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4, 2006

Drive
CA

2006 Meeting Schedule

Helping Cities Plant Trees	Tree People Los Angeles, CA
of Arboretum	Fullerton Arboretum Fullerton, CA

for the 2006 year, please contact Kevin Holman at 714.870.6352

rovide a forum for tree care professionals to share their experiences, knowledge, and expertise for the benefit of the mem- community forests."

Highlights from STS Annual Golf Tournamen

June's meeting was held at the beautiful Los Angeles Royal Vista Golf Club

There were 8 teams competing for best golfer rights, and the tournament w followed by BBQ lunch and general meeting,

Third place went to Team 6: Tim Downey, Bret Richardson, Gon Barriga and Wayne Smith.

Second place went to Team 7: Taylor Rodriguez, Bob Chavez, D Savedra and Willie G.

And a big Congratulations to first place, Team number 2: Norm Sieger, Evan Aldrich, Scott Hamilton and Chris Palmieri.

Aside from the First, Second and Third place teams, trophies were awarded for est Drive and Closest to the Pin. Longest Drive went to Sergio Hernandez, and est to the Pin went to Seleve Tuisaloo.

STS Business Meeting— June 29, 2006

Past Presidents in Attendance:
Dan Jensen, Al Epperson, Al Remyn

Publications Report:
The publications committee is continuing to go through the process of adding and deleting trees for in the next addition of *Street Trees Recommended for Southern California*. Any feedback from the membership is greatly appreciated.

Raffle: Raffle prizes generously donated by : RPW, Street Tree Seminar, Valley Crest Tree Company, Michael w/ Santa Clarita Play It Again Sports, Tad d Russ Wayne Smith

Raffle Winners: Gonzalo Barriga (x3), G Monfette, Bret Richardson (x3), John Sp oni, Dave Cooper, Evan Aldrich, Thoma Hernandez (x3), Rene Laureles (x2), Da Hayes, Kevin Witts, Tim Downey, Kev Holman, Alan Hudak, Felix Vigil, Chris Palmieri

Next Meeting: August 24, 2006
Next meeting will be at the Tree People in Beverly Hills.

Upcoming Industry Events

July 29-Aug 2, 2006
Hooked on Trees, Arboriculture up North
ISA 82nd Annual Conference & Trade Show
Minneapolis Convention Center
Minneapolis, MN
Contact: ISA– www.isa-arbor.com

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apid water loss,

surrounded by non-evaporative surfaces (hard surfaces), leaf temperatures may rise above the thermal death threshold.

Keeping Up

Associated with rapid water loss and temperature increases in the leaves, is a delay or time lag in water absorption by the roots. Leaves can lose water much faster than the roots can absorb water. The difference between water loss from the tree and water gain through root absorption, can initiate many problems. .

Note that a noon-time slow-down in transpiration is caused in-part by water shortages in the leaves closing stomates.

The water shortages of the day are corrected as completely as soil water content allows by water uptake at night. The force or energy for this nighttime water absorption when stomates are closed is through tension in the water column (remaining negative pressure) pulling water into the tree. Night uptake by roots can amount to 20-40% of tree water needs.

Hot Water

Heat injury is difficult to separate from water problems, because water and temperature in trees are so closely bound together in biological and physical processes. Water shortages and heat buildup are especially critical in the leaves, and secondarily, in the cambial and phloem area of twigs and branches. Increased temperatures increase the vapor pressure deficit between leaves and atmosphere, as well as increasing the diffusion rate of water across plant layers. In tree leaves, wilting is the first major symptom of water loss excesses and heat loading. Leaves under heavy heat loads may progress through senescence (if time is available), brown-out and finally abscise. Leaves quickly

ing after heat damage and drought may initiate quick leaf abscission.

Hot Air

Advected heat is carried on the wind, heating and drying tree tissues as it passes. Advected heat from neighboring hardscapes can heat and dry landscapes and trees. Advected heat can power excessive water evaporation of water in trees and landscapes to dissipate heat generated somewhere else.

Wind also decreases the protective boundary layer resistance to water movement and can lead to quick dehydration. Structures and topographic features can modify or block advected heat flows across a site.

