UMASS EXTENSION

Hort Notes

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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Irrigation Systems & Trees

Benefit to Trees

The increased use of underground irrigation systems, including the growing use of the drip-irrigation method, has greatly expanded the variety of plant materials that can be used in the community landscape. In addition to turfgrass, shrubs and trees can benefit through the use of a well-designed and operated irrigation system. Irrigation of trees should be a component of a good Plant Health Care plan and should be considered when developing a strategy for the care and maintenance of trees growing in any landscape. Since drought stresses are often cyclical in many regions of the country, their occurrence should be planned for during the development of any tree management strategy.

Lack of moisture is one of the more severe problems that affects trees growing in a landscape. Trees growing in urban conditions are often more susceptible to this damage due to reduced soil volumes, poorer soil structure and desiccation. However, trees in any landscape need adequate moisture to survive, and underground irrigation systems can enhance the opportunity for survival. Irrigation of trees can provide benefits that lead to healthier trees which are more able to withstand other stresses such as insect and disease infestations that might occur. Reducing drought stress through the proper use of an irrigation system can greatly enhance the likelihood of newly planted trees reaching maturity and can provide older trees with a consistent source of moisture, even during droughty periods.

Damage to Trees

While underground irrigation systems can provide a useful benefit to establishing and growing trees in the landscape, often the installation and improper use of these systems leads to serious tree health issues. Root damage and overwatering are the most common problems associated with underground systems that are installed to irrigate trees or turfgrass.

Root Damage

The long term health of trees can be affected during the installation of underground irrigation systems as

a result of trenching near a tree. Research has shown that tree roots can travel a distance away from the trunk, over 2 1/2 times the height of the tree, and that over 85% of the root growth occurs within 18 inches of the soil surface. Oftentimes these roots are severely damaged, or cut entirely, during the installation of the underground piping that makes up the irrigation system.

In many cases trenching, vibratory plowing, or earth sawing operations make vertical cuts through the soil to depths to over 20 inches, cutting many tree roots growing in their path. The damage to trees is not readily apparent, but generally begins to appear within months or years after the damage. Dieback, decline and mortality often occur, but the severing of roots during the irrigation installation process is not recalled, since most of the problem took place underground, out of sight of the property owner or contractor.

Arborists can provide advice to irrigation installation contractors on how to minimize damage to trees during the installation process. Arborists should be used in developing a tree protection plan that will minimize potential impacts to the root zones of the trees during the installation of any underground system. Without planning for the protection of trees growing in the vicinity of the installation of an underground irrigation system tree root damage is likely to occur. The layout, installation and operational plan for the underground irrigation system should be reviewed by an arborist. These reviews provide the opportunity to protect trees and ensure that their healthy growth will continue.

