



The Slender Axis Planting System

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The Slender Axis system is a higher density variation of the Vertical Axis which has a narrower profile to accommodate tighter spacings. Research has shown that trees planted at higher densities respond with less vigor and can be kept within their allotted space with appropriate management. Higher tree densities mean additional yield in the early years, essential for profitability. Many of the essential tree management practices are those used in the Tall Spindle system.

Characteristics of the Slender Axis system include a row spacing of 12 feet, in-row tree spacing and canopy spread of 4 feet, a tree height of 10-12 feet, canopy spread across the axis is 2-4 feet wide, and with a tree density of 908 trees/acre arranged in a single row.

Keys to success of the Slender Axis are identical to those for Vertical Axis except there is less tolerance for poor tree quality and more attention must be paid to early tree care and management. Nursery trees must have an excellent root system with 8-10 feathers and be fully dormant at planting. Irrigation or regular watering is necessary to help keep above ground portions of the tree healthy and happy. Although transplant shock is important establishing this system, trees must put on some growth to fill the space and at the same time set fruit buds for a crop in the second leaf.

A fully dwarf rootstock must be used. Malling 9 or Bud 9 have proven to be excellent rootstocks for this system. We believe that the improved yield efficiency and fireblight and other disease tolerances make Geneva 41, G.11, and G.16 excellent choices for this planting system.

Trees are minimally pruned at planting only removing larger caliper feathers and tipping each feather and the leader by removing only 2-4 buds. Very vigorous upright feathers should be tied down. Competitive shoots within 4 inches of the leader should be completely removed and vigorous new shoots in the top ½ of last year's leader pinched when they become 4-6 inches in length. This is done by simply using a thumb and forefinger to "pinch" out the growing tip. "Pinching" should continue until shoots can no longer be reached from the ground, usually through the 3rd leaf.

The object is to fruit this system as early as possible yet maintain crop loads that will assure return bloom and cropping. Depending on variety, allow no more than 5-8 fruit per square centimeter of trunk cross sectional area per tree.

A support system should be established in the 1st year and consist of support posts spaced no further than 35 feet apart with a single high wire and individual tree stakes. An alternative support system is to use longer support posts (12ft) spaced 35 feet apart, 10 feet out of the ground with a four wire trellis system. This system is best when temporary training stakes are fastened to the wires and used for early support.

Optimum tree health is important for the success of this system. Foliar feeding pests such as mites, aphids and leafhoppers must be managed at low levels the year of establishment. Since economical yields of fruit are expected in the second and third leaf, aggressive pest management practices must be undertaken to avoid crop losses early in the life of these plantings.

Simplified Pruning and Training Plan

Year of Planting – Plant quality nursery tree with 6-12 feathers and rootstock shank 4-6 inches above ground level while tree is completely dormant at appropriate spacing. Remove feathers that are more than $\frac{1}{2}$ the diameter of the leader where they insert using a bevel cut. Tip the leader and feathers removing a few inches from distal ends. Apply $\frac{1}{4}$ # of Calcium nitrate after the soils settles with a soaking rainfall. Apply another $\frac{1}{4}$ # CaNO_3 after growth starts. Select the leader and remove all competitive shoots 4 inches below the selected leader. Irrigate or water trees as necessary to maintain soil water status. Install a 10 foot conduit stake shallowly and attach each tree to stake with a Max Tapener. Install support posts and wire when possible and attach previously installed stakes to wire with a potato bag tie. Alternately use a 4 wire trellis using 12 foot end and inline posts, with a small bamboo training stake which runs from the 2nd to the 4th wire.

2nd Leaf - At dormant remove scaffolds that are more than $\frac{1}{2}$ the diameter of the tree at the insertion point using a bevel cut. Single the leader removing any competitive shoots. Single scaffolds by removing forks. Bend or tuck uprights along the scaffolds that are appropriate for fruiting wood under adjacent branches to weaken them. Remove exceptionally strong suckers. Weight or tie down scaffold branches that are too vigorous and upright to just above the horizontal. “Pinch” back all shoots in the top half of last year’s leader when they reach 3-6 inches by removing the growing tips using your thumb and forefinger. Repeat this operation as new shoots appear or previously pinched shoots regrow. This may take three passes for vigorous varieties. Thin crop to single fruit spaced 6-8 inches apart. Keep all insect and disease pests under complete control with frequent scouting and appropriate pest management practices. Control of foliage feeding pests such as aphids, mites and potato leafhopper are extremely important to ensure continued tree growth and fruit bud development. This year’s crop is important to help ensure the profitability of this planting system.

3rd Leaf – Continue to remove inappropriate and large scaffolds using renewal pruning concepts. Remove broken branches. Select the leader by removing competitive shoots and single the ends of the scaffolds removing all forked ends. Remove all vigorous upright suckers from along scaffolds. Prune up ends of scaffolds to appropriate shoots that will not interfere with herbicide applications and support the crop load. Tie tree to stakes or wire with permanent tree tie to help support crop load on the leader.

“Pinch” back new shoots in the top $\frac{1}{2}$ of last year’s leader that can be reached from the ground. Thin fruit to singles by hand so that they are at least 4-6 inches apart or appropriate for the tree size and condition. Irrigate as needed to maintain tree growth and optimize fruit size. Lightly summer prune removing just a few shoots to open up tree. Keep all insect and disease pests under complete control with frequent scouting and appropriate pest management practices.

4th Leaf – Remove all broken branches, cut up scaffolds to facilitate herbicide applications. Remove large branches that do not fit the system. Remove uprights and weak hanging shoots and suckers. Tie tree to the top of the stake or top wire with permanent tree tie if not done in the previous season. Use appropriate rates of chemical thinner and follow up with hand thinning. Summer prune to open canopy and optimize fruit quality when seasonal growth has stopped. Keep all insect and disease pests under complete control with frequent scouting and appropriate pest management practices.

5th Leaf to 20th Leaf - Remove bottom scaffolds as appropriate until 3 or 4 remain. These are permanent and should only be cut back to facilitate the movement of equipment through the orchard. Remove other limbs using renewal concepts. Manage the tree top by allowing crop to bend leader above the support stake or wire. When broken or bent below the horizontal, leaders can be cut back to new upright, NOT BEFORE. Manage the crop load through chemical and hand thinning to ensure annual bearing.

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