

BUILDING the TREE FRUIT NURSERY CAPACITY

A Study for the B.C. Ministry of Agriculture

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SUMMARY

- for each of 2015 and 2016 it is estimated that a total of 642 acres will be planted requiring 797,678 trees each year
- for the period 2015 to 2021 it is estimated that a total of 4,494 acres will be planted requiring 5,583,746 trees
- commercial nurseries will supply 203,610 trees in 2015 and an estimated 263,000 trees in 2016
- apple trees on dwarfing rootstocks from commercial nurseries are sold out for 2015 with very limited availability for 2016; orders are being taken for 2017
- apple tree shortage is due to large demand in Washington and to rootstock shortage; there is no immediate solution to the rootstock shortage
- more than 80% of trees sold by Washington nurseries are by contracts made 2 to 3 years in advance
- B.C. and Washington nurseries have the capacity to maintain or increase tree production
- 80 to 90 B.C. growers have home nurseries, most of which consist of apple trees
- main varieties grown in home nurseries are Ambrosia, Honeycrisp and Gala
- many home nursery growers are not using budwood from the Budwood Orchard, thus increasing the possibility of virus and true-to-type problems
- home nurseries will provide 525,115 trees in 2015 and 488,785 trees in 2016
- growers with home nurseries are advised to order rootstocks the fall before planting
- based on assumptions used, supply of cherry trees is adequate
- although apple trees are short of requirements for 2015-16, the supply could exceed demand in 2017 clearing the 2015-16 backlog
- assuming growers contract order 2 to 3 years in advance, supply of apple trees should be adequate from 2017 to 2021 and beyond
- B.C. is vulnerable for supplies of apple rootstocks as local production is less than 5% of needs
- posts for support systems are in short supply with orders being taken for 2016
- the solution for ensuring supply of trees of the most desirable varieties and strains is for growers to plan ahead by 2 or 3 years and purchase trees under contract
- accessing desirable protected varieties is an issue requiring attention

RECOMMENDATIONS

- B.C. Ministry of Agriculture, packinghouse field staff and consultants should encourage growers to plan at least 2 years ahead and contract with nurseries for tree requirements, encourage growers who produce their own nursery stock to order their rootstock requirements the fall before planting and encourage growers to order posts at least a year in advance
- B.C. Ministry of Agriculture and packinghouse field staff should organize frequent grower meetings to discuss variety returns, trends and performance
- B.C. Ministry of Agriculture and packinghouse field staff should organize educational programs regarding the benefits of using certified budwood
- B.C. Ministry of Agriculture should organize training courses for growers producing their own nursery stock to improve tree quality
- B.C. Ministry of Agriculture should encourage increased B.C. production of rootstocks
- B.C. Ministry of Agriculture should undertake a survey comparing the performance of finished trees with benchgrafts planted in-situ
- A committee should be formed to discuss gaining access to restricted varieties

INTRODUCTION

The British Columbia Ministry of Agriculture announced a long term tree fruit replant program beginning April 1, 2015 and finishing in 2021. The program provides grants to growers who successfully complete a replant project. The Ministry of Agriculture has allocated some transitional funding to support the program and to ensure the success of the replant projects. This project is part of that funding.

This project assessed current supplies of commercial and home grown tree fruit nursery stock and the future capacity of B.C. and out of province commercial and home nurseries. It has also provided some recommendations to help ensure future adequate supplies of tree fruit nursery stock.

PROJECT COMPONENTS

The work consisted of the following components:

- assessing available supplies of tree fruit nursery stock suitable for B.C. conditions;
- assessing fruit tree demand based on comments received from growers, suppliers and industry staff;
- determining future capacity of B.C. and out of province nurseries until 2021;
- developing a list of tree fruit nurseries capable of shipping CFIA (Canadian Food Inspection Agency) virus tested fruit trees, rootstocks and budded or grafted rootstock to B.C.;
- visiting and surveying growers who produce nursery trees to assess tree quality and quantity by variety and rootstock;
- developing a grower nursery list;
- recommending how B.C. growers can secure the needed nursery stock of the most desirable varieties; and,
- preparing this report.

PROCEDURE

The following summarizes the procedure followed in the preparation of this report although not necessarily in the order presented:

- contacted CFIA regarding tree fruit importation requirements;
- contacted Oregon Department of Agriculture and Washington State Department of Agriculture regarding tree fruit nursery certification;
- contacted Summerland Varieties Corp, industry professionals, nursery suppliers and home nursery growers who sell nursery stock to determine variety and planting trends;
- contacted nursery suppliers to determine rootstock usage;
- contacted commercial nurseries in B.C., Oregon and Washington to determine fruit tree availability for 2015 and 2016 and for future tree fruit nursery stock production plans;
- visited home nursery growers to determine tree quantities and quality;
- reviewed draft copies of “Assessment of B.C. Apple & Sweet Cherry Varieties” and “Strategic Development of B.C. Apple & Sweet Cherry Varieties” authored by Globalwise Inc. in association with Belrose Inc.;
- compiled and analysed data and information collected; and,
- prepared report.

BACKGROUND

A goal of the Tree Fruit Replant Program is to replant approximately 1,600 acres to highly successful plantings of high value varieties in the 7 years between 2015 and 2021. Replanting, however, is not restricted to plantings eligible for replant grants. Estimates of tree requirements will include total planting requirements for each of 2015, 2016 and the period between 2015 and 2021.

The purpose of this study was to identify and list availability and sources of fruit trees for planting in 2015 and 2016, to determine future capacity of B.C. and out- of- province nurseries until 2021 and to provide recommendations to help ensure future adequate supplies of fruit tree nursery stock.

This was done by interviewing commercial finished tree and rootstock nurseries in Washington and B.C., by contacting and visiting a representative sample of home nursery producers in B.C. and by soliciting suggestions from nurseries and knowledgeable tree fruit industry individuals.

