

# ROOTS: THE KEY TO IMPROVING

# Efficiency

**N**utrient absorption occurs primarily at the white root tips. One root tip can absorb a given amount of nutrients in a day, week or month. If one root can be stimulated to branch and create 10, then branching of those 10 to create 100 and beyond, nutrient absorption is similarly improved... For ANY fertilizer or growing conditions.

Root systems of any plant can be transformed into a more efficient complex by starting with seed germination in RootMaker® propagation containers.

This transformation begins a few days after seed germination when the tip of the taproot reaches the bottom and is air pruned. When a root tip is guided into an opening and exposed to air it dehydrates and dies. Air-root-pruning has the



cultural advantage of pruning without toxic chemicals or creating open wounds. Unlike a cut root, an air-pruned root tip has been effectively cauterized, leaving little chance of pathogen entrance. The tip of all roots, but especially the tip of a vigorous taproot produces hormones that suppress production of secondary roots along the root axis. The same phenomenon is in progress above ground --- repeatedly remove tips of branches of a shrub and soon you have a thick hedge. RootMaker® container designs not only air-root-prune at the bottom, but also at strategically placed openings in the sidewall. At time of transplanting, a network of root tips is aimed to grow in all directions radially as well as downward.

**M**ost plants have a relationship with a microorganism called mycorrhize fungi. Oxygen and temperature play key roles in microbial activity. By creating a fibrous root system that expands quickly into soils, where interaction with these beneficial organisms is greatest, nutrient absorption further improves.

The mycorrhizal association is symbiotic. Mycorrhizae colonize only healthy roots with energy (sugars) to share.

By improving nutrient absorption and transfer to leaves, a greater quantity of energy is produced and shared with the root system and in turn, the mycorrhizae. Mycorrhizal associations with roots may occur during propagation but more importantly, by creating a fibrous root system the favorable association increases as plants grow larger.

Plants propagated in smooth-walled trays and containers that encourage circling roots and minimize root branching, typically grow taller and more slender and have fewer flowers and fruits. By contrast, plants propagated in RootMaker® containers are shorter with stouter stems and more flowers and fruits. An improved root system pays dividends in all aspects of plant growth, health, flowering and fruiting with any fertilizer. Plant growth and productivity is all about energy and an efficient root system is a major contribution.

*(Adapted from Dr. Whitcomb's article.)*

[www.rootmaker.com](http://www.rootmaker.com)

1-800-824-3941