Performance of New Hazelnut Cultivars in British Columbia

Thomas E. O'Dell
Nature Tech Nursery, Ltd., Langley, BC
thom.odell@gmail.com

Summary

Hazelnuts have been grown in British Columbia since the early 1900's. By 2010, there were about 1.2 million pounds per year harvested from about 1000 acres. The introduction of eastern filbert blight (EFB) has caused the collapse of the industry but newly introduced cultivars resistant to the disease are showing a lot of promise in their third to fifth year of field trials.

Six cultivars (three each, main crop and pollinizers) were planted at five trial sites in the Fraser Valley and Gulf Islands in 2011 and 2013. In fall 2016, nuts were collected under four trees per cultivar at each farm. Trees of main crop cvs. planted in 2013 produced 60g to 4450g of nuts per tree (average 1021g); trees of 'Jefferson' planted in 2011 produced 610g to 9350g of nuts per tree (average 3396g). The cultivars 'Jefferson' and 'Sacajawea' show symptoms of EFB at some sites and all cultivars had some winter damage, possibly due to common bacterial blight. These issues should be fairly easy to manage.

Background

The first commercial hazelnut orchards were established in BC around 1905 at what is now Gellatly Nut Farm Regional Park in West Kelowna and over time became centered in the Fraser Valley. Because hazelnuts require mild, yet adequately chilling winters, our climate is uniquely suited to this crop. Most nuts are exported to Oregon and thence to China. While Oregon produces only about 5% of the world supply, it accounts for most North American production, equal to about half of US consumption.

Current challenges to a thriving hazelnut industry include: EFB, that has greatly reduced yields and led to the removal of most older orchards; a drastic reduction in nut supply that makes the necessary support infrastructure unprofitable; and high prices for farmland, a significant barrier to starting new orchards. Nonetheless, we have turned the corner and the industry is gradually recovering. New, highly EFB-resistant cultivars with improved nut yields and quality are performing well in our climate; a new processor and other supporting businesses have started. Interest in small-lot agriculture is growing, along with demand for local high-quality food, and nuts are sufficiently productive to offer property tax relief from a few acres. For more background on the BC hazelnut industry see O'Dell & Argen (2013) and references therein.

Hazelnuts are a crop with many environmental benefits. They can produce large amounts of high quality protein and carbohydrates with relatively low inputs. They have all of the positive attributes of other trees—providing shade and wildlife habitat, reducing run-off, sequestering carbon, and they are also a great source of pollen for winter bee forage.

Hazelnut Variety Trial 2017 Update

The BC Hazelnut Grower's Association, in collaboration with Nature Tech Nursery, Ltd. and support from Investment Agriculture Foundation of BC began a trial of new hazelnut cultivars in 2010. Trees were first planted in 2011 with a second planting in 2013 (due to the difficulty of obtaining in vitro trees from Oregon).

The goals of the project are to:

- Evaluate the suitability of EFB-resistant hazelnut cultivars to Fraser Valley;
- Compare performance of three-EFB resistant hazelnut production cultivars and three pollinizer varieties at six sites (one of which has been sold and therefore been dropped from the trial) in SW BC, and;
- Share information on cultivar performance with growers.

