MINNESOTA
Shade Tree Advocate
Speaking Out For Community Forests
VOL. 5, NO. 2
Spring 2003

Got Muck? Try Rain Gardens.

by Lorrie Stromme

(This article was adapted from a University of Minnesota Extension Service article by the same author in the May 1, 2001 edition of Yard & Garden*, an online newsletter)*

A rainy spring day is an ideal time to notice the areas in your yard where stormwater and snowmelt have left soggy dips or ponds. Instead of making plans to fill in that low spot in your yard, consider installing a rain garden.

What is a Rain Garden?

The term rain garden defies precise definition. Basically, a rain garden is a water quality tool that mimics nature. Just as leaf litter in a forest soaks up water as it percolates into the ground, plants in a rain garden act like a sponge, drawing water down into the soil. Other terms for rain garden are mini-wetland, storm water garden, water quality garden, stormwater marsh, backyard wetland, wetland biofilter, or bioretention pond.

Benefits of a Rain Garden

On a small scale, rain gardens help prevent wet basements by diverting water away from the foundation of a house. On a larger scale, they help improve water quality and recharge groundwater supplies. A rain garden absorbs rainwater

Rain Gardens continued on p. 3

PHOTOS PROVIDED BY AUTHOR

A rain garden is a natural, on-site means of controlling runoff.

◆ ◆ ◆

The Minnesota Shade Tree Advisory Committee's mission is to advance Minnesota's commitment to the health, care and future of all community forests.

Inside THIS ISSUE

Visit MnSTAC on the Web at **www.mnstac.org**

PRESIDENT'S CORNER

Plus ça change, plus c'est la même chose.
[The more things change, the more they stay the same.]

In late March, I had occasion to attend the ISA Southern Chapter Urban Forestry Conference in Asheville, North Carolina, near the "Cradle of Forestry" in the Pisgah National Forest. On my drive down, I watched Spring emerge. Green grass about 200 miles south of Chicago. Red maple buds in Evansville, IN. Daffodils, flowering pears, and redbuds in Bowling Green, KY. Cherry trees in bloom in Asheville. Ahhh. Just what I needed.

In addition to the changing plant hardiness zones, I noticed changing speech patterns, menu options, rock formations, highway plantings, and topography . . . particularly as I traversed the Blue Ridge Parkway through the stunning Great Smoky Mountains. But in spite of the many differences in geography and culture, the conference reinforced that we all face the same urban forestry challenges, whether we're in Mobile, Alabama, or Minneapolis, Minnesota.

Take tree-topping, for instance. (And I saw a lot of it along the way!) And confrontations between sidewalk engineers and city foresters. Or brazen developers who chop down trees in the cover of darkness and feign ignorance of the tree preservation plan. I spoke with arborists from Tennessee, Kentucky, Alabama, and Mississippi about these problems. (Beer is a universal icebreaker.) All were frustrated. We commiserated that 'we're all in this together.' Suddenly, urban forestry issues took on a national, rather than local, significance. We're not so different after all.

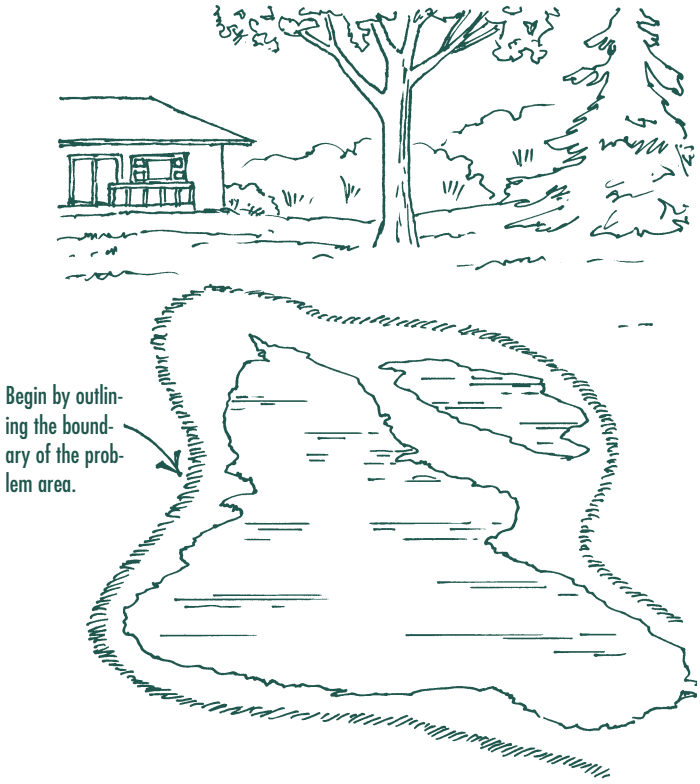
We reached the conclusion that messages about proper tree care haven't resonated, in spite of numerous ISA conferences, publications, and arborist certification programs. The messages are missing their mark. The right mark is a tree company's customer base. An informed public will help set the standard of practice and bring about the change.

We already have the tools: pamphlets, web sites, and videos on pruning, planting, tree health, etc. Now, we have to reach out beyond those who attend tree care workshops to the people who write the checks for the tree care. We all can help in this education effort: volunteer to give short talks to school kids or community groups, write an article or two for local newspapers and newsletters, talk to your neighbors instead of shaking your head in quiet disgust at their ignorance about arboriculture. Be the Cliff Claven of trees at your next family reunion or get-together with friends. You have credentials. You're the experts. Now you can be teachers, too.

Lorrie Stromme is president of the Minnesota Shade Tree Advisory Committee.

Rain gardens can be simple or elaborate.

◆ ◆ ◆



Rain gardens draw water down into the soil, reducing runoff and filtering pollutantants. You can tailor yours to fit your situation.

