

Potential for Commercial Peach Production in Nova Scotia

South Western Ontario and the Okanagan Valley of British Columbia are the two main peach producing areas within Canada. Peach production in these provinces occurs in areas with good soils and hardiness zones of 6a and 6b where winter lows usually do not drop below -18°C . Nova Scotia does have a history of commercial peach production but it is insignificant to the above two areas. Peach orchards have tended to be less than 2 hectares in size and restricted to the milder growing areas of Nova Scotia mainly near the Annapolis and Minas Basin's. That is not to say that there are other areas in the Annapolis Valley and Nova Scotia that commercial peach production has been successful. The major limiting factor to commercial peach production in Nova Scotia is winter minimum lows, fluctuating winter temperatures and tree canker. These three factors have tended to limit productive tree life expectancy to less than 10 years. Secondary to this are suitable soils. Peaches do not tolerate wet soil conditions or wet, poorly drained soil. They tend to do best on the lighter, well drained, sandy loam soils. The Annapolis Valley, where the majority of the commercial apple industry is located, is in a 5b hardiness zone while areas of south western Nova Scotia have a 6a zone but lack suitable soils. On average, winter lows in the Annapolis Valley range between -19 and -23°C with a 45 year extreme low of -30.5°C . Minimum winter temperatures can vary by $2-3^{\circ}\text{C}$ within the Annapolis valley which can have an impact on the probability of winter damage to the flower buds and or trees. The coldest temperatures tend to be on the floor of the Annapolis and Gasperaux Valley, while the warmest are found next to the Minas and Annapolis Basin, as well as on the upper slopes of the North and South Mountain and Gasperaux Valley.

With the introduction of new hardy peach cultivars, the trend for slightly milder winters and the identification of climate zones within the Annapolis Valley, there is an increased opportunity for commercial peach production. The Annapolis Valley Temperature Mapping study which started in 2003 for the Nova Scotia grape industry is identifying micro climates within the Annapolis Valley and area that would be best suited for grape production. The best sites for grape production would also be the best locations for peach production as they both benefit from milder winter temperatures and warmer growing seasons. Temperature information for the data loggers is available at the Applied Geomatics Research Group website. (www.agrgims.cogs.nsc.ca/website/AGRGweather/viewer.htm)

Soils

Peach, nectarine and apricot trees will not tolerate imperfectly drained soils. Deep, well-drained, sandy loam soils are preferred for these tree fruits. Clays and gravel will be tolerated if they are deep well-drained. Soils within the Annapolis and Gasperaux valleys are quite variable and it not uncommon to find more than one soil type within a field. Some of the better soil series as identified in Soils of the Annapolis Valley Area of Nova Scotia Report No. 22, 25 & 26 are the Cornwallis 85, Hansford 83, Herbt 53, Pugwash 52, and Pugwash 82 series. Sandy loam soils such as the Cornwallis soils are more

commonly found on the floor of the Valley. Soils on the south slope of the North Mountain tend to be clay type soils and some of these clay type soils are poorly drained. Although the Pugwash 52 soils (which are found from Welsford to Blomidon) are moderate to well drained, they would benefit from tile drainage. The soil profile of potential site should be checked to determine rooting depth and internal soil drainage. Soil ripping, tile drainage and soil ridging should be utilized were drainage and rooting problems are observed.

Soil nutrients should be evaluated prior to planting and on a regular basis once the orchard is established. Fields having a soil pH and/or nutrients below the desired range will need to be corrected prior to planting. Refer to the following fact sheet Orchard fertility available from the AgraPoint Extension Central website for the desired soil nutrient ranges for tree fruits. (www.extensioncentral.com)

Rootstocks

Peach seedlings are still the main sources of rootstock for peach tree propagation in North America. These seedlings are either produced from the commercial cultivars or from cultivars that are grown specifically for rootstock. The rootstocks Lovell, Halford and Bailey are the most commonly available in Canada and the United States. Ontario recommends Bailey because it is hardy and produces uniform trees that are medium to large in size. Lovell, which is available from the US, is not as hardy as Bailey. Presently there are no commercial dwarf rootstocks that appear to be suitable for Nova Scotia. The hardy rootstock Siberian C which was recommended for Nova Scotia in the 1980's is no longer commercially available. Although this rootstock was hardy, peach cultivars broke dormancy early on this rootstocks and cold weather following mid winter thaws often result in damage to the flower buds and trees.