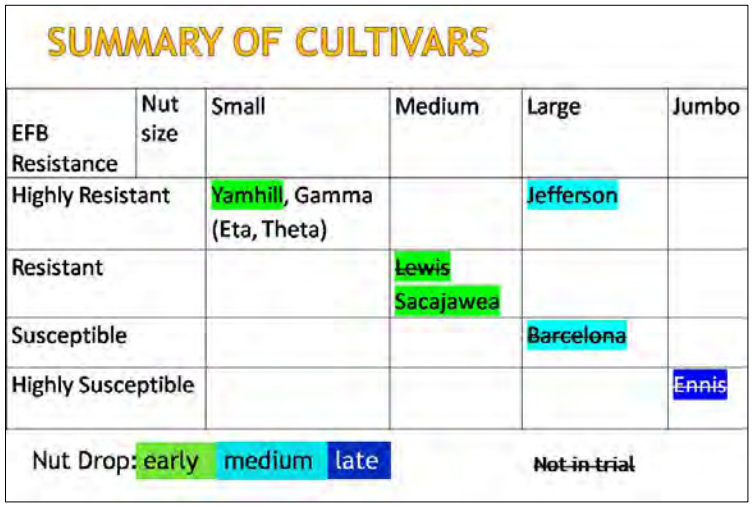

Figure 1. Cultivar characteristics (Olsen et al. 2013).

Results

Disease

Four of five trial sites (all of those in the Fraser Valley) were planted next to existing, heavily EFB-infected orchards and for at least the first several years, there was no management to prevent disease (spraying of active copper or other fungicide) at these sites. By 2014, a few trees of 'Jefferson' planted in 2011 showed minor symptoms of EFB; in 2015 about half of 'Sacajawea' had more extensive symptoms. This is consistent with published information regarding EFB susceptibility (Olsen et al. 2013). At the trial site on Hornby Island, without a nearby infected orchard (and where preventative spraying was done *and* EFB is not known to occur), there have never been any symptoms of EFB.

Last winter saw damage at several orchards not characteristic of EFB. Symptoms are consistent with common bacterial blight but it was not detected in the one sample tested. The general appearance is branches that look like they are about to come out of dormancy, catkins beginning to expand, and then they die. Common bacterial blight may be encouraged by late or excessive fertilizer application and is controlled by fall application of active copper. For guidelines on disease management for hazelnuts, see http://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/animals-and-crops/plant-health/insects-and-plant-diseases/nuts.

Flowering

We observed 2 to 3 weeks overlap of pollen shed by all genetically compatible varieties with female flowering of main crop varieties (**Fig. 2**). This is quite different than results from Oregon where, for example, pollen of 'Theta' tends to begin shedding well after flowering of 'Yamhill' is finished (Olsen et al. 2013).