A number of people provided information and guidance to the author and their cooperation is greatly appreciated.

TREES REQUIRED

One objective of this study was to estimate the total number of nursery trees required for the period 2015 to 2021.

This was a difficult estimate to develop as nobody knows for sure how many acres and trees growers want to plant annually. Planting levels reflect fruit returns, emotions, prospects, planting densities, tree availability and movement to or from other crops. The only way of fully knowing how many acres growers want to plant and how many trees they require is to survey each grower for their planting plans. This approach would be extremely impractical because of time constraints.

The first step was to estimate acreage to be planted in 2015. This would then allow the calculation of trees required for 2015 and subsequent years.

Three different methods were used to estimate acreage to be planted in 2015. The value of each method can be debated as can the numbers used but they were the best available.

Previous plantings method. The previous plantings method used the average acreage planted in 2013 and 2014 taken from the BCFGAs Replant Summaries, plus a new land factor of 120 acres. Using this method 587 acres would be planted annually.

Renovation rate method. The renovation rate method used an estimate of total tree fruit acreage (obtained from Jim Campbell, B.C. Ministry of Agriculture) of 14,500 acres, an estimate of average annual orchard renovation plus an estimate of planting on new land. The renovation rate used was 3.5%. The assumption was that the renovation rate would be higher but the 3.5% was determined by extrapolating data from the draft of the report titled "Assessment of B.C. Apple & Sweet Cherry Varieties". Planting on new land was estimated at 120 acres. This number was chosen based on discussions with nurseries, growers and industry workers. Based on these assumptions 627 acres would be planted annually.

Post method. The post method based the estimate of acreage to be planted on the number of posts ordered for apple support systems. Slightly more than ninety thousand posts were ordered for 2015 which would provide posts for 457 acres of apples. Based on comments from industry workers and observations made while doing the home nursery survey, approximately 75% of these posts will be used for 2015 plantings. The posts will cover 75% of 457 acres which is 342 acres of apples. The 2013 and 2014 Replant Summaries reported that acreages of apples and cherries were approximately the same at 44% each. Information from nurseries, suppliers and industry workers indicate that there is still considerable interest in cherries but that in 2015 plantings of cherries will decline a bit relative to apple acreage. The apple acreage has been

estimated at 48% of the total for 2015. Based on these figures and this method, 712 acres of fruit trees would be planted in 2015.

The use of post orders initially was used as a cross-check of acreages to be planted. It turned out to be a very useful measure.

The estimate of acreages to be planted based on these calculations is rather surprising, especially for the renovation rate and post methods. They were not expected to be as high. This is because the 2013 and 2014 planting levels were substantially lower than the post method. Perhaps this is because of the success of Ambrosia and the fact that cherries have done so well. The estimates also appear to be credible as new land is being planted, particularly at the northern and southern ends of the valley.

None of the 3 methods used to develop the above estimates of acreage to be planted is perfect but they do provide a range of planting possibilities. Each has some merit. Rather than choosing 1 of the above methods, the solution has been to average the 3 different estimates. By doing so the average number of acres to be planted annually is 642. The estimate for trees required for the period 2015 to 2021 is based on replanting 642 acres per year for 7 years which would total almost 4,494 acres. Such uniform replanting would be unprecedented and unlikely but it is a starting point in determining tree needs.

The next step was determining how many trees will be required to plant 642 acres each year.

The Replant Summaries show that of the total tree fruit acreages planted in 2013 and 2014, apples and cherries each accounted for approximately 44% of the total acreage. Perhaps because of the success with Ambrosia, there seems to be an upward shift of interest in apples. In 2015 it is estimated that apples will account for 48% of the acreage planted, which amounts to 317 acres, with cherries being reduced to 42% which is 261 acres.

It is estimated that the remaining 10% of the acreage, which is 64 acres, will be planted to other soft fruits and pears. Tree supplies are generally adequate for these crops so they will receive very little attention throughout this report.

Planting densities vary widely. The Replant Summaries indicate average planting density for apples has been 2,088 trees per acre, cherries 430 trees per acre and 368 trees per acre for other tree fruit crops. These figures will be used for determining tree requirements.

By using the above assumptions it is estimated that total nursery trees required per year will be 797,678 and that 5,583,746 trees will be required by 2021. Of the total, apples

will account for approximately 661,896 trees annually, cherries will account for 112,230 trees annually and pears and other soft fruits will account for the rest which 23,552 trees annually. These numbers are not expected to be correct for any given year but over the next 7 years but they should prove reasonably accurate. At the very least, they provide a starting point for determining tree needs.

The choice of methods for estimating acreages to be planted and trees required for 2015 is illustrated in Table 1.

Table 1. Estimated acres to be replanted and trees required based on 3 methods used

	Methods			Average of Methods
	2013 & 2014 Average	Renovation Rate	Posts Ordered	
Estimated Acres				
Apples	294	314	342	317
Cherries	235	250	299	261
Others	58	63	71	64
Total Acres	587	627	712	642
Number of Trees				
Apples	613,872	655,632	714,096	661,896
Cherries	101,050	107,500	128,570	112,230
Others	21,344	23,184	26,128	23,552
Total Trees	736,266	789,316	868,794	797,678

note: rounding off error for total trees and average of methods

FRUIT TREE SOURCES

The present principal sources of finished trees from commercial nurseries are Byland's Nursery in West Kelowna, Avtar Mann in Vernon and several Washington nurseries. These sources supply slightly more than 200,000 trees annually. The rest of the trees are supplied by home nurseries. Most often home nurseries produce only enough apple trees for their own use.

Most of the rootstocks for both local commercial and home nurseries are imported from the U.S. and Europe. There are only 2 stoolbed rootstock producers in B.C.

