

Haskap: The shape of things to come? *by Dr. Bob Bors*

Breeding plants can be so fun! This summer many haskap/honeysuckles seedlings began fruiting that were hybrids between Japanese, Russian and Kuril parents. Usually, I walk down the rows looking only for the most productive plants with reasonably large fruit with a ‘desirable shape’ and taste the best ones. If I like it, it gets tagged, picked and the fruit gets evaluated further. After detailed scrutiny, the very best may get propagated for further evaluation and perhaps released as new varieties. If I don’t like a plant it gets ignored.

Fruit shape and size But this year was different. I was asked to evaluate a draft ‘Plant Breeder’s Rights’ form that would be used to describe future varieties. ‘Question 24’ gave 3 options for berry shape: narrow elliptic, elliptic, and circular. I could think of 4 others but it occurred to me that there were more. So I picked a berry from each plant in 4 rows of hybrids in breeding program (see fig. 1).

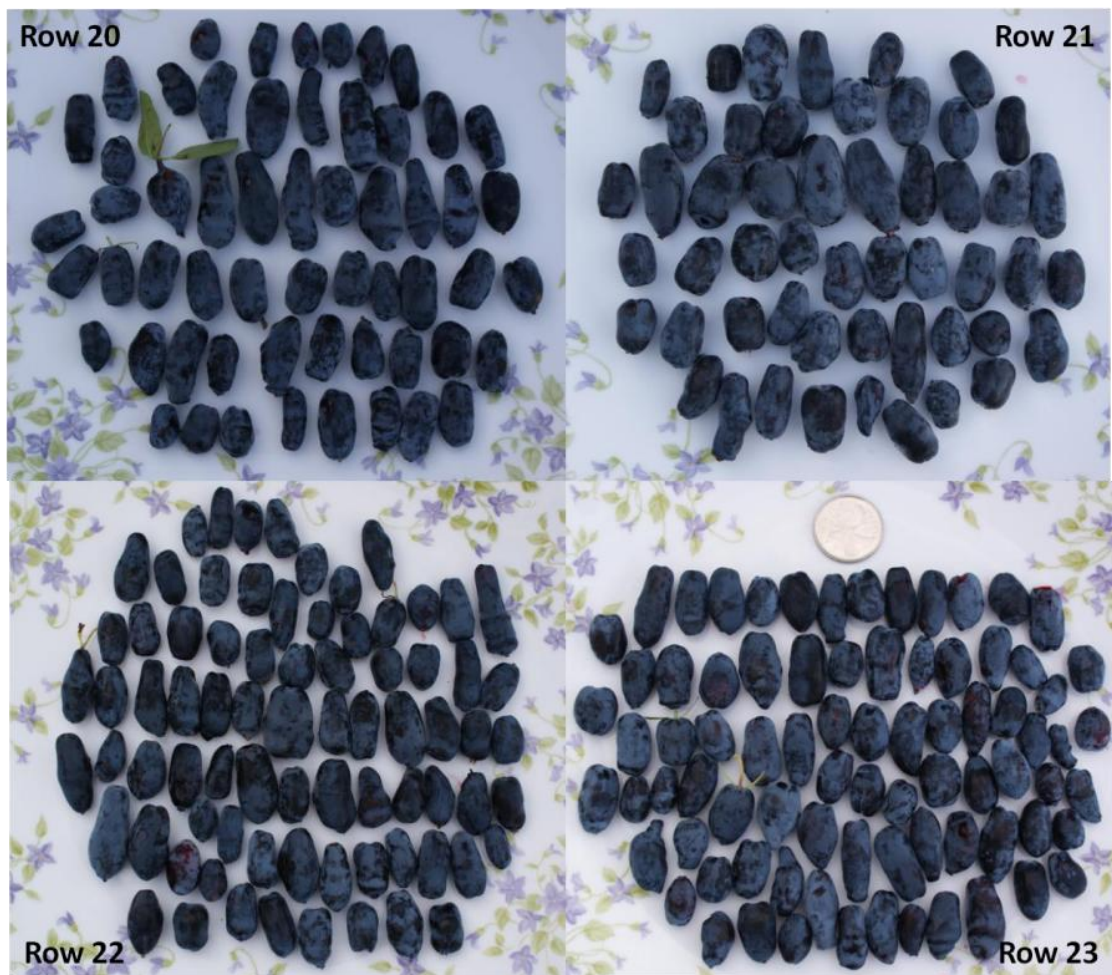


Figure 1. A berry from each plant in 4 rows of our breeding program.

Each berry is positioned with the stem end facing up.

Then I scrutinized them to make an assortment of the different sizes and shapes (see figure 2). It occurred to me that *Lonicera caerulea* probably has the world's most diversely shaped berries...I wonder if this crop could get in the Guinness Book of World Records for that?



Figure 2. Different sizes and shapes from 4 rows of seedlings. These berries are the result of hybridizing Japanese, Russian, and Kuril Island types. Again, each berry is positioned with the stem end facing up. Note: a Canadian quarter is the same size as an American quarter and slightly larger than a Euro 20 cent coin.

Superior selections for commercial growers While the different shapes are fascinating, many are not practical for commercial purposes. Pointed tips are fragile and prone to damage, and damage leads to short shelf life and decay. The berry with leaves in figure 2 is especially vulnerable with points at both ends. Oddly shaped berries don't roll around on sorting tables too well either, which then takes longer to take out any off types.



