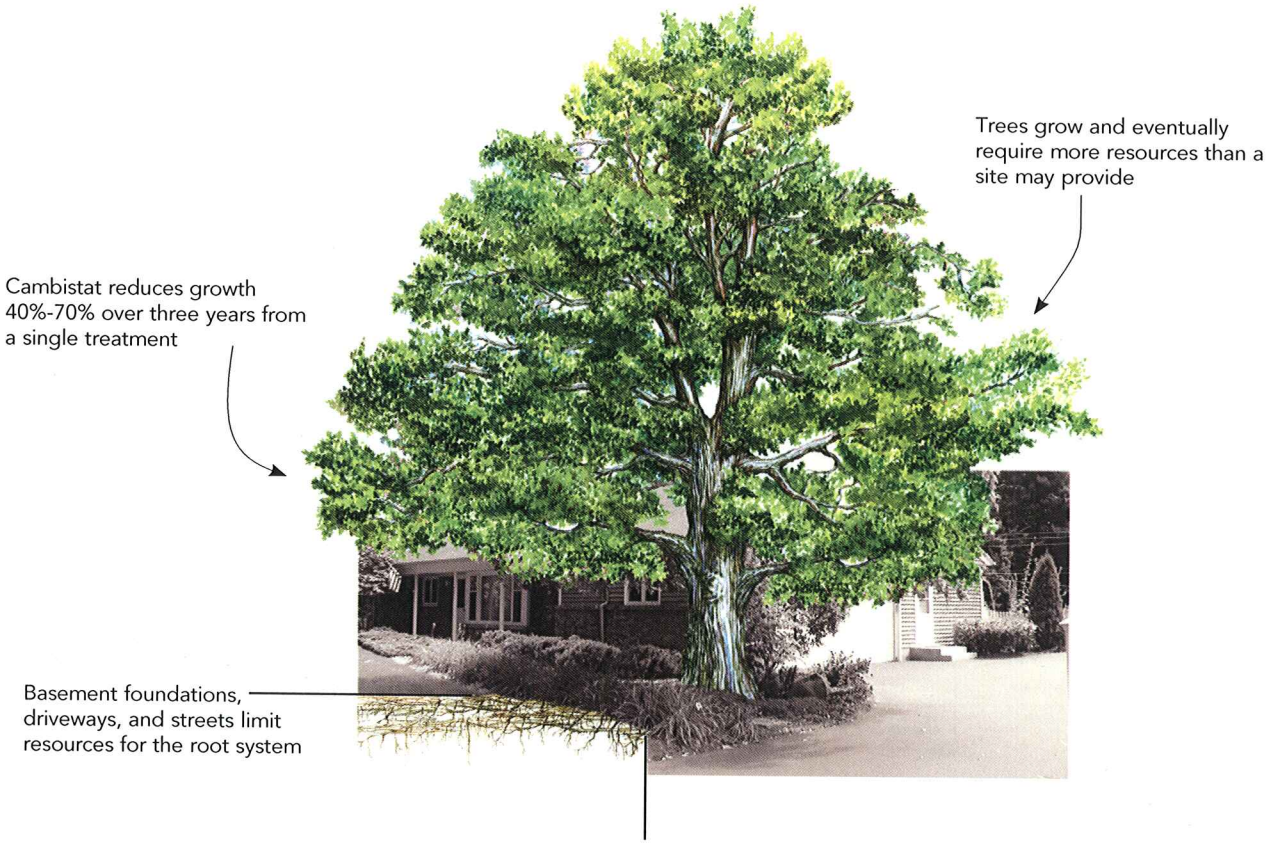
Using Cambistat® to

Reduce Growth



Slowing Growth for a Healthier Tree

Large trees add beauty, character, and value to the landscape, and they are highly desired by many homeowners. While it is appealing to think most trees in the landscape will eventually grow large and provide these benefits, this may not always be in the best interest of your tree and property.

There are two main reasons why:

1. **The size of a mature tree** is often underestimated, and many trees are planted too close to houses, garages, power lines, and other structures. This type of interference may cause damage to the property and require additional maintenance to correct.

