

ABSTRACT

Haskap berries (also known as Blue Honeysuckles, Honeyberries, and *Lonicera caerulea*) are an exciting new fruit crop for Canada. Tasting great and ripening in mid June, they appear to have few insect pests and diseases making it a worthwhile crop to consider for organic production. As a new crop, no pesticides are registered and after 7 years of observation, it appears none are needed. Perhaps its early ripening habit allows the fruit to escape insect damage. Within our collection there are many lines that show high resistance to the few leaf diseases that have occurred. Our collection includes 85 clones from Russia, Japan, Kuril Islands and wild plants from Canada. We also have thousands of hybrid seedlings. Known for health benefits in Eastern Europe and Japan, we plan to investigate our collection for high antioxidant levels as well as breeding for good flavour. Our breeding program is quite unique since we are breeding this crop to be adapted to mechanical harvesting and processing which could allow this crop to be grown on a large scale.

INTRODUCTION

Haskap berries are an exciting new fruit crop for Canada. Ripening weeks before strawberries, they have a flavour commonly described as a combination of blueberries and raspberries. The plants bear at a very young age and the fruit are easily shaken off at harvest time. They may be ideally suited for mechanized harvesting since they don't sucker, and have bushes of a similar size to other fruits that are harvested by machines. They have been used in a wide range of products including juice, wine, candy, pastries, jams, dairy products and are eaten fresh



Figure 1. Origin of *Lonicera caerulea* germplasm collection at the U of S

GERMPLASM

Lonicera caerulea is a circumpolar species native to the northern boreal forests and can be found in mountains as well as marshlands. Although harvested from the wild for centuries in Japan and Russia, breeding programs began the 1950's in Russia and in the 1980's in Japan. Only in the late 1990's did the only two breeding programs in North America begin at Oregon State University and the University of Saskatchewan. The later two institutions are actively working with each other. Dr. Bors has for two years visited Oregon during harvest season to assist with the selection process. The U of S owes its entire collection of Japanese Haskap to Dr. Maxine Thompson at Oregon State University.

The germplasm collection comes from 4 areas (see figure 1) which have distinct attributes for breeding (table 1). While we have had experience with Russian and Kuril Island accessions for 7

years, only in the last 2 years have we obtained Saskatchewan and Japanese accessions. As a whole, minimal insect damage and few diseases have been noted, indicating this crop could be suited for organic production.

| | Saskatchewan | Russia | Japan | Kuril Islands |
|--------------------|--------------|-----------------|----------------|---------------|
| Fruit Size | Small | Medium to small | Large to small | Large |
| Productivity | Low | High | Variable | Low |
| Cold Hardy | Yes | Yes | unknown | Yes |
| Shape | Round | Tubular | Round | Oval |
| Harvest Season | Unknown | June | Probably July | July |
| Ripening | Unknown | Even | Uneven | Even |
| Disease Resistance | Unknown | Variable | Variable | Resistant |
| Flavour | Unknown | Variable | Variable | Good |

BREEDING AND SELECTION

Russian Cultivars have been observed in the field with a goal to identify the best varieties to be used as parents in the breeding program. 14 Russian cultivars have not produced enough fruit to be evaluated, 8 cultivars were rejected for having small fruit, 2 cultivars were rejected for having long pointed and fragile fruit, and 6 cultivars were deemed acceptable for use in breeding. Kuril types were very similar in most traits but 2 selections had fruit that did not bleed from the stem end when picked. Japanese selections were evaluated for fruit size, plant health and productivity in Oregon but clones of the best selections are being grown in pots and will be used for breeding. However, 2000+ Japanese seedlings were field planted in 2005 but were too small to fruit in 2006.



Figure 2: to mimic mechanized harvesting, haskap bushes are shaken into umbrellas. The amount of fruit remaining on bushes after shaking was noted. The plants pictured are 3 years old and approximately 1/4" their eventual size.



Figure 3: Haskap berries are put through a sorting line and observed for damage.

Although 95% of the Japanese seedlings survived the winter of 2005/6, the plants were below the snow line which would not be a good test for cold hardiness.

Over 1200 seedlings derived from Russian and Kuril Island parents were old enough to be evaluated. Desirable plants were tagged in the field and individually harvested. Plants were not picked by hand, as is the case in most places where this crop is grown, but instead were harvested by shaking into umbrellas (Figure 2) to mimic mechanical harvesting. Berries were put through a sorting line, and evaluated for damage (Figure 3 and 4). All tagged selections were evaluated for yield but only the more promising ones were further evaluated for fruit size, flavour, and shape.



Figure 4: Fruit size and shape affects performance in the sorting line. Small (A) and pointed (B) berries often got stuck in the machine and on the belts. Medium-sized berries of Russian selections (C) had less problems but larger, rounded fruit of 'Kuril Island x Russia' types (D) were optimum.

RESULTS

Yield for 3 and 4 year old seedlings was in the range of 0.5 to 0.75 kg/bush.

It was noted that the crosses between Russian and Kuril Island selections resulted in several selections having fruit weights between 1.2 to 1.6 grams per berry. Yet, Russian cultivars and 'Russian x Russian' seedlings had fruit in the range of 0.5 to 0.9 grams. Berries of the Russian x Kuril Island hybrids had a more rounded shape (Figure 5) which was a desirable trait in the sorting



Figure 5: Berry of a Russian x Kuril Island hybrid. Similar in length but twice as wide, many of these hybrids had larger berries than any of the Russian cultivars in our collection.

line and later in the season it was noted that those hybrids had little or no powdery mildew. An informal taste panel of growers and researchers tasted the advanced selections and found them to be very acceptable. The selection that had 1.6 gram berries is being considered for release as a new cultivar. Other selections will be made available for testing by growers interested in commercial production. They are currently being propagated in tissue culture.

In addition to agronomic criterion, we are developing protocols to allow us to select for high anti-oxidant genotypes in our breeding program. Funding for antioxidant and haskap production research is being provided by the Alberta Farm Fresh Producers Association, Saskatchewan Fruit Growers Association, and the Alberta Horticultural Growers Congress and Foundational Society.

References

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 - Thompson, M. and A. Chaovanalikit. 2003. Preliminary observations on adaptation and nutraceutical values of blue honeysuckle (*Lonicera caerulea*) in Oregon, USA. *Acta Hort.* no. 626 p. 65-72.
 - Plekhanova, M. 2000. Blue honeysuckle (*Lonicera caerulea* L.) - a new commercial berry crop for temperate climate: genetic resources and breeding. *Acta Hort.* no. 538, v. 1 p. 159-164.
- Further information on Haskap research can be found at www.haskap.ca or by searching 'Haskap' at www.usask.ca