# PRO HORT

*Center for Urban Horticulture*
*University of Washington*

*Cooperative Extension*
*Washington State University*

Vol. 4, No. 4

Fall 1986


## *LANDSCAPE MAINTENANCE SEMINARS*

### *. . . for the landscape professional*

Cooperating: Center for Urban Horticulture, University of Washington; Cooperative Extension Service, Washington State University; Edmonds Community College; South Seattle Community College.

### *Small Business Legalities and Liabilities: What Every Landscaper Should Know!*

Date : Monday, October 20
Time : 9:00 a.m.–noon
Location : Center for Urban Horticulture
Instructor : Austin Farrell

What's it like to be sued? How can you avoid being sued? Why is it important to have things in writing? What should a contract include? Should you incorporate? What are your potential liabilities? These questions and more will be answered in this seminar. Ample time will be allowed for discussing your individual legal and insurance questions.

Mr. Farrell is an attorney with the legal firm of Farrell & Cool P.S. He has dealt extensively with the legal concerns of landscape business people.

### *Winterizing the Landscape*

Date : Wednesday, November 19
Time : 9:00 a.m.–noon
Location : Center for Urban Horticulture
Instructors : Dr. Ray Maleike and Dr. Rita L. Hummel

Last year's early cold snap caught us and our plants by surprise. This seminar will help you better understand the factors affecting plant hardiness, the various ways in which cold weather can damage plants, and practical steps you can take to protect plants from winter damage. Find out how mulches, late summer fertilization, and irrigation practices affect a plant's susceptibility to winter injury. And what about anti-transpirants—are they safe and effective?

Dr. Maleike is extension horticulturist and Dr. Hummel is assistant horticulturist at Washington State University's Western Washington Research and Extension Center in Puyallup.

### *Successful Landscape Maintenance Estimating*

Date : Wednesday, December 10
Time : 9:00 a.m.–noon
Location : Center for Urban Horticulture
Instructor : Bruce McCormack

Develop confidence in your ability to properly estimate landscape maintenance jobs. Learn how to price your services at a marketable rate and how to make money at what you are doing. Know that you are doing the right thing for your financial situation.

Bruce McCormack is president of Blue Ribbon Landscape Management and a past president of the Washington State Nurserymen's Association. He also has taught landscape business courses at Edmonds Community College.

## *OTHER EDUCATIONAL OPPORTUNITIES*

**Tree Evaluation Workshop.** The Center for Urban Horticulture will sponsor a tree evaluation workshop at the Washington Park Arboretum on Wednesday, November 5, 8:30 a.m.–4:00 p.m. The course is intended for anyone who is required to provide tree evaluations in connection with tree loss, retention of trees, or liability concerns. Through both classroom instruction and field exercises, participants will learn how to make objective, accurate, dollar-value appraisals based upon a tree's condition and appropriateness of location. Those attending should be familiar with basic appraisal techniques. The following panel of experts will lead the workshop: Molly Beck, consulting arborist, Northwest Arborvitae, Bothell; Dr. James R. Clark, professor, Center for Urban Horticulture; Robert Mazany, consulting arborist, Tree and Landscape Consulting Services Ltd., Portland, Oregon; and Sandra Thorne-Brown, urban forester, Thorne-Brown & Associates, Bellevue. For registration information call 545–8033.

**From Nature Into Landscape—Plants from Winter-Rain Regions.** This fall series will feature an in-depth look at plants from winter-rain regions of the world (Mediterranean, Chile, California, Western Australia, South Africa) that are grown in the Washington Park Arboretum. Emphasis will be placed on the connection between a plant's natural habitat and its landscape utility. Saturdays, October 25, November 1, and November 8, 9:00 a.m.–noon, at the Arboretum. Preregistration is required, $15/series or $7.50/individual session.

**WALP Annual Convention.** The Washington Association of Landscape Professionals will hold its annual convention,

which includes educational programs and a landscape awards program, on November 21 and 22 at the Doubletree Plaza Hotel, Tukwila. Entry deadline for the WALP Environmental Awards Program is September 27. Call Peggy Farrell, 232–7825.