◆ ◆ ◆

and snowmelt before they have a chance to flow over impervious surfaces, like driveways, roads, patios, and parking lots. Impervious features in the landscape prevent runoff from percolating into the soil; instead, water remains above the surface, accumulates, and drains–untreated–into storm sewers, en route to wetlands, streams, and rivers.

According to the Environmental Protection Agency, a typical city block generates nine times more runoff than a woodland area of the same size, because of impermeable surfaces. A rain garden is a natural, on-site means of controlling that runoff. It is 30 percent more efficient than turf in soaking up water. Trees and vegetation shield the soil surface from raindrop impact, while the root masses hold the soil particles in place. Improved water quality results from the nutrient removal process as the water and pollutants come into contact with roots and microbes in the soil. A U.S. Forest Service study in Salt Lake City found that the city's tree canopy reduced surface water runoff by 11.3 million gallons during a one-inch rainstorm over twelve hours.

In addition to storing rainwater temporarily, a rain garden filters pollutants carried in surface runoff. Common pollutants in urban areas are sediments from development; oil, grease, and chemicals from vehicles; viruses and bacteria from failing septic systems and animal waste; deicing salts from roadways; and nutrients and pesticides from turf management and gardening. Polluted runoff becomes a water quality issue when it is released directly into lakes and streams without any treatment. Increased pollutant loads can harm fish and wildlife, kill native vegetation, foul drinking water supplies, and make recreational areas unsafe.

Design Features Are Flexible

A rain garden is designed to channel runoff into a vegetated swale or low area away from a house foundation or paved surface. Features include a shallow basin depth, gentle side slopes, soil that allows infiltration, and vegetation that traps runoff. Rain gardens can be designed to accommodate soils, existing drainage patterns, aesthetics, microclimate, and purpose. The variables include dimensions, depth, location, soil type, and plant selection. Designs can vary from a small, low spot in a back yard to a larger project,

There is no standard size or shape for a rain garden. Even drainage channels can be planted to serve the purpose.

◆ ◆ ◆

engineered with underdrains and grading. Even a drainage channel can be planted and serve the purpose.

◆ Dimensions

There is no standard size for a rain garden. The rule of thumb is 5% of your drainage area. For example, a 50-square-foot rain garden would accommodate a 1,000-square-foot lawn area. Rainwater gardens installed by the City of Maplewood in several residential areas are three standard sizes: 12' x 24', 10' x 20', and 8' x 16'. The Water Quality Garden near Lake Como is 4,000 square feet. The rain gardens in the residential development in Somerset, Maryland, are each 300 to 400 square feet.

◆ Depth

The depth of a rain garden can vary depending on how much water you're diverting to the rain garden. Depths range from a shallow bowl approximately six inches deep to a 2- to 4-foot depth for planting soil zones, where a perforated underdrain in a gravel bed connects to a storm drain, French drain, or culvert.

◆ Location

A rain garden should be strategically placed where rain or snowmelt will drain into the dip or depression. Locate the garden near impervious surfaces, such as

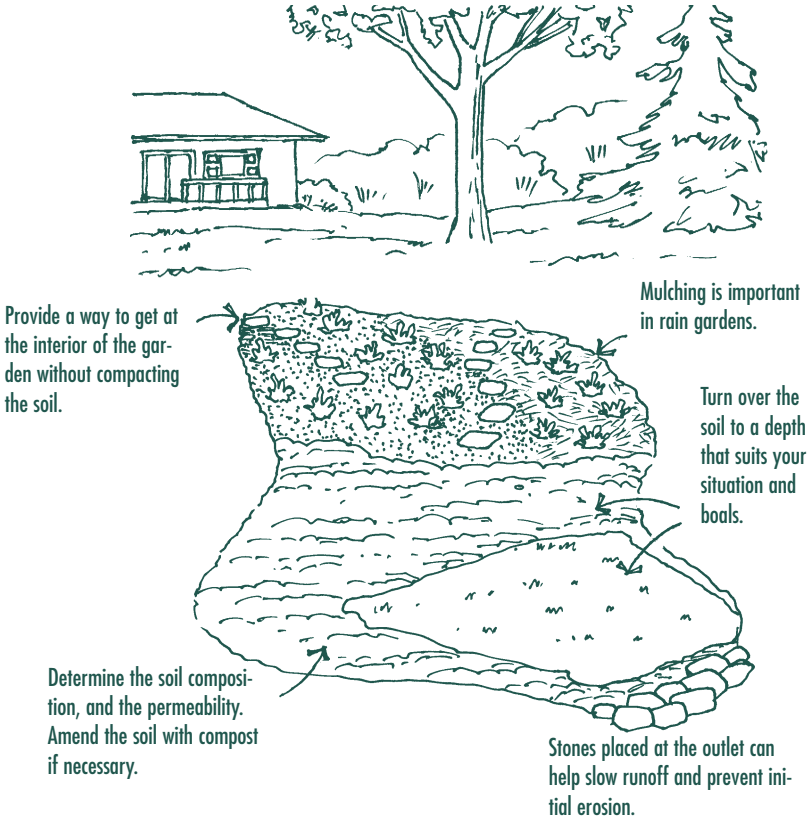
Rain Gardens continued on p. 4

Rain Gardens, from p. 3

alleys, sidewalks, driveways, and under downspouts or gutters, to capture the rain as close as possible to the point where it falls. In residential areas, locate a rain garden in line with the yard's natural drainage pattern, away from the house. Gardens should not be located over gas or water services.

Rain gardens and planted infiltration trenches have also been successfully incorporated into parking lot designs. The Ramsey Washington Metro Watershed District recommends using infiltration trenches on the edges of parking lots.

The H.B. Fuller Company in Arden Hills, Minnesota, designed the parking lots at its corporate headquarters with planted islands and infiltration strips to reduce runoff.



Native plants are usually good choices for rain gardens. Make sure the plants you choose will fit the soil conditions and, if necessary, be resistant to de-icing salts.

