

Street Trees

We need to constantly rethink and update street tree programs giving emphasis to trees that tolerate urban conditions.

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Tree of heaven is a short-lived tree tolerant to most urban stresses. However, its value makes its short life worthwhile.

Trees placed along urban streets are confronted with the harshest macro- and micro-climates possible. They must fit in restricted areas, live in disturbed soil, and be assaulted by salt spray, exhaust fumes, compaction, and even knife-carved graffiti.

As population density increased and man switched from horse-drawn to combustion-engine-vehicles, new problems arose to test the tree's ability to survive.

Trees that worked well when our commercial centers were first developed can no longer take the strain of today's cities. More than 70 percent of our urban centers were developed along rivers and lakes. Rail and highway networks moved cities into new areas.

The average life of trees growing under urban conditions today is 25 to 30 years, not the 100 to 200 years achieved by some trees in their native habitat.

Urban conditions are constantly changing. Likewise, the goals of street tree programs need to be continually adjusted.

By keeping six things in mind, many street tree problems are avoided.

- No species should comprise more than five percent of city trees.
- The backbone of a good street tree program should be based upon native trees.
- Trees selected should adapt well under extreme soil conditions, e.g. low oxygen or wet soils.
- Trees selected should thrive in

conditions of restricted root zones.

■ The ultimate height and habit must fit restricted conditions, e.g. outlaws, utility wires, narrow streets.

■ There is no such thing as bad or weed trees.

History, or hindsight, is often helpful in pointing out short-term errors in judgement and provides a data base to assist us in future development.

Red maples from a Michigan nursery will not do as well as the same trees from local nurseries

The elm is one of many good cases showing monoculture leads to increased problems, insects and diseases in this case. A diverse tree population (no single tree species greater than ten percent of the population) will help reduce the need to control all but catastrophic insect and disease pests.

A good street tree program should be based on the use of native trees. Native trees are usually well adapted to the extreme conditions found in that area. Selecting a number of native tree species is wise for city tree planning.

City foresters and planners should encourage the nursery industry to select, propagate, and sell native plants for their region of the country. In many cases, cities have created their own nurseries to provide replacement trees. The trees in these nurseries should be evaluated for tolerance to modern city conditions and updated.

Trees from similar latitudes around the world should be evaluated for cities. Much of Asia and Eastern Europe is climatically similar to Northern and North-eastern U.S. in terms of temperature, moisture and photo period.

Provenance, or local adaption, is another consideration when

STREET TREES

Drought Tolerant Species

- Acer buergeranum* (Trident Maple)
- A. campestre* (Hedge Maple) (also wet)
- Ailanthus altissima* (Tree of Heaven) (also wet)
- Carya ovata* (Shagbark Hickory)
- Catalpa spp.* (catalpa)
- Cornus kousa* (Kousa Dogwood)
- Corylus colurna* (Turkish Filbert)
- Crataegus spp.* (hawthorn) (also wet)
- Elaeagnus angustifolia* (Russian Olive)
- Ginkgo biloba* (Ginkgo) (also wet)
- Gymnocladus dioicus* (Kentucky Coffeetree) (also wet)
- Koelreutaria paniculata* (Goldenraintree)
- Malus spp.* (crab apple) (also wet)
- Nyssa sylvatica* (Black Gum)
- Quercus alba* (White Oak)
- Q. macrocarpa* (Bur Oak)
- Robinia pseudoacacia* (Black Locust)
- Sophora japonica* (Japanese Pagodatree)

High Clay/Low Oxygen Soils

- Acer campestre* (Hedge Maple)
- A. griseum* (Paperbark Maple)
- A. negundo* (boxelder)
- A. platanoides* (Norway Maple)
- A. rubrum* (Red Maple)
- A. saccharinum* (Silver Maple)
- Aesculus hippocastanum* (Common Horsechestnut)
- Ailanthus altissima* (Tree of Heaven) (also dry)
- Alnus glutinosa* (European Alder)
- Betula lenta* (Sweet Birch)
- B. nigra* (River Birch)
- Carpinus caroliniana* (American Hornbeam)
- Celtis occidentalis* (Common Hackberry)
- Cercidiphyllum japonicum* (Katsuratree)
- Crataegus spp.* (hawthorn) (also dry)
- Fraxinus americana* (White Ash)
- F. pennsylvanica* (Green Ash)
- Ginkgo biloba* (Ginkgo)
- Gleditsia triacanthos inermis* (Thornless Common Honeylocust)
- Gymnocladus dioicus* (Kentucky Coffeetree) (also dry)
- Halesia carolina* (Carolina Silverbell)
- Juglans nigra* (Black Walnut)
- Liquidambar styraciflua* (American Sweetgum)
- Malus spp.* (crab apple) (also dry)
- Ostrya virginiana* (American Hophornbeam)
- Platanus acerifolia* (London Planetree)
- P. occidentalis* (American Planetree)
- Prunus serrulata spp.* (Oriental Cherry)
- Quercus bicolor* (Swamp White Oak)
- Q. coccinea* (Scarlet Oak)
- Q. imbricaria* (Shingle Oak)
- Q. palustris* (Pin Oak)
- Q. robur* (English Oak)
- Q. rubra* (Red Oak)
- Tilia americana* (Basswood)