One of the most useful, and tree friendly, techniques for installing

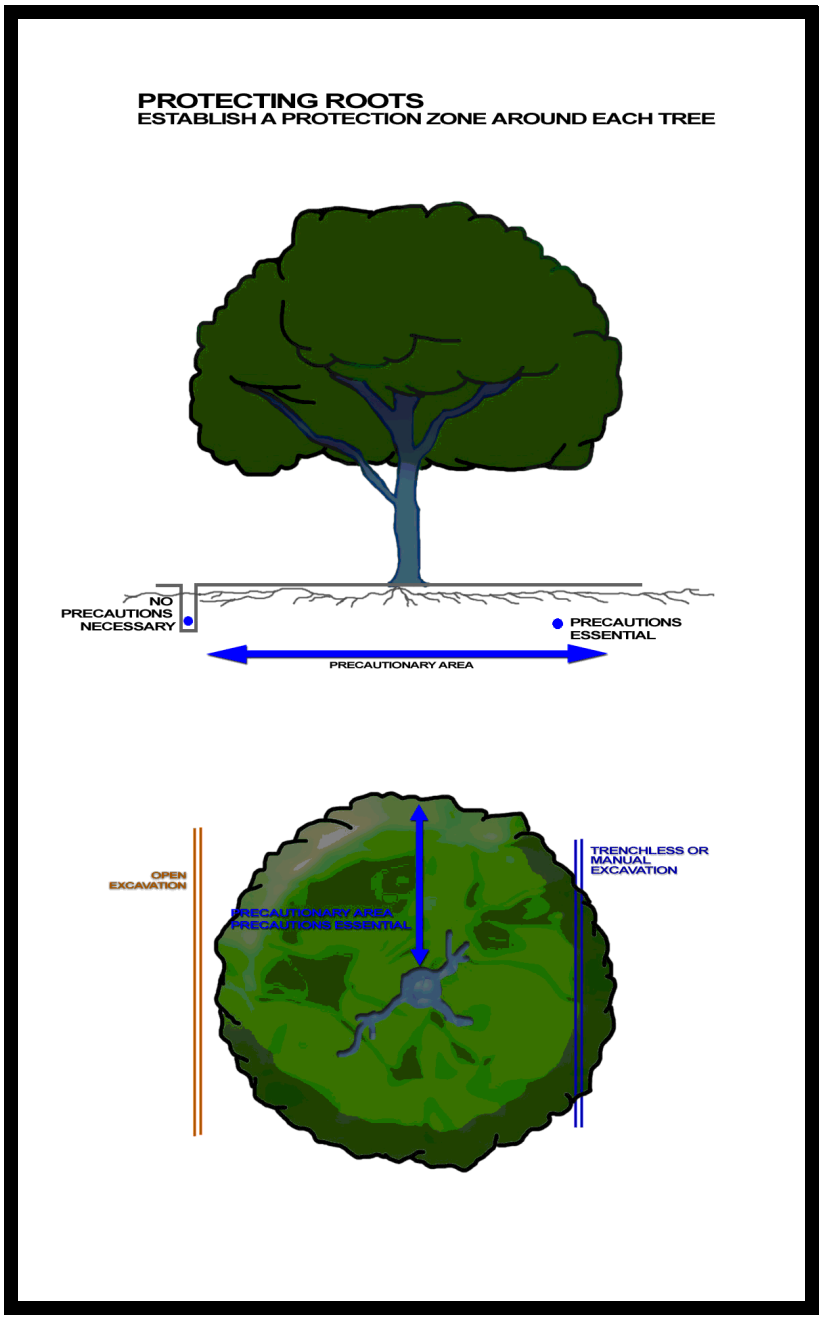

Fig. 1. *The key to protecting tree roots during the installation of an irrigation system is to lay out a plan that will protect as many roots as is possible. Never trench under the canopy of a tree.*

irrigation or other utility piping in the vicinity of trees is horizontal directional drilling. This “trenchless technology" involves the use of specialized equipment which uses a boring head to tunnel under the root zone of a tree, limiting any potential impact to the tree’s underground life support system. Since most tree root growth occurs in the top 18 inches of soil, directional drilling is used to pull piping or conduit at depths, which in most cases, are safely below the root zone.

There are several sources of directional drilling equipment and a variety of models available, depending on the specific application. Units range in size from self contained, small footprint sized units, to larger systems that are used for long-distance utility and telecommunication installations. Today, affordable trenchless technology tools are available from a variety of manufacturers and wide ranges of product specific features are available. Small, easy to maneuver units are extremely versatile and can be used for a variety of applications related to irrigation.

The second half of this article will appear in the next issue of Hort Notes.

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Perennial Plant of the Year

Each year, the membership of the Perennial Plant Association (PPA) elects a Perennial Plant of the Year. The Plant of the Year program promotes the use of outstanding perennials based on the following criteria:

- suitable for a wide range of climates
- low maintenance needs
- easily propagated - true from seed or vegetatively propagated
- exhibits multiple season interest

At the PPA’s annual symposium held this past July in Chicago, IL it was announced that *Leucanthemum* ‘Becky’ will be the Perennial Plant of the Year for 2003. *Leucanthemum* (formerly *Chrysanthemum*) ‘Becky’ is a shasta type daisy. It is a superb garden perennial and, unlike many other shasta daisies, it is winter hardy and very heat tolerant. Like other shasta daisies, *L.* ‘Becky’ grows best in full sun and a well-drained soil.

L. ‘Becky’ has glossy green foliage, no significant pest problems, sturdy stems that don’t topple over, and a vigorous habit. The plant increases in size and overwinters very well. The flowers are large white daisies with bright, yellow centers that bloom in June/ July, and will repeat bloom if deadheaded. *L.* ‘Becky’ forms a nice clump, does not show any tendency to be invasive, has an approximate height of height 36 to 40 inches, and is winter hardy to zone 4. It is said by many to be the best Shasta Daisy. *L.* ‘Becky’ combines well with other sun loving perennials like: *Salvia* ‘May Night’, *Salvia* ‘Blue Hill’,

Scabiosa caucasica, Iris siberica, Monarda didyma, Achillea, Coreopsis verticillata, Lychnis chalcedonica, Papaver orientale, and *Campanula* sp. *Leucanthemum* 'Becky' was discovered in Decatur, Georgia by garden designers Jimmy and Becky Stewart.