◆ ◆ ◆

◆ Soil Considerations

A blend of 20% organic matter, 50% sandy soil, and 30% topsoil is ideal. This blend naturally filters the rain as it runs into the rain garden. If the percolation rate is lower than one inch per hour, soils should be amended with compost or replaced. Some clay is desirable, because clay particles adsorb heavy metals, hydrocarbons, and other pollutants and hold water well, but high clay concentrations may cause poor drainage. Sandy soil permits water percolation, but very sandy soil is too permeable. A soil pH of 5.5 to 6.5 is ideal for pollutant removal by microbial activity. A mulch layer on the garden surface aids in the decomposition of organic matter, prevents erosion, and helps to suppress weeds. Shredded hardwood mulch is recommended, because it resists flotation and has a greater surface area for binding metals in runoff.

◆ Plant Selection

Plant species that tolerate the extremes of wet soils and very dry periods are preferred for rain gardens. Most perennials demand well-drained soil, but some tolerate or even thrive in moist soils. Plants that tolerate standing water or "wet feet" should be planted in the lowest part of the garden, while those that prefer moist soils should be planted on the side slopes. A buffer strip of grass or groundcover at the top edge of the rain garden slows water as it flows into the garden and filters sediments.

Native plants have several advantages. They are best adapted to the local climate and, once established, seldom need watering or fertilizing. Many are deep rooted, enabling them to tolerate dry spells. The long roots also help to direct water deep into the soil. As a bonus, native plants are attractive to diverse native butterflies and provide habitats for birds and other wildlife. Natives are low maintenance, but they still require care, occasional weeding, and control of debilitating diseases and insect pests. Examples include Joe Pye weed, Black-eyed Susan, Big Bluestem, Culver's root, Tall meadow rue, Yellow or blue flag iris, red-twig dogwood, black chokeberry, American highbush cranberry, and buttonbush. (For a detailed list, visit ***www.mninter.net/~stack/bassett/gardens.html.***) In large, planted swales or low areas, incorporate trees into the mix of plants, such as River Birch, Tamarack, Quaking Aspen, Swamp White Oak, Silver Maple, Red Maple, or Willow.

Gardens on high-traffic streets should include plants that tolerate deicing salts. Deicing salts affect plants in two ways. First, direct contact from spray drift can cause bud death, twig dieback, or needle browning. Second, build-up in adjacent soils can damage plant roots so that they are unable to take up water. Symptoms include wilting, marginal leaf browning, needle tipburn, and general stunting. Plants within 60 feet of a highly traveled roadway (i.e., over 10,000 cars per day) are at the highest risk of salt injury. (See the article on deicing damage in this issue of the *Advocate*, page 12.)

What about maintenance and mosquitoes?

Like all gardens, rain gardens require some maintenance: weeding, pruning, plant replacement, mulching, and supplemental watering. As for mosquitoes, a properly designed rain garden should not lead to mosquito-breeding, because a rain garden is not intended to detain standing water for long periods. Ideally, runoff will not be detained longer than four days in the garden. Mosquitoes will not survive in wetlands that dry out in less than a week after a summer rain. The development of a mosquito from egg to adult takes 10 to 14 days. A mosquito larva must live in water for 7 to 12 days before maturing to the adult stage.

Lorrie Stromme is president of the Minnesota Shade Tree Advisory Committee.

Places to see rain gardens in the Twin Cities metro area

In St. Paul:

- **A** Lower Phalen Rain Garden - near Swede Hollow Café (725 E. 7th St.)
- **B** 118 Virginia Street (1/2 block north of Summit Avenue near Western)
- **C** Como Water Quality Garden–near the intersection of Lexington Parkway and Nebraska, just northwest of Lake Como)
- **D** University of Minnesota, St. Paul campus, one block east of the Commonwealth/Gortner intersection, across from the Sarita Wetland.

In Maplewood:

- **E** Birmingham Street, between Ripley and Frost Avenues–completed in 1996.
- **F** Harvester Area neighborhood, just south of Stillwater Road–installed in 2000
- **G** Midvale Place, Ferndale Street, Brand Avenue, Michael Lane, Sterling Street, Evar Street, Edith Street, and Glendon Street
- **H** Bartelmy Acres–to be installed in 2001
- **I** Bartelmy Lane, Mary Street, Magnolia Avenue, Sterling Street

Other metro locations:

- **J** H.B. Fuller Headquarters–3210 Labore Road (in the parking lots)
- **K** Minnesota Landscape Arboretum in Chanhassen

Why Plant A Tree?

Trees provide:

Windbreaks and Shelterbelts

Several rows of trees and shrubs planted along your driveway make an excellent natural snow fence. Rows of trees and shrubs planted on the west and north sides of your house will reduce your heating bill. A windbreak planted along your property boundary provides privacy. Windbreaks and shelterbelts also supply food and shelter to wildlife.

COURTESY TREE TRUST

Fiber Production

Wood products are used in your home, in your clothes, in your car, and on the job. The demand for renewable resources, such as wood, continues to grow. Trees serve many useful purposes during their life span and provide necessary wood fiber when they mature.

Erosion Control

Stands of trees are very effective at minimizing soil erosion caused by wind and water. The spreading branches of groves of trees slow the rain and wind, and reduce the impact on the soil. Tree and shrub roots help stabilize the soil which slows the impact of runoff.

COURTESY TREE TRUST

Wildlife

Mixed plantings of trees and shrubs provide excellent cover and a source of food for a variety of animals. Deer like to eat twigs and buds. Birds enjoy the seeds, berries, and the insects that live on trees. Pheasants find protection in dense plantings.

Need Planting Advice?

Contact your local DNR forester.

