



The Slender Pyramid Planting System

By Steve Hoying, Terence Robinson and Mike Fargione
Cornell University Cooperative Extension, Hudson Valley Lab and NYSAES.

The Slender Pyramid system was developed in New Zealand in the early 1980's and described by Tustin et al. 1990. This is a supported lower density system using semi-dwarf rootstocks. Management practices are a combination of those used with the Central Leader system and the limb renewal concepts used in the Vertical Axis through the establishment phase. This system appears to be particularly suited to New Zealand's long growing season; less so in the United States since the system does not have time to fill its allotted space with growth after harvest. Our Slender Pyramid system is slightly modified from the NZ model to accommodate this difference by reducing the between tree spacing.

Characteristics of the system include a between row spacing of 16 feet, in-row spacing of 8 feet, a tree height of 14-16 feet, pyramid shaped trees, a tree density of 340 trees/acre which are planted in single rows. Appropriate rootstocks for this system are M.7, M.26, G.30, G. 935, and G.6210.

The Slender Pyramid system's major drawback is that it is very slow to begin to bear and reach maximum potential yields. Partially, this is because of the vigor of the rootstocks needed to fill the available space and the bearing characteristics of these stocks. Although initial investment is less than higher density systems, returns and overall profitability has been substantially less than any other planting system with densities approaching 1000 trees/acre.

The major difference in the early management of the Slender Pyramid is that trees are not headed at planting and the bottom tier of branches are encouraged to fill the allotted space by removing unwanted extra lateral shoots from the central leader during the first 2 years in the orchard. The number of basal scaffolds allowed to remain depends on the space the tree needs to fill. Unrestricted extension growth of the central leader is ensured by removal of competing lateral shoots. In the second, third, and fourth years, branch selection among new lateral shoots arising from the central leader was made in early summer. Unwanted shoots with narrow crotch angles, excessive vigor, or in poor positions on the central leader are completely removed. This method of young tree management ensures rapid canopy development to form a hierarchy of loose whorls of fruiting branches of flat orientation and decreasing vigor up the central leader. There is a real danger that unless carefully managed, the leader will not achieve the desired tree height especially on the more precocious rootstocks such as M.26 because of heavy cropping and loss of tree structure.

When necessary, upright lateral scaffold branches are flattened to angles of 20-30° above the horizontal plane in Year 2 using tree spreaders or by tying down scaffolds.

The installation of a support system is necessary to prevent trunk breakage and preserve the leader with heavy cropping. This is especially true with M.26 and G.30 rootstocks which can be brittle. It is important to use one

low wire to fasten bottom scaffolds to prevent twisting and trunk breakage. This system on M.7 will produce a substantially taller tree and be slower to bear with smaller a smaller fruit size.

This planting system is not recommended for New York and has been established for comparative purposes only!

Simplified Pruning and Training Plan

Year of Planting – Plant quality nursery tree with as many feathers as possible. Adjust rootstock shank so that it is 3 inches above soil level. Plant at appropriate spacing depending on rootstock and variety but normally about 8 feet apart. Remove feathers below 12 inches with a flush cut. Do not head leader or feathers. Irrigate or water trees as necessary to maintain excellent soil water status. Select the leader and remove all competitive shoots below the leader. Install a support system that will allow trees to be supported 10 feet. This can be individual stakes or a high wire and stake system. Attach tree to support system with a permanent tree tie above 1st tier of scaffolds. Control all foliar feeding pests throughout the season ensuring near perfect foliage condition and growth.

2nd Leaf – DO NOT HEAD THE LEADER. At bud break, score above buds if additional scaffolds are needed. Single the leader removing any competitive shoots. Single scaffolds by removing forks. Thin crop allowing only those spurs closest to the base of the basal-tier limbs to carry crop. Tie down 4-6 scaffolds so that they are 15 degrees above the horizontal in July. Keep all insect and disease pests under complete control with frequent scouting and appropriate pest management practices.

3rd-5th Leaf – DO NOT HEAD THE LEADER. Remove only vigorous upright limbs that are more than 2/3 the diameter of the leader using a “bevel” cut. Remove competitive shoots with the leader. Remove all lateral shoots that are excessively vigorous, have narrow crotch angles or are in poor position. The branches along the leader of the tree should have a hierarchy of decreasing vigor up the leader. 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-6th Leaf – See above. Progressively reduce the number of basal-tier branches to an optimum of 4 arranged in a cruciform array across and along the row, by removing one each year.

Mature Pruning - Remove and renew upper-scaffold limbs when they cause excessive shading and to develop new fruiting wood. Limit tree to desired height by cutting leader back to a fruitful side branch. Shorten bottom-tier scaffolds by pruning back to side branch to facilitate equipment movement and preserve fruit quality on lower limbs. Summer prune to encourage light penetration and maintain pyramidal tree shape.

The information, including any advice or recommendations, contained herein is based upon the research and experience of Cornell Cooperative Extension personnel. While this information constitutes the best judgment/opinion of such personnel at the time issued, neither Cornell Cooperative Extension nor any representative thereof makes any representation, endorsement or warrantee, express or implied, of any particular result or application of such information, or regarding any product. Users of any product are encouraged to read and follow product-labeling instructions and check with the manufacturer or supplier for updated information.

Cornell University provides equal program and employment opportunities.