All imported rootstocks and finished nursery trees require a Permit to Import from the Canadian Food Inspection Agency (CFIA). This Government of Canada organization regulates the Plant Protection Act and has offices in Kelowna (250-470-4884), Oliver

(250-498-5301) and Vernon (250-260-5030). They also have a website (CFIA) that contains considerable information and an on-line Permit to Import.

Finished trees and rootstocks imported from the U.S. must be certified and fumigated. Most nursery stock exported into Canada from the U.S. comes from Washington or Oregon and each state has a certification program recognized by CFIA. Any grower importing finished trees or rootstocks from the U.S. should begin the Permit to Import process as soon as they order their trees or rootstocks. Lists of certified Washington and Oregon nurseries that frequently ship to B.C. are included in Appendixes 1 and 2.

Production of fruit trees is generally a straight forward process but requires planning.

SURVEY OF COMMERCIAL NURSERIES

An increased demand for fruit trees is evident in B.C. This is quite possibly because of a few years of good fruit prices, Ambrosia and cherry successes, less interest in vineyards, higher planting densities and the Replant Program. The 7 year term of the Replant Program was praised by several of those surveyed believing that it should stimulate some planning by growers.

Five nurseries in B.C. were contacted:

Byland's Nursery (250-769-4466) in West Kelowna has been a major supplier of fruit trees to B.C. orchardists for a number of years. They are very familiar with the B.C. tree fruit industry and growing conditions. They are a Summerland Varieties Corp Licensed Nursery.

Byland's has recently expanded their Okanagan land base, significantly increasing their capacity for fruit tree production. They also have the infrastructure in place to accommodate increased production. Byland's can supply trees under contract within 2 to 3 years but occasionally have non-contracted trees available.

At time of writing Byland's were sold out of trees for 2015 and had a limited supply of apples, cherries and other fruits for 2016.

Avtar Mann of Vernon (250-558-8939 or 250-549-4403) produces fruit trees near Lavington. He is a Summerland Varieties Corp Licensed Nursery. For 2015 planting he grew Honeycrisp, Ambrosia and Gala on B9 and Lapins, Sweetheart and Staccato cherries but is sold out for 2015. For 2016 planting he is growing the same apple varieties and Staccato cherries. He still has trees available.

Stewart Brothers Nursery in Kelowna (250-764-2121) indicated they will have cherry trees available for planting in 2016.

At one time Advance Nursery in Grand Forks were major suppliers of fruit trees to B.C. orchardists. They no longer are interested in producing fruit trees.

In the past Cannor Nursery in Chilliwack sold fruit trees to orchardists in the interior. They no longer do so because they had too many problems dealing with growers and because of apple maggot. Due to apple maggot regulations they cannot ship apple trees east of Hope without washing roots. This apparently affects tree performance.

Availability of finished trees for planting in 2015 from the U.S. was determined by surveying 6 certified nurseries and a tree consultant/tree sales business (Appendix1).

CFIA, Washington State Department of Agriculture and Oregon Department of Agriculture provided considerable help in identifying certified nurseries in Washington and Oregon. These agencies also identified which nurseries regularly or frequently ship into Canada.

Finished tree nurseries in Washington have sold 116,000 trees to B.C. growers for planting in 2015.

New plantings and increased planting densities in Washington have resulted in a large demand for apple trees on dwarfing rootstocks. Growers in eastern U.S. apple producing regions are also showing increased interest in dwarfing apple rootstocks. Apple trees on M9 and B9 rootstocks are very popular. Consequently there is a shortage of apple trees on dwarfing rootstocks for 2015 and 2016 for growers who have not already ordered trees.

Packinghouses, cooperatives, "club varieties" and large orchard companies are buying large numbers of dwarfing rootstocks. One Washington contact indicated that 60% to 70% of the Washington apple tonnage is controlled by 4 or 5 companies and that the number of growers has declined from 6,000 in the 1980's to the present level of 3,000. Another contact mentioned that the number of growers in Washington will decline to about 2,500 after the next low apple price year as smaller growers get absorbed by the larger growers.

There is also considerable interest in the CG rootstocks by growers and nurseries.

CG rootstocks refer to rootstocks developed by the Cornell-Geneva apple rootstock breeding program in New York which was established in 1968. The goal of this program is to develop productive apple rootstocks which offer resistance to problems such as crown rot, fireblight and woolly apple aphid.

Dr. Cheryl Hampson at the Pacific Agricultural Research Centre at Summerland has tested some of the CG rootstocks. For her results, contact her by Email at cheryl.hampson@agr.gc.ca.

Some, but not all, Washington nurseries are planting more rootstocks for budding to keep up with the increased demand for trees. This will not immediately increase tree numbers, however, because finished trees will not be available from the rootstocks planted in 2015 until 2017. One nursery surveyed indicated that they will be planting 3 times the number of rootstocks to plant the same orchard acreage as in past years when more vigorous rootstocks were used. Increasing production of finished trees poses a considerable challenge for nurseries as they must increase land base, storages, add equipment and hire and train more labor and supervisory staff. It also adds more risk to their business.

Some of these nurseries have experienced previous booms and the busts which subsequently followed and are reluctant to substantially increase production. When asked if the current planting bubble was going to burst, one nursery contact replied “there is no end in sight; everyone is chasing new varieties and there are a lot of new varieties”.

Some Washington finished tree nurseries grow all or a part of their clonal rootstocks but most rootstocks are obtained from speciality stoolbed producers. The increased demand for apple trees on dwarfing rootstocks has resulted in a shortage of dwarfing rootstocks from stoolbed producers.