2. **Large trees** require more water, minerals, and soil volume for roots than smaller trees, and these resources may not be available in sufficient quantity in smaller urban sites. If these resources are limited tree health will eventually suffer.

What does Cambistat do?

Cambistat is a tree growth regulator that reduces canopy growth by 40-70% over a three year period. Reducing the amount of tree growth can help you:

- Safely maintain the visual appeal of the landscape.
- Reduce the amount of live wood pruning required.
- Prevent premature overcrowding of competing trees.
- Maintain a smaller, more appropriate tree size when there is a restricted root zone.
- Maintain vista views with less frequent pruning.
- Extend the time in between pruning events.
- Minimize intrusion by power companies.

Additional Cambistat Benefits

As a result of growth reduction, some favorable changes occur that enhance the durability of your tree to the stresses associated with living in an urban yard. These include:

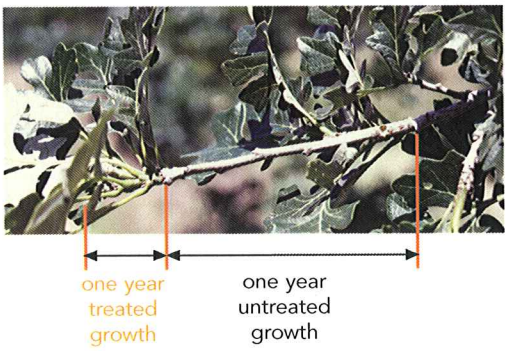
- Stimulate fine root production
- Improve drought and heat resistance
- Higher tolerance to certain diseases

For more detailed information go to www.treecarescience.com

Slower Growing Trees

A common myth about trees is that a faster growing tree is healthier than a slower growing tree. The truth is that slower growing trees will outlive trees that grow faster, especially in situations such as yards where space and resources are limited. The chart below shows some important differences between a tree growing relatively faster or slower.

Cambistat Treated Tree



Slower Growth is Beneficial

Tree Characteristic	Tree Growth Rate Comparison	
	Faster Growth	**Slower Growth**
Resource Demand	Higher	Lower
Sensitivity to Resource Availability	Higher	Lower
Stored Energy Reserves	Lower	Higher
Root : Shoot Ratio	Lower	Higher
Sensitivity to Stress or Damage	More Sensitive	Less Sensitive
Overall Tree Durablity	Less Durable	More Durable

An Integrated Approach

When caring for urban trees it is important to make a thorough evaluation of the site to accurately diagnose all stressing agents and tailor your recommendation to the specific circumstances. These must be dealt with so that your tree can live to its fullest potential. Utilize your arborist for a comprehensive maintenance program.

Benefits of Cambistat for Urban Trees

Cambistat is a soil applied product that is absorbed through the roots. Cambistat gently slows the growth of trees, allowing the tree to redirect some of its energy from canopy growth to defense chemicals, fibrous root production, and other uses. The resulting reallocation of energy makes your tree healthier and more durable.

Drought is a major cause of tree death and decline in the urban landscape. Research shows Cambistat increases drought resistance by helping the tree reduce water losses during dry, hot periods.

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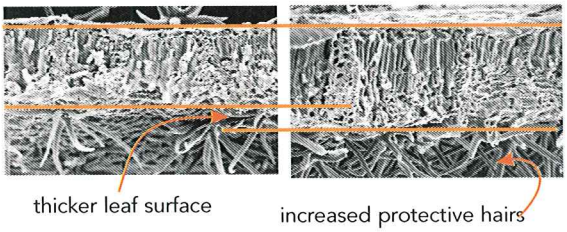
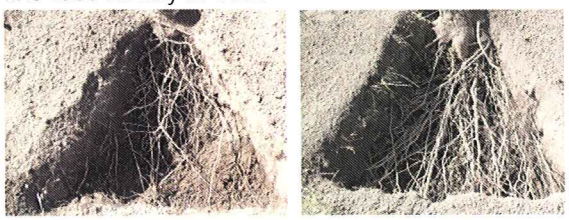


