

## **A Case Study of Organic Apple Production: Champlain Orchards, Shoreham, VT**

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*The following information is drawn from an interview with Bill Suhr, owner of Champlain Orchards in Shoreham, Vermont, on March 16, 2007. We sincerely thank Bill for sharing his knowledge, insight, and experiences in organic apple production.*

### **Introduction**

Champlain Orchards, operated by Bill Suhr since 1998, is located in Shoreham, Vermont. The 100+ year old farm is located on a knob of land in the Lake Champlain valley among neighboring orchards. Orchard soils consist of Vergennes clay and Farmington loam. Champlain Orchards operates on 60 acres using Integrated Pest Management (IPM) practices. Of this, nearly 10 acres are certified organic for the production of vegetables, raspberries, peaches, cherries, plums, and apples. Organic production began in the year 2000. Champlain Orchard sells their products largely through wholesale (95%) with a small amount (5%) of retail (pyo, farm market sales, and CSA).

The transition to organic production on parts of the orchard was prompted by promising marketing opportunities. There are very few local organic producers. “Absolutely what was driving the first move was customer demand. Environmental concerns are relevant here, my long term health and the health of the land, but really what pushed it was the customers and the challenge. The challenge meaning, if no one is going to do it, I would like to at least try.” Using an abandoned block, a switch to organic entailed no sacrifice of existing production to “try something different”. Likewise, no upfront investment in additional equipment was necessary because the Northeast Organic Farming Association of Vermont (NOFA) allowed a one year trial use of a conventional sprayer in the organic orchard provided a thorough cleaning of the tank was performed. A dedicated organic sprayer has since been purchased. Allocating land for a new planting later on was a greater risk but the decision was based on the experience of the first orchard block.

### **Establishment and Horticulture**

There are 2 acres of certified organic apples in production between two orchard blocks. Block #1 was transitioned to organic from an existing, abandoned block of mature ‘McIntosh’ and ‘Empire’ trees on M7 rootstock. These trees are spaced at roughly 12 feet with 18 feet between rows. Block #2 is a new planting of cherry, plum and apple trees. The apple cultivars in this block are disease resistant ‘Freedom’, ‘Crimson Crisp’, and ‘Pristine’ on M7 rootstock. Trees in this block are spaced at roughly 10 feet with 16 feet between rows to conveniently adjoin a neighboring block. More disease resistant cultivars, such as ‘Liberty’, will be added to this block over time in the available remaining space.

The land for Block #2 was previously orchard. Trees and stumps were removed and conventional corn was cultivated for two years by a neighbor. The land was then broadcast

seeded with an orchard mix of grasses and clover and fallow for one year prior to planting of the new orchard in spring 2003 using non-organic trees purchased from a nursery. Trees were chosen based on availability and cost per tree. Because the trees were not organic, the transitional period began when they were planted and the orchard was certified organic three years later.

“Certainly there is a large expense in the removal of the previous orchard. I don’t know what that cost per acre was but it was high because these were small blocks of trees. Clearly, today there might be incentive to graft over if you have the right rootstocks.” Harvesting some of the wood did offset the cost of tree removal although this method was more time consuming. The purchase of a tree planter, following planting of Block #2, will facilitate future plantings.

“The one thing I would do differently on the site prep is that we had multiple locations that did need drainage tile. It is so easy to forget to invest at that point in tile but it is an extremely important thing. If you have a somewhat marginal site due to moisture, it would be imprudent to ask the organic tree to overcome that challenge. They really do need the very best site they can have – drainage, air movement, and super soil.” Young trees are irrigated by a tank with a hose depending on the season; otherwise, there is no active irrigation of the blocks.

The trees in the Block #2 new planting are temporarily staked individually with metal conduit poles. The rootstock provides for “a bit hardier tree” so they are being spread and trained to a Freestanding Central Leader. The cost of these poles is prohibitive compared to the cost of the trees themselves so poles are removed and reused as much as possible as the trees mature. Poles salvaged from other orchards that have gone out of business or mature blocks are inverted and reused. Bent and broken poles are used as short stakes. A three wire trellis system is being tested in an IPM block to bypass the need for poles at each tree.

Each individual tree has a ring of crushed stone holding down the edges of window screen vole guards. A significant expense in materials and labor is needed to install the guards during establishment of the trees. White oak scrap lumber from a local mill are staked next to each tree trunk opposite the 10 foot metal conduit in order to provide protection from the kicker wheel of the perfect mower.