To reduce risk from unsold finished trees, Washington nurseries have gone to contract growing and have greatly reduced their level of speculative growing. Most nurseries have more than 80% of their production under contract and some grow all their trees under contract. Contracts are made 2 to 3 years in advance with growers paying a deposit when the contract is signed. Because of fewer speculatively grown fruit trees it is imperative that growers plan ahead and pay deposits. The amount of deposit varies depending on the nursery but is generally in the range of 20%. Contract growing benefits not only the nursery but also the grower who pays less and by and large has a guaranteed supply of trees.

Two Washington nurseries contacted will not ship into B.C. unless large contract orders are received. This is because of fumigation requirements and extra costs of fumigating small lots.

Washington nurseries listed in Appendix 1 grow under contract but may also have limited numbers of trees available.

Since tree availability changes daily, numbers of trees available at time of writing from commercial nurseries have not been included. Some nurseries have not yet calculated 2016 inventories and availability. The nurseries know how many rootstocks were budded in 2014 for orchard planting in 2016 but won't know the bud "take" until late spring of 2015. They have, however, provided estimates. At times an order may be cancelled creating a supply of a desired variety on a suitable rootstock or conversely an order may be placed removing trees from the inventory. Growers searching for trees should contact the nursery(s) of their choice and if trees are not available get their name on a wait list.

All nurseries listed in Appendix 1 have web sites that list tree availability. Numbers can change daily so growers should contact the nursery directly.

For B.C. apple growers looking for trees from Washington nurseries for planting in 2015 the situation is bleak. With the odd exception apple trees on dwarfing rootstocks are sold out. There are only a few trees available for 2016 and orders are already being taken for 2017.

At time of writing Washington nurseries have limited supplies of pear, cherry, and other soft fruit trees available for 2015. Although inventories for 2016 have not yet been determined trees other than apples on dwarfing rootstocks appear to be available, at least in limited supply, but orders should be placed quickly.

To summarize: unless some major cancellations occur, commercial nurseries in Washington and B.C. are sold out of apple trees on dwarfing rootstock for 2015 and only have limited supplies available for 2016. Growers searching for trees should contact nurseries as soon as possible and get on a wait list. To ensure tree supply for 2017 growers are advised to contract with a nursery or nurseries as soon as possible.

Depending on rootstock supplies, commercial finished tree nurseries in Washington and B.C. have the capacity to increase production of tree fruit nursery stock. Whether this keeps up with the demand for fruit trees is unknown. Some nurseries are expanding and others are fairly static. The days of nursery speculative growing is past. Contracts will be necessary requiring growers to develop a replant plan. If they do so and contract and place a deposit with nurseries, adequate tree supplies should be available for 2017 and beyond.

When tree supplies are short, growers tend to panic. Growers needing trees should be disciplined and not buy just any trees they can find. Such trees too often end up losing money in the orchard because they are either of poor quality or the wrong variety, strain or rootstock.

An interesting comment was made by a Washington nursery contact. He noted that B.C. growers are the last to order trees and then question why they can't get them.

For 2015, 92,000 apple trees and 111,610 cherry trees have been sold to B.C. growers from commercial nurseries in B.C. and Washington. In 2016 it is estimated that 148,000 apple trees and 115,000 cherry trees will be supplied from the same sources.

SURVEY OF GROWER HOME NURSERIES

There were three objectives of this component of the project:

- develop a list of tree fruit growers who supply nursery stock;
- visit and survey a representative number of growers who have produced nursery trees to assess tree quality and variety trends; and,
- estimate the number of trees to be harvested from home nurseries for orchard planting in 2015, 2016 and 2017.

Producing good quality nursery trees is not a simple task. A good site, considerable time, and skill are required. Some home nursery growers have been very successful having more than 75% of their budded or grafted rootstocks developing into good quality trees. Others, however, have been far less successful and would have been better off buying finished trees. It is recommended that training be offered to growers wanting to produce their own trees in an attempt to improve tree quality.

A good reference for growers wishing to learn more about home nursery production is "Tree Fruit Home Nurseries" published by the Okanagan Valley Tree Fruit Authority in 1993. It is available on-line from the B.C. Ministry of Agriculture website and possibly from some B.C. Ministry of Agriculture offices. This pamphlet covers nursery production of apples and soft fruits.

Why do some planted rootstocks not produce a good quality finished tree? Some buds don't "take", some rootstocks or trees get damaged and some trees don't grow well. Growers are advised to plant at least 1/3 more rootstocks in the nursery than trees required for orchard planting. For example, if an apple grower wanted to establish a home nursery to produce enough trees to plant 1 acre of orchard at 2,178 trees per acre (10 feet X 2 feet) then almost 2,900 rootstocks would be required which is a success

rate of 75%. Depending on spacing this would require approximately 1/10 of an acre of nursery.

The home nursery is more at risk than commercial nurseries. Commercial nurseries harvest finished trees in the fall and put them in storage, whereas finished trees in home nurseries remain in the nursery over winter before being harvested. This increases the potential of losses from cold temperatures, snow breakage and deer damage.

An estimated 80 to 90 growers grow some or all of their tree needs which is slightly more than 15% of the growers. Most home nurseries grow for their own use and usually do not have surplus trees for sale. In years when their nursery crop has done well many of these growers will just plant a little closer in the orchard or sell small amounts to neighbors. This does not substantially affect supply.

Survey results indicate that only a handful of growers plant with the intention of selling surplus trees. Average number of rootstocks planted by the majority of home nursery growers is 4,500. This average does not include rootstocks planted by 1 or 2 large home nursery growers which would skew the results. Any surplus trees are generally sold through a wonderful word of mouth communication system in the fruit growing area or through advertisements in the B.C. Tree Fruits Cooperative newsletter. The list of home nursery growers who sell to other growers is included as Appendix 4. The list cannot be considered as complete and cannot be considered as an endorsement for tree quality.