planning urban tree programs. Provenance is the adaption of a tree to a particular area.

Red maple (*Acer rubrum*) is found from northern Florida to northern Michigan. But, red maples purchased from a nursery in northern Michigan and planted in northern Florida probably will not do as well as trees from local nurseries. Although the plant is genetically similar, it developed tolerance to conditions slowly as its range spread.

Provenance, carried to its ultimate, can help horticulturists throughout the world select plants for areas of specific rainfall, temperature, soil, and photo period.

Street tree selection means finding trees which tolerate extremes; e.g. disturbed and compacted soil, high water tables, droughty sites.

Some trees during their evolution have adapted to periodic flooding or low oxygen soils. Tolerance to brief periods of stress offers a fertile area for researchers to select cultivars which normally don't flourish under the same stress for longer periods. The ability to tolerate is more important in some instances than aesthetic characteristics.

Several trees are adapted to high water tables. They include Sweet Birch (*Betula lenta*), River Birch (*B. nigra*), Washington Hawthorne (*Crataegus phaenopyrum*), Kentucky Coffeetree (*Gymnocladus dioicus*), Carolina Silverbell (*Halesia carolina*), Swamp White Oak (*Quercus bicolor*), Shingle Oak (*Q. imbricaria*), Basswood (*Tilia*), Boxelder (*Acer negundo*), Red Maple (*Acer rubrum*), and Silver Maple (*A. saccharinum*). Adaption to droughty soils and ability to compete with turf are other major factors when selecting trees for streets. It is important to select plants with the ability to withstand the rigors of hot, dry summers and restricted root zones.

Washington Hawthorne is presently grown as a multiple-stemmed shrub but is equally effective as a small, single-stem tree. It flourishes in harsh conditions. It is relatively tolerant of salt; in fact, we have seen the bark

literally encrusted with salt and yet the plant survives.

Kentucky Coffeetree is a large tree, reaching 60 to 70 feet in height, with a grotesque growth habit that is, in fact, beautiful. It is extremely tolerant of urban conditions.

Swamp White Oak and Shingle Oak are natives that adapt to low oxygen soils. Their infrequent use is sometimes associated with difficulty in growing and transplanting.

Several plants thrive in droughty soil. They include Shagbark Hickory (*Carya ovata*), Hackberry (*Celtis*), Northern Catalpa (*Catalpa speciosa*), Kentucky Coffeetree, Hophornbeam (*Ostrya*), Bur Oak (*Quercus macrocarpa*), and Black Locust (*Robinia pseudoacacia*). Each of these have a unique niche to fill. The total size of the tree dictates the amount of outlawn required to sustain it. Trees should be classified as small (under 25 feet), medium (25 to 50 feet), and large (more than 50 feet). As urban

TREE HEIGHTS

30 to 50 feet

Sweet Birch
River Birch
Northern Catalpa
Washington Hawthorn
Carolina Silverbell
Hophornbeam
Shingle Oak
Boxelder
Black Locust
Hackberry

50 feet and above

Shagbark Hickory
Kentucky Coffeetree
Swamp White Oak
Basswood
Red Maple
Silver Maple
Bur Oak

areas become more densely populated, outlaws are narrower and street trees may need to be smaller than the towering elms of before.

Trees which survive so well they are often considered weeds should be reevaluated. For example, two maples have received bad reputations, red maple and silver maple. They are rapidly-growing native trees with few insect and disease problems. Regional cultivars of these maples could cause a resurgence in the use of these trees.

We must continually select, breed, and transplant trees with the objective of increased longevity, realizing that a great number of trees will not survive beyond 15 to 25 years. Tree of Heaven (*Ailanthus altissima*) and Boxelder (*Acer negundo*) are tolerant, but short-lived trees for urban areas. Tolerance to urban conditions should be of paramount importance while still trying to select trees with increased longevity.

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