



### **Project Identification**

1. **Project Title:** Haskap Agronomy and Variety Trial
2. **Project Number:** 20180423 SFP
3. **Contractor Undertaking the Project:** Saskatchewan Conservation Learning Centre (CLC)
4. **Project Location(s):** SW 20-46-26 W2 RM #461 (Prince Albert)
5. **Project Start and End Dates (Month & Year):** January 18, 2019, to February 15, 2023
6. **Project Contact Person & Contact Details of Project Manager:**

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### **Objectives and Rationale**

#### **7. Project Objectives**

To determine best management practices for production of Haskap in Saskatchewan, based on mulch covers, fertilizer applications, and irrigation methods.

## 8. Project Rationale

In recent years, the production of Haskaps has been the most rapidly expanding component of the fruit industry. The Haskap (*Lonicera caerulea*) is a circumpolar species native to northern boreal forests in Asia, Europe, and North America (Bors n.d.). Haskaps are a cool season fruiting shrub, and berries can be produced mid to late June; they are one of the earliest fruiting berry plants. Haskaps tolerate spring frosts very well. Open Haskap flowers have been observed in temperatures down to  $-7^{\circ}\text{C}$  without damage (Bors, n.d.). Haskaps are extremely hardy and well-suited for the Canadian climate. They are also very versatile plants and can be grown successfully on slightly acidic to slightly alkaline soils (Halifax Seed Company Inc., n.d.).

Haskap breeding programs were established throughout the former Soviet Union in the 1950s. In the 1990s, Dr. Maxine Thompson and Jim Gilbert from the University of Oregon started their breeding program (Bors, n.d.); the University of Oregon has produced Haskap cultivars that are now well-established industry cultivars. The University of Saskatchewan planted its first four Haskap cultivars in 1998 and has since established the world's largest haskap breeding program and one of the most diverse germplasm collections (Bors et al., 2011). The Saskatchewan breeding program has focused on the hybridization of plants, bringing together the best traits from around the world to produce fast-growing, large plants, with large fruit (Bors et al., 2011). The U of S has been working towards producing Haskaps adapted for mechanical harvesting, while still maintaining a mid to late-season maturity and great-tasting berries (Kostuik et al. 2015).

Vitalaberry Farms is a cooperative venture made up of twelve Western Canadian farmers who produce Haskaps and sell what they grow as finished products (Risom, 2020). In 2018, Vitalaberry Farms estimated there were around 350 Haskap acres in western Canada with growth in the next few years projected to reach 750 acres (Alde, 2018). It is estimated that there are well over 500 Haskap acres in Western Canada presently. Haskaps are considered a superfood because they contain high levels of vitamin C, vitamin A, flavonoids, and polyphenols (Risom, 2020). The Vitalaberry Farms partnered with the Alberta Food Development Centre to develop new Haskap products for the Canadian Foodservice Industry (Alde, 2018). The corporation also announced a partnership with Gordon Food Service to distribute 3 new innovative food products to western Canadian markets (Alde, 2018).

Haskaps have the potential to become a major fruit export for Saskatchewan producers. However, the agronomics of the crop has been poorly defined. The Haskap is more closely related to potatoes and tomatoes than other fruit crops such as blueberries or currants (Bors, n.d.). Fertilizer and irrigation rates have not been well studied in Haskaps; neither have insecticide or herbicide applications. With more farmers looking to produce the fruit, there is a growing need for better-defined Haskap agronomics. Haskaps are a high-value crop that receives increased value in added processing. Further studies on Haskaps in Western Canada will benefit producers. Haskaps have a strong appeal to local and export markets and therefore fit the province's growth strategy very well.

## References

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## 9. Methodology

### Experimental Design:

2022 was the final year of the four-year haskap agronomy project (Fig. 1). Three blocks of treatments were planted in 2019: mulches, fertilizer applications, and irrigation methods (Table 1). Twenty cultivars (Table 2) were selected, and four plants of each cultivar were planted per row, totaling eighty plants. Haskap cultivars were randomized within the block in subgroups that

have overlapping cross-pollination and blossom windows. Plants were spaced one meter apart within the row and treatment rows were spaced four meters apart.



**Figure 1.** Drone footage of the haskap agronomy trial located near Prince Albert, SK in August 2022.

**Table 1.** Treatments used in the haskap agronomy project.

Treatment Block	Trial Row	Treatment
Mulch	1	Black Plastic
	2	White Plastic
	3	Red Mulch
	4	Landscape Fabric
	5	Control
Fertilizer	6	2x Granular Fertilizer
	7	3x Granular Fertilizer
	8	4x Fertigation
	9	6x Fertigation
	10	7x Fertigation
Irrigation	11	1 dripline 2x/week
	12	1 dripline 3x/week
	13	2 driplines 2x/week
	14	2 driplines 3x/week
	15	Tensiometer
Mulch	16	Natural Mulch

**Table 2.** Haskap cultivars used in the haskap agronomy project.

Cultivar Subgroup	Cultivar	
U of S	'Honeybee'	
	'Tundra'	
	'Blue Treasure'	
	'Indigo Treat'	
	'Indigo Yum'	
	'Indigo Gem'	
	'Aurora'	
	'Boreal Beast'	
	'Boreal Beauty'	
	'Boreal Blizzard'	
	Russian	'Blue Banana'
		'Happy Giant'
		'Blue Diamond'
'Blue Jewel'		
'Blue Moose'		
Polish	'Evie'	
	'Larissa'	
	'Rebecca'	
	'Sveta'	
Oregon X	'Kawai'	

The mulch block tested black plastic, white plastic, sierra red wood chip, and landscape fabric against a control treatment (where weeds were controlled using mechanical weed control methods such as mowing and hand-weeding, and herbicide options such as dichlobenil, trifluralin, Fluazifop-P-butyl, Sethoxydim, paraquat, et cetera). The same benchmark fertilizer and irrigation rates were applied to all treatments in this block. An additional natural wood chip mulch treatment (row 16) was added to replace a raised bed treatment.

The second treatment block, fertilizer applications, evaluated the effect of fertilizer rates. Haskap cultivars were randomized in the same way as the mulch block and the fertilizer was applied in split applications according to Eric Gerbrandt & Andrew Hammermeister specified benchmarks (example 18-12-12 N-P-K +n1 Ca, 0.5 Mg, with 5S and micronutrients at a rough minimum equivalent of 47g/plant in the first application, and a total of 78g/plant after the second application). The minimum is expressed as "2x", and the "3x" treatment included an additional application for a total of 78g of fertilizer applied before leaf senescence in late summer. Three other treatments were tested in which water-soluble 20-20-20 + micronutrient (Plant-Prod) fertilizer was applied via drip irrigation at a rough equivalence of 40g/plant per treatment application. Minimum analysis of nutrients used in Plant-Prod fertilizer can be found in the appendix (Table A1). The lowest-rate fertigation treatment occurred 4x (total 160g/plant),

whereas higher rates were 6x and 7x the fertilizer applications at a total rate of 240 and 280g/plant respectively.

The irrigation block started with lower irrigation rates as the plants were young and increased as the plants grew through the four-year project lifespan. Irrigation needs are partially soil and climate dependent. Still, it is anticipated the plants need an additional 300-400 mm of water with higher rate applications occurring during hot dry periods in the summer. The first treatment in this block saw irrigation applied 2x per week along one drip line and the second treatment used one drip line 3x per week. These drip lines deliver water directly to the center of the plant's crown. The third treatment used 2 drip lines 2x per week so that the delivery of water was more spread out. In this way, the shallow spreading haskap roots may be better served via more widespread water availability. The fourth treatment did the same as the third treatment but was irrigated 3x per week. The irrigation block's fifth and final treatment relied on 2 drip lines applying water to a level below saturation, set by tensiometer readings. The final treatment could require watering at low levels more than 5 times per week, or not at all if soil moisture is well retained.

