Growing Fuji Apples in Eastern Washington

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I personally own and operate approximately 100 hectares (247 acres) of apples in both the warm, dry growing regions of eastern Washington and in the cool, humid growing region of western Washington. I have been involved in fruit growing and most aspects of the fruit industry for almost 20 years. For four generations, my family have been fruit growers.

I grow Fuji in the major apple region of eastern Washington. It is a dry, semi-arid climate with hot summers and cold winters. Fruit sunburn with Fuji can be variable. We have just enough length of season to mature Fuji. Late October and early November freezes are a concern in achieving proper maturity.

The principal Fuji strains that are planted in our area are BC2, Naga-fu 6, Naga-fu 12, with many new strains with better coloring possibilities being considered. Rootstocks used include MM.106 and MM.111 for the larger trees that were grafted over from another variety to Fuji. Most new plantings are with M.26 or M.9 or occasionally M.7.

My original Fuji planting was 1.75 m by a little over 4 m (5.7 x 13 ft) on M.26 rootstock. This would be approximately 1300 trees/ha (526 trees/acre). The trees are grown on a French Vertical Axis system with a 4-wire vertical trellis used for support. Originally I created a lower whirl of six to eight branches, though I have reduced them to four or five main branches over the subsequent years. After the original whirl of branches, the trees are allowed to go unheaded and only smaller side branches are retained in the upper areas. The original whirl of branches is just below 1 m (39 inches) in height and the trees have now reached slightly over the 2.5 m (8.2 ft) height. The top yields reached with this system on Fuji have been around 35 to 40 metric tons per hectare (t/ha).

This system has proved only moderately successful for several reasons. The main concern is that there are too many large branches in the trees and too many large branches growing too vigorously, leading to "blind" wood problems.

I have another planting in its third leaf planted at 1 m by slightly less than 4 m (3.2 x 13 ft) on a 'V' trellis system. This is approximately 2750 trees/hectare (1113 trees/a). This system has produced 25 t/ha in the third leaf. The trees are trained to a metal trellis with 8 wires. Attention is

placed on the removal of large limbs in the lower part of the tree from an early age. The branches are trained to the wire to slow their growth, support their weight and help reduce wind damage. This system appears to be manageable and productive, though it comes at a high cost and has its own set of problems. I believe one of the greatest challenges new training systems for Fuji must address is limiting the size of the wood, thus minimizing its blindwood problems. I have planted some trial plantings at approximately 10,000 trees/ha (4050 trees/acre). Where I have achieved acceptable growth without excessive nitrogen and without heading pruning I have been able to achieve a more uniform production of lateral branches and more even production of fruiting wood.

We also use the technique of bagging fruit. Though very expensive, some growers, myself included, have used this technique, especially in the years when Fuji orchards are young. Sunscreen (shadecloth) has been tried with varying degrees of success, as some of our area deals with more sunburn and warmer temperatures than others. Its expense versus benefit ratio is still being questioned. I personally am observing its benefits but use overhead irrigation to cool the fruit during hot weather. Our irrigation systems are usually designed to irrigate either over the top of the orchard for cooling or undertree for normal irrigation. This results in lowering the ambient air temperature, thus reducing sunburn. Reflector mulches placed between the orchard rows have been tried with varying degrees of success. It is not in widespread use.

It appears that management of crop load of Fuji is very important for return bloom, fruit size and coloring. With chemical thinning and the use of Ethrel we have been able to achieve return bloom. Our best results the last few years have been with Sevin (Carbaryl) at petal fall (3 days after full bloom), followed at around 9 to 11 mm fruit size with Sevin/NAA/Ethrel. We have also used Ethrel at 42 and 55 days after full bloom to improve return bloom. We also use extensive hand thinning after the original chemical thinning sprays to achieve the desired crop load.

The variability in crop load, fruit size and coloring is still challenging to those of us conscientiously attempting to grow high quality Fuji in Washington State.

The last topic involves issues of cold storage of Fuji. Internal browning, watercore and external staining are some of the more common storage issues in Washington. The internal browning problems we have dealt with seem to be worse when the fruit is picked with severe watercore and then stored at less than optimal atmosphere conditions. At first we presumed Fuji would handle a fair amount of watercore, which it does, but we attempted to store watercored fruit for too long. Our storage strategies are changing as we get more experience with this apple. Brown staining is another condition that occurs in certain orchards and certain microclimates (my orchard being one

of them). No information on the cause of this disorder is available, though excessive nitrogen levels in the fruit and calcium/magnesium imbalances are being studied. Bagging seems to minimize or eliminate staining.

Summary

Apple growers in Washington State have made a strong commitment to grow this new apple to the best of their ability, realizing it will take different approaches with Fuji than with other varieties. There is a realization that we cannot achieve high yields with this variety. Working toward minimizing blindwood and more natural growth of the tree as opposed to excessive vigor seems to be working best for more even fruit set. Keeping large wood out of the tree is critical for proper coloring and balance within the tree. Crop load management through early thinning to avoid very large crops and biennial bearing problems is the key to consistent cropping.