Training Systems

The traditional training system for peach trees was the open centre system with tree densities between 300 and 380 trees per hectare. Utilizing an upright training system such as the central leader or modified central leader allows for higher tree densities (500 to 700 trees per hectare) and higher yields in the early life of the orchard which is considered a benefit when the life expectancy of the orchard is short. Trials have also indicated that central leader peach trees are less prone to canker and winter injury because of the flatter branch angles. In Ontario, the central leader tree has proven to be more labor efficient than open centre or the modified central leader training systems. Refer to the following fact sheet Pruning and Training Apple Trees available from the AgraPoint Extension Central website (<http://www.extensioncentral.com>) for additional information on pruning and training trees to the central leader system. High density training systems such as the Fusetto (similar to the spindle bush system for apples) and V trellis with tree densities of up to 1,900 tree per hectare would be consider to be very risky planting systems for Nova Scotia. These systems have a high cost of orchard established and crop lost due to winter damage would have a significant impact on the profitability of the orchard.

Peach Cultivars

Literature indicates that there are more than 4,000 peach and nectarine cultivars with new ones being added annually. Looking through North American fruit tree nursery catalogues one would find over 100 peach and nectarine cultivars to choose from however, only a very small fraction of these would be suitable for Nova Scotia. Peach cultivars can be placed into three groupings; yellow fleshed fresh market, white fleshed fresh market and processing. There is no commercial peach processing industry in Nova Scotia and therefore processing cultivars have not been included in this publication. Only hardy early to midseason season maturing cultivars that have some disease resistance should be selected. Peaches have a short shelf life thus a number of cultivars which ripen sequentially are required if one wants to have as long a marketing season as possible. There has been no commercial evaluation of peach cultivars in Nova Scotia since the 1970's and the cultivars listed below are taken from the OMFRA Factsheet #07-041 Peach and Nectarine Cultivars. Redhaven in the past has proven to be a fairly reliable producing peach, of reasonable quality for the Annapolis Valley. Listed cultivars in this publication generally have similar hardiness to Redhaven and ripen prior to and no more than two weeks later than Redhaven. The first grouping of cultivars is listed for general planting in Ontario, the second for limited planting and the third for trial. Harvest dates are based upon local grower information and extrapolating Ontario harvest dates and not from Nova Scotia field trial.

Suggested for General Planting:

<i>Cultivars</i>	<i>Approximate Harvest Date</i>
Harrow Diamond	Aug 10
Garnet Beauty	Aug 25
Early Redhaven	Aug 27
Harson	Sept 1-2
Redhaven	Sept 2-3
Vivid	Aug 20
Harrow Beauty	Sept 12-14
Loring	Sept 2
Cresthaven	Sept 12

Harrow Diamond: a selection from the Harrow Ontario peach breeding program that became commercially available in 1984. It is rated as being disease resistant, winter hardy and has few split-pits. Fruit is small to medium, skin bright yellow with an attractive red blush, flesh is deep yellow, and is nearly free stone. Fruit thinning is required to obtain adequate fruit size. In Ontario it matures about 1 week before Garnet Beauty.

Garnet Beauty: a productive, medium hardy, early ripening sport of Redhaven; has attractive fruit with good size, and color with 70-80% red blush on yellow ground; flesh is firm with medium quality and semi-freestone; usually not subject to split-pits. Fruit ripens several days to a week after Harrow Diamond.

Early Redhaven: similar in characteristics to Garnet Beauty and ripens 2 to 3 days after Garnet Beauty.

Harson: a selection from the Harrow Ontario peach breeding program that was released in 1982. Resembles Redhaven in appearance, size uniform; flesh yellow, ripens uniformly about 1 day before Redhaven. Trees are hardy, similar to that of Redhaven; good resistance to bacterial spot and brown rot; moderate tolerance to perennial canker.

Redhaven: cold-hardy and productive, attractive fruit with 70-80 % red blush on a yellow back ground; flesh is firm, usually freestone and of good quality; must be thinned to attain size; ripens unevenly and trees must be harvested several times.

Harrow Beauty: productive cold hardy, trees with medium vigor and open spreading growth habit. Fruit attractively colored with 80% smooth, bright red blush over a bright yellow ground color. Flesh is firm, smooth textured, bright yellow and tinted wit red at the pit.

Suggested for Limited Planting:

<i>Cultivars</i>	<i>Approximate Harvest Date</i>
Harrow Dawn	Aug 23
Brighton	Aug 26
Harken	Sept 5
Harbrite	Sept 8
Harrow Fair	Sept 10
Veeglo	Sept 15
Vollie	Sept 30

Harrow DawnTM: a recent introduction from the Harrow Ontario breeding program which is hardier then Redhaven. The tree is vigorous, productive and has medium-to-high field resistance to bacterial spot, brown rot and canker. Fruit is attractive, bright redblush on a yellow background, ripens uniformly, medium size, firm yellow flesh, usually free stone when ripe, few split-pits. Ripens about 7-10 earlier than Redhaven.

