

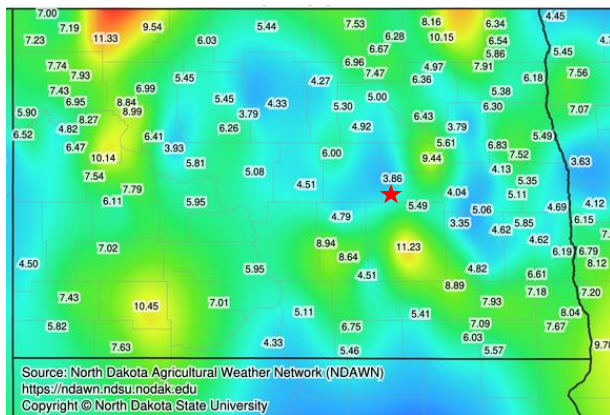
2021 Northern Hardy Fruit Evaluation Project Update

Kathy Wiederholt – Fruit Project Manager

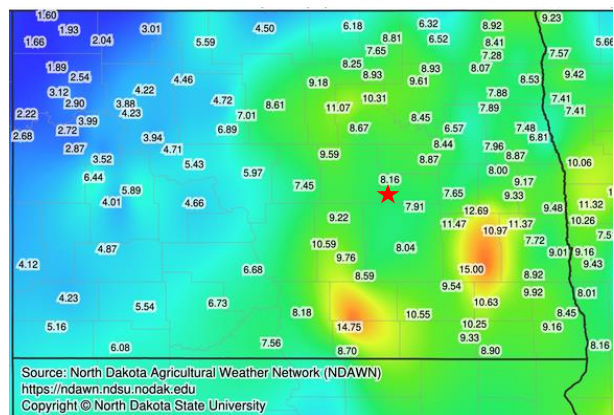
In 2021, the Northern Hardy Fruit Evaluation Project provided distance learning for approximately 900 people through videos and webinars. Our in-person field day was attended by 55 people. We served over 130 people and educators in-state as well as in Nebraska, South Dakota, Minnesota, Montana, Kentucky and Alaska through calls and email.

Cooperators: Our 2021 cooperator was Dakota Sun Gardens Winery, Carrington, ND.

Weather: The drought of 2020 (9.45" rain 4/1-10/31/20), with just over 1-inch of rain from mid-August until the end of October, continued into 2021. This year, from April 1 through August 15th, CREC received 3.86 inches of rain. However, from mid-August through October, we received 8.16 inches of rain; a much-needed reprieve for perennial plants, insects and animals.



Rainfall 4/1 - 8/15/2021 3.86"



Rainfall 8/16 - 10/31/2021 8.16"

Snowfall was slight in 2020-21 with only 25.8 inches recorded. However, wind and lack of soil cover in fields allowed a good amount of snow to blow and settle into the orchard area. The plants had over one foot of insulating snow. There was an extremely cold, two-week stretch in early February with two recordings of -32°F. In general, though, temperatures were over five-degrees warmer for both highs and lows.

Spring was average in temperature but very windy, with 25 days where winds were recorded over 30 miles per hours; this was not good for soil moisture. As summer started, the first half of June was 12 degrees warmer than the average and we recorded 102°F on June 4th.

Irrigation: With the drought known and expected to continue, drip irrigation was installed for all crops this year and watering began June 3rd. We use a 1,200-gallon tank with gravity feed into a 2-inch hose and header and then applied the water through drip-irrigation tubing (8mil, 5/8", 8-inch spacing, 0.67 gpm/100ft). The general plan is to apply 1 gallon of water per foot of row on each side of the row. Liquid fertilizer was applied at either 0.25 or 0.30 oz Nitrogen per plant (older plants got more). The first application was in early June and the second was in the second week of July.

There are two problems with irrigation in the orchard: the inconvenience of using a tank and animal damage. By late July, the squirrels, skunks or foxes have figured out that they can and should chew the irrigation lines to obtain water. Repairs are time-consuming and are made with joining devices or by duct-taping the severed areas. In late 2020 and throughout 2021, water trays, which were refreshed almost daily, were placed around the orchard but did not seem to stop the damage to the tubing.