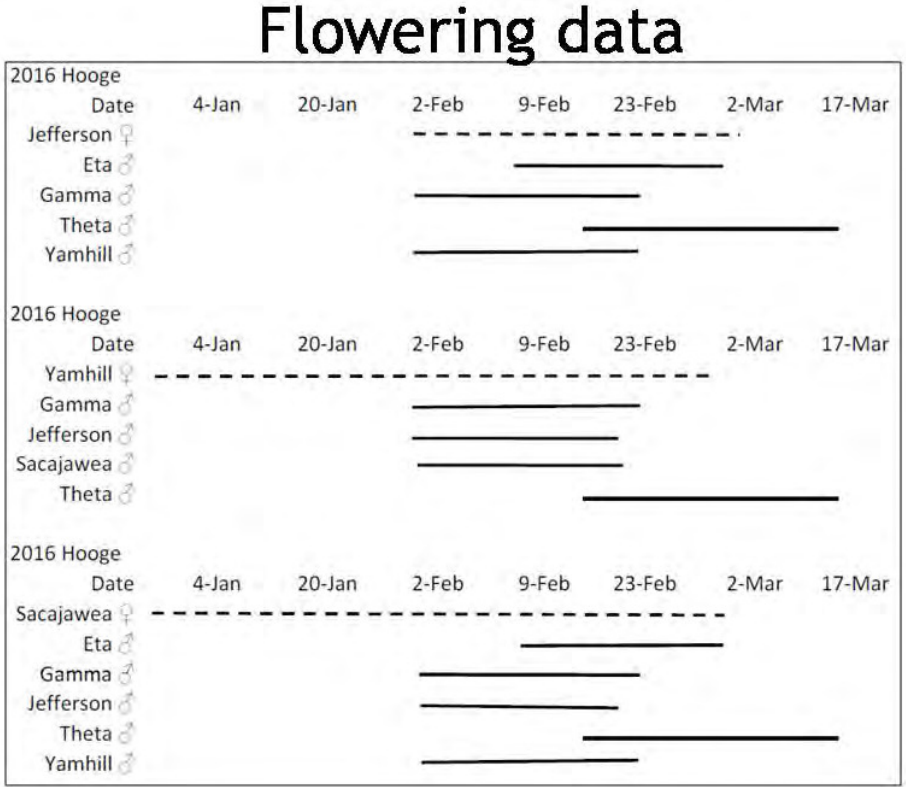

Figure 2. Timing of pollen shed of genetically compatible varieties relative to female flowering of 'Jefferson', 'Yamhill' and 'Sacajawea'.

Yield

In 2015 four trees of 'typical' size from the 2011 were selected at each farm to monitor nut production; trees of the 2013 planting were selected in 2016. Nuts were collected and dehusked by hand, dried and weighed.

Nut production is quite variable between orchards, varieties, and planting year. 'Jefferson' planted in 2011 yielded 610 to 9350g per tree; overall average 3396g per tree, more than double the 2015 harvest (**Fig. 3**). For the 2013 planting, 'Jefferson' tended to have the highest yield although it was surpassed by 'Yamhill' at one farm (**Fig. 4**). For varieties planted in 2013, yield per tree ranged from 60g to 4450g, average nut yield per tree (2013 planting) across all farms was 448g for 'Sacajawea', 759g for 'Gamma', 1417g for 'Yamhill' and, 1462g for 'Jefferson'.

The high variation in yield between farms is likely due to many factors including soil, management (water and fertilizer timing and amount, pruning, etc.) and microclimate. Some varieties may be more precocious in terms of nut yield, so current yield variations cannot be considered indicative of yield at maturity.

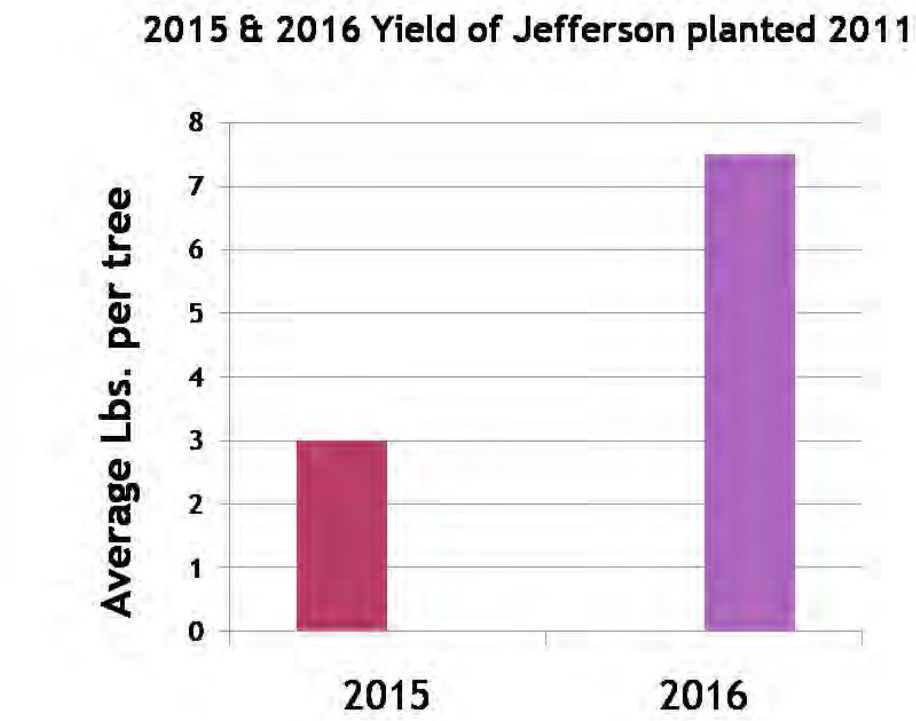

Figure 3. Average (of all farms) 2015 and 2016 harvest of 'Jefferson' planted in 2011.