In all blocks, measurements of growth, labour demand, berry yield, and fruit quality were recorded and analyzed. Winter-hardiness and genotype-by-environment parameters were also measured (blossom and harvest windows, winter kill). Soil quality parameters have been tested throughout the project's lifespan. Growth characteristics of each plant were recorded in spring and fall; plant growth was described as either horizontal (prostrate) or vertical and plant fullness was recorded as either bushy or leggy/spindly. Vigour was rated on a scale of 0-5, with 0=dead and 5=most vigorous.

Haskaps were scouted periodically throughout the growing season to monitor survival, disease, flowering, berry presence, and berry ripeness. For flowering observations, a plant could either be flowering or not flowering. Similarly, for berry observations, a plant could either have berries or not have berries. Harvest began once 100% berry ripeness was observed in any given cultivar. In 2022, berries were first harvested on June 30 and almost daily thereafter until July 22. Initially, plants were harvested from all rows, but due to time constraints and lack of bird netting over rows 6-16, a decision was made to only harvest rows 1-5. Prior to this decision, all 'Blue Banana', 'Blue Diamond', and 'Happy Giant' plants across all treatments were harvested as they appeared to be at 100% ripeness early in the season.

Harvest was done mainly by hand; one plant took between 30 minutes and 1.5 hours to harvest since the plants under the netting had such high yields. A simple mechanical harvester was built using a reciprocating saw with a homemade attachment. A universal adaptor for the saw was purchased and a hot dog roaster stick duck taped to a drill bit ended paint stirrer. The end of the attachment was placed into the haskap bush and the reciprocating motion would shake the berries off the plant. A plastic kiddie pool was used to catch the falling berries. The pool was cut in half and wrapped around the base of a haskap bush (Fig. 2). It took approximately 25 minutes

to completely harvest a plant with this mechanical method. However, the bit would wear out after harvesting a few plants and would require constant repairs.



**Figure 2.** A plastic pool was cut in half to wrap around the base of the plants being harvested. Berries fell into the pool for ease of collection.

Berries were picked from each haskap plant and put into individually marked plastic bags. Each bag was sorted by marketable and unmarketable berry categories and weighed. Ripe and firm berries were categorized as marketable; while mushy, green, and dried berries were unmarketable. Any stems or leaves were removed before weighing. A few berries were chosen from each bag to be analyzed with a refractometer to determine a brix value for each cultivar in each of the harvested rows (1-5). The brix value can be used as a measure of sugar or sweetness of fruits. For reference, brix values of some common fruits are as follows: raspberries, 12-14; blueberries, 8.3-14.3; strawberries, 14-16; and blackberries, 9-10 (Mokrovic, n.d.). Brix values were adjusted to 20°C.

Berry harvest was not done in a consistent manner, so there are potential experimental errors. Not all plants were harvested the same; either done by hand or mechanically. There were minor mix ups in harvesting the wrong plant and/or cultivar at the wrong time. Some berries may have been damaged in the process of picking and sorting, and earlier cultivars had more green berries than later harvested cultivars, so there likely were more berries marked as unmarketable than there actually was. As a result, total berry yield was used rather than just marketable yields for data analysis.

Dormancy observations began the first week of October. When cultivars had lost about 70% of their leaves they were marked as dormant. Plant heights were recorded in the fall of 2022 by measuring two of the four plants in each cultivar. Disease pressure and stress was extremely low

in 2022 and was not recorded. A full list of data collection, weeding, fertilizer applications, and harvest by date can be found in Table 3.

**Table 3.** 2022 schedule of data collection, weeding, fertilizer applications, and harvest in year four of the haskap agronomy trial.

<b>Date</b>	<b>Data Collection/Weeding/Fertilizer Applications/Harvest</b>
May 20	Flowering and survivability observations, vigour ratings, spring growth characteristics
June 1	Flower/Berry Observations
June 6	Granular fertilizer application to 2x and 3x fertilizer treatments
June 8	Flower/Berry observation
June 15	Flower/Berry observation. Mulch spread in row 3
June 15-17	Entire orchard weeded
June 17	Fertigation Round One begins in row 1
June 22	Fertigated row 2
June 23	Fertigated row 3
June 24	Proportion of ripe berries observation. Fertigated rows 4 and 5
June 27	Fertigated rows 6 and 7
June 30	'Blue Banana' harvested
July 4	Proportion of ripe berries observation
July 5	Fertigated rows 12-16. 'Happy Giant' harvested
July 7	'Blue Diamond' Harvested
July 11	Proportion of ripe berries observed. 'Tundra' and 'Honeybee' harvested
July 12	'Blue Moose' harvested
July 13	Indio Yum, 'Boreal Beauty', and 'Blue Jewel' harvested
July 18	'Indigo Gem' and 'Aurora' harvested
July 19	'Evie' harvested
July 20	'Boreal Beast' harvested
July 21	'Indigo Treat' and 'Boreal Blizzard' harvested
July 22	'Blue Treasure', Larisa, 'Rebecca', 'Sveta', and 'Kawai' harvested
Aug 2	Brix readings conducted
Aug 3	Spot weeded whole orchard
Aug 5-11	Fertigated whole orchard for the second and last time
Aug 5	Fertigated 4x, 6x, and 7x treatments
Aug 19	Fertigated 6x and 7x treatments
Aug 25	Fertigated in 4x, 6x, and 7x treatments
Aug 29	Fertigated 6x and 7x treatments
Sept 1	Fertigation in 7x treatment. Fertigation complete
Oct 5	Fall growth observations and plant heights recorded
Oct 5 - Nov 4	Date of leaf loss recorded

#### **Year 4 (2022) Specific Method Updates:**

##### Mulch Block

Due to deterioration and wind carry-off, the wood mulches had thinned and were missing portions. On June 15, 32 bags of Red Sierra mulch were spread in row 3 to replace what was missing. Row 16 did not lose enough mulch to make it worth the supply and labour costs, so it



was left untouched. All plastic mulches had holes caused by wildlife and were left unpatched in 2022. Row 5, the landscape fabric, required no extra maintenance.

### Fertilizer Block

The whole orchard received two rounds of fertigation with rows in the fertilizer block receiving additional rounds of fertigation depending on their treatment type (Table 3). Round one of fertigation began on June 17, but issues were encountered with the pump. Initially it took 1.5 hours to get through a half bucket of fertilizer mix, but the time to get through a half bucket got progressively worse. On June 22 it took 2.5 hours and on June 23 it took 5 hours. The pump was taken apart and seals replaced to try to fix the issue. The next day it took 1 hour to get through the remaining half bucket. The issue of slow uptake progressed again so the pump was replaced. A new pump was purchased and installed July 5<sup>th</sup>, and first round of irrigation was resumed. The retailer suggested opening more than one irrigation line at a time as one line likely did not provide enough water flow for the pump to work efficiently. The second round of fertigation took five days to complete with the new pump and ensuring multiple lines were open at once.

There were no issues with the application of granular fertilizer. For the applications, the granular fertilizer Terico 25-10-10 was spread around the base of each plant (Table 3). The 2x treatment received one application of 40g/plant while the 3x treatment received two applications of 40g/plant, totaling 80g/plant for the season.

### Irrigation Block

Irrigation began on May 31 after there was no longer a risk of overnight freezing temperatures. Treatments with double lines were irrigated by individual treatment for 30 minutes. When single lines were irrigated, two lines (two treatments) were open at the same time for one hour. Each treatment provided approximately 100mL of water per plant. The mulch and fertilizer treatments, as well as the 2x irrigation treatments, were irrigated on Tuesday and Thursday each week. The 3x irrigation treatments were watered additionally on Friday each week. Row 15 (tensiometer-2 driplines ?x/week) was irrigated when the tensiometer reading reached 50 kpa (kilopascals); tensiometer readings of 20-40 kpa indicate there is available water and aeration for plant growth. When the soil was well-saturated, row 15 did not receive any irrigation. During the 2022 growing season, row 15 was irrigated only twice. It is possible this treatment should have received additional irrigation as there were issues with faulty tensiometer readings. Irrigation was stopped on September 30 to promote winter dormancy.

