

2022 Northern Hardy Fruit Evaluation Project Update

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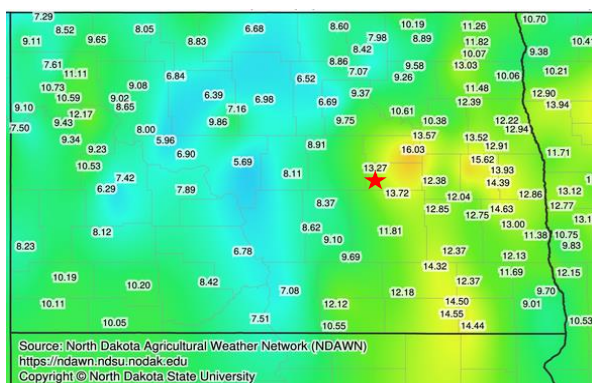
In 2022, the Northern Hardy Fruit Evaluation Project provided educational information to over 900 people with video conference programs, tours, meetings and personal phone calls. Field Day was attended by 55 people who listened to local winemaker Bruce Gussiaas and later visited the winery. In addition to North Dakota, we provided information to people in South Dakota, Iowa, Alaska and Minnesota.

Cooperators: Our 2022 cooperators were Dakota Sun Gardens Winery, Carrington, ND, Karen's Kitchens, Larimore, ND and Berry Dakota, Jamestown, ND. We donate apples to the Carrington Daily Bread food pantry.

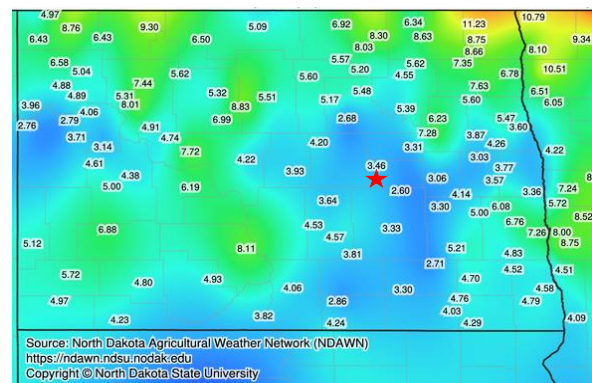
Weather: After several years of drought, significant rain and good snowfall helped to partly correct our local conditions. In fall 2021, we received 8.2" of rain. Snowcover in 2021-22 was good although snow was sparse until December. There was a total of 49" of snow through March. The snowpack almost completely melted by late March into mid-April when most of the haskap and currant shrubs were pruned.

On April 12-14, 2022, an additional 21" of snow set work back in the orchard and fields. We then received 13.3" of rain from April through June, almost six inches above average. The spring temperatures were cool, too, (6.2°F below average) and all plant development was delayed.

There was 2.4" of rain from July 1 to August 15 and only 1.05" of additional rain through the end of October. A blizzard, November 9-11, 2022, just seven months after the last blizzard (!!), gave us about 12" of snow over unfrozen ground, which should slowly melt into the plant root area to provide moisture in spring 2023.



Rainfall 4/1 - 6/30/2022 13.27"



Rainfall 7/1 - 10/31/2022 3.46"

Irrigation: General drip irrigation was not installed this year. Rainfall was plentiful in the spring and the early crops, such as haskaps and Juneberries, were fine without supplemental water. It would have been a good idea to water the currants, hazelnuts and cherries, but it is difficult to get the tubing laid out after the plants are in full leaf. They seemed ok but production will probably be affected in 2023. Aronia was irrigated due to its very late date of ripening. There

was a good crop and the fruit would have dropped if water was not made available. Water application was as follows:

Aronia Irrigation:

Date:	Water Applied:
8/6	550 gal + 18oz 28% Nitrogen = 0.21 oz N/plant
8/12	0.74" Rain
8/15	450 gal
8/21	450 gal
Vacation	
9/2	500 gal (<i>this is 21 gallons per plant</i>)
9/6	500 gal
9/8	Harvest begins



Aronia veraison 8/6/2022

SWD: We apply pesticides with a Jacto A200 airblast sprayer. Pesticides were applied on a 5-, 6- or 7-day schedule in the evening, utilizing NuFilm at 0.125% of total volume. Pesticides in the rotation included malathion, Mustang Maxx, Excirel and Entrust. Control began June 21st. All crops were sprayed pre-harvest and at least once post-harvest until no fresh fruit is left within. SWD larvae were not seen this year. Overall, control was a success in 2022.

Field Day: About 55 people attended the Fruit Project Field Day tour. Our speaker in the field was Bruce Gussiaas of Dakota Sun Gardens Winery, Carrington, North Dakota. People were invited to visit the winery after lunch. Fresh juneberries and cherries were tasted.

Apples: Bloom period was short again this year. Temperatures were about 80°F just before bloom and then May 30-31st, as the flowers would have been opening, a storm delivered 2-inches of rain with temperatures only 60°F both days. May 31st was also quite windy. ‘Zestar!’ bloom was complete by June 3rd and ‘Hazen’ was complete June 5th. The late varieties were nearly complete on June 6th. From June 1-6, temperatures were ideal at 69-74°F.

