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Gordon Baker has been involved with industrial vegetation management for over ten years: "Our project is second only to TVA in size. We have between 1400 and 1500 miles of interconnecting canals to cover. Over the last six years, we've used Banvel 720 for ditchbank brush control because of its economy. And, because it's right up there at the top for effectiveness."

Ed Ingle, landscaping engineer, North Carolina Department of Transportation, Division of Highways.

Ed Ingle recommends vegetation control herbicides for construction projects and highway maintenance in a seventeen county area: "We have used Banvel for three years and found it was an economical and safe chemical. We've had good results with it where we have a lot of kudzu and multiflora rose. There's really no comparison with 2,4-D alone."

Darryl Fendley, founder/owner, Certified Services, Cleveland, Tennessee.

Darryl Fendley has provided industrial vegetation control work for utilities and industrial facilities for over three years: "We use Banvel 720 for vines and brush control. It does a pretty good job, particularly around sensitive areas, because it doesn't have the soil persistency of some other materials. And, when you compare price, you can use a bit more Banvel than you can with some other products. So my preference is Banvel 720.

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MAINTENANCE, ENERGY CONCERNS INCREASE APPLIED TREE RESEARCH

By Douglas J. Chapman, Horticulturist, Dow Gardens, Midland, MI

Applied tree research is a particularly fertile area today. There exists a need for greater plant diversity (tree and shrub) in the landscape.

This could be accomplished by introducing new trees and shrubs, be they native or imported from such areas as the People's Republic of China and the development and introduction of superior cultivars. Regional cultivar introductions propagated by asexual methods, cuttage and/or tissue culture, grown under accelerated growth, should lead to more efficient production. A high degree of emphasis must be placed on stimulating local nurseries to introduce and propagate their own adapted cultivars of trees and shrubs. Traditional forestry has a similar need, yet diversity means developing a practical production technique for seedlings—determining what plants are photoperiodic responsive and breeding programs which will result in plants developed specifically for biomass, disease tolerance, and lastly, clones or cultivars for specific uses or grown under unique conditions, e.g. Sugar Maple and hickory for wet sites.

When considering landscape trees, the selection, production, and introduction of regional clones or cultivars is paramount to the development of the nursery industry. One in Europe would not expect trees to grow everywhere in the European landscape. We in this country should not expect plants developed and introduced in the Great Lakes to thrive throughout the United States. For example, the native range of Acer rubrum is from Michigan's Upper Peninsula to Florida. Yet Florida's Acer rubrum would not be hardy in the Great Lakes region and a Northern Michigan Red Maple would collapse in Florida. With continued efforts towards asexual propagation by cuttage or tissue culture or combinations of the two, the industry can expand the introduction of regional cultivars. High on the list of plants to propagate should be selected cultivars chosen for their environmental adaptation, e.g. drought tolerance, disease resistance, and desirable aesthetic qualities (outstanding fall color, flower color, or habit of growth). In the development of new selections, one may want an Acer rubrum with scarlet or yellow fall color, light or dark bark, and eco-types for droughty as well as poorly drained soils. These selections will be developed and grown in areas where they are native, e.g. the Great Lakes States, the Northeast, or the Southeast.

Propagating these clones by cuttage or tissue culture will mean that the resulting tree will continue to express phenotypically all of the desirable characteristics for which it was originally chosen with no problem of graft incompatibility or incongeniality. Further, since trees native to northern latitudes are more photoperiodic responsive, we can further reduce the time needed for production by growing them under continuous light, thus the tree remains vegetative and growth continues, accelerating the production schedule of Acer rubrum liners from three years to one full growing season.

Another method of propagation which could play a major role in the development of regional cultivars is tissue culture. Where applicable, it can result in the propagation of a large number of individuals in a short period of time. Thus, providing the nursery industry with stock plants for additional propagation. Sink at Michigan State University has been a leader with the development of tissue culture for shade trees, specifically Acer rubrum cultivars. His techniques, combined with propagation by cuttage, could speed up the production cycle, making regional cultivars a reality within five to six years. Meyer at the University of Illinois, working with tissue culture, has been successful in the propagation of iris Hosta Lily, and rhododendron (Rhododendron c. 'Nova Zembla').