Most trees that are purchased from commercial nurseries have been budded. Until recently, most fruit trees produced in home nurseries were also budded. Although many apple trees from home nurseries are still budded a substantial number of growers now use benchgrafts. Both techniques have advantages and disadvantages. Management is the key factor.

Traditionally, benchgrafts were planted in the nursery for 1 or 2 years until they grew large enough to be planted in the orchard. Some home nursery growers still follow this practice. With the advent of super spindle apple plantings it is estimated that more than 50% of benchgrafts have been planted in-situ, meaning they are planted directly into the orchard. Some growers have become very skilled with this technique. Others do not have the skills or have not made the commitment and, therefore, have not been successful. Growers without the skills or with experience with benchgrafts might consider budding or planting benchgrafts in the nursery rather than planting in-situ until they gain the skills.

Information on growing benchgrafts can be found on Cameron Nursery website at www.cameronnursery.com/education.htm.

Even if benchgrafts are planted in the orchard, they are not considered to be trees until they grow and develop caliper and height. For the Replant Program they are not considered to be a tree until they reach a caliper of 7/16 inch. The number of

benchgrafts planted in-situ may be a reason that there are not more trees available from home nurseries for sale to other growers.

The results of in-situ plantings are inconsistent. It is recommended that a survey be undertaken comparing the economic performance of well managed finished trees with well and poorly managed benchgrafts planted in-situ.

A representative sample of more than 45 home grown nurseries was visited. These were all identified by word of mouth or by seeing home nurseries from the road. Growers of these nurseries who were not available for a visit were contacted by phone. The main questions asked were: year of nursery planting, rootstock, variety, budded or grafted, year of budding or grafting, year to orchard plant, tree numbers, number available for sale, orchard planting density and future nursery plans. Some home nurseries were visited without any contact because the grower was away or a contact number could not be found.

The primary purposes for visiting home nurseries were to determine quality and quantity of trees, variety and rootstock trends and to determine if any surplus trees were available for sale. Only 5 home nurseries had trees for sale in either 2015 or 2016. At time of visiting several nurseries located in the North Okanagan were covered by snow and final tree inventory had not been determined. For 2015, total estimated inventory for sale from these 5 home nurseries is in the range of 25,000 to 30,000 trees. Most of these are apple trees but one of the growers has a limited number of cherry trees. For 2016 tree availability from these sources is expected to be the same but inventory will not be known until the summer.

Even though cherry and apple acreages planted in 2013 and 2014 were the same, few home nursery growers surveyed were producing cherry trees. This is possibly because of the random nature of the survey. In addition, cherry bud “takes” are notoriously inconsistent so it appears that growers let commercial nurseries provide the trees.

By far the majority of apple trees being grown in home nurseries for own use or for sale are Ambrosia, red strains of Gala and Honeycrisp. A number of other varieties are being grown to a much less extent the most notable of these being Granny Smith, Sunrise, Salish and Pink Lady. Strains of M9, M9 and B9 are by far the most common apple rootstocks. The most common orchard planting density for apples is 10 feet X 2 feet (2,178 trees per acre).

Spacing in visited home nurseries varied greatly depending primarily on site and available equipment. The average spacing for apples was found to be in the range of 2 to 3 feet between rows and 6 to 8 inches in the row giving the potential of up to 30,000 nursery trees per acre actually planted. Two feet between rows would be considered a bit too close for tree fruit crops other than apples but for nursery trees being grown for super spindle orchards it seems to work well. All possibilities of planting arrangements were encountered. Single rows were the most common but double rows with off-set spacing were also observed and some were grown in plastic using T-tape irrigation.

Some nurseries did very well having good bud or graft “takes” whereas others suffered in this regard.

Finished tree quality in home nurseries covered the complete range from very good to poor.

The source of budwood for budding or scionwood for grafting is a major issue. Many home nursery growers surveyed indicated they collected their own propagating wood. This practice creates a potential for virus spread and true-to-type problems.

Viruses can adversely affect bud take in the nursery, nursery tree size, orchard tree vigor and health, fruit quality, orchard yields and perhaps may even affect fruit marketing for plant quarantine reasons.

Home nursery growers should be certain the variety and strain they are propagating or planting is true-to-type. When propagating wood is collected by the home nursery grower there is a risk of cutting wood that is not true-to-type. This can result in the wrong varieties being planted. Growers who elect to cut propagating material from their own trees should do so very carefully. They should ensure that the trees the wood is coming from are indeed the right variety and strain and identify trees that propagating wood will be collected from.

The best solution to virus and true-to-type problems is to use virus free and true-to-type propagating material from the Budwood Orchard.

The Budwood Orchard at the Pacific Agricultural Research Station-Summerland (PARC) was established in the late 1950’s because of virus and true-to-type problems that were seriously affecting the industry. It is now managed by Summerland Varieties Corp.

Implementing virus and true-to-type certification would be a logical suggestion. Due to the number of home nurseries or orchards planted in-situ such a program might be considered impractical. A more practical alternative is a grower awareness and education program aimed at use of certified virus free budwood and recognition of viruses.

The estimated production of apple and cherry trees from home nurseries for planting in 2015, 2016 and 2017 is summarized in Table 2. The estimates are based on rootstocks believed to have been planted in home nurseries. A 65% success rate is used for apples. This is considered to be a reasonable average as many home nursery growers achieve success rates in the 80% to 90% range but some home nurseries are dismal failures. A success rate of 60% was used for cherries. The number of cherry trees is not much more than a guess as very few home nurseries surveyed grew cherries. Other tree fruit crops are not included as only small numbers of trees are grown in home nurseries.

Table 2. Estimated production of apple and cherry trees from B.C. home nurseries.