Storm Damaged Trees

from Minnesota DNR

GARY JOHNSON

When a storm strikes, clearing damaged trees and branches is the first response. The care you give your trees before and after the storm can be the key to their survival or loss. Here are some key points to consider when assessing and repairing damaged trees and replacing those that must be removed.

Assessing the damage

Approach damaged trees with extreme caution. Stay away from fallen power lines. Call 911 to report any downed wires.

Large trees and branches that are damaged and under tension are dangerous. Have a professional safely clear away the debris. Trees with long cracks or internal decay are often weak and may be hazardous. If you think that a cracked trunk or limb can be repaired, ask an arborist for advice.

You can obtain a list of competent tree care companies from your City Forester or local DNR office. You can also access the Minnesota Society of Arboriculture's web site (www.isa-msa.org) for a list of tree care companies with International Society of Arboriculture Certified Arborists.

Repairing the damage

If you can cut damaged branches from the ground, be sure NOT to leave stubs or flush cut. Prune to preserve the branch collar (the swollen area at the base of a branch). NEVER TOP TREES!! Topping results in many sprouts with weak attachments.

Utilization

Branches can be chipped by the homeowner or at a community recycling site. Chips can be used to give new trees a fresh start. Contact your community solid waste disposal office for recycling tips.

If a large tree (greater than 8 inches diameter) must be removed, ask a forester if it can be used for lumber.

Restoring your home landscape

Draw a map that shows all buildings, utilities and existing plants on your property. Don't replant until all major house and utility repairs have been completed and tree stumps have been removed.

Avoid utility conflicts. Choose tree locations away from overhanging and underground wires: excessive pruning or root cutting will weaken or kill trees.

Storm Damage continued on p. 8

Storm Damage, from p. 7

Get a list of recommended trees and shrubs from one of the organizations listed below. Choose new trees that match the planting site. Consider the mature size of the tree, the hardiness, tolerance to shade and road salt. What type of soil is present? Is water drainage poor or the pH high?

MINNEAPOLIS PARK AND RECREATION BOARD

To save energy, plant shade trees on the west or east side of your house. Avoid south facing windows. If you have a large area of land, consider an evergreen windbreak on the west and north sides.

If you want to plant large, mature trees, choose those with a single central leader and well-spaced side branches with strong branch-to-trunk connections. Avoid narrow branch connections with "included bark," which are weak and more prone to storm breakage.

Trees are a lifetime investment. Shop around and buy quality plants from a reputable nursery. Be wary of people selling trees door-to-door and trees dug from the wild.

Planting

Wait to replant until after major house and utility repairs have been finished and stumps have been removed. Plant trees at the right depth. Planting too deep is a major cause of tree decline and death. Add wood chip mulch to a four inch depth. This will help to conserve water, inhibit weeds and protect the trunk from lawnmowers and weed whips. Prune only dead, broken or rubbing branches.

Tree Care

Water one inch per week, in the growing season, for the first 3 years. Water slowly, for about one half hour. Have large trees checked for damage and pruned every 5 to 7 years.

For more information, access the University of Minnesota, Department of Forest Resources' outreach website at www.cnr.umn.edu/FR/extension/, or contact a DNR forester, county extension office or soil and water conservation district. A variety of free informational brochures and booklets are available. The Minnesota Nursery and Landscape Association (1-888/886-6652) also offers several free publications.

DISPEL-A-MYTH

Myth: Planting as per Landscape Specifications Ensures Long-Term Health

by Gary Johnson

GARY JOHNSON

GARY JOHNSON

Above, upper: Results of too-deep planting can be anything from poor tree health to catastrophic failure of a weakened trunk.

◆◆◆

Above, lower: Excessive soil over the main order roots, whether in the root ball or after planting, promotes the formation of stem girdling roots.

◆◆◆

There is a "growing" concern in our landscapes: the trees aren't growing! Lots of people are pointing lots of fingers at "the others" that are causing all of these problems, but maybe we all bear some responsibility?

"It can't be *me!*"

"I followed the landscape planting specifications to the letter: kept that soil ball perfectly level with the soil surface so there would never be any problems with deep entombment of the root system. If those trees ended up being buried too deep, it must be because someone else came along and piled soil over the roots."

In reality, it very well could be my fault or your fault that the trees are buried too deeply, even if we followed the standards for planting trees correctly. The problem is that we–and the planting "standards"–assume that the trees' root systems are at the top of the soil ball or container, and quite often, that's an incorrect assumption.

The University of Minnesota and other research institutions and groups have been accumulating evidence that points to "planting depth" as a major concern regarding the long-term health of trees in our landscapes. Research conducted in production fields, in public landscapes and in private landscapes is finally quantifying what our horticultural ancestors warned us of over 300 years ago: when root systems are buried too deep, tree health declines.

Too much of "Too Much..."

The frequency of tree root systems buried by "too much soil" is alarming. In randomized sampling surveys conducted by the University of Minnesota, Department of Forest Resources, over 90% of the more than 300 green ash, sugar maples and littleleaf lindens examined in boulevards had more than four inches of soil over the first, main order branch roots. Research on declining trees in Minnesota from 1994-2000 indicated that excessive soil over the roots and the accompanying formation of stem girdling roots on the buried stems were associated with tree health decline in over 80% of the cases. This data matches a similar, national survey of practicing professionals that found stem girdling roots were associated with decline and premature tree death in 82% of the cases.

A survey of nursery stock shipped into Minnesota communities by more than 15 nurseries (many of them from other states) revealed that of the 881 trees surveyed, the majority of them had 1-5 inches of soil over the root systems in the containers or soil balls. Many had more than 6 inches of excess soil covering the roots. A good number of them had more than 10 inches of excess soil over the roots and burying the stems! Therefore, if the planting standards are followed religiously and blindly, in effect we are planting trees with 1–10+ inches of soil over their root systems.

