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## Pros and Cons of an On-Farm Nursery

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### I. Introduction

The increasing acceptance of high-density orchards and specifically the Tall Spindle Planting System to improve orchard profitability has made orchard replanting more expensive than previously. Our data from Cornell and that of many leading NY growers indicates that the increased planting cost of a tall spindle orchard is offset by much higher early and mature yields than we had previously achieved. Thus, our most recent economic analysis continues to show that the tall spindle system with high quality trees purchased from a reputable nursery is the most profitable planting system. Nevertheless many apple growers are looking for ways to reduce the cost of planting a new orchard by reducing tree costs through the development of an on-farm nursery to produce the trees they will plant in their new orchards.

Before a grower enters into an on-farm nursery venture, there are a number of issues to consider. These include intellectual property, tree quality, risk, management demands, potential savings and overall orchard profitability. After careful consideration of these issues, we believe that most growers will decide not to produce their own trees but for the few who will decide to produce their own trees, this article will address the major issues a grower should consider before beginning an on-farm nursery.

### II. Intellectual Property Issues

Federal and international plant patent laws grant the right to a plant patent holder to control propagation of their variety for the life of the patent (in the US it is 20 years, internationally it is 18 years). This means that it is against the law to propagate (bud or graft) a patented variety without permission from the patent holder. Fruit growers who illegally propagate trees of a patented variety do so at great legal peril. There have been cases where the patent holder has sued a grower for illegal propagation and has been granted punitive damages equal to the entire value of the growers farm. Thus, any grower who begins an on-farm nursery must become familiar with which varieties are patented and which are not and respect patent laws by not propagating varieties which are under patent law without permission of the patent holder.

Many older varieties and even some newer varieties such as Honeycrisp are no longer patented. These varieties can be propagated by anyone. Thus, growers who begin on-farm nurseries can grow their own trees of non-patented varieties without permission from anyone. However sometimes variety owners also trademark the name under which the variety is known in the market (for example Pink Lady). Thus, even though a grower could legally propagate trees of Pink Lady he could not sell the fruit as Pink Lady apples. He would have to sell them under a different name such as Cripps Pink which is not trademarked.

For varieties which are patented growers who wish to propagate that variety in their on-farm nursery must first obtain permission from the patent holder or their exclusive agent. This permission, if granted, will almost always require the grower to pay a royalty for each tree produced. Some variety owners readily agree to give growers permission to propagate their varieties as long as they pay the royalty but others are more restrictive and with some variety owners it is virtually impossible to obtain permission for on-farm propagation. This is often the case with "Managed varieties" where the variety owner agrees to restrict production to a limited group of growers and only they can propagate the variety with all other growers are prohibited.

Since almost all of the popular new varieties under patent law, it becomes difficult and cumbersome for the average grower to ensure that he is not propagating illegally and the urgency of the moment makes some growers cut corners and propagate illegally. Illegal propagation of patented varieties is a violation of the intellectual property rights of the variety owner. This must be considered theft and morally wrong. Growers who consider themselves moral people should avoid such illegal propagation. In addition the hassles of obtaining permission to propagate patented varieties is a strong reason why most growers should not consider an on-farm nursery.

### III. Tree Quality Issues

In almost all cases trees produced in an on-farm nursery will be smaller and less well feathered than trees from reputable commercial nurseries. It is well established that the quality of tree planted in the new orchard has a large influence on early production and profitability. Our recent research with highly feathered trees planted in the tall spindle system has shown that it is realistic to produce 3000 bushels/acre over the first 5 years (200 bu/acre in the second year, 400 bu/acre in the third year and 1,000 bu/acre in the fourth year and 1400 bushels in the fifth year). Such high yields are only possible with a tree that is 5/8" caliper is 6-7' tall with 10 feathers. Trees produced in an on-farm nursery are often much smaller; typically 7/16" caliper, 4' tall and have no feathers. These trees will likely produce no fruit in the second year, 150 bushels per acre in the third year, 400 bushels in the fourth year and 800 bushels/acre in the fifth year for a cumulative 5 year yield of 1350 bushels per acre. The difference in yield over the first 5 or even 10 years of a high quality feathered tree vs. a smaller unbranched tree is more than the cost of the high quality tree. Thus, growers should carefully consider whether by growing their own trees they are losing early yield which could help pay for the cost of the new tall spindle orchard.

