



# TREE Cookies Etc.

July 2006

Volume 2, Issue 2



**tree cookie** (trē' kookē) n. a cross sectional slice of a trunk or branch. The concentric rings tell not only the age of that part of the tree, but also a story about the environmental conditions, history, and dynamics of that tree, in that place.

**TREE Cookies Etc.** n. 1. a free electronic newsletter dedicated to tell the story of forest stewardship, tree care, and natural resource management. 2. to help people make best decisions regarding the resources entrusted to them.

## Calendar

### [Woodlot Owners of Rappahannock, Greene, Culpeper, Madison, and Orange Counties Workshop Series](#)

Evening seminar and Saturday field-trips


- August. 14, 19: **Forest Stewardship, what's in it for you?**
- Sept. 11, 16: **Managing & Selling Timber, for profit and ecosystem health**
- October 16: **Forming a Forest Landowner Assoc. – "town meeting"**
- Sept. 21: **Working the Small Woodlot, Madison, VA**
- Sept. 21 & 22: **Portable Sawmilling & Drying Workshop, Madison, VA**
- September. 8: **Waynesboro Plant Health Care for Urban Trees – thinking outside the bark.**
- September. 29: **Northern Virginia Urban Forestry Quarterly Roundtable Leesburg, VA**
- October 19: **Fall Forestry & Wildlife Bus Tour King George, VA**

ANR-57

*Dear Reader,*

*Ask youth the question "What do trees do for us?" the most common first thing they list is "air." It's a simplistic answer and not exactly right, but it does hold lots of truth too. While trees don't exactly increase air quantity, they do impact quality. For example, we know that trees and all green plants convert carbon*

*dioxide into what we and other mammals need to breath, Oxygen! This is the extent of what most of us learned in school. Some exciting research is being done that helps us better understand more of the role trees play in air quality.*

*I hope you enjoy this issue of "TREE Cookies Etc."  Adam*

## Trees & Air

Trees clean the air in basically four different ways and it's as simple as T R E E.

"T" is for Temperature. Enjoy any shade yet this summer? Transpiration from trees (that is the process of moisture evaporating, primarily from leaves) and the canopies themselves not only affect air temperature directly, but also heat storage, wind speed, relative humidity, surface roughness and more. These factors work together to reduce mid-day air temperature under trees.

So, cooler air is nice, but how does it help air quality? The emission of many pollutants and/or ozone-forming chemicals increases with temperature. You know how hot your car is after just a few minutes of sitting in the open sun? Well, hot seats and door handles are not the only things you could do without.

Researchers in Davis, California found trees in parking lots made air 3°F cooler. Those few degrees difference reduced vehicle surface temperatures up to 36°F, inside (cabin) temperatures by 47°F and, importantly, gas tank temperatures by 7°F! Fewer hydrocarbon emissions result from gas that evaporated out of tanks and hoses with reduced temperatures. At present, most of our parking lots are a place where high temperatures increase pollutant emissions and thus the formation of smog and ozone. Gives new meaning to "made in the shade" doesn't it?

"R" is for Removal of air pollutants. Trees are able to remove both gaseous pollutants and airborne particles. Gaseous