Tensiometers and moisture meters were installed on June 13. Rows 9, 12, and 15 had 12-inch tensiometers installed halfway down the rows. Row 9 had a 9-inch moisture meter installed and row 12 had a 24-inch moisture meter installed, both next to their respective tensiometer. Both types of meters were giving readings that were not consistent with the environmental conditions. On July 11, another 12-inch tensiometer was installed in row 15 and another 12-inch moisture meter was installed in row 9, next to the “old/faulty” instruments. The readings from the two same instruments in the same row were never consistent with each other; the moisture meters

in row 9 once read 111 and 6 at the same time. Due to these faulty readings, our data and decision making for irrigating row 15 were likely incorrect in 2022.

### Crop Protection

Bird netting was installed on June 21, 2022. It was not feasible to net the entire orchard, so only the mulch treatment, rows 1-5, were netted. The supports used 4-5in 8ft fence posts; this height was selected to provide clearance of 6ft under the netting. Poly wire was strung down and across rows and then secured to the posts with plastic fittings on the post ends. A high-density white polyethylene netting with a  $\frac{3}{4}$  diamond pattern mesh was used. Small plastic clips were used to secure the netting to the wire and itself, then landscape staples to hold the netting to the ground. Photos can be found in Figure 3. The netting was taken down on July 29 after harvest was complete. No pesticides or herbicides were sprayed on the orchard in 2022.

### Statistical Analysis

Data analysis was completed by Kruskal-Wallis One-Way ANOVA using Statistix 10 software. Post-hoc test used was Dunn's multiple comparisons test at  $p=0.05$  unless otherwise stated. Sample sizes for each category can be found in the appendix (Tables A2 and A3).



**Figure 3.** The set-up of the bird netting.

## **10. Observations and results**

### Weather

The growing season of 2022 at the CLC started off cooler than the long-term average but ended warmer (Table 4). Compared to the 9-year averages of May and October, the mean temperature of May 2022 was 6.6°C cooler while October had a mean temperature double the long-term average. Average temperature for this growing season was just 0.3 cooler than the historical average. This year was drier compared to past years, but not as dry as 2021. All months of 2022 received less precipitation than the historical averages; there was a total of 49.3mm less precipitation this year. May received less than half the amount of precipitation than the historical average. The first frost occurred on September 10 (-0.4). Overall, growing degree days were higher than the historical average. The complete monthly weather summaries can be viewed/downloaded at [src.sk.ca/download-weather-summaries](http://src.sk.ca/download-weather-summaries).

**Table 4.** Weather conditions in the 2022 growing season at the CLC from the onsite SRC weather station.

Year	May	June	July	August	September	October	Average/Total
--- Mean Temperature (°C) ---							
2022	10.5	15.5	18.3	18.5	13.3	6.2	13.7
2012-2021	17.1	16.2	18.7	17.1	11.6	3.1	14.0
--- Precipitation (mm) ---							
2022	17.9	75.7	63.7	37.8	26.3	11.5	232.9
2012-2021	38.3	77.6	75	43	28.3	20	282.2
--- Growing Degree Days (base 5°C) ---							
2022	173.1	314.7	413.6	419.6	248.6	79.8	1649.4
2012-2021	172.1	326.6	416.8	352.4	211.1	36.3	1515.4

Pests

Birds were observed feasting on haskap berries on numerous occasions. The birds were not deterred by human presence. Birds would take whole or partial berries leaving behind half eaten/torn berries that were unmarketable. Additionally, when birds landed on a plant, ripe berries would be shaken off, again making them unmarketable. The common species of birds identified included Cedar waxwings (Fig. 4) and starlings. All cultivars likely experienced losses from birds, but from visual observations the birds preferred cultivars that were more vertical than horizontal.



**Figure 4.** Cedar waxwing pictured flying out of haskap plant after feasting.

Tent caterpillars were found on one plant within the orchard. The insects did not kill the bush, but they did considerable damage to the top 25% of the plant (Fig. 5).



**Figure 5.** Close up of tent caterpillar infestation.

Weed growth was substantial in the mulch control treatment. Weeds emerged along the mulched sides, within holes poked through by wildlife, and at the base of each plant. These areas required the most effort for weed removal. Weeds in the holes and around the plants were hand weeded while the rest were either mowed or whipper snipped where appropriate. The least weedy conditions existed in the landscape fabric; this treatment required minimal weed removal efforts.

#### Stress/Disease Observations

Minimal haskap stress was observed in 2022. On June 23, it was noted that haskap leaves on a few plants were turning brown and drooping like the heat stressed symptoms observed in 2021. A plant was also observed to have leaves that were yellowing, turning white and curling/shriveling (Fig. 6). These symptoms suggest herbicide damage that may have drifted from the neighboring field. It may also be possible wand wiping in fall of 2021 to control weeds could have contacted the haskap plant. One plant had completely died and fallen over (Fig. 6). The sudden death may have been attributed to wildlife damage such as voles.



**Figure 6.** Symptoms indicating an unknown stress or disease.

#### Treatment Vigour, Plant Height, and Dormancy

Overall haskap plants received higher vigour ratings than previous years and were similar across most treatments ranging between 4 to 4.5. However, vigour ratings were statistically lower ( $p < 0.0001$ ) for the natural wood mulch, white plastic and 3X granular fertilizer treatments (Table 5a). Vigour is lowest in row 7, the 3X granular fertilizer treatment, which is not unexpected as this row also has the greatest plant mortality of 24 dead plants (Table 6a). Dead plants received a rating of 0 on the 0-5 vigour rating scale (thus lowering the overall rating). It is likely fertilizer is being applied at too high of a rate or within too close of proximity to the haskap plant and is causing damage.

Granular 3X had the shortest plants, while the red mulch produced the tallest plants. Overall, the red mulch haskaps were 20 cm taller than the granular 3X treatment (Table 5a). Otherwise, the mean plant height for the remaining rows was not statistically different from one another. Plant height increased by roughly 20 cm since 2021. Dormancy did not differ significantly between treatments; the mean range of dormancy across treatments was 289-296 Julian date, a difference of 7 days.

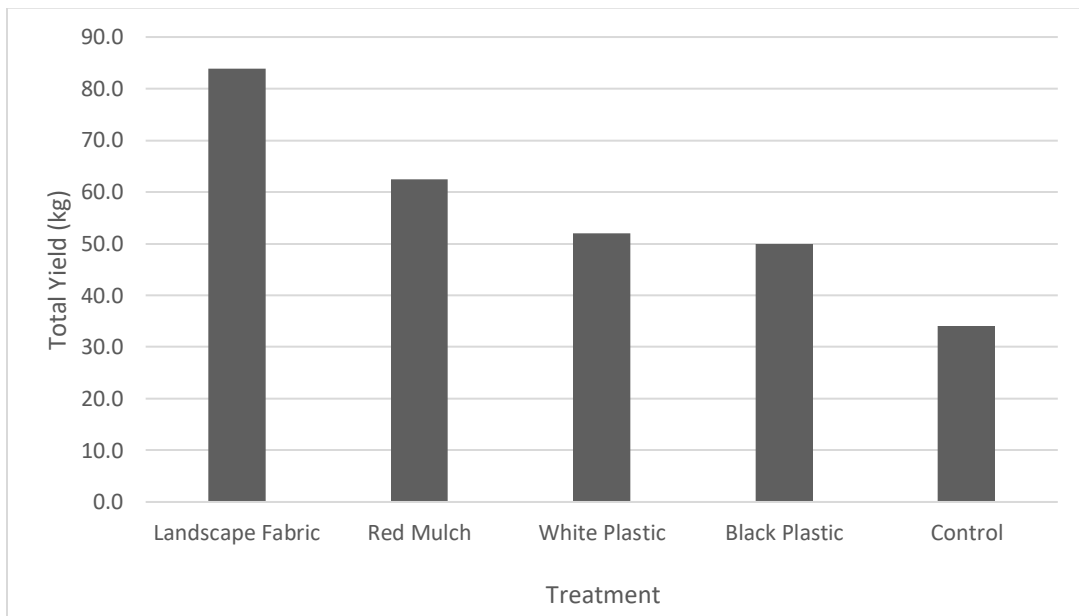
#### Treatment Berry Production: Yield and Quality

Complete harvest was done only for rows under netting (rows 1-5); harvest data and brix readings in Table 5a reflect this. Berry yield was influenced by mulch type while sugar content (brix readings) was not. Landscape fabric outperformed the next highest producing row (red mulch) by 30% (411.4g/plant), and more than doubled yield compared to the control treatment (Table 5a). Total berry yield results are similar to individual plant yields (Fig. 7a). The landscape fabric produced a total of 83.8 kg, or 185 lbs., whereas the lowest yielding row, the control, produced

a total of 34.1kg, or 75 lbs. Total berry yield by treatment can be found in the appendix (Table A4).

