

New Alternative Fruit Crops for Western Washington

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Introduction

One of the greatest challenges all agricultural producers face is to remain economically viable in today's marketplace. Prices for wholesale crops that are below the cost of production are all too common in western Washington. Traditional crops face severe competition from foreign producers in world markets where labor and land costs are much lower. In addition, urban encroachment continues to divert cropland for non-agricultural purposes. To retain agricultural support systems in any given area, farming must remain viable.

Several factors affect the profitability of farming in general. Lack of diversity often results in overdependence on a specific crop. Value-added products can increase profitability compared to marketing a crop wholesale. For example, the potential return for selling one ton of grapes to a winery is much less than the return for the bottled wine made from the same grapes. No one crop is the final answer to the profitability question, because markets are continually changing. Therefore, growers need to consider new alternative crops for this region and learn how to diversify their products, using a vertical market integration approach to secure higher potential profit.

Over the past twenty years the Fruit Horticulture Program at the WSU Northwestern Washington Research & Extension Center (WSU-NWREC), located in the Skagit Valley, has tested a number of alternative fruit crops. The cool maritime climate is typical of many similar coastal areas in Washington, Oregon, and British Columbia. Under these conditions, disease susceptibility is an important element in evaluating potential crops. The ability to produce high quality fruits that mature well in the relatively lower range of heat units is another key factor.

Many of the alternative fruit crops presented in this bulletin were initially tested for suitability to the home grower. Some of these fruit kinds and varieties have shown considerable promise as alternative crops for commercial production because of their horticultural adaptability to our unique area. Many of these crops

may best fit a specialty/niche market, yet there are a few that show possibilities for larger-scale operations, based on the trial data and on assessment of potential future development. The categories of crops discussed below are not all-inclusive; more varieties of each kind of fruit can be found in the WSU-NWREC Fruit Horticulture program's annual harvest reports, available online at http://mtvernon.wsu.edu/frt_hort/fruit_horticulture.htm.

In looking for new crops that have the potential to be profitable, there are several questions to be answered:

- How am I going to market this product?
- Am I targeting a wholesale or a retail market?
- Is there potential for vertical integration, and will it be profitable at each level?
- What are my chances of being successful?
- Have I worked out a business plan?
- What type of competition do I have?
- Does my product have a special quality advantage when grown in our cool maritime climate?

While you will need to answer some of these questions on your own, this publication will help you by providing answers to the following questions:

1. What are some of the new fruit crops that can be grown in western Washington?
2. Does the product have potential for profitability at the wholesale level?
3. Does it have potential for profitability in the direct market?
4. Would organic production be feasible?
5. Is there a special advantage to growing the crop in our local climate conditions (e.g., russet pears)?

Taylor's Gold Comice (Russet Pears)

Taylor's Gold Comice
has an established market
and is particularly well
adapted locally.



Pears (*Pyrus communis*) are generally well adapted to western Washington climate conditions. Taylor's Gold not only has an established market, started in the off-season by New Zealand, it also is particularly well adapted locally. In drier areas such as eastern Washington, it has been very difficult to ensure a uniform development of the russet skin which is necessary to give the fruit its distinctive golden finish. In our cool humid climate, that attractive finish occurs reliably every year. In addition, disease problems such as fire blight (*Erwinia amylovora*) have not been a problem because of our cooler weather. Pear psylla (*Cacopsylla pyricola*) has only been a problem occasionally.

These factors also make Taylor's Gold a promising candidate to grow organically. It can be grown successfully on quince rootstock, which makes the tree more productive, and results in larger fruit when grown on Quince A or Provence Quince. Fruit of pollinizer varieties such as Bosc and Conference can also be sold wholesale. Since our climate is quite well suited to grow this pear, substantial acreage could be planted. Note that due to restrictions placed by the patent holders, trees of Taylor's Gold Comice are available only to commercial growers as of 2005, and may involve specific contract terms.

The challenge for this crop is to develop a business plan, including an effective marketing and warehouse

system to distribute the product. In addition, as a russeted Comice, varietal characteristics of size and productivity can be a challenge and will need careful attention to thinning and good nutrition.

