

New Hazelnut Cultivars and a Trial to Evaluate Them in BC

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Background of Hazelnuts

BC's Fraser Valley has been home to Canada's hazelnut industry since at least the 1940's. The recent arrival of a devastating disease is wreaking havoc in orchards in Chilliwack, Agassiz and elsewhere, but a solution can be found in new cultivars from the breeding program in Oregon. At Oregon State University, about 4000 seedlings per year are grown from controlled crosses of superior parents in a classic breeding program; after 16 or more years of careful evaluation of the most promising seedlings, a few are released as named cultivars. A trial is underway in southwestern BC to demonstrate suitability to local conditions and learn about pollination timing and yields of six blight resistant cultivars released from the OSU breeding program. But why is this focus on hazelnuts important?

Estimates vary, but there were at peak about 1200 acres of hazelnuts in BC, mostly in the lower mainland with an annual harvest worth \$1.3 million. These numbers are shrinking as diseased orchards decline and die, or are removed. Most of the nuts currently produced go to the United States (and many thence to China). Some are sold locally, but Canada imports over 90% of its hazelnut supply from the US and Turkey. The US is also a net importer of hazelnuts and Canada's largest trading partner; this means there exists good long-term market stability. BC's hazelnut industry is in decline mostly because of EFB, and in part because many current orchardists are at or near retirement and so aren't sure that replanting their diseased orchard makes sense for them. However, we are working with others who see great promise and value in hazelnuts as a crop, and who strongly believe that a revitalization of the hazelnut industry in BC is both possible and important. They see it as a profitable crop looking ahead, since demand both globally and in our region far outstrips supply. We are lucky to have two commercial processors already in the Fraser Valley who supply an important service for the supply chain, but they need more growers and orchards to supply raw nuts.

There are many reasons that hazelnuts should be considered by farmers in BC. They are a tasty and healthful source of protein and oil with endless possibilities for adding value. Hazelnuts are sold in-shell or as kernels (raw or roasted), in candy, as a protein powder, as nut butters or chocolaty spreads, as syrups, in snack foods and breakfast cereals, and new products are being developed all the time. The trees are attractive and long-lived, can provide shade to help cool buildings, and many current orchardists tell us they love tending their trees, looking over and walking in their orchards. Hazelnuts fit very well in permaculture, agroforestry and silvipasture systems. Compared to many other crops, inputs in terms of supplies and labour are low, so part-time and small lot farmers can easily manage their orchards and qualify for agricultural tax rates on their land. As nut trees go, hazelnuts are very precocious, with commercial harvests being possible just 5 years after planting and full yields being seen between 10 to 12 years. Where profitability in the early years is important, farmers can increase yields from their land by alley-cropping between the rows of trees and planting trees double-density in the rows. Looking forward, perhaps one of the most important attributes of hazelnut trees is that as a fast-growing perennial tree crop, they sequester more carbon than most crops, an offset to the high contribution to greenhouse gas emissions that is a hallmark of most agricultural production systems. Finally, they have the potential to greatly enhance local and regional food security as a low-input crop with a very high food value.

Current Situation

Eastern filbert blight (EFB) caused by the fungus *Anisogramma anomala* arrived in Washington State in the mid-1970's and made its way to BC by 2005. It is spread by wind and infects young shoots and branches in the spring, causing dieback of limbs. Control measures include aggressive pruning and fungicide treatment. Currently it's affecting every commercial orchard in the lower mainland. This is despite a quarantine on importing hazelnut trees (except in disease-free tissue culture) to British Columbia from any region known to have EFB. Should the quarantine then be relaxed? Absolutely not!

EFB is native to eastern North America where there are hundreds of strains, yet the evidence is that in the Pacific Northwest there has been a single introduction of the disease. Limiting new introductions of EFB are crucial to maintaining the efficacy of hazelnut cultivars selected for resistance to the local population of EFB. Both Washington and Oregon maintain quarantines for just this reason and experts agree that BC must do the same to protect the long-term viability of the industry here as well as across the border in Oregon and Washington, and support the significant and important breeding work at OSU of which we are beneficiaries.

Over a dozen cultivars with high resistance to EFB have been released in the past decade or so from the OSU breeding program. While some are not readily available and the most recent are patent-protected (not licensed in Canada), six of them are included in the BCHGA cultivar trial. There are uncertainties and challenges facing the hazelnut industry in BC, yet there is also opportunity with new, high-yielding releases such as 'Jefferson', 'Sacajawea' and 'Yamhill'. But growers need to remember that it takes time to produce a quality tree and they'll have to plan ahead and work with nurseries to get the trees they want, when they want them.

Trial

Goals

- To demonstrate the suitability of EFB resistant hazelnut cultivars to the Fraser Valley.
- To compare performance of three EFB resistant hazelnut production cultivars and three pollinizer varieties at six sites in southwestern BC.
- To share information on cultivar performance with growers.