Research has shown Cambistat increases fine root density in trees



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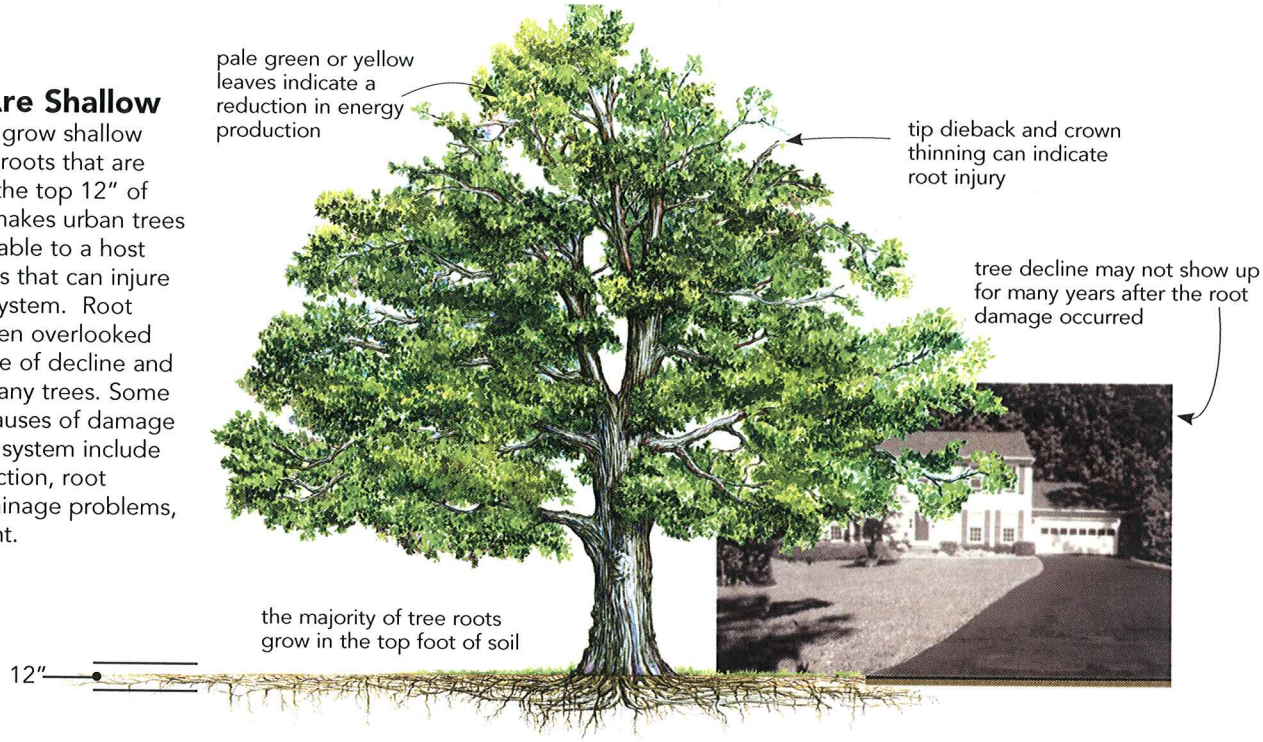
Using Cambistat® to Help Trees with

Injured Roots

Roots Are Shallow

Most trees grow shallow absorptive roots that are located in the top 12" of soil. This makes urban trees very vulnerable to a host of problems that can injure their root system. Root injury is often overlooked as the cause of decline and death of many trees. Some common causes of damage to the root system include soil compaction, root cutting, drainage problems, and drought.



Soil Compaction	Root Cutting	Drainage Problems	Drought
Soil compaction harms tree roots by reducing oxygen and water exchange which inhibits root expansion. Trees in compacted soils are smaller, less healthy, and will die sooner if the compaction is left untreated. There are a variety effective methods to alleviate soil compaction. Talk to your arborist.	This can place a tree in jeopardy from structural failure and dehydration. Good planning is the best solution. If possible, re-cut any crushed or broken roots with a sharp saw or pruning shear. This will enhance their recovery.	Too much water suffocates roots and allows anaerobic conditions to form. This promotes diseases for both your trees and grass. It is better to water deeply and infrequently than many small watering events. A general guideline is to deliver one inch per week in a single watering event.	Since fibrous roots are so close to the soil surface, they can dehydrate and die when the soil loses significant moisture and becomes over heated. Mulching the root zone with wood chips is a very effective method of protecting tree roots as it buffers heat and holds moisture.