Double Trouble

Daytime temperatures obviously provide the greatest heat load, but night temperatures are also critical for many tree growth mechanisms, especially new leaves and reproductive structures. Night temperatures are critical for controlling respiration rates in the whole tree and soil environment. The warmer the temperature, the geometrically faster respiration precedes. As a general rule, each temperature step, beginning at 40oF and continuing to 58oF, 76oF, 94oF, 112oF, and 130oF each allow physical doubling of respiration and water loss. Gross photosynthesis generally doubles up to 94oF and then rapidly falls-off. Heat stroke is a series of metabolic dysfunctions and physical constraints that pile-up inside trees and become impossible

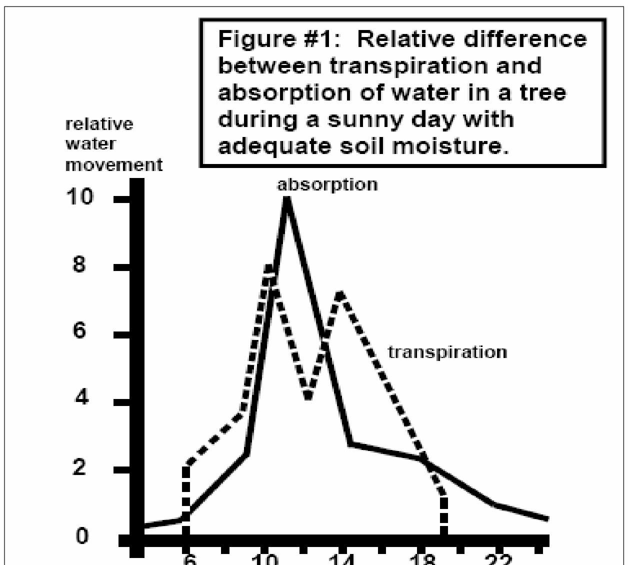

Figure #1: Relative difference between transpiration and absorption of water in a tree during a sunny day with adequate soil moisture.

Additional Stress

Since nitrogen is physiologically demanding, moderate concentrations of nitrogen fertilizers can damage trees under large heat loads. The internal processing of nitrogen fertilizer inputs require stored food (CHO) be used. When no food is being produced in the tree, transport systems are only marginally functional, and respiration is accelerating, nitrogen applications should be withheld. Excessive heat loads and supplemental nitrogen lead to excessive root food use. Fertilizer salt contents or activity in the soil can also be damaging when soil moisture is limiting.

Heat stress problems make trees more susceptible to pests and other environmental problems. A number of pathogenic fungi are more effective in attacking trees when the host is under water or heat stress. Heat injury includes scorching of leaves and twigs, sunburn on branches and stems, leaf senescence and abscission, acute leaf death, and shoot and root growth inhibition. Loss of defensive capabilities and food supplies allow some minor pests to effectively attack trees.

Hot Soil

The soil surface can be both a heat reflecting and absorbing layer. In full sunlight, soils can reach 150oF. This heat can be radiated and reflected into a landscape and onto trees causing tremendous heat loading. As discussed before, excessive heat loading causes large amounts of water to be transpired, initiates major metabolic problems, and can generate heat lesions just above the ground / tree contact juncture (root collar -- stem base area). Heat lesions are usually first seen on the south / southwest side of stems. The duration of hot temperatures can not exceed a tree's ability to adjust, avoid, or repair problems or death results. Less absolute amounts of sensible heat are needed to damage trees as the duration of the hot temperature lengthens. In other words, the more dysfunctional and disrupted growth functions become due to heat loading, the easier it is to develop further stress problems.

Melting Membranes

Living tree cell membranes are made of a double layer of lipids (fats/oils) that contain the living portions of the cell. As temperature increases, membranes become more liquid (similar to heating butter and watching it melt). As temperatures increase, cells use two strategies to maintain life — one is to increase the saturated fat proportion in membranes and, the second is to

enzymes and structural prot
are inactivated or denatured
pirational dead-ends and by
products produce toxic mate
that are difficult to transport
or destroy, compartmentaliz
excrete. Tree cell death is th
result.

Tolerance

The differences among tree
tolerating heat loads revolve
around enzyme effectivenes
membrane health. The bette
enzymes and membranes c
protected from heat effects,
more effective the tree will b
dealing with large heat loads
Protection or deactivation of
zyme systems in trees are in
enced by pH, solute levels in
cells, protein concentrations
protection mechanisms. Th
ability of a tree to continue f
tioning demonstrate toleranc
mechanisms which are prim
genetically controlled, althou
each individual usually has a
range of responses to heat s
Internal changes within the l
tree as heat loading effects
crease:

1. Decrease in photosynthesis
and increase in respiration (Rs)
2. Closing down of Ps (turn-ove
for Ps and Rs = 95oF).
3. Closed stomates stop CO2 c
and food production.
4. Major slowing of transpiratio
of heat dissipation, increase of
nal temperature, and transporta
absorption problems).
5. Increasing cell membrane le
6. Continued physical water los
dehydration.
7. Cell division and expansion l
ited, and growth regulation disr
8. Tree starvation through rapid
of food reserves, inefficient foo
increased photo-respiration, an
inability to call on reserves whe
and where needed.
9. Toxins generated (cell memb