**Table 5a.** Summary of statistical analysis and means of main effects for haskap agronomy trial by treatment in 2022.

Row	Treatment	Vigour Rating (0-5)	Berry Yield (g/plant)	Brix (°Bx)	Plant Height (cm)	Dormancy (Julian Date)
1	Black Plastic	4.4 ab	658 b	11.2	84.6 a-c	296
2	White Plastic	3.4 d	713 b	11.1	89.1 ab	293
3	Red Mulch	4.1 a-c	845 ab	11.3	91.2 a	294
4	Landscape Fabric	4.3 ab	1256 a	11.2	86.6 a-c	295
5	Control	4.1 abc	474 c	11.7	76.4 b-d	293
6	2x Granular Fert	4.3 a			74.7 cd	294
7	3x Granular Fert	3.3 cd			68.3 d	289
8	4x Fertigation	4.0 a-c			78 a-d	294
9	6x Fertigation	4.3 ab			79.2 a-d	294
10	7x Fertigation	4.1 a-c			77.2 a-d	293
11	1 drip 2x	4.1 a-c			80.3 a-d	295
12	1 drip 3x	4.5 ab			81.9 a-d	295
13	2 drip 2x	4.4 ab			80.9 a-d	294
14	2 drip 3x	4.5 a			85.8 a-c	295
15	Tensiometer	4.3 a-c			77.9 a-d	294
16	Natural Mulch	3.8 b-d			79.8 a-d	291
	<b>P value</b>	<b>&lt;0.0001</b>	<b>&lt;0.0001</b>	<b>0.7075</b>	<b>&lt;0.0001</b>	<b>0.8892</b>



**Figure 7a.** Total berry yield per treatment for year four of the haskap agronomy trial located near Prince Albert, SK.

### Cultivar Vigour, Plant Height, and Dormancy

Differences ( $p < 0.0001$ ) in vigour, berry production, brix reading, plant height, and dormancy were greatly influenced by haskap cultivar (Table 5b). Vigour was lowest in 'Honeybee', a cultivar that has suffered from great losses over the four-year span of this project (Table 6b). The tallest cultivar in 2022 was 'Sveta' at 96.3 cm while the shortest cultivar remains 'Rebecca' at 53 cm. 'Rebecca' is predominantly a prostrate growing cultivar, along with 'Tundra' and 'Indigo Gem' (Fig. 8b). The mean range of dormancy across cultivars was 278-307 Julian date, a difference of 29 days. 'Blue Moose' and 'Happy Giant' went into dormancy the earliest, while 'Rebecca' was the latest.

### Cultivar Berry Production: Yield and Quality

Mean plant yields for cultivars were between 196 g/plant and 1697 g/plant; the three highest yielding cultivars were 'Boreal Beauty', 'Blue Jewel', and 'Boreal Blizzard', while the lowest yielding three were 'Blue Banana', 'Blue Diamond', and 'Rebecca' (Table 5b). Some cultivars had a higher individual plant yield than total yield. 'Honeybee' is a cultivar that ranked 8<sup>th</sup> based on individual plant yield, but 13<sup>th</sup> in total yield (Fig. 7b). This cultivar experienced high mortality over the four years of this project (Table 6b). Had 'Honeybee' had better survivability, it would have produced an estimated additional 8 kg of berries (908g/plant x 9 dead 'Honeybee' plants in rows 1-5). Total berry yield by cultivar can be found in the appendix (Table A5).

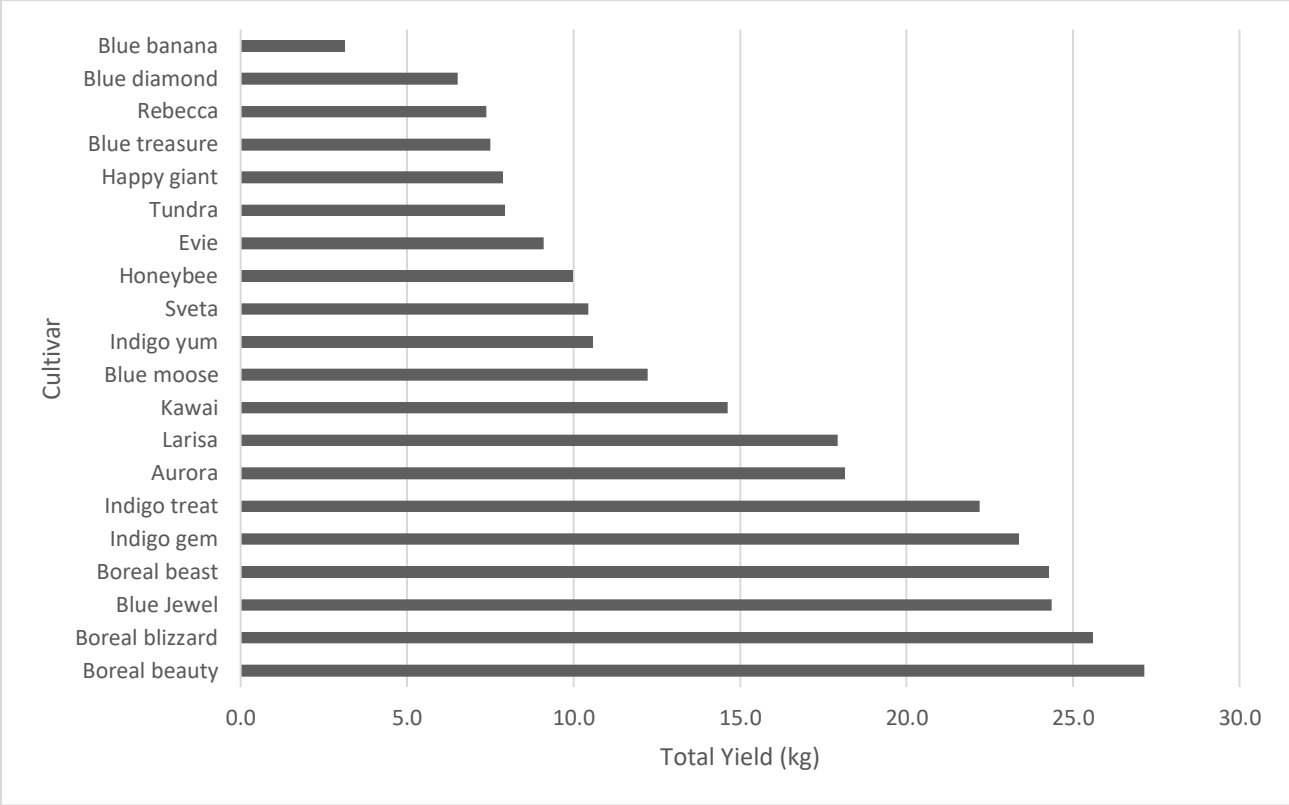
'Boreal Beauty' and 'Aurora' had the highest mean brix values, suggesting they are the sweetest and potentially tastiest cultivars. Brix values of some common fruits are as follows: raspberries, 12-14; blueberries, 8.3-14.3; strawberries, 14-16; and blackberries, 9-10 (Mokrovic, n.d.). A 2013 Simcoe, Ontario study recorded Brix values for a few similar studied cultivars including: 'Tundra' (13.5), 'Indigo Treat' (14.5), and 'Indigo Gem' (14.0) (Elford, 2014). Mean CLC Brix readings were lower than the Ontario study, but cultivars such as 'Aurora' and 'Boreal Beast' had max readings > 14. Future determination of berry Brix throughout the harvest season would be beneficial to determine ideal brix levels for harvest, as basing harvest timing on color alone is not the best method. Brix readings may be inaccurate for 'Blue Banana', 'Blue Diamond', and 'Happy Giant'. These cultivars were the earliest maturing, and fear of birds eating berries before data collection may have resulted in premature harvest and thus the brix value may not reflect the true potential.