A second issue to consider is the variability in tree quality that results within any nursery. The commercial nurserymen grade trees and sell growers a particular grade with great uniformity resulting in an orchard with uniform trees. Most growers of on-farm nursery are hesitant to throw away any tree they have grown and plant all of the trees including the small ones. This results in orchards with variable tree quality and variable performance. A growers should carefully consider if the variability in tree quality in his new orchard is worth the cost savings in initial tree cost. As an alternative growers of on-farm nurseries could institute a rigorous grading system of what they have produced and discard any tree smaller than 7/16" caliper and shorter than 4' tall. In some cases this would result in more than half of the trees being discarded. Although such rigorous grading might seem drastic in the long run such action would benefit the grower by having better orchards instead of "junk" orchards.

#### **IV. Risk Issues**

When a grower undertakes to produce trees in on an on-farm nursery he is assuming all of the risk in the propagation and growing of trees. In contrast, when he purchases trees from a reputable nursery, the nursery assumes all of the risk in propagation. This also helps explain the cost of a nursery tree vs. a home grown tree where part of the cost of the nursery tree is to cover risk. Nursery production in NY State carries the risk of poor bud take due to budding or grafting errors, cool growing weather resulting in small trees, firelight which can destroy an entire crop of trees, hail which can do the same, high winds which can break trees off at the graft union, deer which can ruin a crop, and early winter cold events which can severely damage trees resulting in tree death or poor growth in the orchard. In addition the lack of experience growing nursery trees is a high risk for inexperienced growers. A realistic evaluation of these risks must be done and the value of assuming those risks must be included in the calculations of potential saving from growing your own trees. Fruit growers will have different tolerances to risks in the nursery and some will decide that the risks of failure are too high and it is a more sure bet to buy high quality nursery trees.

#### **V. Management Issues**

Growing your own trees requires a new skill set, high management ability and specialized equipment. A nursery must be considered a whole new business with its distinct management challenges and specialized knowledge. The learning curve to produce high quality trees is steep. Often during the first 2-3 years there is a high failure rate as growers learn the "tricks of the trade". As growers gain more experience with growing trees they are less likely to fail but even experienced growers of on-farm trees can have bad years. The purpose of this fruit school is to help growers acquire the specialized knowledge needed to propagate and produce high quality trees. However, there is considerable on-job learning and a tremendous number of "hard knocks" during the first few years even though you may have sat through this school. Growers should carefully consider their willingness to tackle the steep learning curve before beginning an on-farm nursery.

With fruit farms there is a second important management complication: Nursery tasks often coincide with orchard tasks. Nursery tasks like orchard tasks are very time sensitive. If labor is limited which task does the grower chose to do? It is true that there can be some labor efficiency gains by joining orchard work and nursery work since some tasks do not overlap. But it is clear that fruit growers that begin on-farm nurseries must be willing to hire more full time labor than most apple farms currently have. The labor must be deployed at the perfect time and the labor must be skilled enough to accomplish the nursery task properly to allow a high quality tree to be produced. A breakdown in the management chain at any point in the nursery process can lead to failure just as a breakdown in the management chain in the orchard can result in scabby unmarketable fruit. An important question for growers to consider is: Do I have the management ability to run two distinct businesses: orchards and nursery.

The third management issue is that nurseries require some specialized equipment not common on fruit farms. These include a nursery planter, high clear tractor, high clear cultivators, specialized herbicide applicator, and nursery digger. Some of these can be manufactured by innovative farmers but the cost and time to do that must also be considered before starting an on-

farm nursery. In addition an on-farm nursery requires deer fencing and irrigation which are not common on most fruit farms.