Planting Year – Orchard	Apples	Cherries
2015	504,595	20,520
2016	463,785	25,000
2017	617,500	40,000

B.C. growers with home nurseries have the capacity to increase production of tree fruit nursery stock. As with commercial nurseries, it will depend on availability of rootstocks.

SURVEY OF ROOTSTOCK PRODUCERS AND SUPPLIERS

As a result of the high levels of apples on dwarfing rootstocks being planted in Washington, and the interest in dwarfing rootstocks in other apple producing areas, the supply of dwarfing apple rootstocks from stoolbeds has not kept up to the demand for trees. In the near term rootstock supply will not increase substantially as it is difficult to quickly build up supplies of clonal rootstocks. This is because after being planted, stoolbeds require at least 3 years before good yields occur.

Most rootstock stoolbed producers contacted indicated that regular customers have their orders filled first. If production becomes sold out to the regulars, potential new clients will not be able to purchase rootstocks.

In addition to stoolbeds, rootstocks can also be produced by tissue culture. Rootstocks from tissue culture, however, are more expensive to produce so the tissue culture technique is generally reserved for a quick build-up of supplies.

AgriForest Bio-Technologies Ltd. in Kelowna can produce clonal rootstocks through tissue culture. The contact is Dr. Kamlesh R. Patel at 250-764-2224. AgriForest have propagating stock of M9 (3 sources), M26 and O3. Under contract they are willing to provide lining out stock. An order of 50,000 rootstocks by spring of 2015 would be ready for field planting in 2016 and larger orders would be ready for field planting in 2017.

Most rootstock producers provide a wide range of product from dwarfing to semi-standard apple rootstocks and some also produce cherry and pear rootstocks.

Most rootstocks used for apple production in B.C. and Washington by commercial nurseries are grown in Oregon and Washington but some come from Holland. Major producers in the U.S. are listed in Appendix 2. Rootstocks for B.C. home nurseries come from the same sources.

Some growers import rootstocks but the majority of rootstocks used for B.C. home nurseries are brokered by James Calissi (250-763-7087) in Kelowna and by Golden West Nursery in Summerland operated by Al Fisher (250-494-1150). In addition to selling rootstocks Al Fisher also sells benchgrafts. Some sources indicate the supply of rootstocks for home nurseries for 2015 is in the range of 500,000 short of the demand.

At one time there were no restrictions on rootstock sizes imported from Holland but now only 10 mm and smaller are permitted by CFIA. This is because of the wood boring pest *Anoplophora spp.* This insect attacks larger sizes of apple rootstocks but not the smaller sizes. The smaller sizes are suitable for lining out for budding but not large enough for grafting.

There are 2 stoolbed producers of apple rootstocks in B.C.

Neufeld Brother's Nursery (604-796-3806) near Chilliwack has stoolbeds of M9 and B9. They can also do contract growing of finished trees but need 2 to 3 year advance booking and deposits.

Alain Peron of Old Tower Farm (250-499-5654) in Keremeous has stoolbeds of M9 and B9 for organic and conventional growers.

B.C. is extremely vulnerable regarding rootstock supplies. The current production level in B.C. falls well below our needs. If major rootstock shortages occur as is happening now because of large demand, or if a major insect or disease problem develops in Holland or the U.S. affecting importation of rootstock or finished trees, rootstocks will not be available. Commercial nurseries and home nurseries will therefore not have access to rootstocks and local finished tree supplies will not be available. This situation presents an opportunity for an individual or organization and it is suggested that the industry or Ministry of Agriculture promote the concept in the hopes of encouraging increased local stoolbed production.

The supply of rootstocks is not expected to change substantially. Some rootstock stoolbeds are being renovated but there aren't a substantial number of additional rootstock stoolbeds being planted. Stoolbed producers face the same issues experienced by finished tree producers when it comes to expansion such as land and storage costs.

If present orchard planting trends in Washington continue, finished tree availability will continue to be tight.

POST SUPPLY

In addition to the shortage of rootstocks and trees there is also a shortage of posts for support systems from the preferred manufacturer. Quite possibly this is the result of the increased planting densities by Washington growers. At time of writing a major supplier has sold out of 3-4" X 12' but may possibly have some 4-5" X 12'. Supplies for 2016 are now approximately half booked. Again growers must plan and pre-order.

2015 and 2016 NURSERY TREE SUPPLY BALANCE SHEET

Apples for 2015 and 2016

Total trees required		1,323,792
Trees available:		
Home nurseries	968,380	
Commercial nurseries	239,187	
Total available	<u> </u>	<u>1,207,567</u>

Apple tree balance for 2015 and 2016 **Deficit 116,225**

Cherries for 2015 and 2016

Total trees required		224,460
Trees available:		
Home nurseries	45,520	
Commercial nurseries	226,610	
Total available	<u> </u>	<u>272,130</u>

Cherry tree balance for 2015 and 2016 **Surplus 47,670**

The estimates in the Balance Sheet were based on the assumptions developed on pages 7 to 9. These indicate a total shortage of 116,225 apple trees for 2015 and 2016 and a total surplus for 2015 and 2016 of 47,600 cherry trees. If the "post" method for determining acreage and tree numbers had been followed, or if the estimated cherry and apple acreages had been equal, the cherry tree supply and demand would be close to being balanced. Also, these cherry estimates assume favorable bud "takes". If these are poor, the supply of cherry trees for 2016 will decrease. The shortage of apple trees will increase if planting densities average more than 2,088 trees per acre.

Regardless, based on the assumptions used, availability of cherry trees appears to be adequate for 2015 and 2016 but not necessarily for the most desirable varieties. Supply of apple trees, however, is 116,225 short of the estimated demand. Even if the assumptions are changed, supply of cherry trees should still be adequate and supply of apple trees will still be short.