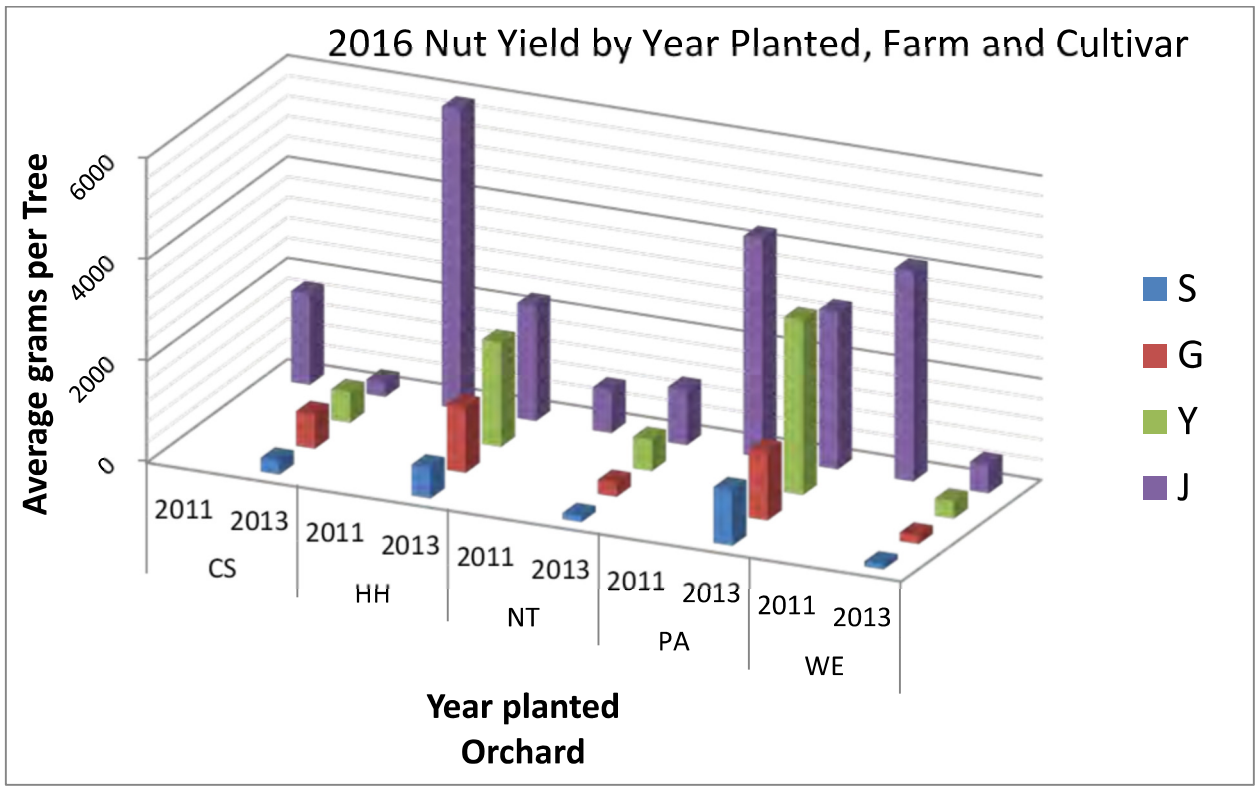

Figure 4.

Conclusions

We are currently measuring our last flowering season for this project, will collect yield data in fall 2017 and present final results of this trial in early 2018.

So far the new cultivars meet expectations for disease resistance and yield and appear to have greater overlap between pollen shed and female flowering than is reported elsewhere (Olsen et al. 2013). We continue to be optimistic regarding the resurgence of hazelnuts as a commercial crop in British Columbia.

References

Olsen, J. S. Mehlenbacher, B. McCluskey, and D. Smith. Growing Hazelnuts in the Pacific Northwest: Hazelnut Varieties. OSU Extension publication EM 9073. Corvallis, Oregon.

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