**Myths in Tree Care—The Root of the Problem.** The International Society of Arboriculture, Pacific Northwest Chapter, will hold its annual meeting and training conference on October 1, 2, and 3 in Corvallis, Oregon. "Myths in Tree Care" is the theme of this year's program. Call J.B. Good, Inc., (503) 752–6260.

**Edmonds Community College Horticulture Courses—Fall 1986.** Day courses: Hand Tools and Small Machines for Horticulture; Broadleaf Plant I.D.; Houseplant I.D.; Design Layout; Landscape Materials; Greenhouse Studies. Evening courses: Hand Tools and Small Machines for Horticulture; Urban Trees; Insect Pests; Broadleaf Plant I.D.; Greenhouse Management; Sprinkler Design. Call 771–1679.

**South Seattle Community College Horticulture Courses—Fall 1986.** The Landscape Industry; Fall Plant I.D.; Horticultural Drafting; Fall Landscape Maintenance; Horticultural Science; Washington Certified Nurserymen's Review; Tree Pruning and Repair; Insect I.D. and Control; Plant Propagation; Introduction to Drainage and Irrigation; Landscape Design II; Small Business Management for Horticulture; Landscape Maintenance Estimating and Bidding. Call 764–5336.

**Lake Washington Vocational Technical Institute.** Training is offered in nursery and greenhouse operations. Call Don Marshall, 828–5621 or 828–3311.

# ARTICLES

## *Mycorrhizae and Drought Tolerance*

Dr. Barbara Smit-Spinks
Center for Urban Horticulture
University of Washington

Much of the research on the importance of mycorrhizae for tree establishment and growth has been directed toward commercial tree production (orchards, forestry), but the research also has implications for the management of urban trees. Mycorrhizae are a beneficial association of roots and fungi which can alter the structure, nutrient concentration, growth regulator chemistry, water use, and photosynthesis of plants.

There are two common types of mycorrhizae: (1) *ectomycorrhizae*, in which the fungus develops outside of the root cells; and (2) *endomycorrhizae,* in which the site of infection is inside the cells. Ectomycorrhizae occur on trees such as pine, larch, fir, spruce, oak, birch, and hickory. They can be seen on the roots and often change the root structure by inhibiting root hair formation and causing root branching. Endomycorrhizae occur on many herbaceous plants as well as Russian olive, maple, ash, honeysuckle, and apple. This type of mycorrhizae causes little or no change in the physical appearance of the roots.

Enhanced drought tolerance of plants with mycorrhizal roots was the initial indicator of the beneficial nature of this plant/fungus relationship. Our lab and others are involved in research examining the mechanism by which mycorrhizae impart increased drought tolerance to plants. Cooperative projects are under way with researchers from the College of Forest Resources and Washington State University's Western Washington Research and Extension Center. We are studying the effects of mycorrhizae on water uptake through the root systems of Dougas fir (ectomycorrhizae) and crab apple (endomycorrhizae). Mark Coleman, a Ph.D. candidate, has looked at the relationship between phosphorous nutrition and water uptake of Douglas fir and how they are affected by mycorrhizal infection.

There are three possible direct mechanisms by which the fungus could alter the water status of roots: (1) increased root area for the collection of water; (2) increased transport of water to the root by fungal hyphae in the soil; and (3) reduced drying out of the root due to the mantle of fungus covering the root. We are, however, particularly interested in the effects of the mycorrhizae on the capacity of a root to transport water from the soil to the shoot. This characteristic, root hydraulic conductance, can be affected by changes in plant nutrition and plant hormones as well as by other factors. If root hydraulic conductance is increased in mycorrhizal roots, the increased drought tolerance of a plant could be independent of the soil volume available to explore for water. This would be important for plants with restricted soil volume, including container grown plants.