## **VI. Potential Cost Savings**

The reason most growers consider producing their own trees is to save money. The tree cost for an acre of Tall Spindle orchard planted at 3' x 11' is \$9,900 when the tree price is \$6.50 and the royalty is \$1.00 per tree. With less expensive home grown trees costing \$3.50 per tree plus \$1.00 royalty the cost per acre would be \$5,940 per acre. At Cornell we recommend that a grower replant 5% of his acreage each year. For a growers with 200 total acres of apples this would amount to 10 acres per year. If a grower is plants 10 acres of tall spindle per year the tree cost would be \$99,000 per year for high quality nursery trees but only \$59,400 per year for home grown trees. The difference would be \$39,600 per year which is a large potential savings. This potential savings must be weighed against the higher production over the first 10 years with the high quality feathered trees detailed in an earlier section compared to the lower production of the smaller on-farm produced tree.

Our most recent economic analysis of tree price and quality indicates that the high quality feathered tree from a commercial nursery is more profitable at densities from 200 trees/acre up to about 1400 trees/acre the highly feathered more expensive tree purchased from a reputable nursery is more profitable than the smaller and cheaper on-farm produced tree. At higher tree densities such as with the super spindle the smaller and cheaper tree is more profitable. This economic analysis must be coupled with the risks detailed in an earlier section for a grower to make the decision about producing his own trees.

## **VII. Increasing Farm Profitability**

A final consideration growers should consider before beginning an on-farm nursery is what is the best way to increase profitability of my farming business. Is it by reducing tree costs by starting an on-farm nursery, or is it by reducing pruning cost by buying labor saving platforms, or is it by reducing cost in other areas. Perhaps it is to vertically integrate and build storages and or packing facilities. Or perhaps it by improving production or fruit quality. Often the best way to improve profitability is not through cost savings but by strategically investing more money in high return ventures. Is an on-farm nursery going to be a high return venture or could it be a money pit? Perhaps the best way to improve farm profitability is to aggressively replant 5% of your acreage to more profitable varieties using high quality trees and focusing on managing the new orchards so they achieve the target yield of 3,000 bushels over the first 5 years.

Focus on what you do best. Vertical integration can be good but it must be considered carefully in light of what other ways there are to improve profitability. Look at Wegmans, they decided to produce their own eggs but not apples. Perhaps they could produce, store, pack and sell their own apples. But so far they have decided to focus on selling apples and not growing them. Apple growers would not be happy if Wegmans decided that the growers were making too much profit so they started growing their own apples. Likewise the nurseries must make a profit to continue in business and growers should not begrudge them making a profit. Perhaps the high quality and uniform tree they deliver to you is your best weapon to improve your own profitability.

### VIII. Summary

Before beginning an on-farm nursery, a grower should carefully consider several issues which include:

1. Is this the best place for me to invest money and time to improve the profitability of my farming business?
2. Am I willing to seek permission and pay the royalties to propagate varieties legally?
3. Do I understand the risks and am I willing to assume the risks of growing my own trees?
4. Am I capable of managing two businesses: orchards and nursery?
5. Am I willing to invest the time to climb the steep learning curve of propagation and tree growing?
6. Am I willing to hire more labor to manage my on-farm nursery?
7. Do I have the soil resources to grow a quality nursery tree?
8. Am I willing to forgo some early yield and plant lower quality trees in my new orchard?
9. Am I willing to implement a rigorous grading system and throw away small trees so that my new orchard will be based on uniform, minimum-quality trees?
10. Am I willing to acquire the specialized equipment I will need to manage a nursery?
11. Am I willing to install deer fencing, irrigation and stake the trees?

Each grower will answer these questions differently. We hope this school will help you think through the issues and come to a decision that is right for your farm.