaus, PA, Contact: Emelie Swackhammer (610)391-9840 .

**September 9-** Industrial and Right-of-Way Weed Meeting. Location: Williamson Restaurant, Horsham, PA, Contact: Scott Guiser (215)345-3283.

**September 16** - Ornamentals Research Expo. Location: UDBG, Newark, DE, 4:30pm-8:00pm, Contact: Elaine Eiker (302)831-2534.

**September 15-** Berks County Landscape Update, Location: Berks County Ag Center, Leesport, PA, 12:30-3:30pm, Contact: Nancy Bosold (610)378-1327.

**September 16-** Montgomery County Landscape Update. Location: Montgomery County 4-H Center, Creamery, PA, 12:30-3:30pm, Contact: Mary Concklin (610)489-4315.

**September 19-** Tree Tenders Training. Location: Berks County Agricultural Center, Leesport, PA Contact: Julianne Schieffer (610)489-4315 ; [jxs51@psu.edu](mailto:jxs51@psu.edu).

**September 28** - Landscape Award Submission Deadline.  
Contact: Valann Budischak (888)448-1203.

**October 5-9**- Tree Climbing School. Location: The Brandywine Battlefield, 8:30am-4:30pm, Contact: Cheryl Bjornson (610)696-3500.

**October 21** – CNP exam. Location: Delaware Department of Agriculture, preregistration required.  
Contact: Valann Budischak (888)448-1203.

**November 18** – Turf and Ornamentals Workshop.  
Location: Hockessin Memorial Hall, Hockessin, DE,  
Contact: Valann Budischak (888)448-1203.

**January 13 & 14** – Delaware Hort Industry Expo.  
Location: Modern Maturity Center, Dover, DE. Contact:  
Valann Budischak (888)448-1203.

