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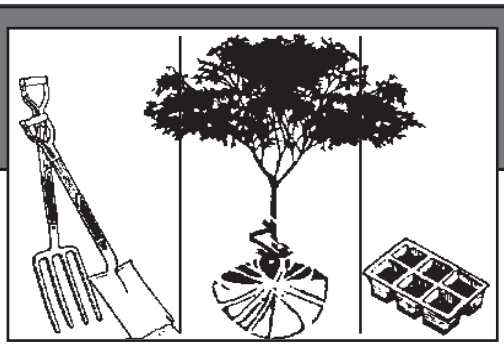

An educational newsletter with research-based information for businesses and individuals involved in selling, planning, designing, servicing, and enjoying landscapes and gardens.

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2010 Cary Award Plant Winner

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The Cary Award Plant Program was developed for New England gardeners, recognizing plants that do well in New England gardens. Cary Award winning plants are woody trees, shrubs, or vines that are chosen for their multi-seasonal interest, winter hardiness (hardy to at least zone 5), exceptional season-extending interest, and resistance to insect and disease problems. A Cary Award plant must also be readily available in the nursery trade in the year it is recognized.

The Cary Award Plant for 2010 is *Hydrangea paniculata* (**Panicle Hydrangea**) and all of its 'glorious' cultivars. *Hydrangea paniculata*, native to Japan and China, is an "oldie-but-goodie", having been introduced to the US in 1861. *Hydrangea paniculata* produces beautiful, 6 to 10 inch panicles of white flowers from July through September, depending on the cultivar. As the flowers age, they turn from pale to deep pink, sometimes with burgundy or purplish tones, again depending on the cultivar. In the late fall to early winter, the flowers turn a tannish-brown and continue to add interest late in the season. There are *Hydrangea paniculata* cultivars that bloom in early, mid, or late summer.

In addition to its beautiful flowers, what also makes this plant a winner is that it is cold hardy to zone 3 and its flower buds are not damaged or killed by cold winter temperatures or late spring frosts (unlike many other hydrangea species, most notably *Hydrangea macrophylla*). *Hydrangea paniculata* flowers on new wood (wood that is produced in the current season), so even if the plant is cut back in the late fall or early spring, the plant will still produce flowers.

There are numerous cultivars of *Hydrangea paniculata* and size is variable, anywhere from 8 to 20 feet in height and width. Habit is an upright multi-stemmed shrub or small tree with dark green foliage. Like many other landscape plants, *Hydrangea paniculata* prefers full sun to partial shade and a well-drained organic loam soil. That being said, *Hydrangea paniculata* has proven to be very site adaptable and shade tolerant. In fact, according to Dr. Michael Dirr, "*Hydrangea paniculata* is difficult to kill."

With so many cultivars to choose from, it is a challenge to choose a favorite. However, one of the earliest to bloom is *Hydrangea paniculata* 'Praecox', which begins to bloom in early July, on old wood. The numerous lace-like panicles are fragrant and are often visited by honeybees. *H. paniculata* 'Praecox' is a large shrub 12 to 15 feet high and wide. It flowers reliably and does not require much, if any, maintenance. According to the *Manual of Woody Landscape Plants*, the original plant still grows at the Arnold Arboretum in Jamaica Plain, MA and is over 100 years old.

Another timeless favorite is *H. paniculata* 'Grandiflora' or "PeeGee" hydrangea. The flowers are usually quite large and can be over 16 inches in length. "PeeGee" usually blooms late July into August and continues to provide interest, as the flowers turn pink. Often trained as a standard, *H. paniculata* 'Grandiflora' is frequently seen as a focal point in the landscape, especially with older plantings.

Blooming late in the season, *Hydrangea paniculata* 'Tardiva' usually begins to flower in September and, sometimes, October. The flower clusters are long, conical inflorescences that add color and texture to the late summer, early fall landscape.

The three *Hydrangea paniculata* cultivars mentioned here are three of the older cultivars, with numerous new cultivars being added each year. It is worth checking all of them out.

Hydrangea paniculata can be used for screening, in a mixed border, as a specimen plant, or grown for its flowers to be used in dried arrangements.

Hydrangea paniculata is a tough plant with beautiful flowers, no significant insect or disease problems, and is significantly drought-tolerant and long-lived; a welcome addition to the Cary Award Program.

