

Building the Perfect Orchard – Experiences with Orchard Establishment in Nova Scotia

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The first apple trees planted in North America were in Nova Scotia's Annapolis Valley in the early 1600's. One would think that after 400 odd years of growing apples that we would finally have it right!

For most of the last four centuries our industry was based on the large seedling or "standard" tree's, with a density of 40 -100 trees per acre. The development of the Malling series of dwarfing rootstocks in the 1960's led to a flurry of activity in planting a number of good sized orchards on mostly semi-dwarfing stocks. The problem was, there was very little done in the way of land preparation and the trees were widely spaced, often at 100-150 trees/acre.

About this time a disorder known as Specific Apple Replant Disease began to appear. Basically what happened is that the new trees which were planted in place of the grand old towering trees failed to grow in the first two or three years after planting. A complex of soil borne pathogens was identified as the cause, rather than high nematode levels which have been implicated in other areas. Some orchards were fumigated prior to planting, but only to a depth of 6-8". The trees continued to be planted at fairly wide spacing's in hopes that they would eventually fill their space. In most cases this never happened, and the average per acre production never reached an economically sustainable level. We were also planting low valued varieties such as McIntosh, Cortland and Ida Red, which did not help the situation. The industry started to decline, and was well on its way to becoming insignificant.

In the mid 1990's we recognized that we had to do something. We started travelling around the world to see what we were doing wrong. Following a trip to South Africa, we realized that significant improvements were well within our reach. We hired a soil scientist from South Africa to come work with us for a two-year term and he liked it so well that he never went home.

We started out by identifying blocks that were losing money and removed the trees. We then went in and dug test holes with a backhoe in a grid across the property. Soil samples were taken at various depths and sent for chemical analysis. Problems such as soil compaction or poor drainage were identified. A deep ripping plow was constructed, and where required the soil was ripped and/or mixed to a depth of 48" using a bulldozer to pull the plow. The rows were then formed into ridges using a blade or a specially designed set of disc harrows.

It was identified that we were not fumigating the soil to a depth where the bulk of the roots were growing. To correct this, we purchased and modified a deep shank fumigator that placed the material deeper in the soil profile.

Poor quality nursery stock was the rule rather than the exception in our area. To correct this, we began to import high quality, large caliper trees from the United States. Small trees were rejected by the farmers at delivery. These were planted closer together and in very straight rows using GPS guided tractors and tree planters.

No more free standing trees were planted. Even semi-dwarfing stocks had the tops supported with simple yet effective trellis systems. No more single tree stakes were used as these were prone to leaning and breakage. At close spacing's the trees needed to remain upright or the system became unmanageable. The most common system consists of a two wire trellis with a leader support attached to each tree. This was usually an electrical conduit attached to the wires with a special high tensile clip. Bamboo and 12.5-gauge wire have also been tried with varying degrees of satisfaction. The trellis is supported by 12' pressure treated poles driven 30" in the ground spaced every 30-40' in the row. Fourteen-foot poles driven 4' in the ground are used on each end. These are angled back about thirty degrees off vertical. The poles are driven with a plate tamper affixed to the boom of an excavator.

A 48" long screw in anchor is used at each end, with ratchet tighteners used to keep the wire tight. Various four and six wire trellises have been tried, but the growers have tended to be unhappy with the constraints on movement imposed by these systems. However, once the spacing drops to less than 2' these systems become more attractive from a cost standpoint.

An intensive irrigation study was undertaken, measuring soil moisture levels and tree growth in various soil types. It was ascertained that irrigation was beneficial in some cases, but only in our lightest soils. Systems were installed in areas that required them.

So then an amazing thing happened. When we prepared the soil properly, planted good trees close together and supported them properly, we began to grow a lot of apples on a little area. In fact we could grow almost as many apples per unit area as the other apple growing regions. We had been using the excuse of climatic limitations to production for so many years that we actually started believing it. All of a sudden we were producing 1000-1200 bushels per acre instead of 400 bushels per acre, which was the historic provincial average.

When we combined the high annual production with high value varieties such as Honeycrisp the industry began to grow. There were some growers who did not embrace this way of growing apples and most of them are now gone or will be shortly. Those who did are financially stable and many have children who are anxious to get into the business. What a far cry from where we were twenty years ago.