

# Arid Zone Times

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## Quality Control: Principles and Practices

Arid Zone Trees employs an assortment of quality checks within our production process to insure that the trees we bring to market have sound horticultural qualities, are uniform in appearance, vigorous and, with proper care after transplanting, long-lived and an asset to the landscape. The challenges of quality control, when applied to horticultural crops, are unique. Quality control is a process used by all responsible manufacturers to monitor the production of their product(s) and to insure that finished goods meet or exceed the quality parameters expected by the manufacturer and their customers. Quality is a fairly subjective term and can be applied to appearance, reliability, durability or simply consistency (e.g. all our leaves are the same color green). What makes horticultural "manufacturing" challenging, is that the end products are living plants with each species produced having individual horticultural requirements and unique characteristics.

Like any production line there is an array of steps involved in the process of producing trees and quality control measures are best applied at each production step. "Raw materials" like seeds or mother stock (for clonally produced trees), mulch and soil mixes, containers, fertilizer and watering schedules must be carefully selected with the market ready tree in mind. Horticultural practices, pruning, staking, transplanting (bumping from one container size to the next larger) and irrigation must be individually tailored for each species grown.

**Propagation Stock:** Quality trees begin with well-selected and screened propagation stock. Vegetative (cloning) methods are used in the production of desert trees species. Trees that will serve as "Mother" trees for our clonal propagation are evaluated for several years in our demonstration garden to assess horticultural qualities including form, growth rate, response to pruning, cold hardiness, root growth in proportion to canopy growth and water requirements. Additionally, with species



### Arid Zone Trees

*Dedicated to providing quality trees to the landscape industry, that are appropriate to the desert Southwest.*

that are valued for their flowers (e.g. Desert Willow, *Chilopsis linearis*, Sonoran Palo Verde *Cercidium praecox*), flower color, size, abundance and seasonality are also evaluated. New trees are added to the "Mother" block as they are identified, offering landscape design professionals an ever-expanding number of varieties to choose from. Just like seedlings, clone trees start in the greenhouse and remain there until rooted. They are then hardened off and, as they grow, are gradually transplanted through a series of increasingly larger containers until they are "market Ready." While cloned trees address the desire for genetic uniformity, trees are continually evaluated for imperfections in form and structure at each transplanting.

**AZT Root Management:** Trees in the desert southwest are sold and priced by container size (15 gallon, 24" box, etc) and specified or described based on their height, width and caliper. Of these criteria, tree caliper is a widely recognized indicator of root mass. It is the best and most visible way to determine if a tree is overgrown or that the structure of the root system has been compromised in the process of growing the tree in the nursery.

In the pursuit of value, the motto "bigger is better" must be carefully applied when

purchasing landscape trees. The notion that a large tree growing in a smaller box is a bargain is usually incorrect in the long run. Longevity, growth and the vigor of trees depend on a well developed and proportional root system.

Bumping is a term commonly used in the nursery trade to describe the practice of moving plants that have reached their optimal size in one container and transplanting them into a larger container. Plants left too long in small containers can become overgrown and develop circling or bound roots. Root binding is a horticultural time bomb that if allowed to develop, when trees are young, will severely shorten the life of maturing trees by causing crown girdling or by significantly increasing the risk of windthrow from poor root distribution. From the standpoint of production, root binding slows growth and development increasing production time and costs.

Quality control at this level of production involves taking steps to insure that the root system is vigorous, appropriate to the size and stage of development of the tree, and well distributed without being overgrown.

AZT has developed a "Root Management Program" that utilizes an assortment of measures and inspections that are, collectively, designed to optimize root development throughout the growing process. Each time trees are bumped the roots are inspected with an eye for a well distributed root mass and a fine net of lateral roots. One product AZT has evaluated is a root inhibiting product, that can be painted on the inside of smaller (2, 5, & 15 gallon), smooth sided plastic containers, that acts as a barrier and chemical root pruner. When roots come in contact with the treated sides of the container, this product inhibits root elongation while stimulating secondary and lateral roots. Another approach currently evaluating and using with success are air root pruning containers. These containers have open spaces and indentations along their sides that create air spaces that, in effect, prune off the tips of the roots. This process also serves to stimulate the development of secondary and lateral roots behind the pruned tip. A third option, along

the same lines, currently being evaluated for 15 gallons only is fabric liners. This is a porous fabric that can be used in conjunction with a container or be used as a container. The results of all three of these root management controlling containers are denser; more dispersed root systems that enhance the root architecture, eliminate circling roots, and support the overall growth of the trees.

Once planted into the next larger container or in the landscape these tree roots are better adapted to explore surrounding soil and hasten the establishment of the tree. In addition, prior to bumping, the root mass of each tree is examined and numerous vertical cuts are made through the outer edge and bottom of the root-ball to further inhibit circling roots and encourage lateral root growth. This practice is followed when bumping all sizes of trees (liners to 48" boxes).

Roots perform three essential functions for all landscape trees and shrubs. They extract essential nutrients from the soil, are the point of absorption and conduction of water and they anchor the plant in the ground allowing them to resist the forces of wind, rain and the ever increasing weight and mass of the tree itself. It is easy, given the "out of sight, out of mind"

nature of root system to not think critically about its health, vigor and development until it fails. A vigorous, well dispersed root system is critical to the long term growth and survival of any plant but especially trees. Just as we prune the above ground trunks and branches, particular attention must be paid to shaping and fostering a root system that is well distributed, vigorous and, to the extent possibly, free of potentially fatal defects (circling or girdling roots).

The ultimate goal of this process is to optimize the density and distribution of the root system, to eliminate kinked or girdling roots (especially those close to the trunk) and to promote healthy, vigorous growth both in the nursery and in the landscape. Such quality controls reduce production time and expense by accelerating growth, decreasing the need for stake and pruning and reducing the number of cull or unmarketable trees.

**Planting Mix:** The planting soil mix is adjusted to meet the needs of different desert tree species, using a homogeneous blended soil at every stage of tree development. Early in the propagation process (greenhouse) soil mixes are lighter and soil-less. With most species, as trees are planted into larger containers and boxes,

an industry standard ratio of native soil and organic material is used and for the few highly drought tolerant species pumice is added to increase the rate of water percolation and root exploration. The results of recent University research strongly cautions against the addition of organic amendments to the backfill soil when transplanting desert tree species. Consequently, we grow our trees in a mixture of native soil and mulch. Our experience has shown that this mixture promotes strong root development in the nursery and encourages rapid rooting and aid in water penetration when trees are transplanted into the landscape (Arid Zone Times April 2002, "Tree Planting Practices an Overview").

As outlined here quality control at AZT begins with the selection of propagation stock and continues until the tree is loaded onto a truck for delivery to the job site. In a sense our newsletter, Arid Zone Times, is an attempt to extend our commitment to quality control by offering readers state-of-the-art botanical and horticultural information that we believe will help them select the appropriate tree(s), used proven planting methods and maintain trees for vigorous growth and long life.

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