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To: Date:

3 pages from Mario Lanthier

The annual conference of the International Society of Arboriculture (ISA), Pacific NorthWest chapter, was held September 16 to 19 in Corvallis (Oregon). See http://www.pnwisa.org/.

The meeting was attended by over 300 persons, mostly arborists employed by municipalities, commercial companies and utility agencies.

Tree preservation during construction, the following quote is from Dr. Tom Cook, Oregon State University (http://hort.oregonstate.edu/faculty-staff/cook).

"You cannot build around mature trees. If you want to save the trees, you better redesign the building."

Climate change and potential impacts on the Pacific Northwest

By Dr. Eric Maloney, Oregon State University (http://people.oregonstate.edu/~maloneye/)

A member of the "Climate Impacts Group", an interdisciplinary research team studying the impacts of "global warming" in the region (http://cses.washington.edu/cig/).

During the 20th Century, key climate trends in the Pacific Northwest:

- Since 1900, nearly every glacier has retreated in Cascades and Olympic mountains.
- Since 1920, temperature increase of 1.5°F and 30 to 60% lower snowpack on April 1st.

The changes in climate cannot be explained only by natural phenomonas.

- The changes also cannot be explained only by human behaviour (greenhouse gases).
- The changes in climate are explained by the combination of the two (natural + human).

For the 21st Century in the Pacific Northwest:

- "High confidence" that temperature will increase 2°F by 2020, especially in summer.
- "Less confidence" that precipitation will be higher Dec to Feb, lower from June to Aug.

REDUCING INFRASTRUCTURE CONFLICTS

By Dr. Larry Costello, University of California (http://ucanr.org/seek/anrdirectoryinfo.cfm?index=450)

A presentation based on a 2003 publication by the same author [1]. The book was prepared following a 2000 symposium on this topic at the University of California.

Summary of comments

To prevent infrastructure damage by tree roots, there are 3 sets of strategies.

1) Tree based strategies

The objective is to select trees that minimize damage potential to infrastructure. The current trend is to plant trees of smaller mature size.

2) Design strategies

The objective is to maximize the distance between trees and infrastructure. Provide new trees with adequate sprace by using larger planting spaces.

3) Root strategies

The objective is to provide sufficient soil volume to allow the roots to develop and support the tree canopy. In general, increase the volume of available soil.

Tree based strategies: Select an appropriate tree species

1) Consider the trunk flare and root buttress when the tree reaches mature size.

Trunk flare expands with age, which may result in cracking or lifting of pavement.

Tree size is usually based on DBH (Diameter at Breast Height). On some trees, the trunk flare (near the soil line) is similar to the DBH. On other trees, the trunk flare is wider than the DBH. The planting space should be based on trunk flare, not DBH.

From a survey of street trees in San Francisco, California, the following trees had a trunk flare 2 times or more the size of the DBH:

Aesculus / Alnus / Betula / Crataegus / Liquidambar / Magnolia / Platanus / Ulmus.

2) Consider the root characteristics of the tree selected for planting.

Trees with large root masses or shallow roots cause more damage to pavement.

Under local growing conditions, some tree species tend to develop shallow-roots. Those species should not be planted in small planting sites.

A review of 13 studies concludes the following tree species tend to form surface roots (the work was not performed the same way across the authors):

Acer / Fraxinus / Liquidambar / Magnolia / Platanus / Populus / Robinia / Salix / Ulmus

[1] Costello L.R. and K.S. Jones. 2003. Reducing Infrastructure Damage by Tree Roots: A compendium of Strategies. Western Chapter of the International Society of Arboriculture. Cohasset CA.
Available at the ISA web store at
http://secure.isa-arbor.com/webstore/Reducing-Infrastructure-Damage-by-Tree-Roots-P229C0.aspx.

Design strategies: Allow adequate space for the tree to grow

1) Consider the dimension of the planting hole.

The larger the planting hole, the lower the potential damage from trunk or roots.

- England: a sidewalk planting cut-out should be at least 2 meters wide X 2 meters long.
- United States: "very high damage potential" if the cut-out is less than 2 feet by 4 feet.
- For large trees: "damage is almost guaranteed" if the planting strip is under 6 ft wide.

Guidelines for tree well planting space (in sidewalk) [2]

SIZE OF TREE WELL		TREE DIAMETER
3 feet wide X 6 feet long		Maximum 18 inches DBH
4 feet wide X 4 feet long	Up to 4 feet X 6 feet	Maximum 24 inches DBH
5 feet wide X 6 feet long	Up to 5 feet X 10 feet	Maximum 36 inches DBH
6 feet wide X 10 feet long	Up to 6 feet X 14 feet	Maximum 48 inches DBH

2) Consider using other sidewalk materials.

A concrete sidewalk can be modified with expansion joints, thicker slabs, or reinforced with rebar. Alternatives to concrete include asphalt and compacted gravel.

Root strategies: Allow adequate space for the roots to grow

1) The soil volume needed for the roots is directly proportional to the tree canopy.

In 1991, researchers at Cornell University suggested 2 cubic feet of soil for every 1 square foot of tree crown projection (total ground area under the dripline of the tree) [3].

Guidelines for required soil volume [4]

TREE DBH (INCHES)	TREE CROWN (FT^2)	SOIL VOLUME REQUIRED (FT^3)
4	140	200
8	320	420
12	480	760
16	640	1000
20	900	1260
24	1200	1500

2) Consider using root guidance systems.

This includes root barriers to deflect roots and trenches to channel roots.

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[2] City of Los Angeles, California. "Table for tree wells".

[3] The calculated estimate of soil volume required is based on transpiration water loss from mature trees in loam soil with good drainage, rainfall of 30 inches per year without supplemental irrigation. The estimate is valid for most climate zones but not sufficient for desert regions where there is high evaporation potential and little precipitation. This approximation is based on Area = $pi*r^2$. Soil volume = (tree width at maturity / 2) * same * 3.14159 * 2

[4] Urban J. 1992. Bringing order to the technical disfunction within the urban forest. J of Arboriculture. 18(2):89.