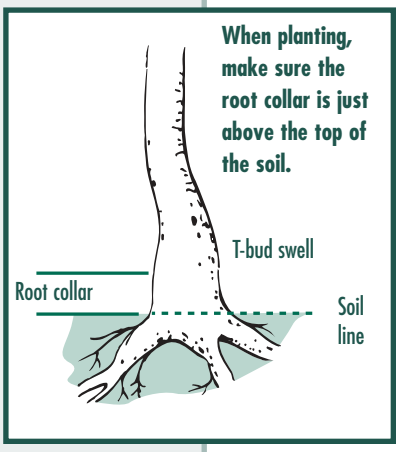
GARY JOHNSON

Check soil depth over the roots before you purchase or plant a tree.

◆ ◆ ◆

What can you do?

Check the depth of soil over the roots on every soil ball or containerized tree BEFORE you purchase or plant them. A simple wire probe–try using a meat skewer–pushed down into the top of the soil ball will give you an idea of the depth the roots are at. If there is excess soil (more than an inch), you may either choose to reject that plant and find a better one, or correct the problem at planting time. For instance, if the soil ball depth is 12 inches, and you discovered 4 inches of soil over the roots in the container or soil ball, dig the planting hole 8 inches deep. After placing the plant in the hole, backfill it until it is stable and then remove that extra top soil before finishing the planting project. Voila! It's now in the ground at the correct depth: roots at or near the surface, and the stem well-above the soil line.



REPRINTED FROM ADVOCATE, SPRING '98

It's a simple problem to correct once you recognize the problem. Stop pointing fingers, assume some responsibility and get those trees off to a good start.

Gary Johnson is a professor of Urban and Community Forestry at the University of Minnesota.

Preventive fungicide is injected into an elm tree's root flares through a network of tubing and "tees."

◆ ◆ ◆

COURTESY CITY OF ST. LOUIS PARK

St. Louis Park Works to Prevent Dutch Elm Disease

by James Burks

It is hard to believe that anyone ever doubted the threat of Dutch elm disease to Minnesota's vast elm population; but that was the case in the 1950's. As greatly over-planted elms in southern cities were falling like dominos, it was widely believed that Minnesota's cold climate would not allow Dutch elm disease (DED) to become established. Indeed, the wide spread urban/suburban planting of elms, often in monoculture settings, went on unabated. So, when DED arrived in Minnesota, our cities were unprepared. The disease rapidly spread through the large population of elms that basically defined the landscapes of our region. By 1970, a full-blown epidemic existed in the Twin Cities, and in much of the rest of the state.

Disease Claims Trees

State and municipal regulations were established that mandated the removal and disposal of dead and diseased elms. The plan was to reduce the breeding grounds of the vectoring bark beetles that cause DED and to disrupt root graft transmission. Many cities developed subsidy programs to help their citizens absorb the huge cost of removing the diseased trees. The years have passed, and with them, much of the urban elm population. Likewise, many of the tree removal subsidies are gone. St. Louis Park, however, continues to offer a subsidy program which enjoys high levels of participation and strong community support.

A New Approach

When Jim Vaughan took the helm of St. Louis Park's forestry program fifteen years ago, Dutch elm disease was still wreaking havoc. Vaughan inherited a subsidy program that, like many in the area, aided property owners in removing Dutch elm diseased trees. A year later, St Louis Park took a new approach. The city decided to subsidize the injection of elms with a systemic fungicide to prevent DED. Hence, the city's investment shifted from removal to prevention.

When St. Louis Park switched to a prevention subsidy, acceptance was not immediate. According to Vaughan, the change from a removal to an injection subsidy met some resistance due to the expectations of citizens. Good communication with the stakeholders/citizens was imperative. "Over time, the benefits of a protection plan over a removal plan became obvious," Vaughan noted, and the number of subscribers to the injection program increased.

The Injection Program

How does the injection program work? Simply put, a St. Louis Park property owner with an elm (or elms) fifteen inches d.b.h. or greater can apply through the city for subsidized injection of Arbotect 20-S of their tree(s) by mid-May. After the property owner files an application, the city forester inspects the tree for suitability and places it on a list. The injection program is currently limited to the first 400 suitable trees for

City of St. Louis Park
Arbotect 20-S Elm Injection Efficacy

(3-year cycles)

year	# trees injected	# injected trees infected
1995	306	6
1996	453	11
1997	518	6
1998	555	4
1999	522	7
2000	383	8
2001	306	6
2002	321	6

which application has been made, with consideration given to recent disease incidence and broad geographic distribution. For a public tree, the city pays 60 percent of the injection cost. For privately owned trees, the city's contribution is 40 percent. The property owner is responsible for the remainder of the costs.

The injections are performed under contract by Rainbow Treecare. A bidding process, based on projected number of treatments, has reduced the normal price of this service, with costs for an average tree running about $210. Rainbow Treecare guarantees disease protection for three years. Rainbow's Ben Johnson adds that if an injected elm shows any sign of disease during that period, "we will send up a climber to diagnose and, if appropriate, cut out [the diseased wood]." If, however, these efforts are unsuccessful and the tree must be removed, the company refunds the cost of the injection.

The Treatment Schedule

Injections are performed from June to September, when vascular uptake in the tree is sufficient to insure adequate distribution throughout the tree. Small holes are drilled in the tree's root flares, into which plastic "T"s are inserted. A system of tubing connects these inserts and runs from the tank, which contains the Arbotect/deionized water mix. Assuming an adequate number and correct placement of inserts, the material will be pulled upward evenly. It takes about 45 minutes to fully inject a 24 inch elm.

COURTESY CITY OF ST. LOUIS PARK

Properly injected, the tree's vascular system distributes the material evenly throughout, providing up to three year's protection against Dutch elm disease.