Further information:

EB0937 *Fruit Handbook for Western Washington: Varieties & Culture*, G.A. Moulton and J. King (Revised 2006).

Mark's Fruit Crops, M. Rieger, Professor of Horticulture, University of Georgia, Athens, GA
<http://www.uga.edu/fruit/pear.html>

Taylor's Gold Pears, Specialty Produce Co. product sheet. <http://specialtyproduce.com/spNetwork.ASP?Item=7035&WCI=Frameset&WCE=Main>

Pear Bureau Northwest
<http://www.usapears.com/>

Sensory Evaluation of New Pear Cultivars, Vaysse, P., P. Reynier, L. Roche and O. Laviolle. IX International Pear Symposium, Acta Horticulturae 671.

Consumer Sensory Evaluation of Pear Cultivars in the Pacific Northwest, USA, Turner, J., J. Bai, A. Marin and A. Colonna. IX International Pear Symposium, Acta Horticulturae 671.

Asian Pears

Probably the most promising varieties of Asian pears in our area include the russets such as **Chojuro** (pictured).



Asian pears (*Pyrus pyrifolia*) are sometimes called “apple pears” due to their commonly round shape and crisp, crunchy flesh. Like apples, they are harvested when they are ready to eat. Fruits must be handled carefully to prevent skin punctures and bruising, so they are often packed in the field. The stiff stems are cut short to prevent damage to fruit in packing.

Probably the most promising varieties in our area include the russets: **Kosui**, **Chojuro**, **Mishirasu**, and **Atago**. Some late varieties such as **Atago** store well, thereby extending the marketing season. Like the European russet pears, Asian pears produce attractive, high quality fruit. **Mishirasu** in particular is unique, with brown russet skin, a roundish irregular shape, and very large size—some individual fruits weigh up to two pounds. If packaged appropriately, this variety could have distinctive marketplace appeal. An attractive smaller size pack may make these pears suitable to special high-end markets. Asian pears also have good potential for organic marketing, since the major disease problem, susceptibility to bacterial infection (*Pseudomonas syringae* pv. *syringae*), can be largely avoided by selecting more resistant varieties and by pruning during the summer. Developing market

awareness may present a challenge, and careful fruit handling and packing will be necessary.

Further information:

EB0937 *Fruit Handbook for Western Washington: Varieties & Culture*, G.A. Moulton and J. King (Revised 2006).

Mark's Fruit Crops, M. Rieger, Professor of Horticulture, University of Georgia, Athens, GA
<http://www.uga.edu/fruit/pear.html>

Asian Pears, Beutel, J.A. 1990. p. 304–309. In: J. Janick and J.E. Simon (eds.), *Advances in new crops*. Timber Press, Portland, OR
<http://www.hort.purdue.edu/newcrop/proceedings1990/v1-304.html>

Pear—Pseudomonas blossom blast and dieback, J. Pscheidt, Oregon State University Extension, Disease Control bulletin online, revised January 2005.
<http://plant-disease.ippc.orst.edu/disease.cfm?RecordID=807>

Hardy Kiwis

The hardy kiwi variety **Ananasnaja (Anna)** is very productive and has good potential for the wholesale market.



Hardy kiwis (*Actinida* spp.) are about the size of a very large grape. They have smooth brown or greenish skin, often with a red blush, and can be eaten whole like a grape. The flavor has been described as a touch of berry with pineapple overtones. The vines need to be grown on a strong support system; several different trellis designs can be used. Most kiwi varieties require one male plant as a pollinizer for every nine female plants, although a few (e.g., **Issai**) are self-fertile.

The most economically important hardy kiwi (*A. arguta*) cultivars include **Ananasnaja**, **74-49**, **Meador**, **Ken's Red**, **Geneva**, and **Issai**. The variety **Ananasnaja (Anna)** has been very productive and also has good potential for the wholesale market. The vines are hardy down to -25°F in the winter. However, in several areas, the flowers were found to be susceptible to spring frost damage. In milder climates near the Puget Sound, no problems with frost have occurred in more than ten years. In addition, the fruit attains a very high quality in our cool climate. As yet no major pest problems have occurred in our area, therefore hardy kiwi has very good adaptability to organic cultural methods.