The Best Strategy for Managing Root Damage is Avoidance.

How Close Can Root Damaging Activity Come to a Tree without Causing Injury? The simple answer is the farther away it stays the better. If possible, avoid damage within the drip line of the tree. The more area you can protect the less impact on your tree.

Before Root Damage Occurs. Cambistat is best used before construction activity. Cambistat puts the tree in a more conservative mode by reducing water needs, slowing top growth and redirecting energy to fibrous root growth. A tree with a bottom-heavy balance between the roots and crown will have greater stability during the stress and a stronger likelihood of long-term survival.

Damage that has Already Happened. If root damage has already occurred, try to stabilize the tree and prevent decline. Not all trees may be savable if the damage is severe, and there is significant decline. Cambistat should be used in conjunction with other cultural practices to get the best results.

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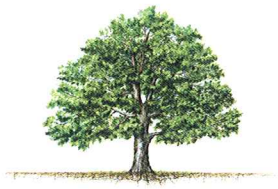

Slower Growing Trees

Trees are energy systems that make their own food, and decline begins when a tree uses more energy than it is making. Cambistat reduces vegetative growth, improves the root to crown ratio, and improves the plant's ability to photosynthesize under adverse conditions. In many species it stimulates fibrous root growth that gives the tree greater ability to mine the soil for water and nutrients. Conservative growth strategies will extend the longevity and help shift the tree back into a favorable energetic balance.

1989 treated 1994 2001

Information and photos from Watson, G.W. 1996. Tree Root System Enhancement with Paclobutrazol. J. Arboriculture 22:211-217

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An Integrated Approach

When caring for urban trees it is important to make a thorough evaluation of the site to accurately diagnose all stressing agents and tailor your recommendation to the specific circumstances. These must be dealt with so that your tree can live to its fullest potential. Utilize your arborist for a comprehensive maintenance program.

Benefits of Cambistat for Urban Trees

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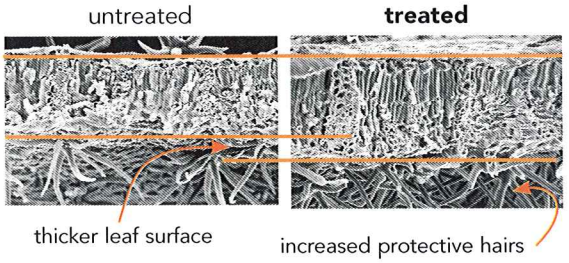

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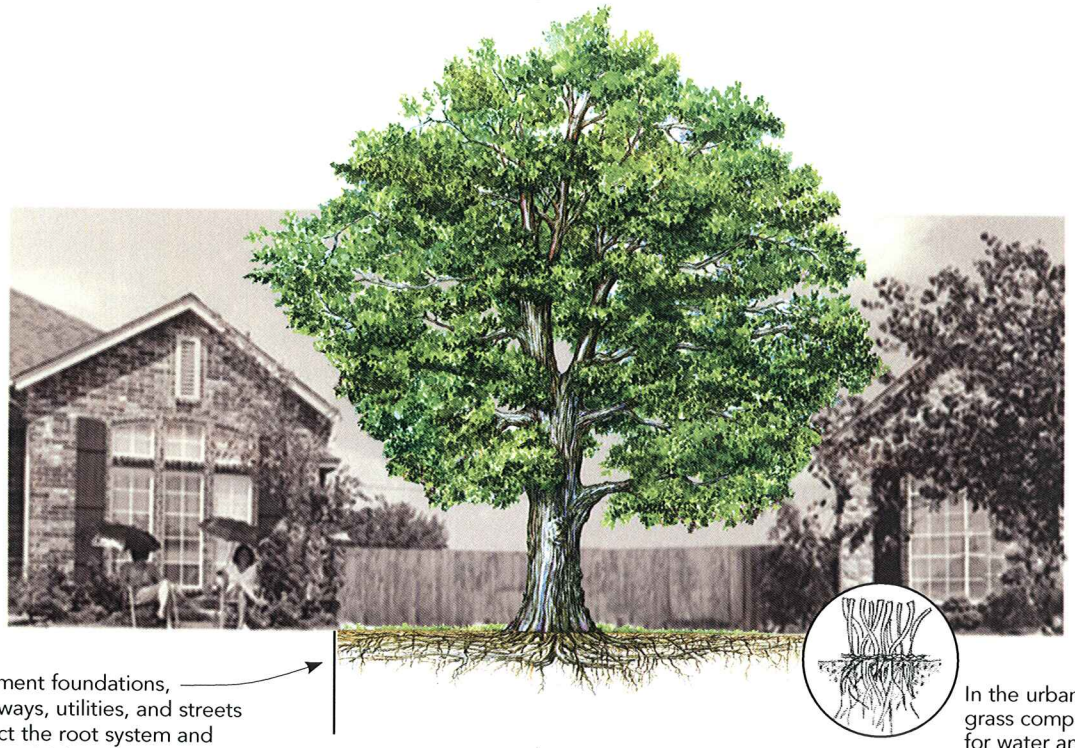
Using Cambistat® to Help Manage