Approach

Trees were planted at six sites in the lower mainland/gulf islands at double density (9'x18' – 10'x20'); about 500 trees were planted at each site in total between 2011 and 2013. Some sites needed clearing of existing orchards at significant expense. Each site is managed by the owner in terms of fertility, water, weed control, pruning, etc. Site locations are mostly in the Agassiz/Chilliwack area but one is on Hornby Island.

'Jefferson', 'Sacajawea', 'Yamhill' are the main crop cultivars, with 'Eta', 'Gamma', and 'Theta' as the main pollinizers at 15% of total.

Variables being monitored include: growth and health of trees, flowers timing of: catkins (tassels) and female (pistillate) flowers, nut yield, nut quality, and time of harvest.

Current status

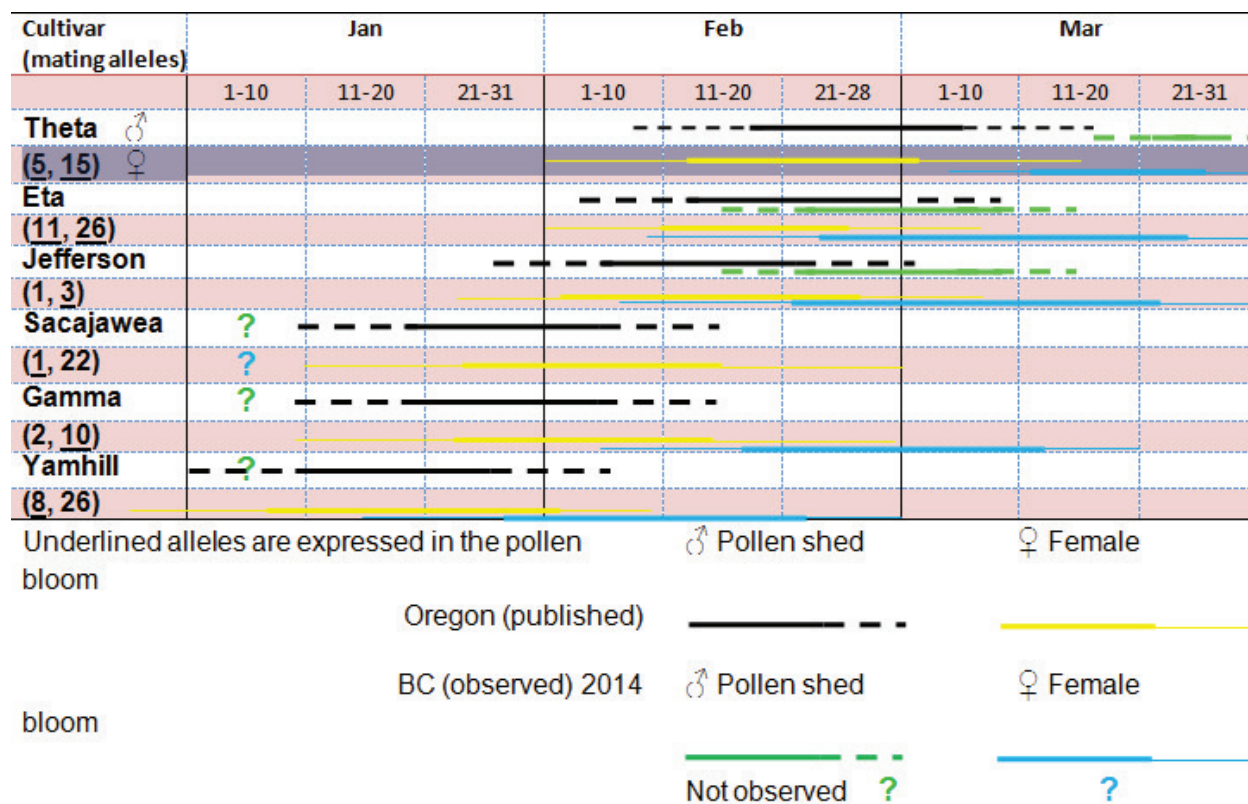
- Trees planted in 2011 are up to 65mm in diameter.
- Nuts have been produced from 2011 and 2013 plantings in small numbers.
- No symptoms of EFB have been observed.

Preliminary results

2014 was the first year of regular flower observations and nut quality evaluations. Since these trees are still young and not all yet flower or produce nuts, these results are based on small sample sizes and must be considered preliminary.

Pollination

In 2014 all cultivars but Sacajawea had some flowering (including catkins), though not all produced pollen; Sacajawea was not seen flowering. Both Yamhill and Gamma produced catkins but neither shed pollen, probably because of the freezing cold, dry conditions in January. The relative order of flowering was similar to that reported from Oregon, but delayed by two to three weeks.



Next Steps

We will conduct our second season of flower monitoring this winter (January to April 2015) and begin gathering some yield data in fall 2015. We will continue to share updates with the hazelnut grower community.



Hazelnut trees in the nursery.



Young orchard of 'Jefferson' hazelnut (planted 6/2011; photo 7/2014).



Some value-added products from hazelnuts.

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