Challenges will include setting up a marketing structure, harvesting aids, and using trellising systems that

facilitate hand or possibly mechanical harvest. There is potential interest in both fresh fruit and processed products such as jam, but it will be necessary to develop a market for these products. Correct timing of fruit harvest will be measured by testing the brix (soluble solid content) of sample juice, so that fruit can be ripened off the vine yet retain good quality. If harvest is delayed until the fruit is soft, the skin can tear and market shelf life is very short.

Further information:

Hardy Kiwifruit (Actinidia spp.) Genetic Resources, K. Hummer, USDA-ARS, Corvallis, OR (June 1999)

Kiwifruit Production, B. Strik and H. Cahn, Oregon State University, Northwest Berry & Grape Information Network.

<http://berrygrape.oregonstate.edu/fruitgrowing/berrycrops/kiwifruit.htm>

Hardy Kiwi Fruit, California Rare Fruit Growers (1996)

<http://www.crfg.org/pubs/ff/hardy-kiwifruit.html>

New Temperate Fruits, A.R. Ferguson (1999)

<http://www.hort.purdue.edu/newcrop/proceedings1999/v4-342.html>

Late Sweet Cherries

Late self-fruitful varieties like **Lapins** can ripen up to 3 weeks later than the same varieties grown in eastern Washington.



Self-fruitful late sweet cherries (*Prunus avium*) grown on Giesla 5 rootstock can produce a profitable late cherry crop in western Washington. The introduction of dwarfing rootstocks has resulted in higher cherry production per unit area. The smaller tree size has a number of other advantages including, facilitating picking and pruning without ladders, application of netting for control of bird damage, and sheltering trees from rain damage. In eastern Washington, the “Fourth of July glut” occurs when the bulk of the cherry crop comes on the fresh market and the price is lowest. Later in the season, when the crop from eastern Washington is mostly gone, the price rises again.

Late self-fruitful varieties, which include **Lapins**, **Sweetheart**, and even some new later introductions, are very productive and can ripen up to three weeks later than the same varieties grown in eastern Washington. Some of the most promising sites for cherry production might be found in the San Juan Islands or on the east side of the Olympic peninsula. These areas can be very cool and relatively dry (such as Sequim with 1300–1400 heat units and approximately 13” of annual rainfall). Major expenses for this crop include

bird protection and rain cover. The biggest challenge is the development of a market structure for both wholesale and direct market distribution.

Further information:

EB0937 *Fruit Handbook for Western Washington: Varieties & Culture*, G.A. Moulton and J. King (Revised 2006).

Sweet Cherry Varieties for Eastern U.S., R.L. Anderson, Cornell University, Geneva, NY (January 2004),
<http://www.maes.msu.edu/nwmihort/swtvarieties.htm>

Move Over, Bing and Lapins, R. Stern, The Grower, May 2004

Canadian sweet cherry breeding program offers new varieties, F. Kappel and R. MacDonald, The Great Lakes Fruit Growers’ News, April 1997
<http://virtualorchard.net/glfgn/april1997/canadiancherries.html>

Wine Grapes

Wine grapes like **Agria** (pictured) are one of the most promising of the alternative crop choices for western Washington.



There are several reasons that production of wine grapes (*Vitis* spp.) is one of the most promising of the alternative crop choices for western Washington. The climate range in this area closely resembles some of the premier wine growing regions of France and Germany. Mild winters eliminate most worries about frost damage, and the cool spring and early summer temperatures provide a healthy, low stress atmosphere for optimum vine growth.

In the past, there was a perception that our area was too wet to grow good wine grape varieties. However, from July to October, when grapes are ripening, it is normally quite dry and very conducive to wine grape growing. Because of our cool climate, fruits retain their esters, developing a full aroma and fruitiness in the finished wines. Since there are several mesoclimates in western Washington, choice of a vineyard site is important. See EB2001 *Growing Wine Grapes in Maritime Western Washington* for detailed information on establishing a wine grape vineyard and recommended varieties for this region.