Brighton: early –ripening, medium size, attractive red in color, good quality with a clinging flesh. Fruit ripens 4-5 days after Garnet Beauty

Harken: a cold-hardy Harrow selection with a large attractive peach with red coloring over most of the fruit and a bright yellow ground-color. Flesh is firm, good quality, and oxidizes slowly. Good resistance to bacterial spot and brown rot. Fruit ripens 2 to 3 days after Redhaven.

Harbrite: a cold-hardy Harrow selection that is productive. Fruit are uniform of good size, with attractive bright red blush (80%) on a yellow background; flesh is firm, semi-free to free stone and quality is good but slightly below Harken. Fruit resistant to bacterial spot and brown rot

Veeglo: a selection introduced from Vineland in 1981 that ripens 7-9 days after Redhaven. Fruit attractive; skin medium-bright red blush over a light golden yellow background, flesh is yellow and slow to oxidize. Has moderate resistance to bacterial spot.

Harrow Fair™: a 1995 introduction from the Harrow breeding program. Fruit are medium to large in size, brightly colored, juicy and flavorful. Trees are rated as having good disease resistance. Fruit ripen second week of September.

Vollie™: A Vineland selection recently trade marked by the University of Guelph. Fruit are medium to large, attractive red with firm flesh. Matures late September and may be too late for Nova Scotia. Moderate resistance to Cytospora canker and brown rot and is susceptible to bacterial canker.

Suggested for Trial Planting:

<i>Cultivars</i>	<i>Approximate Harvest Date</i>
Flaming Fury ® PF-5B	Aug 16
Risingstar™	Aug 30
Flaming Fury ® PF-15	Sept 2-3
Redstar™	Sept 2-3
Blazingstar™	Sept 3-4
White Lady	Sept 5-6
Blushingstar™	Sept 12-14
Flaming Fury ® PF-17	Sept 20

Flaming Fury® PF-5B: Fruit are medium in size slight larger than Redhaven, flesh firmness is only medium, skin red blushed, few split-pits and has good to medium tolerance to bacterial spot. Fruit matures one to two days after Harrow Diamond.

Risingstar™: A medium size peach with an 80% bright orange-red skin with a slight stripe. Flesh is firm, non-oxidizing and semi freestone. Good resistance to bacterial spot and peach canker. Variety will ripen 1 or 2 days before Garnet Beauty.

Flaming Fury®PF-15A: A hardy peach of medium size with an attractive red blush. Fruit firmness is rate slightly below that of Redhaven. Very few split-pits and has medium to good tolerance to bacterial spot. Fruit ripens just before Redhaven in Ontario.

Redstar™: A medium size peach with flesh softer than Redhaven but is equal to it in hardness. The fruit has a scarlet-orange color with a good blush. Fruit ripens at the same time as Redhaven.

Blazingstar™: A small to medium size peach that matures just after Redhaven. Skin is bright red, flesh is firm and semi-freestone. Tree is hardy and resistant to bacterial spot. Aggress hand thinning is suggested to obtain good fruit size.

White Lady: A hardy attractive white fleshed peach with low acid flavor and moderate aromatic character. Fruit ripens about 5 days after Redhaven. Tree is moderately susceptible to bacterial spot.

BlushingstarTM: A hardy white fleshed peach, medium to large in size, skin blushed with a pinkish red over-color, flesh is firm and freestone. Tree is productive but moderately susceptible to bacterial spot.

Flaming Fury[®] PF-17: A medium size peach with firm flesh and hardiness equal to Redhaven. The skin has a dark red, highly blushed color. Has a good tolerance to bacterial spot. Fruit ripens two weeks or later than Redhaven which would place it at the tail end of the season.

Nectarines

Nectarines tend to be smaller and not as hardy as peaches, although they are of the same species. Nectarines are smooth skinned and can have yellow or white flesh with a distinctive flavor and texture. Hand thinning is recommended for crop load management so that marketable size fruit can be obtained. Like peaches cultivar evaluations trials have not been carried in Nova Scotia during the past twenty years and listed cultivars in this publication are based upon those recommended for Ontario.

Suggested for General Planting:

<i>Cultivars</i>	<i>Approximate Harvest Date</i>
Harflame	Sept 2-3
Harblaze	Sept 3-4
Fantasia	Sept 30

HarflameTM: A 1999 Harrow introduction that produces medium size fruit with an 80% blush on yellow background. Fruit is yellow fleshed, semi-freestone of medium quality with a low incidence of split-pits. Good resistance to bacterial spot, brown root and canker. Tree is as hardy as Redhaven.