◆ ◆ ◆

The limitations of the injections are made clear in both written and oral communications. Treatments are preventive, not curative (except in rare, early detected cases). Injections protect healthy trees only from bark beetle disease introduction, not root-to-root transmission. Treatments provide protection for three years, after which another treatment is necessary for continued chemical defense.

If a St. Louis Park resident calls Rainbow Treecare for an elm injection price, they will be referred to the city's Forestry Department, thus reinforcing the program, and assuring that interested citizens get the lower rates for this work. According to Vaughan, the current budget for tree injections is $70,000 (out of a $600,000 Forestry budget); but, he notes, "half of that comes back [in payments from program participants]." Saving the stately elms that continue to grace St. Louis Park speak well for this investment in the future.

Further information about Dutch elm disease and treatment is available from U.S.F.S. "how to" publications and other publications listed in the following links. The Arbotect 20-S label may be viewed online at the blue book site.

- www.na.fs.fed.us/spfo/pubs/howtos/ht_ded/ht_ded.htm
- www.na.fs.fed.us/spfo/pubs/howtos/ht_dednecrosis/ht_dednecrosis.htm
- forestry.lib.umn.edu/cgi-bin/forsearch3.pl
- www.bluebooktor.com/Search/QuickSearch/index.asp

Further information about Dutch elm disease and treatment is available from U.S.F.S. "how to" publications and other publications listed in the following links. The Arbotect 20-S label may be viewed online at the blue book site.

James Burks is a forester with the Cities of Crystal and Robbinsdale.

Deicing Salt and Tree Health: Paying the Cost for Convenience

GARY JOHNSON

By
Gary R. Johnson

There is an obsession that tree lovers seem to have during the long winter months in the upper Midwest: "What damage has the winter wreaked on our landscape plants?" Most often, the worry is focussed on cold temperatures, lack of snow cover or brutal winds. In fact, a significant contributor to winter's woes is deicing salt, and in some instances this contributor causes most of the damage. Late winter, spring and even into the summer damage to trees and shrubs from deicing salt accumulations is the cost we pay for the convenience of having dry and safe transportation corridors.

Though spruce (below) and river birch (above right) are somewhat tolerant to deicing spray, these trees show symptoms of damage.

◆◆◆

GARY JOHNSON

What are deicing salts?

Are they all the same? What's an anti-icer or a deicer? Although sodium chloride is still probably the most commonly used deicing salt, there are several other products that are used to keep our streets and sidewalks dry, all affecting tree health to different degrees. Deicers are liquid forms of salt compounds that break down existing snow and ice. Anti-icers are liquid forms of salt compounds that prevent the bonding of snow and ice to paved areas, therefore making the removal a bit easier and more effective. And even the term "deicing salt" is a bit general. "Salts" may include sodium chloride, calcium chloride as well as a corn-based deicer (Caliber M1000) as options in this general category. And in some areas, "fertilizer" salts, such as granular urea have been used to melt snow and ice from sidewalks.

Most commonly, a combination of materials is applied to pavement. Sand is frequently mixed with deicing salts, deicers and/or anti-icers. And as you have probably noticed over the past few years, these products are used freely and frequently whenever the snow or ice falls. Public safety is paramount for most state, community and business owners; therefore, slippery surfaces are generally intolerable.

Deicing salts damage plants in a variety of ways, some directly and others indirectly. In general, the modus operandi includes "spray salt" and "soil salt." Spray salt occurs when the melted snow/ice slurry that includes the liquid deicing salts drifts away from the paved roads and the salt spray is deposited on the buds, twigs or needles of those plants unfortunate to be in the way. All you need to do is drive behind someone in the winter to understand how much spray is generated from vehicle travel on wet roads. That spray is deposited on your vehicle's windshield and body. Some of it drifts away from the road or is sprayed away when the "rubber hits the road." Add some strong winter winds to the situation, and the extent of drift can become extensive.

Both sodium and chlorine can enter the plant and become toxic to plant tissues at high levels. Chlorine can enter through either exposed plant tissues (as spray salt), or absorbed by roots (soil salt). Sodium enters the plant primarily as spray salt, damaging exposed plant tissue. Therefore, if any deicing salt contains chlorine, there is still an element of risk for plant health.

Soil salt may damage the plants directly (toxicity of chlorine), or indirectly. High levels of

sodium in the soil can break down or prevent the formation of soil aggregates. In "normal people" language, the soil can become more compacted with age and severity of soil salt, due to the high concentration of small soil particles filling in pore spaces. As pore spaces in the soil become more deficient, it's more difficult for plant roots to absorb the oxygen they need to live. As pore space decreases and compaction increases, it becomes more difficult for water to percolate down through the soil. The end result is that plants in those areas become very stressed over time and their health visually declines.

Another indirect effect of sodium chloride is the compromise of a plant's winter hardiness. The more this deicing salt affects the tree, death of plant tissues (internal and external) becomes more common. Branch dieback, bud death and potentially, the entire tree dies.

What to look for?

Spray salt damage is most evident along heavily traveled highways or streets where high speed and high volume traffic (especially truck traffic) have accelerated the drift. Also, in areas where prevailing winds are constant and strong, even the dried up salt left on the pavement can be picked up and drifted away. In particular, the damage will be most severe to those plants within 60 feet of the road.

Spray salt damage causes bud death and twig dieback in deciduous plants. One of the more common symptoms of this damage is called "witches'-broom" growth, which appears as tuft-like growths from the branches. With evergreens, the symptom is "browning" of the foliage, ranging from one-sided (facing the source of drift) light damage to extreme needle browning.

Soil salt damage often doesn't show up until well into the summer. Leaves turn brown around the edges or evergreen needles start dying back from the tips. As with spray salt, dieback is often a symptom, and if the problem continues for several years, the dieback becomes worse and more chronic.