An orchard mix groundcover of grasses and clover is grown on the organic block floors. Frequent mowing (4-5 times per year) is employed on the entire orchard in place of herbicides, at the expense of time and fuel costs. Time is required to double-stake each tree to protect from the mower, then a “tremendous amount of time” is necessary to mow slowly because smaller mowers are being used. Scything and machetes are used around the trees once per year in the autumn. “Obviously, establishing a young orchard is very challenging without the use of herbicides but we experience that in our IPM blocks anyway so we are accustomed to the machete labor and other tools. I think because of the frequency of the mowing and the ability to mow inside the row that our weed pressure is low. But it is expensive to keep it low.” Seeding of only low-growing clover has been tested in other plantings with mixed results despite being easy to mow. Flame weeding and tillage are options that will be explored for future weed management.

Compost is the only form of fertilizer currently applied to the trees at a rate of three shovels per tree in autumn after harvest. Chilean nitrate was initially used to augment the compost but the requirement to quantify fertilizer inputs for organic certification was too challenging. Foliar and soil analyses are not performed on a regular basis. Compost applications are done with a wagon and shovels. “We have two men in the wagon throwing compost out while a third person is driving and that has been cost effective for our scale so far.” Compost is sourced from a local dairy farm and applied in the autumn after harvest.

Crop thinning is not an issue in the organic orchards. “I have never had an issue with thinning apples in fact the opposite. The reason for that is probably the nutrition or lack of nutrition in our orchard. We have had zero need to invest money in apple thinning.”

A standard Rears airblast sprayer with a 400 gallon tank is designated specifically for the organic blocks. Other equipment, such as tractors, planters, and mowers, are shared between the IPM and organic areas.

### **Disease, Arthropod, and Vertebrate Pest Management**

Tarnished plant bug (TPB), European apple sawfly, plum curculio, apple maggot and mites are the principal arthropod pests experienced in the organic blocks yet none are overwhelming problems requiring special management. The focus in the organic orchard is on production of high yields of processing-quality fruit therefore aesthetic issues, such as TPB dimpling, are not stringently managed. “I just want production from the organic block so we can process. I care less about the insect damage occurring to the fruit.” Dormant oil is used to suppress mites.

The pesticides Surround® and sulfur are regularly employed in the organic blocks. Surround® is used to manage insect pests in May and June and sulfur to manage diseases. “I feel that Surround® is fairly benign to the human. Sulfur not necessarily.” Cost per acre of other insecticides is largely prohibitive.

Scouting for insect pests in the organic blocks is minimal and actions are based on observations from the IPM blocks. This is “certainly an area it would be prudent to invest in hiring a scout” for an unbiased report.

In the formerly abandoned trees of Block #1 “we have applied Surround® never at the full rate of truly whitening the tree. Up until this year we have never been able to penetrate the top canopy with any of our sprays. That is a mechanical issue on our part. The tree height will be lower this year and we will be using a more powerful sprayer.” Continuous coverage by way of repeat applications of dilute spray solution (25 pounds per acre) has been used to compensate for the lack of uniform application.

Apple scab and sooty blotch are the principal diseases in the organic blocks. Powdery mildew has not been an issue. “I would think the sulfur is taking care of a lot of the mildew.” Sulfur is applied as an apple scab preventative at the maximum rate, applied to every row, every 7-10 days during primary scab period. Lime sulfur is used during periods of high apple scab pressure but can only be applied early in the year to avoid fruit damage. Unfortunately, “the apple scab is not

being successfully managed with sulfur. We have had very little ability to cut back on sulfur application because of the lack of successful stickers. We have used Nu-Film in the past. It just wears you out because you are pouring money and time and fuel into this block with very questionable results.” There is also concern over the amount of sulfur affecting tree nutrition.

There have been improvements made in disease management. Mowing and pruning in Block #1 has reduced the disease pressure in the orchard. Again, the focus in the organic orchard is on production of high yields of processing-quality fruit. “Our difference is we can add value to the fruit that we lose aesthetic quality on.”

Deer are not a significant pest in the orchard. For voles, window screen guards are used around the base of each tree. A method used by other orchards is to manage vole population by having no ground cover is of interest but has not been pursued.