**Table 5b.** Summary of statistical analysis and means of main effects for haskap agronomy trial by cultivar in 2022.

<b>Cultivar</b>	<b>Vigour Rating (0-5)</b>	<b>Berry Yield* (g/plant)</b>	<b>Brix (°Bx)</b>	<b>Plant Height (cm)</b>	<b>Dormancy (Julian Date)</b>
'Honeybee'	2.6 efg	908 a-f	10.9 b-f	85.9 a-f	290 c-g
'Tundra'	3.5 fg	397 def	12.0 a-e	68 h	285 efg
'Blue Treasure'	3.0 g	375 def	11.3 a-f	94.4 ab	304 ab
'Indigo Treat'	4.8 a	1110 abc	10.5 c-f	91.3 abc	290 c-f
'Indigo Yum'	4.1 b-f	557b-f	11.7 a-f	74.8 e-h	288 d-g
'Indigo Gem'	4.9 a	1169 ab	10.7 c-f	68.3 h	289 c-g
'Aurora'	4.3 a-d	907 a-d	12.8 ab	84.3 b-g	299 a-d
'Boreal Beast'	3.8 d-g	1214 ab	13.1 a	88.8 a-d	301 abc
'Boreal Beauty'	3.7 b-e	1697 a	10.3 ef	85.3 a-f	302 abc
'Boreal Blizzard'	4.4 a-d	1280 a	10.1 f	86.1 a-e	300 a-d
'Blue Banana'	4.2 abc	196 f	12.4 abc	73.8 f-h	286 efg
'Happy Giant'	4.3 ab	563 b-f	11.2 a-f	72.6 gh	278 g
'Blue Diamond'	4.8 a	326 ef	11.2 a-f	76.5 e-h	283 fg
'Blue Jewel'	4.9 a	1282 a	9.8 f	94 ab	292 c-f
'Blue Moose'	4.9 a	612 b-f	11.5 a-f	78 d-h	278 g
'Evie'	4.1 c-f	455 c-f	10.8 c-f	81.6 c-g	295 b-e
Larisa	4.4 a	1120 ab	12.1 a-e	77.2 d-h	300 a-d
'Rebecca'	3.5 fg	369 def	10.5 d-f	53 i	307 a
'Sveta'	4.4 a-d	549 b-f	12.3 a-d	96.3 a	298 a-d
'Kawai'	3.5 fg	813 a-e	10.7 c-f	85.6 a-f	306 ab
P value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

\*Dunn's pairwise comparison done at p=0.1



**Figure 7b.** Total berry yield per cultivar for year four of the haskap agronomy trial located near Prince Albert, SK.

Size and shape of the 20 different cultivars varied and are presented in Figure A1 in the appendix. ‘Rebecca’ had the largest roundest berries. ‘Boreal Beauty’ and Blizzard also had very large berries with a more unique shape. ‘Blue Diamond’, ‘Happy Giant’, ‘Indigo Treat’, and ‘Tundra’ were some of the smaller cultivars. These qualitative observations were based off a single berry per cultivar and does not capture the potential variability within each cultivar that is likely to exist.

Survivability

A plant was described as dead during surveys when it was missing or completely brown and leafless. This trial began with 1280 haskap plants and by the end of year four there are 1169 plants left – an 8.7% decrease. End of season percent survival was high in all treatments (Table 6a) except in the 3x granular fertilizer treatment which saw a 23% decrease in surviving plants from 2021 to 2022. For the 3X granular treatment, 13 plants died overwinter, and an additional 5 throughout the summer.

**Table 6a.** Count and proportion (as a percent) of deceased plants by treatment.

Row	Treatment	Number of Dead Plants			End Of Season % Survival	
		Fall 2021	Spring 2022	Fall 2022	2022	2021
1	Black Plastic	4	4	4	95	95
2	White Plastic	3	3	5	94	96
3	Red Mulch	6	6	6	93	93
4	Landscape Fabric	5	7	7	91	94
5	Control	7	7	7	91	91
6	2x Granular Fert	3	5	6	93	96
7	3x Granular Fert	6	19	24	70	93
8	4x Fertigation	8	8	8	90	90
9	6x Fertigation	6	6	6	93	93
10	7x Fertigation	8	8	8	90	90
11	1 drip 2x	7	7	7	91	91
12	1 drip 3x	2	2	2	98	98
13	2 drip 2x	3	5	5	94	96
14	2 drip 3x	4	4	4	95	95
15	Tensiometer	4	4	4	95	95
16	Natural Mulch	8	8	8	90	90
	Mean	5	7	7	91	93
	Standard Deviation	2	4	5	6	2

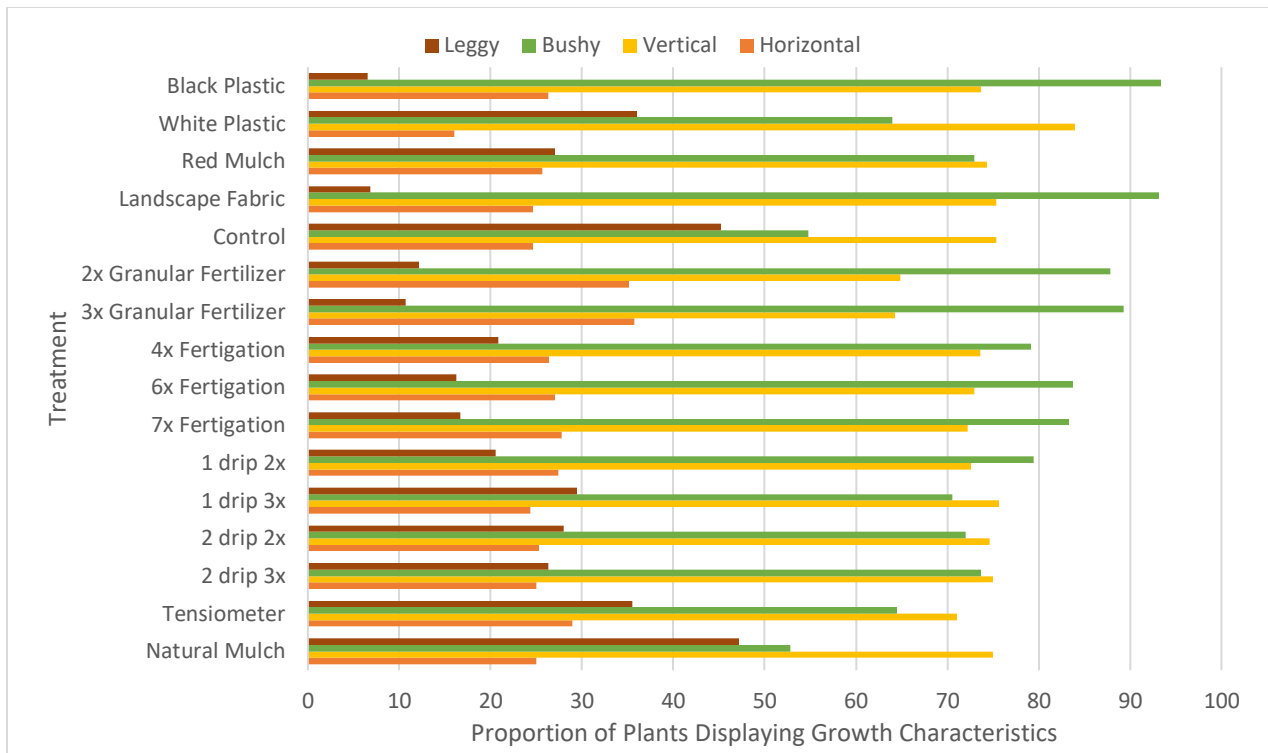
Some cultivars experienced losses in 2022 (Table 6b). Previously, ‘Honeybee’ has had the highest mortality rate and still does with only 50% of the plants surviving by the end of the season; however, ‘Honeybee’ did not experience the greatest losses in 2022. The most notable losses include ‘Tundra’, ‘Blue Treasure’, ‘Boreal Beast’, ‘Evie’, and ‘Rebecca’ that lost 5-8% of their plants. The cultivars that did not suffer any losses are ‘Indigo Gem’, ‘Boreal Blizzard’, ‘Blue Banana’, ‘Happy Giant’, ‘Blue Diamond’, ‘Blue Jewel’, Larisa, ‘Sveta’, and ‘Kawai’. Within the four years of this trial, ‘Indigo Gem’ and ‘Blue Jewel’ did not lose any plants.