Since the trees are already stressed from the salt accumulations in the soil, the worsening condition of the soil and perhaps some spray salt damage, they become very vulnerable to other problems, such as a summer drought. Normally, healthy trees can tolerate summer drought and then recover when the rains return. Salt stressed trees often do not have the energy to tolerate other stresses and as a result may die.

Avoiding the damage

So, is damage from deicing salt a *fait accompli*? With some planning, much of the damage can be avoided or lessened. Avoiding the damage will always be more successful than treating the damage.

When possible, avoid all deicing agents, or at least, avoid using sodium chloride. If you need traction, maybe spreading sand will be satisfactory.

Protect vulnerable plants, especially those within 60 feet of the high use road. Barriers to spray drift may be constructed of burlap or snow fencing or other synthetic shields. They won't work for soil salt, though.

Don't plant trees and shrubs in areas that you know receive a lot of deicing salt deposits, either as spray or soil salt. If existing plants in those areas are suffering severely from the deicing agents, remove them.

GARY JOHNSON

This bur oak branch exhibits "witches'-broom" growth from spray salt damage. ◆ ◆ ◆

In high salt areas, only plant trees and shrubs that are salt tolerant. This is a short list, unfortunately. And more unfortunately, some plants are tolerant to spray salt but intolerant to soil salt. And even MORE unfortunately, you may not *like* the plants that have the greatest tolerance of deicing agents.

For soil salt problems, add organic matter, activated charcoal or gypsum to the soil and thoroughly leach (flood with water) the soil to "flush" the salts out. However, this tactic (leaching) doesn't work very well for compacted, clayey, poorly drained soils.

Keep the trees and shrubs healthy. Never let them become drought stressed–at any age of the plant, during any time of the year.

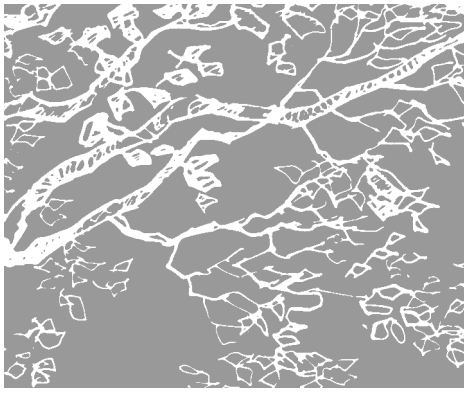
Gary Johnson is a professor of Urban and Community Forestry at the University of Minnesota.

For more detailed information on preventing deicing salt damage to trees and shrubs:

- *Minimizing De-Icing Salt Injury to Trees,* by Gary R. Johnson and Ed Sucoff. Bulletin number FO-1413, available from the University of Minnesota Extension Service Distribution Service.
- *Best Practices Manual for Roadside Vegetation,* Mn/DOT Manual No. 2000-19, available by contacting them at 651-282-2274.
- *Effect of Deicing Salts on Woody Vegetation Along Minnesota Roads,* by Ed Sucoff. Technical Bulletin 303, Minnesota Agricultural Experiment Station.

MnSTAC Awards Recipients for 2002

On behalf of MnSTAC and tree advocates everywhere, congratulations to the recipients of the MnSTAC 2002 Community Forestry Achievement Awards. A tremendous amount of work goes into organizing and implementing the hundreds of community tree-related projects that take place in Minnesota each year. Thanks to all the nominees, for their important contributions to our community forests!



Outstanding Youth Project

◆ Will Hawkinson
for Reforesting Highway 55 in Plymouth

Outstanding Volunteer Project Award

◆ The Fern Hill Neighborhood Association
for their Invaluable Contribution to the St. Louis Park Arbor Day in Fern Hill Park

Outstanding Arbor Day

◆ Minneapolis Park & Recreation Board
for "Reconnecting Our River Roots" at North Mississippi Regional Park

Outstanding Volunteer Project Award

◆ Mosaic Youth Group
for Excellent Volunteerism on the Hwy 100 Lilac Moving Project in Crystal

Outstanding Partnership Project Award

◆ City of Proctor and MN/DOT District 1
for their Highway 2 Planting in Downtown Proctor

Innovation Award

◆ Minneapolis Park & Recreation Board
for Creating the Position of Forestry Preservation Coordinator

Distinguished Service Award

◆ Glen R Shirley
for his Dedication to the People and Trees of Minnesota through his service to MNSTAC

Stewardship Award

◆ Mike Haugen
for Saving Trees from the Ground up at the Twin Cities University of Minnesota Facilities

Outstanding Community Forestry Maintenance Award

◆ City of St. Paul, Forestry
for Capital City Lights

Award of Special Merit

◆ City of Ramsey Environmental Expo and Tree Sales
for Innovatively Building Environmental Awareness and Community

About MnSTAC

The Minnesota Shade Tree Advisory Committee (MnSTAC) was established in 1974 by a group of concerned citizens to address the health and well being of community forests. MnSTAC is recognized throughout Minnesota and the country for its expertise, advice, coordination and support for community trees. It is an organization of diverse individuals who represent a broad spectrum of tree-related interests. It fosters and supports local community tree programs across the state so healthy community forests are fully integrated into community development, infrastructure, education and management.

Regional MnSTAC Committees

Southeast STAC

Chair: Henry Sorensen—651/388-3625 or 651/385-3674
Sec./Treas.: Katie Himanga, Heartwood Forestry, Lake City —651/345-4976

Headwaters-Agassiz STAC (HASTAC)

Chair: John Johnson, City Forester, City of Thief River Falls—218/681-1835
Sec./Treas.: Jeff Edmonds, DNR Forestry, Bemidji —218/755-2891

West Central STAC

Chair: Bob Fogel, Director of Parks, City of Moorhead —218/299-5340
Sec./Treas.: Dave Johnson, DNR Forestry, Detroit Lakes —218/847-1596

Northeast STAC

Chair: Kelly Morris, City Forester, City of Grand Rapids —218/326-7600
Secretary/Treasurer/Technical Advisor: Dan Jordan, IRRRA Mineland Reclamation—218/254-7967

Calendar

Events

June 15-28–**International Seminar on Watershed Management.** Stevens Point, Wisconsin. Contact: Karin Theophile 202/501-5513; fax 202/273-4750; ktheophile@fs.fed.us; www.fs.fed.us/global.