For more information on the Cary Award Program, visit the web site: www.caryaward.org

Review of Mycorrhizae Applications

Alex Sherman, Arborist, and H. Dennis Ryan, University of Massachusetts, Department of Natural Resources Conservation, Arboriculture & Community Forestry

Humans have performed the practice of fertilizing plants for thousands of years. As early as 6000 BCE, agricultural methods had been established that included irrigation systems and soil fertilization (Nemet-Nejat 1998). While agriculture for food production has historically been the major driver of fertilizer development, trees can also benefit from fertilization. In natural forested settings, it is not necessary in most cases to add nutrients to the system to increase tree health or vigor. The natural recycling of plant and leaf material generally satisfies the nutrient requirements of the trees. There is generally a thick organic soil horizon or duff layer that contains decomposing plant material and mycorrhizae in the soil.

Landscape trees are subject to harsh growing conditions and are not always surrounded by a thick organic layer. In fact, many times fallen leaves are removed from the growing site to increase the aesthetic appeal of the landscape. In suburban settings, trees can be surrounded by lush grass lawns, which compete for the same water and nutrient resources as the trees. In more urban conditions, native soils have often been replaced by construction rubble or growing space is limited by impervious surfaces such as sidewalks and roads. Trees in this environment do not always have access to adequate nutrient resources, so fertilization can be beneficial.

Tree fertilization research has seen a sharp increase from the mid 20th century to the present. Tree interactions with the surrounding landscape as well as nutrient requirements have been explored. The application of soil science and tree physiology has advanced the practice of tree fertilization including mycorrhizae. Studies focusing on mycorrhizal fungi will be discussed.

It is important to remember that the soil is full of living organisms and many of them have great influence over the availability of mineral nutrients, as well as a tree's ability to take in these nutrients. Soil mycorrhizae are one such example. Mycorrhizae are defined as a fungus and plant root structure (Kujawski et al. 2006). There are two major types of mycorrhizal fungi, ectomycorrhizae and endomycorrhizae. Ectomycorrhizae occur when the fungus grows on the outside of the root surface (Kujawski et al. 2006). Endomycorrhizae occur when the fungus actually penetrate the cells of the root and occur within the root structure (Kujawski et al. 2006). This symbiotic relationship between the fungi and the tree roots provides benefits for each organism. The mycorrhizal fungi take up water and nutrients and deliver them to the root cortex (Garbaye and Churin 1996). The fungi in turn receive carbohydrates from the roots of the trees. Within the past fifteen years, the inoculation of commercially produced mycorrhizal fungi has become more popular. It is important to note that most soil contains naturally occurring mycorrhizal fungi. This fact, along with varying experimental results, has made the activity of mycorrhizal fungi inoculation somewhat controversial.

Research studies have often failed to provide conclusive results of the efficacy of mycorrhizal inoculation (Appleton et al. 2003). Garbaye and Churin (1996) looked at the efficacy of three different ectomycorrhizal fungi on urban trees. Treatments included each fungi applied separately as well as a mix containing all three fungal strains. They found that there was a 25% increase in height growth of trees treated with mycorrhizal fungi, although these effects did not show until the third year of treatment (Garbaye and Churin 1996). The positive results were seen equally with the mixed inoculums as with the individual applications (Garbaye and Churin 1996).

Marx et al. (1997) also displayed positive results in a separate ectomycorhizal inoculation study. This study in-

cluded injecting fungal spores into the soil, as well as introducing the spores using a vertical mulching technique. They included a water control treatment, a fertilizer alone treatment, a mycorrhizal fungal treatment, and a fungal plus fertilizer treatment. They found that introducing mycorrhizal fungal spores with or without fertilizer stimulated three to four times the root growth than just water (Marx et al. 1997). This study shows that there could be some benefit to introducing mycorrhizal spores into poor urban soils. It is important to note that the spores plus fertilizer had the greatest effect on root growth in this study. This is significant because it suggests that it may be possible to use less fertilizer when including the mycorrhizae to help the tree absorb the introduced nutrients.

Some studies have found little to no benefit of adding mycorrhizal fungi to the soil environment. Gilman (2001) conducted a study that examined the effects of adding mycorrhizal fungi to the backfill of transplanted trees. He found that inoculating soil with myccorizal fungi at transplanting had no impact on tree survival or growth (Gilman 2001).