The supply of apple trees starts to turn in 2017. This is because of the increase of rootstock plantings in 2015 by both home nurseries and B.C. commercial nurseries. Supply from Washington nurseries is not expected to increase substantially. Production of apple trees for planting in 2017 is estimated at 781,500 trees, 119,604 trees more than are required for 2017 which erases the 2015 and 2016 shortage.

Even with the anticipated adequate apple tree supply for 2017 competition for purchasing trees is still expected to be fierce. Growers not propagating their own trees must contract with nurseries now to guarantee a supply for planting in 2017 and must continue to contract for future years. With the tight supplies of apple rootstocks, growers who grow their own trees are also advised to pre-order rootstocks to ensure supplies.

Ensuring future adequate supplies of fruit trees should not be difficult. Commercial fruit tree nurseries in B.C. and Washington and grower home nurseries in B.C. have the capacity to maintain and increase production of fruit trees as long as rootstock supply is adequate.

The following recommendations are provided to help ensure future adequate supplies of fruit trees for B.C. orchardists:

- initiate research programs to improve home nursery production;
- initiate research and demonstration projects to fast track production of fruit trees;
- encourage increased rootstock production in B.C.;
- support B.C. nurseries whenever possible;
- organize training programs for home nursery growers;
- organize training programs for growers using benchgrafts; and
- research treatments other than fumigation for imported plant material.

SECURING THE NEEDED NURSERY STOCK OF THE MOST DESIRABLE VARIETIES

One of the tasks of this study is to provide recommendations for securing the needed nursery stock of the most desirable varieties and strains.

The current unavailability of apple trees on dwarfing rootstocks is due primarily to unprecedented planting in Washington and the fact that the supply of dwarfing apple rootstocks has not kept pace with tree demand. Even if the Washington planting bubble bursts it won't necessarily mean that availability of apple trees will improve. This is because growers pay deposits to nurseries for contracted trees and don't want to forfeit those deposits.

Those not propagating their own trees need to purchase them. To ensure supply of the most desirable varieties and strains growers must plan ahead by 2 or 3 years and purchase trees under contract. This will require a deposit. Some growers don't want to do this because they think varieties or strains may change. This can happen, but generally not that quickly.

Planning ahead and paying a deposit in order to obtain the most desirable varieties and strains is a good economic decision compared to not getting trees or planting an inferior variety or strain. Growers who propagate their own trees start paying for them 2 years in advance when they purchase and plant rootstocks. Paying deposits for trees, therefore, should not be considered as a hardship to growers who purchase trees.

The advantages of planning ahead and buying trees on contract should be an on-going communication to growers by the Replant Program, field staff and consultants.

The key decision to make for new plantings is what varieties and strains to plant. In the short term, there are not many desirable varieties to choose from that offer returns in excess of 25 cents per pound.

At grower replant meetings on February 10 and 11, 2015, organized by BC Tree Fruits Cooperative field service, Charlotte Leaming, fieldperson, provided information on variety returns for the years 2011 to 2013. She indicated that Ambrosia, Honeycrisp and Pink Lady returned more than 25 cents per pound. Gala was barely over that amount but will be under 25 cents per pound for the 2014 crop year. McIntosh could be close to 25 cents per pound if the grades could come up to at least 80% Fancy. This information

was very useful and it is recommended that such information on varieties be presented frequently.

Recommended apple varieties for the next 5 to 10 years are included in “Assessment of B.C. Apple & Cherry Varieties” (“Assessment”) done by Globalwise Inc. in association with Belrose Inc. This was funded by the B.C. Ministry of Agriculture.

The “Assessment” recommends Ambrosia, red strains of Gala, Honeycrisp, Spartan, red strains of McIntosh, Envy and Salish. The inclusion of Spartan on this list is rather interesting because of lower recent prices but they do qualify their recommendation noting that quality needs to be improved. They also comment that McIntosh needs a better appearance and higher yields and that Salish has not had extensive consumer testing. They caution that deeper red strains of Gala must not reduce storage life, which would make the fruit less acceptable at retail. The suggestion is that it is the red strains of Gala that reduce storage life but the problem is probably more related to management at harvest. The inclusion of the apple variety Envy in the “Assessment” list is interesting. It is a protected variety from New Zealand and is not accessible to B.C. growers.

The varieties referred to by Charlotte Leaming and by the “Assessment” provide a good list from which to choose. The grower’s selection might be limited, however, because some of the varieties listed do well only in specific areas of the Okanagan-Simalkameen. It can be anticipated that returns from these varieties will drop over the next several years as production levels increase.

Growers will need choices of desirable new varieties to plant when that occurs. These new varieties might include protected varieties from elsewhere or new varieties from the breeding program at PARC.

The “Assessment” comments that “while numerous new varieties are commercialized every year, many are being released under various restrictions and conditions that make it difficult for B.C. growers to gain access to them.” The conclusion is that there is not much opportunity for the B.C. apple industry to secure a major club variety.

The main reasons given are excessive costs to win the rights, small industry size, industry structural issues, grower performance and lower yields due to latitude. Undoubtedly those are valid reasons although yield differences due to climate may not be as big an issue as suggested.

Lack of access to protected varieties emphasizes the need for the PARC breeding program.

The B.C. industry has some very large advantages that can be promoted. Although the “Assessment” considers less than half the growers to be internationally competitive, others are among the world’s elite.

From a climate perspective, the Okanagan-Simalkameen is one of the premier apple producing areas in the world. Long, warm, sunny summer days followed by cool nights in September are ideal for apple color development. History has shown that this is especially so for difficult to color red skinned varieties with maturities ranging from mid-September and later. With the right variety, therefore, the strengths of the Okanagan-Simalkameen should be of interest to licensors.