June 24-25–**Minnesota Vegetation Management Association of Minnesota (VMAM) Conference.** University of Minnesota, Morris, Minnesota. Contact: Vicky Dosdall, 320/795-2412; vttd@runestone.net or Paul Walvatne, MNDOT, 651/284-3793; paul.walvatne@dot.state.mn.us

July 26-30–**Soil and Water Conservation Society 2003 Annual Conference.** Spokane, Washington. Contact: Nancy Herselius 515/289-2331, ext. 17; fax 515/289-1227; www.swcs.org.

August 6-9–**International Society of Arboriculture Annual Conference.** Montreal, Quebec. www.isa-arbor.com

September 17-20–**National Urban Forestry Conference.** San Antonio, Texas. www.american-forests.org

September 21-28–**XII World Forestry Congress.** Québec City, Canada. www.wfc2003.org

October 25-29–**Society of American Foresters National Convention.** Buffalo, New York. www.safnet.org

New Publications

Common Sense Forestry. Hans W. Morsbach. 2003 Chelsea Green Publishing Company. www.chelsea-green.com

Landscape Ecology and Resource Management: Linking Theory with Practice. John A. Bissonette and Isle Storch. 2003 Island Press. www.island-press.org

Geology and Plant Life: The Effects of Land Forms and Rock Types on Plants. Arthur R. Kruckeberg. 2002 University of Washington Press. www.washington.edu/uwpress/

Practical GIS Analysis. David L. Verbyla. 2002 Taylor & Francis Books. www.tandf.co.uk

Urban Open Spaces. Helen Woodley. 2003 Spon Press. www.sponpress.com

Spanish Books

The International Society of Arboriculture (ISA) now offers Spanish editions of several publications. Titles available in Spanish include the *Tree Climbers' Guide, Tree-Pruning Guidelines,* and the *Quick Reference Guide of Arboricultural Terms.* Contact ISA at www.isa-arbor.com or 1-888-472-8733.

New on the Web

Minnesota Tree ID
Online guide to 35 trees commonly found in Minnesota
www.extension.umn.edu/distribution/naturalresources/DD6593.html

Minnesota Trees & Shrubs
www.cnr.umn.edu/FR/extension/Treeandshrubselection.html

National Symbols Program (Smokey the Bear and Woodsy Owl)
www.symbols.gov

North American Forest History
www.lib.duke.edu/forest/index.html

For handy up-to-date links to websites of interest, be sure to visit

www.mnstac.org

Minnesota Shade Tree Advocate

A quarterly newsletter published by the Minnesota Shade Tree Advisory Committee.

Managing Editorial Group: MnSTAC Education Committee (Gary R. Johnson, Cindy Ash, Mark Stennes, Jeff Rick, Ken Holman, Rich Hauer, Gail Nozal, Patrick Weicherding and James Burks)

Editor-in-Chief:
Judy Slater
judyslater@earthlink.net

Design:
Jim Kiehne

This publication was produced with the support of the U.S.D.A. Forest Service, Northeastern Area; State and Private Forestry.

Address inquiries to:

Judy Slater
Minnesota Shade Tree Advocate
115 Green Hall
1530 Cleveland Ave. N.
St. Paul, MN 55108

Printed on recycled paper using soy-based inks.

Minnesota's Big Trees

Since 1962, the Minnesota Department of Natural Resources (DNR) has located and identified the state's largest native trees. Minnesota has 52 native tree species listed in the Big Tree Registry.

What is a Big Tree?

A nominee for the champion of a species is judged on three measurements: the circumference in inches of the tree trunk 4 1/2 feet above the ground (a.k.a. *dbh* or *diameter at breast height*, in foresters' language), the tree height in feet, and one-quarter of the tree's crown spread in feet. The total of these measurements is the number of points awarded to that particular tree. A champion tree is one that has accumulated the most points. If two trees of the same species have identical scores, the tree with the largest trunk circumference becomes champion.

The Search for Champions

Everyone is invited to join the search for Minnesota's champion big trees. There are many unreported giants just waiting to be found. To nominate a champion big tree, just fill out the DNR application form, available by calling the DNR Information Center at 651/296-6257 (Metro) or 1-888/646-6365 (toll free), or check www.dnr.state.mn.us/trees_shrubs/bigtree/index.html. Your nomination must be one of the tree species listed in the registry. All categories of information must be completed in your application form. Federal, state, county, or city foresters can help verify your tree's species and measurements. You can also contact local nurseries and tree care companies for help.

You will be notified in writing if your tree is the new champion. Nominated trees that do not surpass the recorded champion are filed as "contenders." When a champion tree falls, the largest contender of that tree species on file becomes the new champion. Nominations are accepted year-round. An updated big tree list is printed once-a-year in the fall.

National Register of Big Trees

There is also a National Register of Big Trees that recognizes champion trees of 823 species and varieties. Minnesota has three national champions included on this list–the jack pine, red pine, and white spruce. In fact, Minnesota's program is set up using much of the same criteria as the national program. For more information on the National Register of Big Trees, contact American Forests, P.O. Box 2000, Washington, DC 20013; 202/955-4500; www.amfor.org.

MINNESOTA SHADE TREE ADVISORY COMMITTEE
MnSTAC

Minnesota Shade Tree Advocate
115 Green Hall
1530 Cleveland Ave. N.
St. Paul, MN 55108
RETURN SERVICE REQUESTED

Presorted Standard
U.S. Postage
PAID
Permit No. 171
St. Paul, MN