Urban Tree Stress



Basement foundations, driveways, utilities, and streets restrict the root system and limit available resources.

In the urban environment grass competes with trees for water and minerals. This significantly reduces the capacity of a yard to support a tree.

Why Urban Trees are Stressed

Less Water is Available –
Unless regularly irrigated, urban trees generally have less water available than their counterparts in natural settings. Why? Paved surfaces encourage runoff instead of absorption, and these surfaces cause higher soil temperatures and faster evaporation of rainfall.

Restricted Root Space –
Building foundations, streets, driveways, and other obstacles limit the expansion of tree roots and significantly reduce the amount of water and minerals available to the tree.

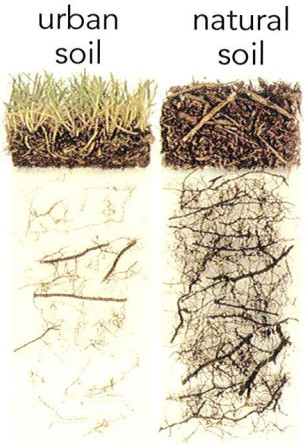


photo: Dr. Gary Watson

Compacted Soils –
Urban soils are usually compacted from human activity, and this creates stress for a tree. Soils can become difficult for roots to penetrate, and compacted soils hold much less water and oxygen which are critical for tree health.

Competition –
Most yards have a dense layer of turf that surrounds a tree. Turf aggressively competes for minerals and water, which reduces their availability to other plants. Adding several inches of mulch within the dripline of the tree reduces competition with turf, keeps the soil cooler, and holds more moisture.

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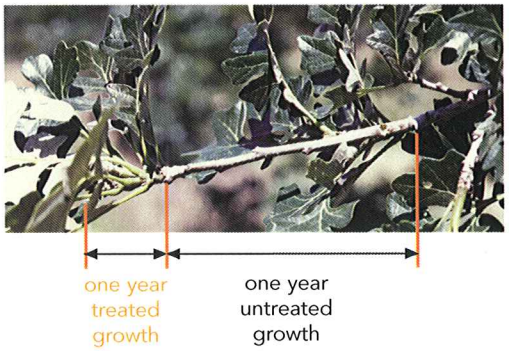

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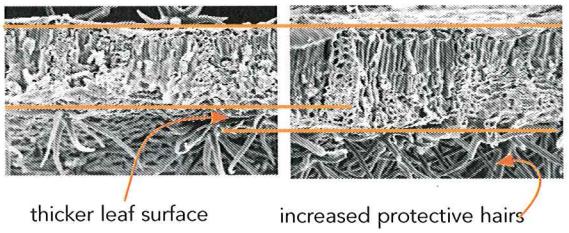

