Breeding Peaches for the True North: A Moving Target Amidst Climate Change and Consumer Demands

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Canada has grown peaches for the past 100 years and perhaps at the northern most latitude where peaches are grown. However, peaches are grown only small pockets in Canada- mainly along the southern/south-eastern shore of Lake Ontario (the Niagara Peninsula), some parts of south west Ontario and currently some more in British Columbia. Of these areas, the Niagara peninsula grows the most peaches, 10,000 acres. Most other regions are too cold for peaches to grow and even in the areas where peach is grown, we need to develop cultivars that could survive the cold weather of Canada.

Niagara peninsula enjoys a micro-climate thanks to the effects of Lake Ontario and the escarpment providing a slightly warmer winter than the rest of the Canadian peach growing areas. This is what is popularly called the 'lake effect' although it means a lot of other things as well. Briefly the lake effect micro-climate of the Niagara region is due to warmer air raising from the Lake Ontario in winter, which absorbs heat during summer and releases it lowly as long as there is open water in the lake. This coupled with the downhill breeze which develops from the top of the Niagara Escarpment, creating an airflow pattern that draws warmer air from higher inversion layers. As a result, the lake moderates temperature fluctuations by warming the offshore breezes in winter and cooling the onshore breezes in summer. This moderating influence is important as winter temperatures in the region seldom go below -18C/-0.4F or greater than 30C/86F in the summer. This effect delays the development of the fruit buds in spring, reducing the chance of damage caused by spring frost. The first fall frost is also delayed allowing for a longer growing season and greater heat units late into the season.

Utilizing this unique phenomenon, stone fruits are thriving in these northern latitudes. In order to develop cultivars that suit to these climate/temperatures, a stone fruit breeding program was established at the Vineland Research Station in early 1900s. The first peach variety that was released from the center in 1924 was named Vimy. Since then, 61 stone fruits varieties including peach, plum, cherry and apricots have been released from this center. After going through many hands and changes in these years the current breeding program – the only one for peach breeding left in Canada- has been led by me for the past 22 years. Although Vineland was focusing on developing processing peaches for a long time, since 2008 only fresh market peaches and nectarines are developed from this center.

With the constantly changing climate and the changing preference of modern consumers, the current breeding program is aiming to develop cultivars that will fit both these needs locally and beyond. A committee known as TFEC (Tender Fruit Evaluation Committee) was formed in late 2000s and this committee comprises of reps from the entire peach value chain- from the breeder, growers, extension agents, nursery, packers, shippers, the marketing board and retailers who all will also share their thoughts as consumer. Weekly tours are held for the committee by the breeder during the fruit season which typically spans from mid-July to first week of September (7-8 weeks). As a result of such wider input

during the cultivar development process, most cultivars that are released from this center have been fairly successful in the value chain.

Based on the mandate from the tender fruit industry, the focus is to develop early ripening cultivars and late season cultivars that can store and ship well. Thus, the program has developed a number of cultivars in the recent past and some are furnished graphically below.

Currently, we are focusing on developing firm and crispy peaches by incorporating the 'Stony Hard' gene. This is gene known for a long time and seen in some early cultivars like 'Yumyeong' and 'Gloria' (NJ351). These cultivars also show a delayed abscission. As a result, the fruits are firm even after fully ripe and store well for a long time (~2-3 weeks compared 4-6 days in normal peach) and also hang in the tree even after ready for picking. These Stony Hard selections are in the testing stages and we anticipate to release a few in the next 4-5 years. They have a popular name as the 'neat peach' since they do not drip much juice like a normal peach. An example of a selection with Stony hard is presented below.

Veeblush ™

- Released in 2013
- Harrow Diamond x V790638
- July 28 – 2-3 days after HD
- Good size, nice red colour
- Consistent cropper
- Extremely low spilt pits <0.5%
- 34K trees planted (~110 acres)-2020
- <4 acres in 2015

V96141 – To be released

- Newhaven x Harblaze
- July31-Aug 3
- Large Fruits
- Excellent color and flavor
- Consistently rated high
- Should round out the early season

We hope these stony hard gene carrying neat peaches will be liked by the current younger generation of consumers and could also open up other value-added products like sliced peaches in bags etc. We do not anticipate these modern genotypes will replace the conventional peach as we know it but would complement them much like the flat peaches and form a niche market in the future.

Editor's Note: We are working on the best way to get some of these Canadian peach cultivars for trial in the USA. Because of quarantine issues between Canada and the US it is not simple

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