Interest in wine grape growing has increased dramatically over the past decade. Our research has identified several new varieties as well as some established ones that do well in western Washington. In new vineyard plantings, it is very important to use plants grafted to selected rootstock.

To get the most out of wine grapes as a value-added product, growers can benefit greatly from having their own winery and selling directly to the consumer or

supplying wine to the wholesale market. However, this process requires a very large capital investment and can be risky. In addition, an area that combines scenic attractions with several wineries can become a destination point for wine tasting tours and similar activities, as can be observed in some northwest Washington counties. The challenge for those who want to just grow wine grapes and sell them is the need to negotiate an agreement with a buyer before planting any grapes.

Organic wine grape growing is more of a challenge, but it can be done, especially by selecting sites carefully and planting certain varieties (e.g., **Regent**) which have shown some resistance to disease.

Further information:

EB2001 *Growing Wine Grapes in Maritime Western Washington*, G.A. Moulton and J. King (2005)

Wine Grape Glossary, A.J. Hawkins (June 2005), <http://www.wineloverspage.com/wineguest/wgg.html>

Frequently Asked Questions about Viticulture, E. Goist (includes viticulture glossary), <http://vitfaq.vinic.com/>

Grape Rootstocks and Nutrient Uptake Efficiency, M.C. Vasconcelos and S. Castagnoli, Oregon State University (1997), <http://berrygrape.oregonstate.edu/fruitgrowing/grapes/nutrroot.htm>

Hard Cider

The production of hard (fermented) cider is a specialty market similar to microbreweries. At Mount Vernon, a number of hard cider apples (*Malus domestica* Borkh), including **Kingston Black**, **Yarlington Mill**, **Vilberie**, **Dabinett**, **Michelin**, **Chisel Jersey**, **Brown Snout**, **Muscadet de Dieppe**, **Harry Masters Jersey**, and **Foxwhelp**, have performed well.

While opportunities exist to grow these varieties for commercial cider production, growers are reluctant to plant varieties whose only use is for hard cider without a ready market. Existing dessert varieties, particularly **Jonagold** and **Gravenstein**, can be handled as stand-alone single varietal ciders, but they will need innovative techniques of cider making for good results. However, they can be greatly enhanced by adding specialty cider varieties, a process that varies with cider styles.

Several of the hard cider varieties are great as stand-alone varietal ciders, developing distinct characteristics of flavor, body, and quality. Some have mildly bitter juice and would be considered mild, smooth, full-bodied cider. Others have strong bitter components, so their use would be as “stouts,” ciders of the heavier, very bitter type.

A cidery can produce several different styles of cider. Varieties suited for blending include those best used in combination to produce a complex, high quality cider. We have used the cider aroma wheel developed by Peter Mitchell, a cider consultant from the UK, to describe existing cider varieties. These descriptions help the cidemaker decide which varieties to plant for cidermaking and blending. Our website includes a yearly report on our hard cider research (see http://mtvernon.wsu.edu/frt_hort/fruit_horticulture.htm).

In addition to hard (fermented) cider, future products may include blends with other fruit juices (blueberry, strawberry, etc.) and carbonated sweet ciders, either single-varietal or blended. The challenge is to introduce and promote these new cider microbrew product(s), then create a successful business plan. We recommend that growers obtain these specialized hard cider varieties grafted to dwarf rootstock, then use a trellis system to mechanize operations as



The production of hard cider is a specialty market similar to microbreweries.

much as possible. The best value-added potential lies in producing cider from the apples you grow. Here again, those who only want to grow the fruit will need to contract with cider makers before planting their orchard.

The major pest problems for this crop are apple maggot and anthracnose control. Anyone planning for organic production will have to meet the challenge of controlling these pests, which are both serious problems.

Further information:

Mitchell F&D Limited, Peter Mitchell, Cider Academy, professional training and information <http://www.cider-academy.co.uk/>

The Real Cider & Perry Page, G. Grafton, P. Gunningham, ed. (updated 2004) <http://www.ciderandperry.co.uk>.

