

## Clone versus Seed Production

The modern era is perhaps best characterized by the adage “the only thing that is constant is change.” Significant advances in numerous fields (information technology, biology, medicine and communications, on all levels) offer unprecedented opportunities for innovation and creativity. Urban planners, developers and municipalities are reinventing the notion of community with an eye on improving the quality of life and the need to attract and retain increasingly discerning populations of prospective homebuyers, professionals and artisans. A more attractive urban environment demands imaginative design and high quality, durable landscape plants. To meet this demand, growers must embrace new technologies, innovative propagation and production methods and remain ever watchful for new and better species and varieties to grow.

Ideally, well designed and constructed landscapes combine beauty and durability. With the greater uniformity and consistency, cloned trees offer landscape design professionals a unique and much needed addition to the desert landscape palette. The use of AZT’s multiple clone approach for a give species conserves genetic diversity while providing greater variety of shapes and forms than would be found in single line clones.

With over a decade of experience behind us at AZT, it is increasingly clear that vegetative propagation of desert adapted trees is an attractive and horticulturally sound alternative to seed propagation.

To meet the ever increased demand for both formal and more natural formed trees, growers have traditionally employ both seed and vegetative propagation methods for producing desert adapted landscape trees. Each propagation method has its virtues and challenges. Many growers have relied almost exclusively on collected seed for the propagation of desert trees. Producing trees from seed has been the most economical method and therefore the preferred method, by most nurseries, for producing large quantities of plants when uniformity and horticultural consistency are not the primary objectives.

Growing from seed preserves a portion of the genetic diversity, character and horticultural qualities of desert region trees represented within the grower’s seed source. Variety in tree shape and form is particularly valued in landscape designs that attempt to recreate desert settings or integrate with surrounding native desert. Large inventories of uniform or similarly shaped trees, like those desired in streetscape planting or more traditional landscape designs, has been accomplished, in the past, by producing large numbers of seedlings of a given single species.

To insure the desired quality and uniformity in seed propagated species, trees that exhibit undesired horticultural characteristics (thorns, asymmetry, leaf type and number) or genetically inferior forms must be culled or removed from the inventory. The criteria used for culling a particular tree varied depending on the specie being produced and on assumptions of what constituted the most desirable characteristics. Highest quality and consistency are achieved when culling is done continually in all stages of production and container sizes, beginning with liners and repeated until the inventory is brought to market (15 gallon through 48”). As a consequence, culling is an expensive, time consuming, wasteful method, yet remains the only successful means to insure that seed propagated, mature specimens exhibit the most desired horticultural qualities. The ultimate quality of the trees produced will be significantly influenced by the vigilance, consistency and rigor applied throughout the culling process.

Vegetative propagation (also called clonal propagation or cloning) has proven to be a highly reliable alternative to seed production. With cloning, plant parts (typically fresh, lush, green, terminal branch growth) are treated with plant growth hormones, under environmentally controlled greenhouse conditions, to encourage the formation of roots. Once rooted, cuttings are then grown like seedlings to produce new trees. Using this method new plants, identical to the original "mother" plant, are produced. Rooting plant parts insures greater uniformity and reduces the need for the costly, time consuming culling to remove

trees with undesirable qualities. Cloning provides a useful method for producing large numbers of genetically uniform trees that exhibit similar form, structure, flower color, leaf pattern or any other desired physical quality or appearance.

The challenges associated with bringing quality cloned trees to the market have always been to 1) select trees with the desired physical characteristics (branch structure, flower color and amount, foliage, thorns); 2) insure that these selections possess sound horticultural qualities (well-distributed root mass, cold hardiness, growth rate and form) and 3) can be successfully and efficiently propagated on a large, commercial scale.

While cloned plants will exhibit all the desired physical features of the mother plants, they will also possess all the other positive and negative physiological and horticultural qualities of the parent. These qualities may go largely overlooked or unseen due to a lack of expression in young trees or masked by the absence of necessary horticultural or environmental conditions. Careful and continual evaluation of parent (“Mother”) plants for defects is essential to insure that undesired qualities like poor rooting, susceptibility to disease or insect pests, wind throw or cold tenderness are avoided. Given the diversity of environmental conditions across the “greater” desert southwest (Southern California, Southern Nevada, Central and Southern Arizona, New Mexico and Texas), growers must always be on the lookout for new, better adapted trees to add to their collection of “Mother” stock.

The quality and durability of these trees will still depend on the care and attention given to the selection of propagation material (seed or vegetative) and the attention paid to sound growing and quality control practices in nursery production, as well as sound horticultural practices in the landscape

Arid Zone Trees (AZT) began its research on cloning desert trees with two principles in mind. First, that there are many individual trees within a given tree species that may exhibit desirable characteristics for landscape applications. And second, that all trees developed and marketed by AZT need to possess both desirable physical and horticultural characteristics. To satisfy both goals we embraced a multiple clone approach. By identifying a number of trees, from within an individual species, with desirable characteristics, we can offer uniformity while maintaining genetic diversity. The search for new trees to clone continues and offers the opportunity to introduce new clones as suitable selections are identified. We use the *Variety ‘AZT’* name on all our cloned trees to allow us to add new trees as they are identified while still assuring our clients that all selections are the product of our lengthy screening and evaluation process. All ‘AZT’ varieties epitomize Arid Zone Trees’ commitment to quality and innovation.