Why consider asexual propagation of trees and the development of regional cultivars? During the past eight to ten years, a disturbing phenomenon has been observed. With increasing frequency, grafts of Red Maple (Acer rubrum cultivars 'October Glory,' 'Red Sunset,' and 'Schlesinger'); White Ash (Fraxinus americana 'Autumn Purple' and 'Rosehill'); European Ash (Fraxinus excelsior 'Hessei'); Pin Oak (Quercus palustris 'Soverieg'; and London Planetree (Platanus acerifolia 'Bloodgood') are showing graft incompatibility or incongeniality. Researchers, including Davidson at Michigan State University, feel this incongeniality is a prove

Continues on page 56
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straight liner. Since that time, incompatibility of scion and understock have become a problem, resulting in many landscape trees collapsing either soon after propagation or after reaching 3 to 4 inches in trunk diameter. Propagation by cuttage is one way to circumvent this problem.

Why haven't shade tree cultivars been propagated by cuttage in the past? The answer is tradition. Pomologists, specifically European, have grafted or budded apple trees for over 200 years. This tradition then inhibited change and/or research in new propagation techniques.

Recently Dow Gardens initiated research with the goal of propagating shade trees by cuttage. Working with several maple species (Acer campestre, A. ginnala, A. platanoïdes, A. rubrum, A. saccharum nigrum) two linden cultivars (Tilia cordata 'Greenspire' and Tilia americana), and several crab apple cultivars (Malus), we achieved 70 to 98% success.

We found that cuttings of Acer rubrum should be taken from spring wood that is no longer actively elongating (late May through mid-June). Usually these plants have completed their rapid growth (elongation) and lateral meristem or cambium seems more active, resulting in better rooting. Cuttings taken earlier in the season show a high tendency toward rotting. The cuttings are treated with Hormodin #3, placed in intermittent mist, and usually root within three to four weeks. Hedge Maple (Acer campestre), Amur Maple (A. ginnala), and Norway Maple (A. platanoïdes), lindens Tilia c. 'Greenspire' and Tilia a. 'Redmond,' and 'Snowdrift' Crab Apple were found to root successfully when taken during mid-July through early August. Coincidentally, this is a period of high cambial or meristem activity as reported by Hart and, again, Shigo. These rooted cuttings can be placed in cold storage or grown on and planted out the following spring. The most efficient production techniques must be worked out for each area.

Forestry has a similar problem. They must be researching ways to speed up their production cycle without increasing energy needs (pesticide application). This speed up in production cycle may be accomplished by accelerated growth of seedlings. Why seedlings? Seedlings remain particularly important as they provide genetic variation needed so that insect and disease control is not required or run rampant. Extensive disease and insect control on a scale required in traditional forestry would make the growing of trees almost prohibitory, be it for biomass, pulp, or lumber. New production techniques, resulting in 12 to 18 inch trees at the end of the first growing season, would greatly alleviate problems of the early years in establishment.

For northern areas, work by Hanover, Michigan State University, clearly has shown that accelerated growth concept can speed the production cycle. This accelerated growth is nothing more than using the inherent photoperiodic response (low energy). Plants are put under continuous light shortly after the seedlings germinate during the growing season, keeping them vegetative, i.e. in a state of almost constant cell division and elongation. Thus, we have seedlings 18 to 20 inches in height and ready for rapid establishment. The seedlings can be from collected sources which show genetic resistance or special environmental adaption needed for specific production goals. This combined with the above-mentioned asexual propagation for urban trees could improve the quality while reducing maintenance costs of tomorrow's landscapes. One should expect to see only disease resistant crab apples, sycamores resistant to anthracnose, Shagbark Hickories tolerant of urban soil; further, readily-available plants which are easy to transplant yet are competitive with turf, e.g. Bur Oak and Shagbark Hickory. Some of today's dreams and needs will be available for tomorrow's landscapes because of this type of applied plant physiology or horticultural research.
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GAIN SUPPORT FOR TREE PROGRAMS BY WORKING WITH LOCAL MEDIA

By Michael Scearce, consulting arborist, Baton Rouge, LA.

As city governments grind along toward providing their priority services, public tree care is often found at the bottom of the stack. Street repair, drainage, new construction, and refuse disposal are usually the top order of the day. However, as more and more of our urban trees tumble before the heavy equipment of progress the ones which remain gain in importance. The less there is of any one commodity, the more valuable it becomes.

The remaining public trees belong to the citizens; the voters. The liaison between the public and their trees is the municipal forester or city arborist and all too often one of his most powerful tools is neglected. That tool is not a spray rig or a power saw. It's the local news media!