The Wittenham Hill Cider Portal, A. Lea (January 2004), http://ourworld.compuserve.com/homepages/andrew_lea/

Apples & More, University of Illinois Extension <http://www.urbanext.uiuc.edu/apples/cider.html>

Peaches

The market for U-pick peaches (*Prunus persica*) should be outstanding. The wholesale potential for tree-ripened peaches delivered direct from the field to local supermarkets and restaurants could also generate considerable interest and potential profit. The outlook for growing peaches in western Washington has improved, but varietal productivity is still inconsistent. However, the selection of newer peach varieties looks promising compared with the standard varieties of a few years ago. Many new cultivars have been introduced recently and prospects are optimistic for expanding peach variety recommendations in the future.

When selecting peach varieties, we look for the following four characteristics:

1. Consistent productivity
2. Attractive appearance and good internal quality
3. Low incidence of split pit
4. Disease resistance

These are the most reliable current varieties:

- **Redhaven** is an old standard that is still one of the most reliably productive varieties in our region; fruit quality is good but it can have some split pits.
- **Harbelle** and **Frost** are also consistently productive, but they can have a lot of split-pit fruit in most years. Mature trees of **Frost** are resistant to peach leaf curl, but the young trees need protection for the first few years.
- **Starfire** is a newer variety that appears to be consistently productive with good quality, very colorful and attractive fruit, but it can have some split pits.
- **HW 272** has been a very consistent producer with high quality and low split pits. This variety should soon be named and available at local nurseries.
- **Redstar** and **Blazingstar** have been tested for several years and have shown promise. Both are high quality, with **Blazingstar** showing the lowest percentage of split pits.

We are currently evaluating some new varieties that have shown great initial promise, but need more testing to see how they perform over the long term.



The selection of newer peach varieties for western Washington is promising.

New varieties worthy of trial include **Summer Prince**, **Juneprince**, and **Contender**, as well as a few others. The greatest limitation at this time is that these promising new varieties have only been on trial since 2002.

Growing peaches on a larger scale may be enhanced with some kind of frost protection during bloom, such as wind machines. See our harvest report for more information on peaches.

Further information:

EB0937 *Fruit Handbook for Western Washington: Varieties & Culture*, G.A. Moulton and J. King (Revised 2006).

Mark's Fruit Crops, M. Rieger, Professor of Horticulture, University of Georgia, Athens, GA
<http://www.uga.edu/fruit/peach.html>

Handbook of Peach and Nectarine Varieties, Okie, W.R., USDA Agricultural Research Service, (Handbook #714, publication #PB98-149602, contact <http://www.ntis.gov>).

Plums

Several of the improved dessert-type plum varieties such as **Victory** (pictured) have shown promise, with good flavor and reliable productivity.



Historically there have been successful commercial plum orchards in a number of Puget Sound locations, mostly specializing in “prune plums” of the Italian type. In particular, European type plums (*Prunus domestica*) are well adapted to this area, in terms of orchard viability and productivity.

Economic and marketing aspects now need to focus primarily on high-end, dessert-type fruit for the fresh market rather than the prune types for drying or processing. There is good potential for wholesale marketing as well as direct retail access to specialized consumer niche markets. For example, fruits could be marketed in small paper baskets at supermarkets. The challenge is to develop a good local market and infrastructure to market the fruit at a profitable price.

Over the last twelve years we have been testing improved dessert-type varieties of stone fruit.

Table 1 presents some promising varieties that ripen over a wide range of harvest dates. Many of these have good flavor, appearance, and reliable productivity. Our goal is to have quality varieties covering a harvest range from late July to mid-September. Several new varieties will be fruiting in the next few years, and more will be added to the list of marketable plums.

Further information:

EB0937 *Fruit Handbook for Western Washington: Varieties & Culture*, G.A. Moulton and J. King (Revised 2006).

Mark's Fruit Crops, M. Rieger, Professor of Horticulture, University of Georgia, Athens, GA
<http://www.uga.edu/fruit/plum.html>

Table 1. Plum harvest dates by variety for 1995–2005.