We are hopeful that this research will indicate whether mycorrhizal associations might be advantageous for urban trees in low water/low maintenance sites. Further research will be necessary to determine the cultural techniques needed to inoculate and maintain mycorrhizal associations under urban conditions.

## *Urban Trees—What Makes a Good Street Tree?*

Dr. James R. Clark
Center for Urban Horticulture
University of Washington

The search for the perfect urban tree is never ending. Anyone who deals with street tree programs or other urban landscape situations desires an aesthetically pleasing, easy-to-cultivate, pest-free, stress-tolerant, environmentally functional, fast-growing plant. Whether such a plant will ever be found is open to question. It is clear, though, that the trees currently being used in cities are compromise choices, upon which we are constantly trying to improve.

One approach to identifying species that will perform well as street trees is to examine the characteristics of those trees that have already proven successful. Do species and cultivars frequently used in cities possess certain features that could be used as indicators of success?

In 1978, Jim Kielbaso and Ken Ottman of Michigan State University compiled lists of the most popular street trees in the U.S. From these lists I have selected nine species appropriate for the Pacific Northwest region and compared four ecological/cultural characteristics—shade tolerance, flood tolerance, tolerance of poor soil, and ease of transplanting (Table 1). The following references were consulted for ecological/cultural information:

Fowells, H. 1965. *Silvics of Forest Trees of the United States.* U.S. Dept. of Agriculture Handbook 271.

Harris, R. 1983. *Arboriculture—Care of Trees, Shrubs and Vines in the Landscape.* Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Himelick, E. 1981. *Tree and Shrub Transplanting Manual.* Urbana, IL.: International Society of Arboriculture.

The popular street trees vary widely in their tolerance to shade. Although nursery trees are grown under "full-sun" conditions, the amount of light that may reach street level in

***Table 1***

| ***Species*** | ***Relative Tolerance:*** Shade | Flooding | Poor Soils | ***Ease of Transplanting*** |
|---|---|---|---|---|
| Norway Maple<br>*Acer platanoides* | Tol. | ? | ? | Easy |
| Red Maple<br>*A. rubrum* | Tol. | High | High | Easy |
| Sugar Maple<br>*A. saccharum* | Very Tol. | Low | Low | Mod. |
| Green Ash<br>*Fraxinus pennsylvanica* | Intermed. | High | High | Easy |
| Honey Locust<br>*Gleditsia triacanthos inermis* | Intol. | High | Mod. | Very Easy |
| Sweetgum<br>*Liquidambar styraciflua* | Intol. | High | Mod. | Difficult |
| Pin Oak<br>*Quercus palustris* | Intol. | High | High | Very Easy |
| Red Oak<br>*Q. rubra* | Intermed. | Mod. ? | Mod. | Easy |
| Little-Leaf Linden<br>*Tilia cordata* | ? | ? | Mod. | Easy |

Source: Fowells 1965, Harris 1983, Himelick 1981, Kielbaso and Ottman 1978.

a high-rise urban core is but a fraction of "full-sun." Tall buildings cast large shadows that can shade trees for much of the day. In Seattle, my students and I have studied the performance of sweetgum over a range of planting sites. Growth, branching pattern, and leaf development vary widely within a few blocks. We believe the amount of light these trees receive is an important factor contributing to this variation. Shade-intolerant species will not perform well under heavy shade. Thus, in an urban location surrounded by skyscrapers, a street tree should be tolerant of shade.

Successful street trees are generally tolerant of poor soil and/or flooded conditions. This is not at all surprising considering the typical urban soils—highly compacted and with poor structure and low fertility. It does reveal that one strategy for selection is to identify those species that will grow on heavy, poorly drained soils.

The performance of sugar maple seems to support this point. Though it has been widely planted as a street tree, sugar maple has a low tolerance of flooding and poor soils and only seems to perform well in well-drained locations. My observation is that it is not a good urban tree.

