Breeding the Boreal Series of Haskap (Lonicera caerulea)

Bob BORS  Department of Plant Sciences, University of Saskatchewan, SK

Background
The U of SK first varieties (Tundra, Borealis and the Indigo Series) were hybrids between Russian and Kuril accessions. These varieties showed superior characteristics for fruit quality and size compared to their parents. But early breeding at the U of SK was limited to only 4 parents obtained in 1998 (1).

By 2008, much germplasm from Russia, Japan and the Kuril Islands had been collected and observed for several years with desirable and undesirable characteristics noted in general within each group (figure 1). By that time the program had over 20 named Russian cultivars, 30 clones of Japanese selections, and several Kuril varieties (2,3).

The crossing strategy was to intersperse the 3 groups of Haskap to incorporate desirable characteristics of the 3 groups. It was hoped that hybrid vigour might occur that might make some offspring superior to their parents (1, 3, 4).

Material and Methods
From 2008 to 2010, 14 Russian cultivars, 6 Kuril selections and 88 Japanese selections were used as parents in 690 combinations of controlled crosses. A goal had been to create at least 50 seeds per cross. An estimated 16,000 seedlings were planted at high density. Approximately 25% of seedlings were discarded that showed poor growth. An estimated 10,000 seedlings were planted at high density in a 4 acre area.

Seedlings were field evaluated when they reached 4 years of age or older. Superior plants were tagged throughout the growing season. The best of these had fruit harvested and evaluated in the lab (2012, 2013, 2014) (5). Advanced selections were analyzed in the lab for various fruit characteristics. The Boreal series was selected from among these selections.

Important selection criteria (2, 3, 5):
• Flavour
• Fruit size
• Productivity
• Suitability for machine harvesting

Breeding often resulted in shorter plants that would be more difficult to grow. Kuril germplasm in breeding often resulted in shorter plants that would be more difficult to harvest. Some of the RJK hybrids (like Boreal Beauty) possessed sturdy branches similar to Kuril parents but were not short.

Results and discussion

Figure 1. Fruits of Russian, Kuril and Japanese germplasm typical of the parents used in crosses from 2008 to 2010. They are depicted close to actual size on this poster along with general observations made previously about each group (2,3). Each berry is from a different accession. Each berry is arranged with the stem end facing up. Note: Several recent Russian and Japanese varieties tend to be much larger than these.

Figure 2. Average fruit weight of advanced selections and Boreal series.

Figure 3. The Boreal series of haskap and important characteristics that led to renaming and releasing them. Berries shown are close to actual size.

Kuril varieties (below) • oval, thick fruit • ripen early • ripen late • held on when ripe • Ranged from 1.0 to 1.5 g/berry • low productivity • short sturdy bushes • Mildew resistance

Russian Varieties (above) • long, thin, & flat • ripen early • fall off easily when ripe • ranged from 0.6 to 1.1 g/berry • tall bushes • productive

Japanese Seedlings & Selections (above) • oval or pointed fruits, thick • ripen unevenly • most ripen mid-season • hold on when ripe • ranged from 1.25 to 1.75 g/berry • tall bushes • productive

Boreal Beast (below) • JxRh hybrid • 2.0 g average fruit weight, largest fruit of any haskap cultivar on the market • 1.9 g max weight • Low acid • Ripens 1 week after previous U of SK cultivars

Boreal Beauty (above) • JRK hybrid with open pollination involved • 2.8 g average fruit weight, largest fruit of any haskap cultivar on the market • 2.7% harvest fruit on the market • Ripens 3 to 4 weeks after our previous varieties

REFERENCES