Cultivar	JULY			AUGUST				SEPTEMBER		
	8–15	16–23	24–31	1–7	8–15	16–23	24–31	1–7	8–15	16–23
Early Laxton	•	•••••	••	••						
Beauty ¹	•	••	•••	•						
Shiro ¹		•	•	•••	•					
Imperial Epineuse		•	•••	••••	•••					
Richards' Early Italian					•	•••	•••			
Seneca						•	•••	•••	••••	
Victory							•••	••••	••••	
Queen Victoria							••	••••	••	
Longjohn								••••	•••••	
Valor							•	•	••••••	•
Stanley							•	••	•••	••••

¹Japanese (*Prunus salicina*) or Hybrid
Note: Each dot represents a harvest year.

Dessert Apples

Dessert apple varieties that are productive and have some larger wholesale market potential in our region include **Jonagold** (pictured), **Honeycrisp**, and **Braeburn**.



Growing apples commercially in western Washington has been feasible for the last 20 years. However, the apple industry as a whole is struggling to remain economically viable within the traditional market system and with common apple varieties. To remain competitive, value added components such as packing and marketing will be necessary. Varieties that are productive and have some larger wholesale market potential in our region are **Jonagold**, **Honeycrisp**, and **Braeburn**.

Gravenstein, which thrives in our cooler climate, could continue to increase in profitability because of its familiarity in both local and national markets. **McIntosh** strains and certain Mac types such as **Jonamac** also do well and may satisfy a specific market demand. The greatest challenge with apples is to develop an infrastructure to market and process the fruit. Forming a partnership with a developing pear industry might be a lucrative possibility. In addition,

apples have several serious pest problems, particularly apple maggot and apple anthracnose, that have severely stifled production.

The list below includes some apple types and varieties that do well in our area and that have been in high demand at fruit shows. Some of these will probably have limited niche and direct markets.

Further information:

EB0937 *Fruit Handbook for Western Washington: Varieties & Culture*, G.A. Moulton and J. King (Revised 2006).

EB1804 *Growing Jonagold in Western Washington*, Moulton, G.A. (1996) WSU Extension Bulletin.

EB0940 *Apple Anthracnose*, Davidson, R. and R.S. Byther (1992) WSU Extension Bulletin.

Japanese, Sweet	Sweet-Tart	Cox Types	Mac Types	Oldtimers & Russets
Tsugaru, Homei Akane Beni Shogun (early Fuji) September Wonder (early Fuji)	Honeycrisp Jonagold Melrose Braeburn	Alkmene Rubinette Cox's Orange Pippin (Queen's Cox) Elstar and Elista (red sport) Karmijn de Sonnaville	Jonamac Red Cortland Spartan Empire (Thome, Royal)	Gravenstein Red Boskoop Ashmead's Kernel
Other Sweet				
Sunrise				

Currants

Black currants have the highest Vitamin C content of all temperate fruits and also contain bioflavanoids, agents that reduce blood pressure.



The genus *Ribes* is native to the high latitudes of the northern hemisphere. Europe, Asia, and North America all have native species. Most commercial production is concentrated in Europe and the USSR. The largest commercial use of currants is for juice production. Black currants have the highest Vitamin C content of all temperate fruits, with only Barbados cherry and rose hips having higher levels. Red currants and gooseberries are very high in Vitamin C as well. Black currants also contain bioflavanoids, which are agents that reduce blood pressure.

Fifteen different varieties of black, red, and white currants were planted at WSU-NWREC in Mount Vernon in 2001. Some of the varieties from Scotland show promise. Resistance to mildew and the currant sawfly were observed in a few of the black currant varieties. Several varieties show good productivity and disease resistance with acceptable plant growth habit for possible mechanical harvesting. Varieties that appear productive in our area are **Ben Alder**, **Ben Lomond**, **Ben Nevis**, **Ben Sarek**, **Ben Tirran**, **Magnus**, **Minn 69**, **Rovada**, **Titania**, and **Tsema**.