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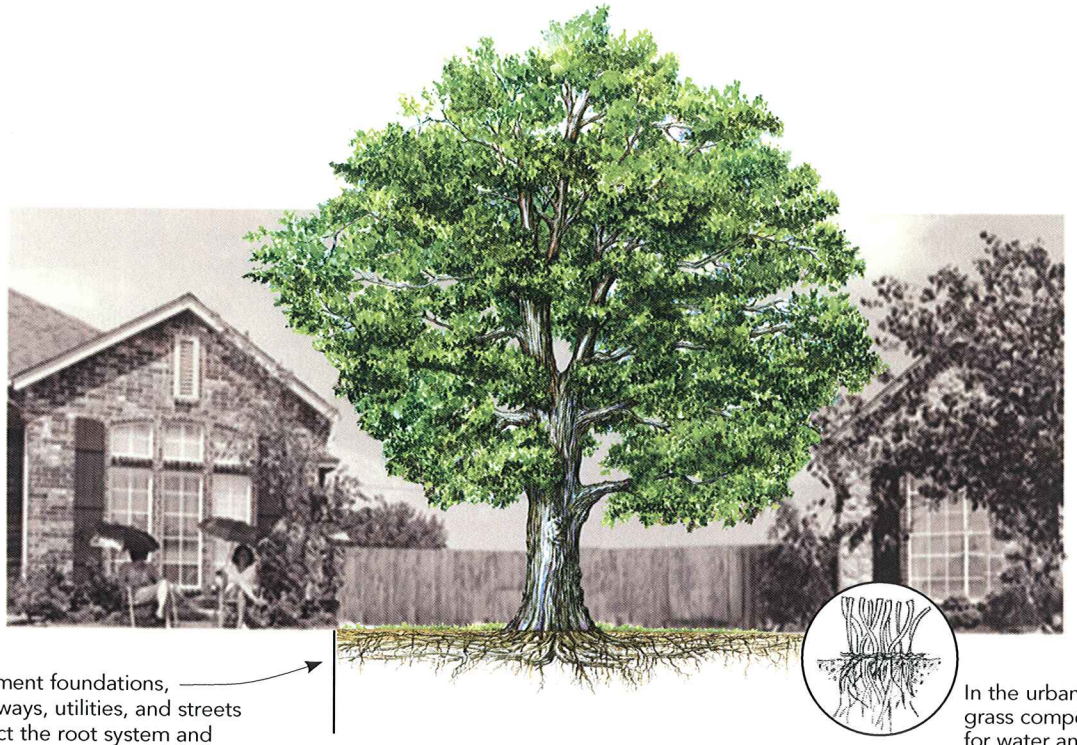

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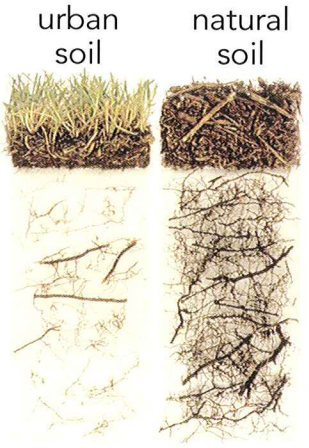

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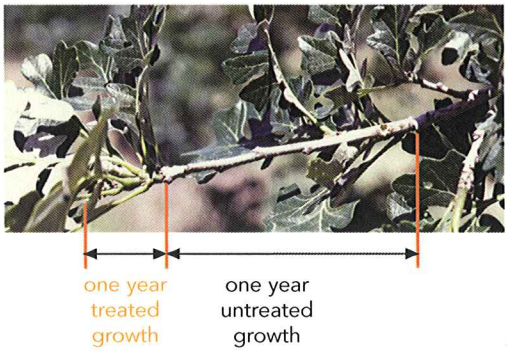

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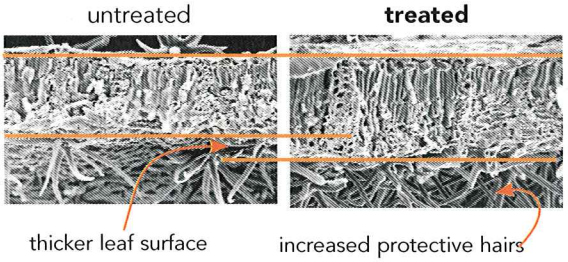

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