Apple production was quite good this year despite concerns during the drought last year. The trees were watered as much as we could but it was surely less than ideal. One or two ‘Honeycrisp’ trees have black rot injuries. Branches were removed as necessary this season. The ‘Hazen’ crop was large but not very edible. The fruit dropped easily in the dry weather and many of the fruits were dry, cracked, or had watercore.

One ‘Honeycrisp’ tree has a second fungal infection, *Schizophyllum commune*, and the whole tree will be removed in spring 2023. *S. commune* is a common and aggressive wood decay pathogen in some orchards.

Harvest: ‘Zestar!’(4) – 182lbs, ‘Hazen’(3)– 321lbs, ‘Honeycrisp’(6) – 232lbs, ‘Sweet 16’(4) – 151lbs, ‘Haralred’(4) – 165lbs



***Schizophyllum commune* on ‘Honeycrisp’**

Aronia: The Aronia crop was ‘nice’ this year; not too small and not too big. Rainfall was short in the later months of summer and we began to irrigate the crop on August 6th, at veraison, until the beginning of harvest. Fruit size was good, averaging 0.98 g/berry and ‘Viking’ juice was especially sweet and mild this year. There were more cherry fruit worms in the berries this year than in any year past. This was characterized by the fruit typically being a bit wrinkled or softer and the stem pulling away easily and leaving a large hole in the top of the fruit. The interior of an affected berry is dry and brown. Is this the work of the fruit worm or could it be a fungal problem? We don’t often find a worm nor a worm exit hole in a berry that is brown and dry inside.



Cherry fruit worm in Aronia berry



Cherry fruit worm damage or fungus? Worm in 1st fruit.

Canadian Sour Cherries: The 2022 cherry crop was small. We let Field Day attendees pick what they wanted and CREC cleaned up the rest. There was disease in the fruit this year due to the many days of rain this spring. In the days leading up to Field Day, the manager picked noticeably-bad fruit and discarded it. ‘Romeo,’ again, had very little fruit which ripened about 14 days after ‘Juliet.’ ‘Juliet’ has gummosis in two plants but we are not sure if the causative agent is fungal or bacterial.



‘Romeo’. Very little fruit July 28. Not quite ripe yet.

Black Currants: In 2021, the currants were heavily pruned to remove all the stems with currant borer. The plants regrew and we hoped that the application of SWD pesticides would coincidentally reduce the number of borer moths. This year, early in the season, we implemented lures and sticky cards to notice and identify the borer adults; however, we did not catch ANY! For control of the borer larvae, we applied a weekly spray of *Beauveria* fungus and *Bacillus thuringiensis ssp.kurstaki* and set out *Trichogramma* wasps over 6 weeks. The currants had a nice crop in early summer but the fruit started to fall off the plants around July 2nd.



Currant borer lure and sticky trap

For several years, black currant fruit has fallen off the plants at early stages. We blamed this on both the several years of drought and SWD. Another grower in the area lost all his fruit for two years and he also thought it was due to drought. When the fallen fruit was opened this year, segmented larvae were found in some of them. These were not SWD maggots after all. We believe they are ‘currant fruit flies’ (*Epochra canadensis*) which are not ‘fruit flies’ as you normally think of them (those are in the genus *Drosophila*) but are actual ‘flies’ that appear similar to apple maggot adults. In fact, apple maggot lures are used to bring them to traps and we will try that in 2023.



Grapes: Despite other fruit crops ripening later than average after the cool spring, the grapes were ready earlier than normal, most likely due to the dry conditions in late summer. ‘Valiant’ was picked soon after September 12 and ‘Somerset Seedless’ was quite ripe then, too. Bird depredation was delayed this year and we removed some of the fruit after frost on October 11-12 so that it would not hang all winter. Birds arrive later and finished the job.

In some years past, there has been winter injury to ‘St Croix’, but this year it was completely killed to the ground. ‘Frontenac Gris’ and ‘Bluebell’ also suffered a lot of damage. These plants will be retrained or removed, depending on how they regrew.

Haskaps and Honeyberries: With the good rain this spring, following 2021 irrigation and fall precipitation, haskap fruit was very nice. The crop was late though, with the first Japanese haskap picked on July 7th as compared to 2021, when that date was June 21st.

Fruit data is being collected for newer Canadian and Japanese haskaps. The Canadian cultivars, planted in 2018, ‘Boreal Beauty, B. Beast, B. Blizzard and Aurora’ are selections from the University of Saskatchewan-Saskatoon breeding program. ‘Aurora’ is the most delicious of the group, and really better than any other haskap but it ripens very, very late and unevenly at that. We find the Boreal series difficult to pick due to heavy leaf cover throughout the plant. Of these, ‘Boreal Beauty’ is the nicest with a cling and sweetness that’s just right. The tops of the berries tear while picking ‘Boreal Blizzard’ and the leaves are very thick, making the job harder.