Berry processing plants and machinery are established in western Washington, and this technology may be adapted readily to currant culture and processing. The challenges to be met are dealing with the need to process a product that may have a narrow, limited market, and finding a wholesale market that is profitable. Mechanized picking is needed to reduce labor costs. Also, competition from other regions where currants grow well and market structure is already established could be problematic.

Further information:

Mark's Fruit Crops, M. Rieger, Professor of Horticulture, University of Georgia, Athens, GA
<http://www.uga.edu/fruit/ribes.html>

Black Currant Research in Alberta, Fisher, P. (2004) Ontario Ministry of Agriculture, Food and Rural Affairs

Planning for Profit: Black Currants—Lower Fraser Valley, Harris, A. and M. Sweeney, (2000) British Columbia Ministry of Agriculture, Food and Fisheries
http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/berry/currants_12_2000.pdf

Sea Buckthorn (Seaberry)

Seaberry plants are very productive, setting many small orange fruits with a citrus-like flavor.



Sea Buckthorn (*Hippophae rhamnoides*) is a very thorny shrub or small tree native to eastern Europe and Asia. It has nitrogen-fixing properties, is very tolerant of drought and poor soils, and has been introduced as a shelter belt plant in some of the Plains states and Canada. In eastern Europe and the former Soviet Union the berries are commonly harvested for juice, which is very high in Vitamin C and has other healthful properties. Medicinal uses of extracted plant oils from this plant are also well documented in Europe and Asia.

Plants on trial at WSU-NWREC have fruited successfully since 1999, and appear quite well adapted horticulturally. The plants are very productive, setting many small orange fruits with a citrus-like flavor. We have not experienced any problems with pests thus far, so there is high potential for organic production. Commercial development of this plant is being pursued by the British Columbia Sea Buckthorn Growers' Association in the Okanagan Valley (see **Further information**).

Major challenges confront profitable production of this crop. Processed juice and juice derivatives are

the marketable products, so some infrastructure for processing is necessary. Where this is not already in place some capital outlay will be necessary. An innovative method of mechanized picking is needed; current methods of harvesting include cutting off and threshing the branches or hand picking. Plants are very invasive so controlling root suckers can be a problem. Since seaberry products are generally unfamiliar to the public, promotional work would also be needed. Due to the healthful properties attributed to this plant, connection to specialty health food or herbal retailers may provide a limited niche market.

Further information:

Market Analysis Division Online, S. Novelli, Agriculture & Agri-Food Canada (July 2003)

British Columbia Sea Buckthorn Growers' Association
<http://www.hippophae.com/>

Fruit Potential of Sea Buckthorn, T.S.C. Li, Summerland, B.C., Canada

<http://www.hort.purdue.edu/newcrop/proceedings1999/v4-335.html>

Aronia

Aronia is valued for its juice, which has healing properties and is also used for natural food coloring.



Aronia (*Aronia melanocarpa*) is a native North American plant popularized in eastern Europe and the former Soviet Union, particularly after World War II. Designated a “healing plant,” cultivars were developed for fruit production. The fruit is valued for its juice, which is very high in anthocyanins, blends well with other fruit juices, and is considered to be a source of “phenols, leucoanthocyanins, catechins, flavonols, and flavones” that are bioactive in humans (Finn, see below.) The juice also has very strong colorant properties; it is used in natural food coloring and also as a teinturier to impart a deeper red color to red wines.

We have had specimen plants of aronia since 1998 and have found that while plants do well and show no sign of disease, their productivity has been only moderate. This crop will have to be protected from birds because they devoured the berries before harvest. Other than that, we have observed no major pest problems thus far. Aronia has potential for mechanical harvest but any prospective grower must line up a market before planting extensively. Productive clones

will need to be selected, as some available plants were selected as ornamentals, not for high yield potential. At this point, growers need to proceed carefully in choosing this crop.

The greater challenges lie in developing an infrastructure and business plan for a profitable industry that can compete with low cost bulk juice imports from Europe. Here again it might be possible to engage a niche market in the health food sector, but the competition for shelf space puts an unknown product at a serious disadvantage.