**Table 6b.** Count and proportion (as a percent) of deceased plants by cultivar.

Cultivar	Number of Dead Plants			End of Season % Survival	
	Fall 2021	Spring 2022	Fall 2022	2022	2021
'Honeybee'	31	31	32	50	52
'Tundra'	1	4	5	92	98
'Blue Treasure'	1	5	5	92	98
'Indigo Treat'	1	1	2	97	98
'Indigo Yum'	2	3	3	95	97
'Indigo Gem'	0	0	0	100	100
'Aurora'	5	6	7	89	92
'Boreal Beast'	4	6	8	88	94
'Boreal Beauty'	9	11	11	83	86
'Boreal Blizzard'	1	1	1	98	98
'Blue Banana'	10	10	10	84	84
'Happy Giant'	7	7	7	89	89
'Blue Diamond'	1	1	1	98	98
'Blue Jewel'	0	0	0	100	100
'Blue Moose'	1	1	2	97	98
'Evie'	0	1	3	95	100
Larisa	6	6	6	91	91
'Rebecca'	0	3	4	94	100
'Sveta'	2	2	2	97	97
'Kawai'	2	2	2	97	97
Mean	4	5	6	91	93
Standard Deviation	7	7	7	11	11

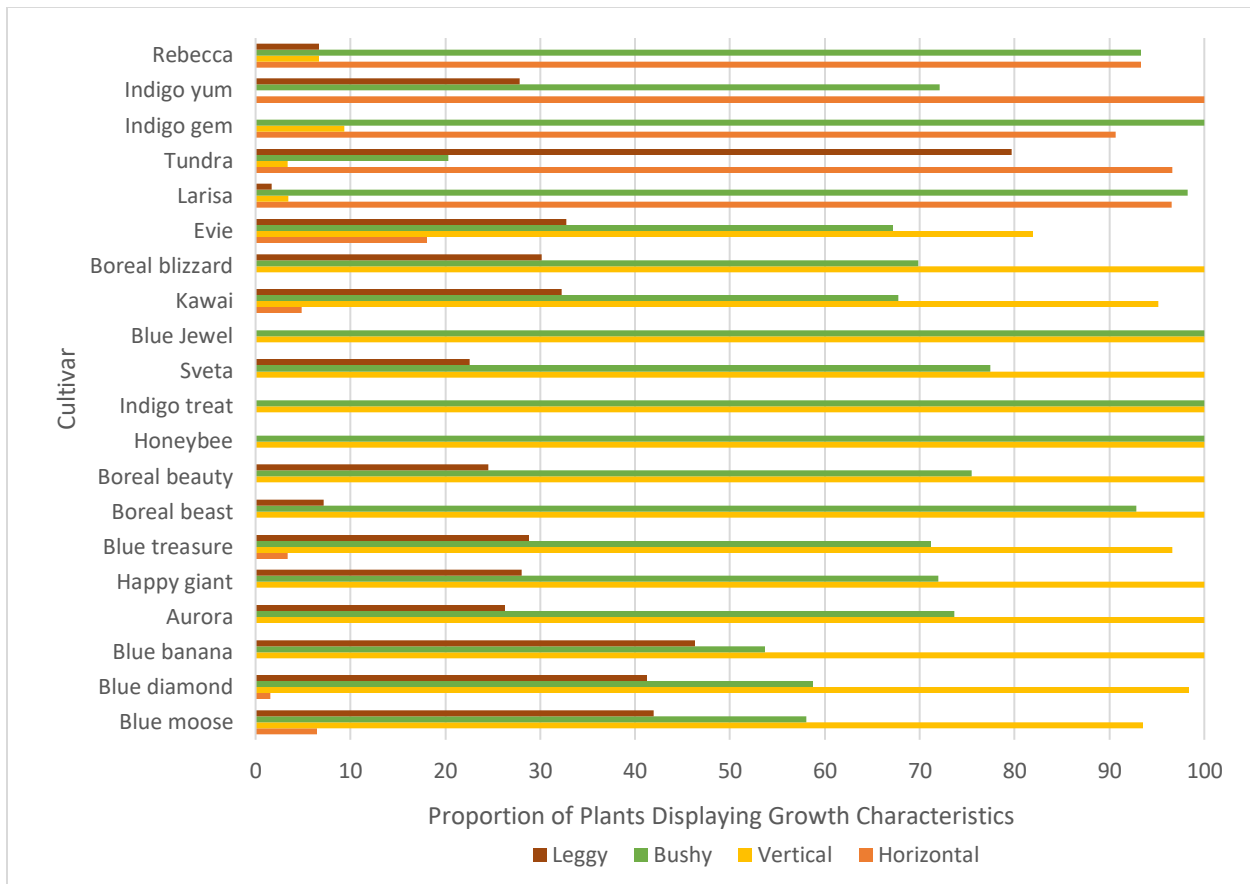
### Growth Characteristics

A summary of growth characteristics by treatment can be found in Figure 8a below. Differences across treatment blocks or the treatments themselves are minimal; in any given treatment the plants mainly display vertical and bushy growth. The granular fertilizer treatments have the highest proportions of both bushy plants and horizontal plants. Alternatively, white plastic, control treatment and natural mulch have the highest proportion of leggy plants. The white plastic also has the most vertical plants.



**Figure 8a.** Growth characteristics of haskap treatments as a proportion of plants that display the characteristics.

A summary of growth characteristics by cultivar can be found below in Figure 8b. ‘Tundra’, ‘Indigo Yum’, ‘Indigo Gem’, Larisa, and ‘Rebecca’ primarily displayed horizontal growth. ‘Honeybee’, ‘Indigo Treat’, and ‘Blue Jewel’ all had lush appearances as they displayed 100% both vertical and bushy characteristics. Most cultivars displayed more bushy growth than they did leggy except for ‘Tundra’ that showed the leggiest growth out of all the cultivars observed.



**Figure 8b.** Growth characteristics of haskap cultivars as a proportion of plants that display the characteristics.

### Flowering Observations

Observations of the presence of flowers were done to determine the flowering windows of the cultivars (Table 7). Unfortunately, the beginning of the flowering window was missed for most cultivars. 10 cultivars had nearly all plants blooming by May 20 and flowering was complete 12 days later June 1. The remaining cultivars had flowering windows that lasted from May 20 to June 5, a span of 16 days. Within these longer flowering cultivars, the majority had their highest proportion of flowering plants on June 1.