Canadian Variety	2021	2022	Notes
Boreal Blizzard	7/4	7/12	V low acid, v tight cling but tops tear. Hard to pick. No.
Boreal Beauty	7/4-13	7/14	Med-tight cling, even shape, good taste/texture.
Boreal Beast	7/6	7/26	Fruit softer at pick, tight cling, many leaves, hard to pick.
Aurora	+ 7/13	7/21-29	Good, firm fruit, tasty, medium cling. Late to ripen.

Work continues with our Japanese haskaps. In total, we have 83 selections with 58 producing and 25 new selections that are not fruiting yet. Evaluations continue so that we can find several plants that fruit early and cling to the plant while they ripen. Our harvest season is diverse! This year, life cycles were delayed by cool weather and harvest ran from July 7-August 5th. Some of the late berries were interesting but both the plants and fruit were afflicted with powdery mildew. Irrigation may have helped but this fungus is hindered when rainfall washes it off of leaves, and it did not rain. The newest plants will be cut back to encourage good branching next spring; they will not fruit until 2024. These selections will have fruit that ripens early in the season.



Japanese haskap 133-07



Juneberries: Juneberries were renewal pruned and are becoming quite tall. We normally hand-spray fungicides on the plants at bud break but it has become too difficult to reach the tops. The Jacto airblast sprayer will be used exclusively from now on. Since the plants were irrigated in 2021, we conveniently applied imidacloprid to control wooly elm aphids after harvest, through the drip tape. We can't really say whether the plants produced more vigorous new shoots yet, but the size of the crop in 2022 was surprising. Harvest began July 11th with the larger fruits, 'JB30', 'Martin' and 'Thiessen' followed by the smaller 'Honeywood', July 15th and 'Smoky' on July 17th. The harvest period for each type of Juneberry is about

7-10 days, so the earlier varieties finished July 18th and the smaller-berry harvest was complete July 26th. The recorded harvest was 769 pounds. Quite a few berries fell overnight before Field Day, July 19th, due to the wind and then our visitors picked several buckets for themselves. The total production this year was at least 800 pounds, or 10.7 pounds of fruit per plant.

Pears: Most of the pear trees produced fruit this year. 'Schroeder Hardy ND' and 'Ely' continue to produce inedible fruit. During a conversation with a North Dakota pear enthusiast, the person brought up the conundrum of the 'Schroeder Hardy ND' vs 'Vitko' pear. The cuttings were supposedly taken from the same tree, but SHND is supposed to be good while the 'Vitko' is terrible. Our SHND must be 'Vitko' because over 4-5 years of trying to ripen its fruit, none have been good. They seem to taste like rubber or solvent and they spoil from the inside out every time. This year, I thinned the fruit on one tree but not the other. In the picture, you can see how overproduction keeps fruit small. Neither tasted good.





On the other hand, we finally had a good crop of both ‘Nova’ and ‘Patten’ pears this year. ‘Nova’ was picked at light green to light yellow after the stems loosened from their tight connections. Following short or longer storage at 35°F, the fruit became fragrant, sweet and juicy after countertop softening. Some of the larger pears weighed 500 grams. The crop was small but the fruit was as enjoyable as commercial pears.



Pear galette

The ‘Patten’ pears are trickier to pick and ripen. It seems best to pick them at light yellow when they are becoming more ripe because they spoil along the core at all stages from green to yellow when they are set out at room temperature to soften. They are sweet but crispy and are good for baking or fresh eating. They pale in comparison to ‘Nova’ but are quite nice eaten alone or for those who would like a less sweet fruit. ‘Patten’ is the last pear to ripen. On the last day of harvest before freeze, the remaining fruit was still pretty green.



‘Stacey’ pear had fruit in 2021 and 2022 but we have not been able to harvest any of it. The fruit project manager was on vacation the last two weeks of August through Labor Day both years and the fruit turned from green to overripe both times. They seem to ripen in a short time and perhaps ripen evenly. The fruit are round like Asian pears but with a pointed top. One branch of this variety had a canker this spring, revealed by the presence of light green and yellowing leaves that looked dry. It was removed.

PEARS	Trunk Caliper (mm) <i>apx</i>						2020	2021	2022
	2015	2018	2019	2020	2021	2022	Crop west/east	Ready to pick	Ready to pick
Ely	13-19	40	50	59	69	79	yes/no	~9/21	~9/30
Nova	13-19	63	72	96	105	117	yes/no	~9/5	9/30-10/3
Patten	13-19	50	60	72	83	96	yes/no	~9/10	10/1-6
Schroeder Hardy ND	13-19	46	62	68	80	80	yes/yes	~9/6	~9/18
Stacey	13-19	72	80	102	129	150	yes/no	~8/24	~8/26

Hazelnuts: For what seems like the first time, this year, all of the six Johnson hazelnut plants and the single St. Lawrence Nursery Hazelbert plant had nuts. By August 18th, squirrels had been slowly taking clusters off of plant 3 for about two weeks. At this point, the nuts were starting to turn a bit tan but they were not loose in the husk yet. Nevertheless, samples were taken and dried for two days at 100°F with air circulation. Harvest data was not collected because the nuts were not ripe before vacation and they would be gone when work resumed.

	1	2	3	4	5	6	Hazelbert
Nut size	large	small	large	v small	v small	small	large
Crop size	2	5	5	2	2	4	2