Figure 3. Berries from superior selections that began to fruit in 2010.

Figure 3 shows a berry from each superior selection considered to be the best that bore fruit for the 1st time last year. Of course, berry shape was not our only criterion for choosing these. Flavour, yield and firmness are very important, plus there are about 20 other characteristics we evaluate. The larger wider berries in Figure 3 are considered 'close to optimum'. The tubular-shaped ones are not desirable but likely those plants had something special that made them stand out. As breeding progresses, it is likely that most commercial Haskap berries in the future will look like the wider ones depicted above.

Fun for Gardeners It would be fun to have varieties with different shaped berries for home gardeners, as long as they taste good. An assortment would be especially fun to give as gifts to surprise friends and relatives. But don't make the mistake of thinking there is a variety that makes many shapes. There is just one general shape per bush. If a bush has pear shapes..all on that bush are pears. If the bush has 'lumpy pillow shapes' all the fruit looks like lumpy pillows. So if you wanted 6 different shapes, then you should make room for 6 bushes. The only time there are different shapes on one bush is when some berries are poorly pollinated. With poor pollination berries are usually smaller and thinner. Starting in 2011, we will be on the lookout for weirdly shaped berries that taste good.

Flavour After taking those pictures, I had to eat all those berries; one at a time! Most of the berries tasted 'nice' a few were bitter, more than a few were sour and about 10% were exceptionally flavourful. Overall, the average plant in this generation shows much better fruit quality than our 1st generation of Haskap breeding. Flavour in the breeding field could be described as sweet, sour, bland or bitter versions of raspberry, blueberry, plum or black currants and any mixture in-between. The best ones however seem to have a predominantly raspberry flavour with sweetness and just a hint of sour or bitter or astringency to give a little zing. That little zing might be described as desirable 'mouthfeel' in the world of red wine tasting. To me it seems like a little 'Tang' or carbonation (like soda) has been added to the fruit. Fortunately, big berries were just as likely to taste good as small berries.

Comparison to 'Borealis' and 'Tundra' There were only a few plants that had berries with somewhat better fresh flavour than our 'Borealis' and 'Tundra' varieties. In the years to come, I'd predict some improvements in flavour. However, there will be dramatic improvements on how fast the plants grow and larger berry size. I'd guess that the average seedling in last year's new breeding field was growing 50% or more faster than the 'Borealis' planted in the same field. But that is a guess. To make a valid comparison, we'd need to vegetatively propagate 'Borealis' and our favourite new selections at the same time to ensure the plants were similar size when planting.

Jigsaw Puzzle Breeding Haskap is like building a jigsaw puzzle where we are accumulating desirable traits from various parents to build better varieties. Most of the desirable selections found this year were descendants of 'Borealis', 'Tundra' and the 'Row9' family crossed with plants from Dr. Maxine Thompson's program. But some good ones were descended from other germplasm. That we found superior characteristics in our seedlings does not mean that they have been 'put together' in a complete package. We have identified a few plants that have good flavour and berry size, but we need to evaluate these for productivity, suitability for mechanical harvesting, even ripening, leaf disease resistance, and ability to stay dormant in warm winters.

New varieties in the short term In the near future (possibly as early as January 2011) we may release a pollinator for ‘Borealis’ and ‘Tundra’ to our propagators. [propagators will need 6 months to a year to begin producing plants for sale] This future variety will be faster growing, but bloom at the same time as ‘Borealis’ and ‘Tundra’ and have compatible pollen. Because of the pressing need for a pollinator we will release it, but it will still require a few years of observations to determine if this new variety is good enough to be a mainstream variety. If it proves superior to ‘Tundra’, growers may want to plant it in larger numbers and grow ‘Borealis’ and ‘Tundra’ as the pollinator.

In 2009, 6 superior selections were observed in the field from the new generation. In 2010 these 6 plants were bagged and used in crosses and observed for blooming time. They were also put into tissue culture. Of the 6 only 2 bloomed at the same time as Borealis and Tundra. Of the two remaining ones, only 1 had good crossability and seemed to do well in tissue culture. We are now looking at whether this remaining selection roots easily in tissue culture and if it can be propagated reasonably well. If it is slow to propagate it would be better to test the plants that bore the fruit in Figure 3 for pollen compatibility.

Future varieties In 2010, 8 rows of seedlings came into production for the first time. But in 2011, 18 more rows will begin producing. By 2014 there should be 60 rows that will need to be evaluated. There is bound to be something good in all that material since each year we are using better quality parents in our crosses. Most of our advanced breeding material is based on hybridizing germplasm from Maxine Thompson (Oregon State University) who gathered material in Japan, Russia and Europe, Jim Gilbert (Northwood’s Nursery) and Maria Plekhanova (Vavilov Institute, Russia). In the next couple years 3 major new sources of germplasm will begin fruiting: material gathered from Hokkaido and across Canada (from my sabbatical) and more material from Russia (Artem Sorokin, Vavilov Institute). Having a wide germplasm base gives our program much potential but a few generations will still be needed to bring together the attributes we want.

In particular we likely need a few generations to develop haskap that bloom and ripen late and that are better adapted to warmer areas. Since we now have a Johanna-3 harvester we will be able to directly measure suitability for mechanization. Also as this plant begins to be more widely planted we will get feedback on what needs to be improved. Our first varieties emphasized fruit quality but now we want high quality with higher yield.