**Table 7.** Proportion of plants with flowers present by cultivar on a given date.

Cultivar	% Plants Flowering			
	May 20	June 1	June 5	June 15
'Honeybee'	86	9	3	0
'Tundra'	92	3	0	0
'Blue Treasure'	0	100	34	0
'Indigo Treat'	100	0	0	0
'Indigo Yum'	100	0	0	0
'Indigo Gem'	100	0	0	0
'Aurora'	98	9	3	0
'Boreal Beast'	66	19	3	0
'Boreal Beauty'	42	78	17	0
'Boreal Blizzard'	38	87	30	0
'Blue Banana'	98	0	0	0
'Happy Giant'	98	0	0	0
'Blue Diamond'	100	0	2	2
'Blue Jewel'	100	6	0	0
'Blue Moose'	100	0	0	0
'Evie'	0	55	14	0
Larisa	60	41	0	0
'Rebecca'	7	84	33	0
'Sveta'	6	87	40	0
'Kawai'	5	97	28	0
Mean	65	34	10	0
Standard Deviation	40	39	14	0

### Berry Presence

Observations of the presence of berries were made on June 1, 5, and 15, 2022. This observation determined whether a plant had any berries regardless of ripeness. As of June 1, all treatments ranged from 56-78% berry presence with the black plastic treatment having the lowest percentage of plants with berries and the Tensiometer treatment having the most (Table 8a). While it appears the irrigation treatment block had the most rapid berry production over four days after the initial observation, it is more likely the initial observer missed the presence of berries due to green berry colour or not lifting the branches to see hidden berries. It appears the mulch block was slower to produce berries; however, the mulch block was closest to the wooded area and since the bird netting had yet to be installed, these rows may have been selected for by birds since they were closest to cover from predators.

**Table 8a.** Proportion of plants with berries present by treatment on a given date.

Row	Treatment	% Plants with Berries		
		June 1	June 5	June 15
1	Black Plastic	59	70	100
2	White Plastic	56	73	99
3	Red Mulch	64	80	100
4	Landscape Fabric	62	81	100
5	Control	67	79	100
6	2x Granular Fert	60	77	100
7	3x Granular Fert	73	74	100
8	4x Fertigation	72	100	100
9	6x Fertigation	64	100	100
10	7x Fertigation	68	100	100
11	1 drip 2x	64	97	100
12	1 drip 3x	72	99	100
13	2 drip 2x	75	99	100
14	2 drip 3x	68	100	100
15	Tensiometer	78	100	100
16	Natural Mulch	62	97	100
	Mean	66	89	100
	Standard Deviation	6	12	0

By June 1, 14/20 cultivars had over 50% berry presence with 11 of them near or at 100% (Table 8b). Cultivars such as 'Blue Treasure', 'Evie', 'Rebecca', 'Sveta', and 'Kawai', were slower to produce berries. This corresponds with flowering data indicating that the same cultivars were late to flower. This highlights the importance of selecting different cultivars that will have overlapping bloom periods to ensure successful pollination.



**Table 8b.** Proportion of plants with berries present by cultivar on a given date.

Cultivar	Proportion of Plants with Berries (%)		
	June 1	June 5	June 15
'Honeybee'	91	97	100
'Tundra'	100	100	100
'Blue Treasure'	3	66	100
'Indigo Treat'	100	100	100
'Indigo Yum'	100	100	100
'Indigo Gem'	100	100	100
'Aurora'	100	97	100
'Boreal Beast'	84	97	100
'Boreal Beauty'	24	83	100
'Boreal Blizzard'	13	70	100
'Blue Banana'	100	96	100
'Happy Giant'	100	100	100
'Blue Diamond'	100	98	98
'Blue Jewel'	98	100	100
'Blue Moose'	100	100	100
'Evie'	45	86	100
Larisa	59	100	100
'Rebecca'	16	67	100
'Sveta'	0	60	100
'Kawai'	3	72	100
Mean	67	89	100
Standard Deviation	40	14	0

### Benefits of Netting

Berry production from under the net versus in the open can only be compared through the three cultivars that were completely harvested: 'Blue Banana', 'Blue Diamond', and 'Happy Giant'. Rows 1-5 produced 17.5 kg total of the 3 cultivars, while rows 6-16 produced only 4.3 kg total. This data highlights the importance of bird netting, as bird netting increased yields by 11x.

### **11. Conclusion and Recommendations**

This four year project provided insight into haskap agronomy that will allow producers to make educated decisions on the care of their haskap plants. Crop protection in the form of bird netting was implemented for year four only, but it was evident that it was crucial to the success of high yields and was responsible for a 4X yield increase. Weed growth was substantial in the mulch control treatment and thus was the most labour intensive. The landscape fabric row had the least weedy conditions and produced significantly higher berry yields than the other mulch rows. The treatment that received 3x granular fertilizer applications experienced the greatest plant mortality (30%). Fertilizer damage, either too much or too close to the plant, is a likely reason.

Results were greatly affected by cultivar. 'Honeybee' had the lowest vigour ratings and experienced the greatest mortality over the four years (50%) while 'Indigo Gem' and 'Blue Jewel' did not have any losses. Flower and berry presence data collection provided a relative bloom window for each cultivar. Cultivars such as 'Blue Treasure', 'Evie', 'Rebecca', 'Sveta', and 'Kawai', were slower to produce berries. This corresponds with flowering data indicating that the same cultivars were late to flower. This highlights the importance of ensuring cultivar selection accounts for overlapping bloom periods to ensure successful pollination. Mean plant yields for cultivars were between 196 g/plant and 1697 g/plant. The three highest yielding cultivars were 'Boreal Beauty', 'Blue Jewel', and 'Boreal Blizzard', while the lowest yielding were 'Blue Banana', 'Blue Diamond', and 'Rebecca'. The three highest yielders also had the lowest brix, meaning they may not be selected for taste. 'Boreal Beast' and 'Aurora' were high yielders and high brix, which may make them more suitable for production purposes. 'Rebecca', 'Tundra', 'Indigo Gem', 'Indigo Yum', and Larisa are predominately prostrate growing cultivars which may make them difficult to mechanically harvest and not suitable for large scale operations unless they can be pruned in a way to make them grow upright.

Further research such as pruning methods, full flowering windows, harvestability, and harvest timing based on brix values would be valuable to producers. Some cultivars tend to hold onto fruit better than others and some natural growth characteristics do not allow for efficient mechanical harvesting. Pruning may help with these issues. Haskap berries can appear ripe due to color change from green to dark blue, but often require time to still fully mature prior to harvest. Using brix values to determine harvest timing is likely a better indicator; however, it is unknown what the ideal maximum brix level to expect for different cultivars.

## **12. Acknowledgements**

The Conservation Learning Centre graciously acknowledged the Ministry's support through signage directly in the field with the project, verbally during the Field Day, and on the Field Day agenda handed out to all visitors. 60 individuals were in attendance during the Field Day. A crop walk video was created in July 2022 and has had 251 views. An update was provided at Crop Opportunity held March 2, 2022 with 120 attendees. The trial was also toured by private industry and by the general public when requested. In August 2022, a video was professionally filmed and edited and is to be posted onto the CLC YouTube channel winter 2023. Haskap berries were brought to the local Prince Albert Farmers market and provided an excellent opportunity to promote haskaps and discuss the trial. The CLC has a TikTok account and has produced 4 haskap videos that has received over 4000 views.