### **Harvest and Processing**

Harvested fruit is stored in wooden bins that have been cleaned and sanitized using normal practices following the previous harvest but bins are not specifically dedicated to organic storage prior to harvest. During and following harvest, bins containing organic fruit are tagged separately and very clearly identified. “You better believe this is valuable fruit. It is like having gold.” All harvested fruit is kept separate by bin and stored in the same cooler.

The young trees in Block #2 are still maturing so yields are uncertain. The entire of Block #1 had been yielding only 60 bushels of tree-picked fruit per year until a record 900+ bushels were harvested in 2007. Low yield is still something that needs to be addressed. “There is significantly more on the ground by the time we get there to harvest. I don’t care about the aesthetic quality of the fruit other than it be ripe and have good sugar content. Aesthetics of how it appears is not significant any more in the apples.” Almost 100% of organic apples are routed toward processing, where value is added to the crop and produces the highest monetary return possible for the fruit.

Organic apple butter has been produced on the farm and other products, such as cider, are being explored. “Never do I foresee organic fruit leaving the farm to be processed elsewhere because of our desire to create the value-added product on the farm.”

The focus on processing organic fruit into value-added products was prompted by the significantly higher selling price of fresh organic apples turning away customers. “We are finding that customers have such faith in our IPM practices that they are not differentiating the higher requested price for the organic fruit.” Consumers were not willing to buy less than perfect looking fruit even if it was organic, and education of the consumer was not a practical approach. “The negative feedback was draining and discouraging. Not something I want to endure again.” Despite the tribulations, “the fact that we are even trying has been very positive in the press and with our customers.”

## **Orchard Operation**

A staff of eight is employed by the orchard in the summer, with a percentage of their time allocated to the organic blocks. The cost of labor for organic production is “significant although not more significant than IPM with the exception that the spraying appears to be more frequent.” Advertising in the newspaper and the NOFA website and word of mouth attracts employees in addition to returning Jamaican labor through the U.S. Department of Labor’s H-2A temporary agricultural program. Employees are paid on an hourly basis except during harvest when they are paid piece rate. “Only a fraction of our work is actually harvesting fruit. We start in the morning in the packing house and we end it in the packing house.”

Thorough record keeping is necessary for organic certification and this makes it slightly different from standard IPM practices. Organic records are kept in a standard spray manual alongside IPM records. “Often I finish the IPM orchard then change tractors and sprayer and move into the organic block. I like to document that all together and then we break it down later.”

Finding information about organic apple production is “certainly is a challenge”. The first choice is talking with other growers. This is “discouraging” in Vermont due to a lack of in-state organic apple producers, although there are some growers in New York to consult. The USDA National Organic Standards (NOS) & the Organic Materials Review Institute (OMRI), NOFA, sales representatives, and industry publications provide more easily accessible sources of information. However, industry publications are not specific to Vermont and standards set by the state and NOFA are more restrictive than those set forth by NOS & OMRI. What is permissible and what is not for certified organic apple production in Vermont has been difficult to determine at times.

## Insights

Organic apple production is not without challenges. Significant upfront costs may be necessary for equipment, the certification process is time consuming, creativity is needed to market organic fruit, and the monetary return on investment is “near impossible” to achieve early on.

There is disconnect between federal and state organic standards that is frustrating to growers. Making the information more straightforward and more easily available to growers will make organic production “just outright easier. We should all be playing with the same rules”

Research is needed to focus on tools for sustainable, continual production. “We are not talking about aesthetically beautiful fruit, just repeat production. Not with really healthy young rootstock for the first five years but ten, fifteen years.” This should be among the top priorities for extension/outreach to help enhance organic apple production in New England.

“The biggest challenge for organic growers is going to be maintaining production through nutrition of the trees.” Tree nutrition to increase the health of the tree could offset a host of other problems faced by growers. Better ways to analyze and quantify tree nutrition requirements, combined with knowledge of the abilities of available organic fertilizers to meet those needs, is crucial. The long-term effects of continuous use of sulfur need to be studied and alternatives need to be developed.

Regardless of all the challenges, the market for organic apples is there and the potential returns are high. “I would love to switch all 60 acres over to organic. Even at half the yield I could do it, and I would feel very good about it. Ethically I would love to make the switch but we are just lacking the ability to guarantee consistent production.”