The PPA is a professional trade association dedicated to improving the perennial plant industry by providing education to enhance the production, promotion, and utilization of perennial plants. You can visit the PPA web site at ***www.perennialplant.org***

Past Perennial Plant of the Year

2002 *Phlox paniculata* 'David'
2001 *Calamagrostis* x *acutiflora* 'Karl Foerster'
2000 *Scabiosa columbaria* 'Butterfly Blue'
1999 *Rudbeckia fulgida* var. *sullivantii* 'Goldsturm'
1998 *Echinacea purpurea* 'Magnus'
1997 *Salvia* 'Mainacht' ('May Night')
1996 *Penstemon digitalis* 'Husker Red'
1995 *Perovskia atriplicifolia*
1994 *Astilbe* 'Sprite'
1993 *Veronica* 'Sunny Border Blue'
1992 *Coreopsis verticillata* 'Moonbeam'
1991 *Heuchera micrantha* 'Palace Purple'
1900 *Phlox stolonifera*

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Monitoring Checklist for late September and the dormant season

PLANT PHENOLOGY: *OVER 2800 GROWING DEGREE DAYS*

PLANT
Rhododendron; occasionally mountain laurel and deciduous azaleas

PEST OR PROBLEM
Rhododendron borer - *Synanthedon rhododendri*
p. 258, CD

GDD: 192 -3000

WHAT TO LOOK FOR

Affected plants, or just individual shoots, will wilt. Inspect the base of plants for piles of sawdust and evidence of entrance / exit holes that are usually within a few inches of ground level.

WHAT TO DO
Affected shoots can be pruned away and destroyed to kill the larvae within. **Entomopathogenic nematode** sprays can also be applied to the base of the shoots when the larvae are present. **Chemical** sprays are also available for the adult moths. **Pheromone traps** can be utilized earlier in the season to monitor for the flight activity of the adults and sprays can then be applied to break the cycle of re-infestation. This pest generally has a random pattern of attack and can be very difficult to manage. Their presence is rarely noticed until shoots begin to wilt.

PLANT
Boxelder (*Acer negundo*) primarily

PEST OR PROBLEM
Boxelder bug - *Leptocoris trivittatus*
p. 398, CD

GDD OR ENVIRONMENTAL CONDITIONS
Active much of the growing season but really only a problem in the fall. GDD: 2500-3200

WHAT TO LOOK FOR
At this time of the year, these black insects with red markings can be found in abundance on female boxelder trees, primarily feeding on the seeds. They are not a problem on the plant but as autumn wanes, they then migrate, en masse, in search of an over-wintering site. Oftentimes, they congregate in huge numbers on the sides of houses prior to finding their way inside.

WHAT TO DO
Inspect host plants. If prevalent, a "knockdown" spray, such as a pyrethroid, may be warranted to reduce their numbers. It is much easier to manage them on the host tree than on the sides of houses.

PLANT
Many woody & herbaceous plants susceptible, but commonly infected are ash, black locust, catalpa, cherry, elm, golden-rain tree, honeysuckle, horsechestnut, lilac, magnolia, rose, maple, redbud, smoke tree, spirea, tulip tree, viburnum, weigela

PEST OR PROBLEM
Verticillium wilt (fungus)
pp. 374-377, CD

GDD OR ENVIRONMENTAL CONDITIONS
Lives in the soil, surviving as resting structures (microsclerotia) after diseased plant material dies. Microsclerotia are stimulated to send out thread-like structures (mycelia) when roots of susceptible plants grow near by. Mycelia penetrate fine feeder roots or wounded roots. The fungus grows inside

the root and produces spores that are drawn up into the plant with the movement of water. Water conducting vessels (xylem sapwood) are killed when infected directly or by fungal toxins. Acute symptoms caused by infections of current season's xylem sapwood. Chronic wilting symptoms are caused by infections of xylem sapwood that is a year or more old.

WHAT TO LOOK FOR

Symptoms can look like those caused by root damage, drought or canker infections; anything that impairs water uptake and distribution in the plant. Initial indications of infection are usually seen in a branch or two or near the top of the tree. Affected branches often show brown to green colored streaking of the cambium or sapwood. Chronic wilt progresses slowly through the tree causing yellow-green foliage, marginal browning, stunted growth, smaller than normal leaves and shoot dieback. The acute type of wilt causes the symptoms listed, but also shriveled leaves, early fall color, loss of foliage, and dieback of major branches or entire plants.

WHAT TO DO

Impact depends on inherent susceptibility of plants, environmental stress, and aggressiveness of the fungus. Water plants weekly during warm, dry periods, especially transplants that have been in the ground for less than 3 years. Maintaining a soil nutrient level somewhat high in potassium and low in nitrogen helps plants resist the disease. Fertilization of diseased trees with slight symptoms with ammonium sulfate or a balanced fertilizer (10-10-10) may help suppress disease development. However, over-application of high nitrogen fertilizers may increase wilting symptoms. Prune dead branches to prevent infection by other pathogens. Pruning will not eradicate the fungus in the plant but can help improve appearance and vitality. Replace severely infected or dead plants with resistant species. No chemical control recommended for treatment in the landscape. Soil fumigation only practical in certain nursery situations.

CD = More detailed information on this insect can be found on UMass Extension's Tree Bytes CD-ROM. The page numbers in the second column, after the pest, refer to the texts Insects That Feed on Trees and Shrubs, 2nd ed., Johnson and Lyon, and Diseases of Trees and Shrubs, Sinclair, Lyon and Johnson, Cornell University Press.

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