Virginia Cooperative Extension

Knowledge for the Commonwealth



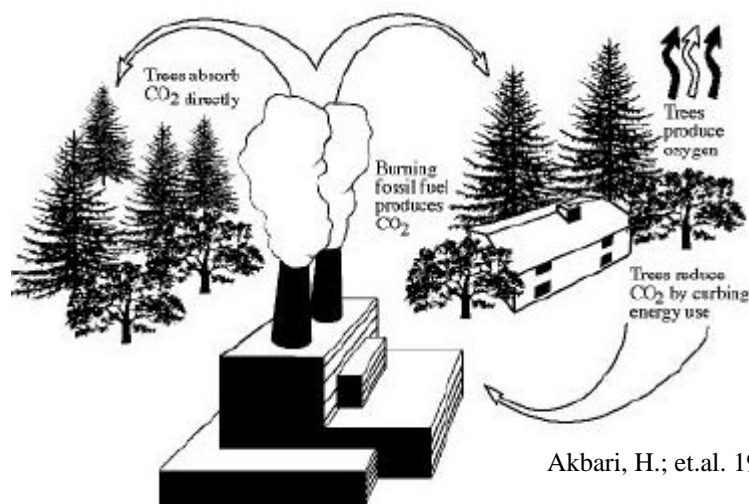
## Trees & Air- continued

pollutants include ozone, sulfur dioxide, nitrogen dioxide, and carbon monoxide. These are taken out of the air by trees primarily through leaf stomata. Stomata are small “windows” on green leaves which let carbon dioxide in and oxygen out.

Airborne particles, or particulate matter, is removed (at least temporarily) from the air by mechanical interception, primarily on leaf surfaces. While these bad guys float around in the air, their microscopic size enables them to be breathed deep into our lungs, potentially causing serious health problems or just a temporary irritation. Trees help hold onto these particles until they fall to the ground with the next rain.

“E” is for Emission of Volatile Organic Compounds (VOCs) and tree maintenance emissions. You may remember some time ago, trees were reported to contribute to ozone formation. This misleading fact contains only part of the truth. Most trees do emit biogenic VOCs such as isoprene and monoterpenes which can contribute to the formation of ozone and carbon monoxide. The other side of this story is that in areas with low nitrogen oxide concentrations, such as more rural areas, VOCs are believed to remove ozone. Additionally, since trees lower air temperature, the net effect of increased trees in urban areas is an overall lowering of VOC emissions and therefore ozone formation.

Trees in urban areas require energy inputs for planting, maintaining and removing. Because we burn fossil fuels (which emit CO<sub>2</sub>, SO<sub>2</sub>, N, CO and VOCs) in all these activities, we also need to factor that into the Trees + Air equation. In this case, it tips the scale a bit to the net loss side... but not for long!



Akbari, H.; et.al. 1992

“E” is also for Energy effects on buildings. Well-placed trees can significantly lower temperatures in buildings by shading them. On the other hand, poorly placed trees can increase energy needs by shading in the winter or blocking summer breezes. For trees to have a net positive effect on energy usage in buildings, proper placement is critical. With proper placement, however, the savings are quite significant. Homeowners get a lower energy bill while we all benefit from the reduced energy demand. When energy demand decreases, pollutant emissions from the power plants supplying that energy also decreases, and that generally improves air quality.

When we put all these letters back together we get the whole word. Likewise, we must consider each of these effects as cumulative and interactive to understand the overall impact of trees on air pollution.

The research on trees and air pollution is rather new and still ongoing. Currently, the best picture we can get is by running simulation models. The general conclusion is that increasing urban tree cover reduces ozone concentration. Economically, it's probably one of the most efficient ways to do so. And that's to say nothing of the many other benefits these aesthetically appealing air cleaners provide.

AKD

continued



## Trees & Drought

Article adapted from: "Trees and Drought" written by Bill Elmendorf, Penn State

Water is one of the main elements involved in photosynthesis. Without it, trees cannot produce enough food to fuel growth. Drought impacts the leaves' ability to produce food, the roots' ability to grow and function, and the plant's ability to move food, hormones, and other elements around. The main problems associated with longer periods of drought (weeks and months) are decreased vigor and stunted growth. Ultimately, lack of water will lead directly to death or secondary problems such as a insect & disease.

One of the first symptoms of drought is wilted leaves that don't recover in the evening. Other symptoms include: leaf browning, early leaf fall and early fall coloring. Interestingly, the symptoms of over watering can look the same.