Further information:

Oregon State Plant Foods Index: Aronia

Temperate Berry Crops, Chad Finn, p. 324-334. In: J. Janick (ed.), *Perspectives on new crops and new uses*. ASHS Press, Alexandria, VA (1999)
<http://www.hort.purdue.edu/newcrop/proceedings1999/v4-324.html#chokeberry>

Other Fruits

Specimen plants from a number of different species and varieties are currently being tested at WSU-NWREC, with little information as yet on their future potential. They include figs (*Ficus carica*), quinces (*Cydonia oblonga*), seedless grapes, doughnut (Peen Tao) peaches, paw paws (*Asimina triloba*), persimmons (*Diospyros virginiana* [American]; *Diospyros kaki* [Japanese]), elderberries (*Sambucus canadensis*), honeyberry (*Lonicera kamchatika*), blue honeysuckle (*Lonicera caerulea*), mountain ash and other Sorbus species, and cornelian cherry (*Cornus mas*).

Most of the above fruits have marketing difficulties. They are unfamiliar to the public or have only a narrow specialized appeal. Many of these berry crops must be processed before they can be marketed, and several of the crops experience horticultural problems in our area. Some have not been tested long enough to establish cultural standards such as long-term productivity, or whether they can be sufficiently profitable.

Seedless grapes have some potential for direct local markets, provided the site is warm enough to develop good sweetness. Peen Tao or “doughnut” peaches have sold well in trial markets, as their small size, unusual shape, and very sweet flavor make them popular for eating out of hand. Further progress depends on finding varieties that are consistently productive in our climate. Quinces are very productive, and the varieties **Van Deman** and **Aromataya** have both performed very well in trials at Mount Vernon. Quinces are a staple of Mediterranean cuisine and apparently a very specific niche exists for this fruit in supplying ethnic restaurants and markets. However, this connection must be established before initiating a commercial planting.

Gooseberries (*Ribes grossularia*), especially the larger, sweeter cultivated varieties, do well as home garden crops but finding markets as well as picking and processing will present challenges. Insect pests also can be damaging to the crop. Fuzzy kiwis (*A. deliciosa*) grow well and are very productive, similar to hardy kiwis described above. They are well adapted to the coastal climate of western Washington but are sensitive to freezing in colder areas. Frost at bloom time can also be damaging. Figs can be grown here,

particularly with careful selection of varieties, and a number of large old fig trees have been noted in urban Seattle yards. **Desert King** and **Brown Turkey** are fairly reliable, but again they are sensitive to frost damage, particularly when young, and productivity is limited.

Some of the more uncommon fruits we have tested do not appear to have potential beyond home garden use at this time. Paw paw varieties currently available are not highly productive and information on their culture is lacking. Persimmons can be very productive but the biggest challenge is getting them to ripen. American persimmons are hardier than the Japanese type but fruits remain astringent until very soft. This would limit any potential for shipping, but the soft pulp could potentially be processed (e.g., for fruit leather or flavoring).

Cornelian cherry, a relative of the dogwood, is an excellent ornamental shrub, covered with bright yellow flowers in late winter to early spring. Productivity is very good, but the fruits have a strong unusual flavor, so a special market niche, perhaps including processed products as for currants, must be sought. Mountain ash varieties we have tested are very good as ornamental trees, fast growing, with attractive bloom, airy leaf texture, and colorful fall fruit. The fruit may have some use by home canners and processors but the mealy texture is not appealing when eaten right from the tree.

Further information:

Oregon Tree Fruits and Nuts, Kim E. Hummer, Research Leader and Curator, USDA ARS National Clonal Germplasm Repository, 33447 Peoria Road, Corvallis, Oregon 97333-2521 (2000)

Mark's Fruit Crops, Mark Rieger, Professor of Horticulture, University of Georgia, Athens, GA
<http://www.uga.edu/fruit/>

Advances in New Crops, Janick, J. and J.E. Simon (eds.), Timber Press, Portland, OR (1990)
http://www.hort.purdue.edu/newcrop/CropInfo/Sources/NewCropsBook1990_info.html



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