Appleton et al. (2003) utilized similar methods as Marx et al. (1997) on trees in a parking lot and street medians. They showed that one year after treatment there were no significant increases in trunk diameter or leaf chlorophyll content at either site (Appleton et al. 2003). They did find that pre-treatment soil tests showed adequate naturally occurring amounts of mycorrhizal fungi in the soil (Appleton et al. 2003). This finding suggests that a soil test* is critical before recommending inoculation of mychorrizal fungi.

Efficacy of mycorrhizae in the urban environment - Conclusions

The above review of literature has focused on the major issues surrounding the practice of mycorrhizae fertilization. This issue is extremely complex and the need for continued research is important. Tree care professionals are in the business of maintaining healthy and vigorous trees. It can often be difficult to determine the current state of the science, as many recently conducted studies seem to find varied results which often times may be a result of both species and location of the study. The issue of mycorrhizal inoculation is a prime example of this. Garbaye and Churlin (1996) found positive results in the third year after inoculation, but admit these effects could be attributed to other environmental factors. Gilman (2001) and Appleton (2003), on the other hand, determined little benefit of mycorrhizal inoculation in their studies. Overall, the evidence of potential benefit is compelling but it may be important to conduct a soil test* to look for naturally occurring populations of mycorrhizae before recommending inoculation. Further research is needed to determine the true effect of mycorrhizal inoculation.

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* Soil Testing

The UMass Soil and Tissue Testing Lab offers a variety of soil test opitons. Go to

www.umass.edu/soiltest

or call (413) 545-0895 for a listing of tests, fees, and an order form.

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Upcoming Events

*For more details and a registration form, go to **www.UMassGreenInfo.org** under Conferences and Workshops.*

March 9 - Community Tree Conference: Tree Invasives – What's Next?
Stockbridge Hall, UMass Amherst, 9 am to 4 pm
For arborists, tree wardens, municipal managers, city planners, foresters, sugar bush owners and landscape architects who are involved with the management of property, both private and public. Cosponsored by UMass Extension, MDAR and the USDA Forest Service.
Four pesticide contact hours for categories 29, 36, and Applicator's License; 6 ISA, 5 SAF, 6 CFE, 1 MCA and MCH, and 2 MCLP credits available.

March 23 - Garden Center Employee Training
Publick House, Sturbridge, MA, 9:30 am to 3:30 pm
Training for garden center employees, horticulture retailers, and others interested in helping their customers with questions about pest control products that provide green, organic and sustainable solutions. *Info on credits TBD.*

April 1 - Weed Management for Garden Retailers
Doubletree Hotel, 11 Beaver St., Milford, MA
8:30 am to 12:30 pm
Customers commonly ask garden retailers questions about weed identification and the control of weeds in lawns, landscapes and gardens. This program with help retailers answer many of these common questions.
Four pesticide contact hours for categories 29, 36, 37, and Applicator's License; 1/2 MCA, and 1 MCLP and MCH credits available.

April 15 - Insect Laboratory: Hands-on Identification and Management Strategies, UMass Cranberry Station, E. Wareham, MA, 9 am to 3:30 pm
Hands-on workshop where participants will examine actual specimens in a teaching lab with the use of microscopes. This is an opportunity to hone your IPM monitoring skills and to become a better IPM and Plant Health Care practitioner. Pre-registration is required, as space is limited to 30 participants. Cosponsored by UMass Extension, Plymouth County Cooperative Extension, and Barnstable County Cooperative Extension. *Five pesticide contact hours for categories 29, 36, and Applicator's License; 5 ISA, 5 1/2 SAF, 5 1/2 CFE, 1 MCA and MCH, and 2 MCLP credits available*.

Scouting for Pests and Problems of Woody Ornamentals Walkabouts
April 29 - Diseases and Weeds, 5 to 7 pm
Arnold Arboretum, Jamaica Plain, MA
June 3 - Insects, Weeds and Cultural Problems
Bridgewater State College, 5 to 7 pm
September 30 - Diseases and Weeds, 4 to 6 pm
Holy Cross College, Worcester, MA
Two pesticide contact hours each for categories 29, 36, and Applicator's License; 2 ISA, 2 SAF, 2 CFE, 1/2 MCA, and 1 MCLP and MCH credits available.

May 27 - Inland Wetland Plant Identification
June 3 - Identifying Inland Wetland Soils
UMass Amherst, 9 am to 3:30 pm

Weed Identification Workshops, 9 am to 3:30 pm
June 22 - Broadleaf Weeds, Arnold Arboretum
June 25 - Broadleaf Weeds, UMass Amherst
August 24 - Grassy Weeds, UMass Amherst