Treating drought is not just about spraying water:

- 1) Treat any cultural problems such as soil compaction, soil fill, de-icing salts, competition with weeds and turf, and root damage.
- 2) To slow evaporation of water and control weeds and grasses, mulch as much area under the canopy as possible with 2- 3 inches of composted mulch. Keep mulch a few inches away from the tree trunk. Trees will do this naturally if you let them with a fresh layer of leaves every year.
- 3) Apply moderate amounts of water slowly and deeply so that water is made available for uptake, but does not exclude oxygen from the soil. Trees need water to penetrate from 24 to 36 inches into the soil. Soil must be allowed to dry between watering. Newly planted trees should be watered every four days or so during hot, dry weather. This means applying about 10 gallons deeply through soaking. Large trees need thousands of gallons of water so in most cases it is not practical to irrigate large areas of trees. Mature trees benefit from irrigation when they have been hurt by soil compaction or root damage.

Lastly, two actions that will absolutely NOT HELP in drought are fertilization and pruning. Do not do these! Fertilization stimulates vegetative growth which demands more water and pruning is a stressor. In general, pruning should be done during dormancy. (See the last issue of TREE Cookies Etc., Vol. 2, Issue 1).

Periods of drought are to be expected and seasonal water stress is part of our growing season. Newly planted trees should be irrigated to help them get established. Once established, a tree should not need additional watering unless there has been construction damage or other root damage.

### <World Wide Web Watch>

#### Urban Tree Cover & Air Quality Planning

[www.treescleanair.org](http://www.treescleanair.org)

Research based information for the general public, policy makers and researchers about the effect of trees on air quality and how to help states incorporate trees as a strategy to meet federal air quality regulations. To find out air quality measures for your county, go to: [EPA Air Quality designations](#)

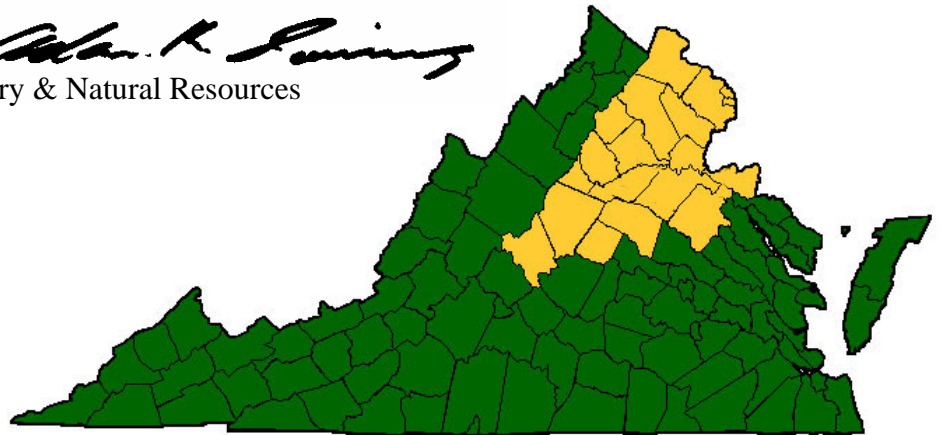


P.O. Box 10  
Madison, VA 22727  
540-948-6881  
adowning@vt.edu

Date: June 30, 2006

To: Citizens, Landowners, and Natural resource professionals

From: Adam K. Downing  
Extension Agent, Forestry & Natural Resources  
Northern District



To receive this newsletter, please join the "Tree\_Cookies\_Etc" Listserv by sending an e-mail to: [LISTSERV@LISTSERV.VT.EDU](mailto:LISTSERV@LISTSERV.VT.EDU) with SUBSCRIBE Tree\_Cookies\_Etc in the body (and nothing else). Leave the subject line blank and be sure to turn off any automatic signatures. *The electronic distribution of this newsletter has been set up with the tightest possible controls. Only the list owner can send to this listserv and replies cannot be sent to the list.*

**Extension is a joint program of Virginia Tech, Virginia State University, the U.S. Department of Agriculture, and state and local governments.**

If you are a person with a disability and desire any assistive devices, services or other accommodations to participate in this activity, please contact Adam Downing, VCE-Madison at (540-948-6881/TDD\*) during business hours of 8:00 a.m. and 4:30 p.m. to discuss accommodations 5 days prior to the event.  
\*TDD number is (800) 828-1120.

Virginia Cooperative Extension programs and employment are open to all, regardless of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. An equal opportunity/affirmative action employer.