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# Autumn 2021

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## TREE GROWTH and TREE HEALTH

### Controlling Growth To Promote Healthy Trees In Urban Environments

Growth is not always healthy. Just ask a doctor if you should eat less and exercise more. The same scenario goes for trees. As trees mature they need to grow less and utilize their photosynthetic energy for other processes like reproduction, defense and storage. In urban environments we often need to slow a tree's growth to help it recover from stresses such as root damage, soil compaction, and severe pruning. Purdue University, the University of Minnesota, Ohio State University, and others have worked to develop products that use the natural growth processes of trees to manipulate growth patterns. One such product inhibits tree growth hormones called gibberellins. When applied to trees, at the proper rates, regulator can reduce and even stop the above ground growth of trees. While growth is slowed, photosynthesis is not reduced, so the trees continue to build up their resources. With the use of growth regulator, trees may benefit from:

- Reduced above ground growth
- Increased root development
- Thicker, darker green leaves
- Enhanced energy reserves
- Stabilization of decline
- Less susceptibility to environmental stresses



### Benefits to Trees

In nature, trees grow. In urban landscapes continued growth is not always desirable. In some situations it is necessary to reduce the above ground growth of trees to reduce their impact on structures, or to prevent them from outgrowing a limited area. Reducing above ground growth of mature trees is also a good thing when planned construction activities may cause root trauma or to rejuvenate damaged root systems.

By slowing canopy tree growth we can reduce the interval between pruning times by over three years. The cost of a regulator treatment is much less than having to perform annual or biannual pruning.

The most recent research also has demonstrated that by reducing above-ground growth, specific compounds in particular regulators forces the tree to reallocate resources to increase root growth and proliferation. Roots are to a tree what the heart is to a human. Without a healthy root system, a tree cannot sustain life. Certain regulators essentially put the tree on a diet of sorts and loses unnecessary fat (growth) that is then put into the tree equivalent of muscle and a healthy heart, its roots.

While it will take years more research to realize all the benefits of growth for the benefit of tree health, many trees in various states of decline have been revived by using growth regulators when all other activities (fertilization, insecticides, fungicides) have yielded little to no results.

At Arbor Care Tree & Landscaping, we use the best regulators available, combined with other plant health care practices as both a stress preventative and as a therapeutic treatment for decline due to root injury.

The best results can be achieved by creating a healthy rooting environment for any tree via proper landscaping with much or through root enhancement procedures. Using quality regulators in combination with these treatments slows the growth of the trees while allowing them to acquire needed elements from the environment and utilize those resources to heal themselves.





The reallocation of energy makes the tree healthier and more durable. Regulator is absorbed by the roots and transported in the xylem to the growing points where it blocks formation of the hormone gibberellic acid. Gibberellic acid is responsible for cell elongation, and it is produced through a series of reactions in the isoprenoid pathway. The result is a 30-70% reduction in growth over a season. (SEE DIAGRAMS FOR DETAILS).

When gibberellic acid formation is inhibited by a regulator, the tree responds with a reduction in vegetative growth. Many species display a 40-60% reduction over a three year time period with one application. Species differ in sensitivity to regulators, but vegetative growth is generally reduced by 40-60% over a three-year period from one treatment. Growth reduction within the first year of treatment may not be as noticeable as in subsequent years.

### 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:

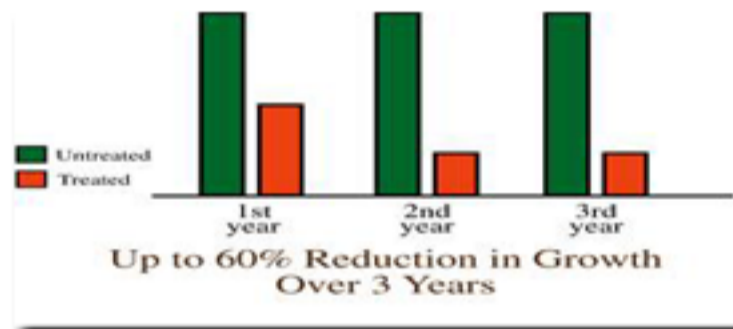
The size of a mature tree is often underestimated, and many trees are planted too close to houses, garages, power lines, and other structures. This type of interference may cause damage to the property and require additional maintenance to correct. Large trees require more water, minerals, and soil volume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

### Slower growing trees

A common myth 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 where space and resources are limited such as yards. The chart at right shows some important differences between a tree growing relatively faster or slower.

### An integrated approach

When caring for urban trees it is important to make a complete evaluation of all environmental conditions to accurately diagnose all stress factors and prescribe care based on specific circumstances. This prescriptive care will help your tree meet its full potential.



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 Durability	Less Durable	More Durable

### Benefits to Shrubs

Better appearing plants

- Treated plants have darker green foliage that won't 'thin-out' in the middle
- Will not cause a yellowing (chlorosis) of new growth

Reduce retrimming

- Treated plants require less pruning and will exhibit a more compact growth habit.

Reduce labor costs

- Fewer trips to the site and less debris to dispose of

Easy to apply

- Foliar spray applications provide more consistent results than granular applications
- Eliminates the hassle of removing mulch and landscape fabric underneath the plants

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