Harblaze: A Harrow selection introduced in 1989 with medium to large fruit with a 70-90% scarlet red skin and yellow flesh. Relatively winter hardy with a good level of resistance to bacterial spot and brown rot.

Fantasia: Fruit medium to large with a bright red over yellow background, flesh is yellow and firm. Trees are moderately hardy and resistant to bacterial spot. Its late maturity date may present a problem when growing season temperatures are below average.

Suggested for Trial

The two cultivars Flavortop and Redgold are suggested for trial by Ontario however, both are tender to winter cold and susceptible to bacterial spot thus would not be recommended for commercial planting in Nova Scotia.

Peach Diseases

There are four main diseases that can adversely affect peach production in Nova Scotia, perennial canker, bacterial spot, peach leaf curl and brown rot.

Perennial canker can be the most devastating of these diseases in that it reduces the life expectancy of a peach tree and would be considered to be one of the limiting factors to peach production in Nova Scotia. There are no sprays to protect peach tree from perennial canker however, cultural practices can reduce or limit the spread of this disease. The disease invades tree tissue through wounds thus steps taken to prevent damage to peach trees will help to control perennial canker. Winter injury to peach tree causes many of the wounds allowing for the establishment of perennial canker. The following steps will help to reduce canker infections:

- Proper site selection and preparation to reduce winter injury
- Select hardy cultivars and rootstocks
- Plant away from peach trees that have canker
- Training young tree so that narrow crotch angles are not produced. Limbs with narrow crotch angles can split or break which serve as a site for infection.
- Remove dead twigs on limbs
- Prune during dry weather
- Prune after or during bloom; actively growing trees can protect pruning cuts from infection
- Trees that have fully hardened off before cold weather are less susceptible to winter injury therefore practices that stimulate late season growth i.e.; nitrogen application after June and late season cultivation should be avoided.

Bacterial Spot attacks the fruit, leaves and current season's twigs. Early season infections result in deep lesions on the fruit while late season infections result in circular yellow spots. Leaf infection can lead to defoliation and weakening of the tree. Bacterial spot as named is caused by bacteria and there are no bactericides registered in Canada for this disease. A dormant copper spray may reduce inoculum from overwintering cankers. The most effective means of controlling this disease is to plant cultivars that have some resistance to this disease.

Peach Leaf Curl is a fungal disease that causes discoloration and curling of leaves which die and are replaced by healthy leaves. Severe defoliation by this disease in early spring will result in crop losses and annual leaf drop from this disease will weaken the trees. The fungus overwinters as spores on twigs and infects buds early in the spring when the buds begin to swell. The application of a fungicide in the fall and/or spring prior to bud swell will control this disease.

Peach Pest

There are only a few insect pests that may need to be controlled on peach trees in Nova Scotia. Plant bugs are the major pest however plum curculio, green peach aphid and mites may occasionally need to be controlled. Plant bugs, primarily tarnished plant bug, and stink bugs cause damage to the fruit known as catfacing. The most severe catfacing damage is done in the period from shuck off until the pit hardens (12.5-19 mm in diameter). Stinging results in destruction of cells, thus inhibiting fruit development at the feeding site, while surrounding tissues continue to grow and expand causing scarring called "catfacing". As peaches increase in size, feeding by plant bugs or stinkbugs causes less scarring and distortion of the fruit. Clear beads or strings of gum may exude from the feeding site and shallow, dry, corky, sunken areas may develop. Peaches on the edges of orchards bordering woodlands, fencerows, or fields are usually the first and most severely damaged.

Plum curculio will lay eggs around fall. They will scar the fruit and further damage will occur when the eggs hatch and the white grub tunnels to the pit where they continue to feed. This fruit may drop prematurely. Treatments to control plant bugs would also control this pest.

Green peach aphid adults and nymphs suck sap from the underside of leaves which results in a curling and yellowing of the foliage. Feeding on young fruit can result in distortion and discoloration. This pest is the main vector for the spread of the plum pox virus.

European red mite and two spotted spider mite populations can build to levels where miticide treatment may be required.

Earwigs, although not considered a pest, can reduce the marketability of fruit. They become a problem when they enter the fruit as a result of split-pit. Earwigs enter the fruit at the opening of the pit at the stem end and make the open cavity their home. Consumers tend to find earwigs exiting the fruit as they begin to eat it; less than appealing. Planting cultivars that have no or few split-pits will help to reduce this problem.

For more information, please contact:
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