Gaining access to restricted varieties will not happen overnight. Some effort and leadership will be required to get the process started. The leadership could come from a grower, industry and government group but a champion will be required.

Funding to gain access to protected varieties is a big issue. The intent of the Replant Program is to replant to highly successful plantings of high value varieties. To help achieve this objective perhaps the Replant Program could provide funding from the program to get the process of accessing protected varieties started. This could be in partnership with the industry as a whole or a group within the industry. Several funding and organizational alternatives exist. Regardless, someone or a group should take the lead and begin to analyse and assess the possibilities.

CONCLUSION

Supplies of cherry, pear and other soft fruit trees for the period 2015 to 2021 are expected to be adequate although some desired varieties may be unavailable.

For this same period, availability of dwarfing apple rootstocks, apple trees on dwarfing rootstocks and posts for apple support systems will be limited. This is due to large acreages of apples on dwarfing rootstocks being planted in Washington and other major apple producing regions.

To ensure supplies of rootstocks for home nurseries, growers should contact their rootstock supplier to order their requirements for 2016. Likewise, growers requiring posts for apple support systems should contact their supplier at least a year in advance to order their requirements.

Growers wanting to purchase apple trees from commercial nurseries should plan their needs and be prepared to pay deposits and contract order 2 to 3 years in advance of planting. Orders for apple trees are now being taken for 2017.

LIMITATIONS

I, M.J. (Mike) Sanders, PAg, certify that I have carried out the majority of the work described in this report. An independent contractor, Don Bertoia, B.Sc. Agr., surveyed home nursery growers in the greater Kelowna area. I have based my opinions on my horticultural experience and expertise and the information and data provided to me by others. My experience and expertise leads me to believe that the information and data provided to me is accurate, or reasonably so, but I cannot make any guarantees in this regard.

M.J. (Mike) Sanders, PAg
March 12, 2015

APPENDIX 1- CERTIFIED U.S. FRUIT TREE NURSERIES

note: only nurseries who regularly or frequently ship into B.C. or who indicated interest are listed

C & O Nursery
1700 N. Wenatchee Ave.
P.O. Box 116
Wenatchee, WA 98807
(800)- 232- 2636

Cameron Nursery, LLC (large contracted orders only)
1261 Ringold Road
Eltopia, WA 99330
(509)- 266- 4411

Van Well Nursery, Inc.
P.O. Box 1339
Wenatchee, WA 98807
(509)- 886- 8189

Willow Drive Nursery, Inc.
3539 Road 5 NW
Ephrata, WA 98823
(888)- 548- 7337

Tree Connection (tree consultants and sales; not certified but sell certified fruit trees)
P.O. Box 549
Dundee, OR 97115-0549
(800)- 421- 4001

APPENDIX 2- CERTIFIED U.S. ROOTSTOCK PRODUCERS

Bailey Nurseries Inc (they also supply finished trees under contract)
9855 NW Pike Road
Yamhill, OR 97148
(503)- 357- 6380)

Carlton Plants
14301 SE Wallace Road
Dayton, OR 97114
(503)- 868- 7503

Firdale Nursery
21200 SW Scholls Ferry Road
Beaverton, OR 97007
(503)- 628- 2755

Treco
P.O. Box 98
Woodburn, OR 97071
(503)- 634- 2209

Willamette Nursery
25571 S. Barlow Rd.
Canby, OR 97013
(503)- 263- 6405

Willow Drive Nursery
3539 Road 5 NW
Ephrata, WA 98823
(888)- 548- 7337

APPENDIX 3- B.C. FRUIT TREE AND ROOTSTOCK SUPPLIERS

AgriForest Bio- Technologies Ltd., Kelowna; 250- 764- 2224; produces rootstocks by tissue culture

Byland's Nursery, West Kelowna; 250- 769- 4466; produces fruit trees and will supply bench grafts

Billy Boerboom, Windmill Orchards, Summerland; 250- 494- 3178; under contract will supply Siberian C and Bailey peach rootstocks

James Calissi, Kelowna; 250- 763- 7087; rootstock broker and rootstock grower

Al Fisher, Golden West Nursery, Summerland; 250- 494- 1150; rootstock broker and will supply bench grafts

Avtar Mann, Vernon; 250-558-8939 or 250-549-4404; produces fruit trees and custom graft

Neufeld Brother's Nursery, Rosedale, B.C.; 604- 796- 3806; stoolbed producers of M9 and B9

Alain Peron, Old Tower Farm, Keremeous; 250-499-5654; applerootstocks.com; stoolbed producer of M9 and B9 for organic and conventional growers

Stewart Brothers Nurseries Ltd., Kelowna; 250-764-2121; cherry trees available in 2016

APPENDIX 4- B.C. HOME NURSERIES WITH TREES FOR SALE

Gary Dhaliwal, Oliver; 250-498-9876; Gala and Ambrosia on M9 for 2015 and 2016

Joe Dhand, Vernon area; 250-306-0864 or 250-938-7273; Gala and Ambrosia on M9 and B9 for 2016

Kaul, Vernon area; 250-307-3350 or 250-542-6598; several apple varieties on dwarfing rootstocks and cherries for 2015 and 2016

Kashif Mohammed, Lavington area; 250-309-0975; Gala on B9 for 2015 and 2016

Gurmit Sidhu, Kelowna; 250-317-1672; Honeycrisp on M9 for 2015 and maybe 2016

APPENDIX 5- AUTHOR

The author of this report is M.J. (Mike) Sanders, PAg who is the principal of Apple Time Inc. whose main activity is horticultural consulting.

Mike is a former Provincial Tree Fruit Extension Specialist with the B.C. Ministry of Agriculture. His main areas of interest were rootstocks, training systems, pruning, varieties and thinning. For 12 years he managed the trueness-to-type portion of the Certified Tree Fruit Nursery Program.