### 13. Appendix

**Table A1.** Minimum analysis of nutrients used in Plant Prod fertilizer.

<b>Nutrient</b>	<b>Minimum Analysis (%)</b>
Total nitrogen	20
Phosphoric acid (P2O5)	20
Soluble potash (K2O)	20
Boron (B)	0.02
Chelated copper (Cu)	0.05
Chelated iron (Fe)	0.1
Chelated manganese (Mn)	0.05
Molybdenum (Mo)	0.0005
Chelated zinc (Zn)	0.05

**Table A2.** Sample sizes of data presented in Table 5a.

<b>Row</b>	<b>Vigour</b>	<b>Berry Yield</b>	<b>Brix</b>	<b>Plant Height</b>	<b>Dormancy</b>
1	76	76	20	20	20
2	77	74	19	20	20
3	74	74	20	20	20
4	73	73	20	20	20
5	73	72	18	19	19
6	75			20	20
7	61			20	20
8	72			20	20
9	74			20	20
10	72			19	19
11	73			20	20
12	78			20	20
13	76			20	20
14	76			20	20
15	76			20	20
16	73			20	20

**Table A3.** Sample sizes of data presented in Table 5b.

<b>Cultivar</b>	<b>Vigour</b>	<b>Berry Yield</b>	<b>Brix</b>	<b>Plant Height</b>	<b>Dormancy</b>
'Honeybee'	64	11	4	14	14
'Tundra'	64	20	5	16	16
'Blue Treasure'	64	20	5	16	16
'Indigo Treat'	64	20	5	16	16
'Indigo Yum'	64	19	5	16	16
'Indigo Gem'	64	20	4	16	16
'Aurora'	64	20	5	16	16
'Boreal Beast'	64	20	5	16	16
'Boreal Beauty'	64	17	5	16	16
'Boreal Blizzard'	64	20	5	16	16
'Blue Banana'	64	16	5	16	16
'Happy Giant'	64	14	5	16	16
'Blue Diamond'	64	20	5	16	16
'Blue Jewel'	64	19	5	16	16
'Blue Moose'	64	20	4	16	16
'Evie'	64	20	5	16	16
Larisa	64	16	5	16	16
'Rebecca'	64	20	5	16	16
'Sveta'	64	19	5	16	16
'Kawai'	64	18	5	16	16

**Table A4.** Total yields in grams, kilograms, and pounds for the five complete harvested rows in 2022.

<b>Row</b>	<b>Treatment</b>	<b>Total Yield (g)</b>	<b>Total Yield (kg)</b>	<b>Total Yield (lbs)</b>
1	Black Plastic	49994	50	110
2	White Plastic	52046	52	115
3	Red Mulch	62512	63	138
4	Landscape Fabric	83886	84	185
5	Control	34109	34	75

**Table A5.** Total yields in grams, kilograms, and pounds for the 20 cultivars in 2022.

<b>Cultivar</b>	<b>n</b>	<b>Total Yield (g)</b>	<b>Total Yield (kg)</b>	<b>Total Yield (lbs)</b>
'Honeybee'	11	9985	10	22
'Tundra'	20	7940	8	18
'Blue Treasure'	20	7508	8	17
'Indigo Treat'	20	22194	22	49
'Indigo Yum'	19	10583	11	23
'Indigo Gem'	20	23369	23	52
'Aurora'	20	18144	18	40
'Boreal Beast'	20	24284	24	54
'Boreal Beauty'	17	27146	27	60
'Boreal Blizzard'	20	25599	26	56
'Blue Banana'	16	3143	3	7
'Happy Giant'	14	7888	8	17
'Blue Diamond'	20	6515	7	14
'Blue Jewel'	19	24363	24	54
'Blue Moose'	20	12231	12	27
'Evie'	20	9092	9	20
Larisa	16	17925	18	40
'Rebecca'	20	7388	7	16
'Sveta'	19	10436	10	23
'Kawai'	18	14631	15	32



**Figure A1.** Size and shape of haskap berries from the haskap agronomy trial in 2022 near Prince Albert, SK.

**Table A6.** Proportion of plants displaying various growth characteristics by treatment.

Row	Treatment	% Horizontal	% Vertical	% Bushy	% Leggy
1	Black Plastic	26	74	93	7
2	White Plastic	16	84	64	36
3	Red Mulch	26	74	73	27
4	Landscape Fabric	25	75	93	7
5	Control	25	75	55	45
6	2x Granular Fert	35	65	88	12
7	3x Granular Fert	36	64	89	11
8	4x Fertigation	26	74	79	21
9	6x Fertigation	27	73	84	16
10	7x Fertigation	28	72	83	17
11	1 drip 2x	27	73	79	21
12	1 drip 3x	24	76	71	29
13	2 drip 2x	25	75	72	28
14	2 drip 3x	25	75	74	26
15	Tensiometer	29	71	64	36
16	Natural Mulch	25	75	53	47
	Mean	27	73	76	24
	Standard Deviation	4	4	12	12

**Table A7.** Proportion of plants displaying various growth characteristics by cultivar.

Cultivar	% Horizontal	% Vertical	% Bushy	% Leggy	
'Honeybee'	0	100	100	0	
'Tundra'	97	3	20	80	
'Blue Treasure'	3	97	71	29	
'Indigo Treat'	0	100	100	0	
'Indigo Yum'	100	0	72	28	
'Indigo Gem'	91	9	100	0	
'Aurora'	0	100	74	26	
'Boreal Beast'	0	100	93	7	
'Boreal Beauty'	0	100	75	25	
'Boreal Blizzard'	0	100	70	30	
'Blue Banana'	0	100	54	46	
'Happy Giant'	0	100	72	28	
'Blue Diamond'	2	98	59	41	
'Blue Jewel'	0	100	100	0	
'Blue Moose'	6	94	58	42	
'Evie'	18	82	67	33	
Larisa	97	3	98	2	
'Rebecca'	93	7	93	7	
'Sveta'	0	100	77	23	
'Kawai'	5	95	68	32	
	Mean	26	74	76	24
	Standard Deviation	41	41	20	20

**Table A8.** Proportion of plants with flowers present by treatment on a given date.

Row	Treatment	% Plants Flowering			
		May 20	June 1	June 5	June 15
1	Black Plastic	57	42	29	0
2	White Plastic	64	42	27	1
3	Red Mulch	54	36	20	0
4	Landscape Fabric	64	38	19	0
5	Control	56	33	19	0
6	2x Granular Fert	69	40	23	0
7	3x Granular Fert	67	27	26	0
8	4x Fertigation	74	28	0	0
9	6x Fertigation	73	36	0	0
10	7x Fertigation	76	32	0	0
11	1 drip 2x	67	36	3	0
12	1 drip 3x	64	28	1	0
13	2 drip 2x	62	25	1	0
14	2 drip 3x	61	32	0	0
15	Tensiometer	68	22	0	0
16	Natural Mulch	53	49	3	0
	Mean	64	34	11	0
	Standard Deviation	7	7	11	0



#### **14. Abstract/Summary**

The objective of this trial was to determine best management practices for production of Haskap in Saskatchewan, based on mulch covers, fertilizer applications, and irrigation methods. Bird netting provided substantial protection increasing yields by 4X. The most labor-intensive treatment was the mulch control treatment, while the least was the landscape fabric. The landscape fabric also produced a substantially higher berry yield than the other mulch rows. The 3x granular fertilizer applications were likely too harsh for the plants as this treatment experienced the greatest plant mortality (30%).

Results were greatly affected by cultivar. 'Honeybee' had the lowest vigour ratings and the greatest mortality (50% over 4 years) while 'Indigo Gem' and 'Blue Jewel' did not have any losses. Mean plant yields for cultivars were between 196 g/plant and 1697 g/plant; the highest yielding cultivars were 'Boreal Beauty' and 'Boreal Blizzard' (>25 kg), while the lowest yielding was 'Blue Banana' (<5 kg). 'Boreal Beast' and 'Aurora' were high yielders and had high brix values, which may make them more desirable for production. 'Rebecca', 'Tundra', 'Indigo Gem', 'Indigo Yum', and Larisa are predominately prostrate growing, which could make mechanical harvest difficult and not suitable for large scale operations unless they can be pruned in a way to make them grow upright. Future research should investigate pruning methods, flowering windows, harvestability, and harvest timing based on brix values.

60 individuals attended the CLC's Field Day where attendees had the opportunity to tour the orchard. The trial was also toured in 2022 by private industry and the general public when requested. In August 2022, a video was professionally filmed and edited and is to be posted onto the CLC YouTube channel winter 2023. The CLC has a TikTok account and has produced 4 haskap videos with over 4000 views. Results will be presented at the AgriARM update on March 1, 2023 and fact sheets will be created. These results will be of value to share with Haskap Saskatchewan and Saskatchewan Fruit Growers Association. There has also been out of province interest in results.