Finally, good street trees should be easy to transplant. Since the level of aftercare is generally minimal, transplanted street trees must quickly establish themselves. All the trees listed in Table 1 are fairly easy to transplant except sweetgum. Marvin Black, Seattle city arborist, has said that this species "struggles" for a couple of years after planting but then does quite well. Are there other plants with a similar transplant difficulty that would make good street trees with better aftercare?

The search for the perfect urban tree will continue, probably without success. But an awareness of the characteristics found in most successful urban trees will enhance our chances of identifying new plant material for the urban landscape.

## *The Franklin Tree—A Plant with a History*

Dr. Ray Maleike
Western Washington Research and
Extension Center
Washington State University

The Franklin tree, or *Franklinia alatamaha*, previously has been listed as *Gordonia alatamaha*, and the latter scientific name is still occasionally used in the trade.

The Franklin tree could be classified as a large shrub or small tree. It usually is branched quite low or may have two or three main trunks. Ultimate height is between 20 and 30 ft. (7–10 m) with a width of about ½–¾ the height. The large specimen at the Washington Park Arboretum is well over 20 ft. The main branching is usually ascending with more lateral branches. The outline is a large, broad, upright oval if it is grown in the open sun.

Leaves are usually limited to the end of the branches giving the tree an open, airy appearance. The obovate leaves are 4–5 in. long and 1–1½ in. wide, with weak and irregular crenations or serrations. The tops of the leaves are lustrous, a good landscape characteristic. The autumn color is bright, rich red, similar to some clones of *Oxydendron arboreum*. The plant should be grown in the full sun to achieve the maximum effect of the autumn coloration.

Stems are usually a gray-brown. Very often younger stems will have thin striations of a yellow-tan. This is an interesting landscape feature for close viewing in the winter. The effect is lost with algae covered stems.

The 3–3½ in. flowers are solitary with 5 white petals and many yellow stamens. The flowers are similar to single white *Camellia* or *Stewartia* flowers. Both *Camellia* and *Franklinia* belong to the *Theaceae* or Tea family. Blooming commences in late summer or early autumn.

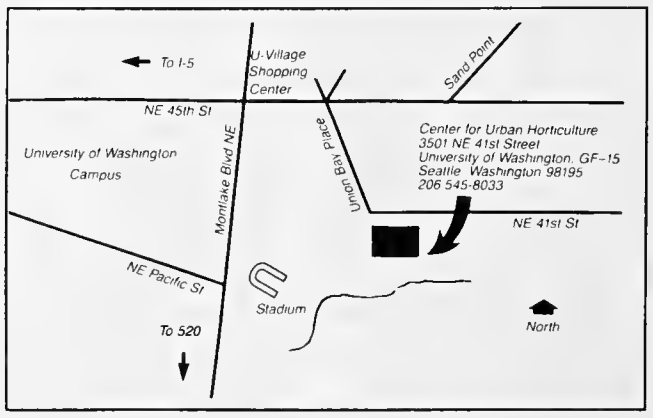
While never prolific, the flowering is showy and may last up to 2 months. Flowering is effective during a period when there is a dearth of blooming woody plant materials.

Hardiness has been reported as Zone 5 (−10 to −5°F) by the Arnold Arboretum or Zone 6 (−10 to −5°F), USDA. A recent journal article reported *Franklinia* stems killed at −25 to −27°F.

*Franklinia* seems to be relatively pest-free. It may suffer from root rot under lack of aeration/poor drainage. It is best planted in a moist, well-aerated soil. Its culture is not much different than most of the Ericaceous plants.

The unusual history of the plant may be a good selling point. John Bartram, a Philadelphia plant hunter, originally found the plant growing on the banks of the Altamaha River in Georgia in 1770. Bartram failed to find the plant in subsequent trips. The plant has never been found in the wild since.

*Franklinia alatamaha* is a multiseason interest landscape plant from its very good, lustrous summer foliage to late-season blooming and has excellent fall foliage coloration and good bark characteristics. Its only cultural requirement is that it have a well-drained, moist soil.

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