Just as a chain saw performs best when well oiled, so does the public best support an urban tree care program when kept informed as to its problems and successes.

The municipal arborist will almost always find the local print and broadcast media eager to cover his story. In Baton Rouge, La. the city Beautification division has never had a public service announcement turned down. As a matter of fact, the accompanying photo was shot and donated free of charge by WAFB TV.

The media is, in essence, the private citizen's only means of keeping abreast of how his elected representatives spend his tax dollars. Regular monitoring of the city council can result in its becoming more responsive to the desires of those it represents.

In Baton Rouge, we have used the local media as a pry bar to lift the heavy lid of obscurity from municipal tree care. A regular weekly column I call "Out On A Limb" has been running in a local newspaper for a year and a half. The column approach provides continuous information about such topics as how trees function, what stresses occur in urban environments and how those stresses can best be dealt with. Pertinent do-it-yourself tips for the interested homeowner are well received, also. We have found that the better educated and more involved person is concerning his own trees, the more interested he becomes in the health and appearance of his community's public trees.

Occasional feature stories in local magazines or newspapers help acquaint readers with specific tree care programs, let them know what their urban forester is trying to accomplish, and most importantly, keep the concept of public tree care fresh in their minds.

Both print and broadcast media coverage are useful for "spot request" type stories. This can include the introduction of such programs as seasonal volunteering, neighborhood self-help projects, requests for the reporting of damaged or unhealthy public trees, summer watering of street trees, and requests for donations of seedlings or mulching materials. Response is sometimes overwhelming. One lady recently responded to our request in the local newspaper for winter mulch by donating 500 bales of hay!

Local T.V. and radio talk show hosts seem to be quite receptive to devoting shows to municipal tree care whether in the format of an interview with the city's tree specialist or having him/her field questions from the public by telephone. We are planning weekly radio call-in type shows with high expectations. A regularly scheduled local ½ hour home owner's T.V. show in Baton Rouge has expressed interest in doing a show concerning various aspects of public/private tree care, ordinances and legalities, and power line clearing problems.

Television public service announcements can be invaluable for rallying the public hue and cry over important tree care issues as they come up before the city council. In Baton Rouge, we have found that nothing elicits response from the public better than T.V. news coverage of a vandalized oak or the saving and transplanting of a mature Palm tree.
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Q: What herbicide(s) can we use to remove crabgrass from bentgrass greens which will not injure the bentgrass? (Tennessee)
A: Pre-emergence herbicides such as Betasan can be used, but repeated use may reduce stress tolerance and increase disease incidence. Postemergence herbicides such as DSMA have also been used, but the potential for injury is high, particularly at high temperatures. Perhaps the best solution is to remove the crabgrass by hand and improve the growing conditions to favor bentgrass growth.

Q: At what height should bermudagrass be mowed on a football field, and when should it be cored? (South Carolina)
A: Hybrid bermudagrass is mowed at one-half inch; common bermudagrass, at one inch. Core cultivation should be done after bermudagrass begins growth in the spring.

Q: When is the best time to control oxalis?
A: Any broadleaf weed can be controlled best when the weed is actively growing.

Q: Is it possible for a tree to be injured by lightning and not have any external symptoms such as strips of bark burned or peeled off?
A: Yes, internal tissues in the trunk and roots may be severely burned without external evidence. Symptoms of injury may not become apparent until several months after the tree is struck by lightning.

Q: What herbicides will control the weeds that were controlled with Silvex? Are there other herbicides available to replace 2,4-D if it is removed from the market? (New York)
A: Dichlorprop (2,4-DP) in combination with 2,4-D will control many of the same weeds controlled by Silvex. Spurge can be controlled with DCPA and bromoxynil.

As an alternative to 2,4-D, MCPA is reportedly a viable substitute as are a few experimental compounds. However, I do not feel we should allow the 2,4-D turf registration to be cancelled without giving it a fair trial; I have yet to see any scientific data that supports the claims being made against it. Support the Professional Lawn Care Association of America's campaign to save 2,4-D. Their address is 435 North Michigan Avenue, Suite 1717, Chicago, Illinois 60611.

Q: Where can I obtain a compound called Anhydrite? It is used as a soil amendment.
A: Check with supplier of gypsum. Anhydrite is anhydrous calcium sulfate.