SWD: We apply pesticides with a Jacto A200 airblast sprayer. Pesticides were applied on a 6- to 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 15th, ten-days earlier than 2021. All crops were sprayed pre-harvest and at least once post-harvest until no fresh fruit is left within or under the crop. In 2021, due to the (continuing) drought, only one SWD larva was found in one Juneberry fruit. It is hoped that the dry conditions and spraying have broken the cycle of so much SWD damage to the crops. In early August, spider mites were found in the red currants, undoubtedly due to the application of pyrethroids and other classes of insecticides which killed spider mite-consuming insects.

Field Day: Our annual orchard tour was conducted in person in 2021. Our guest presenters were Lochy Catron and Andrew Pittz of TrimTab Agriculture, Sioux City, Iowa. They provided small-equipment demonstration and a presentation later in the day. Approximately 55 people attended.

Apples: Each variety of apple bloomed for only 4-6 days this year during a period of 80°F temperatures and very dry, windy conditions. 'Zestar!' blossoms opened May 14th and were almost complete on the 19th. The other varieties opened their flowers May 17-18 and were completed by May 20-21.



Production has been affected by the continuing drought. The 'Zestar!' crop was quite small from trees that are usually reliable bearers. The 'Hazen,' 'Haralred' and 'Honeycrisp' crops were small, too. However, 'Sweet 16' had the largest crop so far and the last tree of the four finally started bearing fruit. In general, the fruit ripened unevenly and did not keep well (except 'Honeycrisp'). 'Hazen' was inedible; it was soft and dry inside. The orchard has had some black rot damage the last 3 years. An infected branch was removed from a 'Hazen' tree in 2019 and from a 'Honeycrisp' in 2020 and 2021. In 2020, despite the dry conditions, 'Zestar!' leaves and fruit were affected by black rot spotting. In early August, watersprouts were removed from all the trees and extra shoots from 'Sweet 16' trees.

Harvest: 'Zestar!'(4) – 31lbs, 'Hazen'(3)– 80lbs, 'Honeycrisp'(6) – 153lbs, 'Sweet 16'(4) – 160lbs, 'Haralred'(4) – 90lbs



Aronia: The Aronia crop was quite large again and we were determined to bring it to maturity. In 2020, the crop slowly disappeared up until harvest when little was left. This year, irrigation began June 6th and continued through August 18th. On August 20th, 1.26" of rain fell with a total of 3.4" of rain prior to the start of harvest, September 8th. Fruit size was average and the berries were sweet. 0.48" of rain fell toward the end of harvest and those berries were larger yet. Typical weight per berry is 0.98 grams, and these last berries weighed an average of 1.1 grams. There were no SWD problems in Aronia this year and any sawflies or lace bugs were killed by preventive sprays to control SWD. For the first time though, there was cedar waxwing damage to the Aronia berries at the end of August, as they were desperate for fruit and water.

Canadian Sour Cherries: With no SWD in 2021, we could let the cherries hang on the plants until full maturity. 'Juliet' was ready July 16th but we also covered two plants to protect from squirrels and left the fruit hang until the 19th, which was Field Day, so that people could taste them. Then the remainders were harvested. 'Romeo' has had a lot less fruit-set and was ready to pick July 26th. However, there was just a handful of fruit left as the squirrels ate most of it while also breaking branches with their efforts. There is a concern with these plants: Gummosis. Two of the 'Juliet' plants have oozing sap and one of the branches is dead. There is one unknown plant (we think it's 'Carmine Jewel') and it also has gummosis.



Black Currants: There was not much fruit to pick this year. Once again, the plants were really infected with currant borer, which weakens the stems. We chose to cut out almost all of the bearing canes and just left new shoots to re-grow. It's hoped that with the drought and the use of SWD pesticides, the incidence will be reduced in 2022. We are not hopeful though; pesticides were sprayed in 2020 and yet the incidence was high this year. The fruit that did develop ripened unevenly or shriveled and fell off the plants very early. Very little usable fruit was harvested. The plants were irrigated, but not as much as if they would have had a full crop.

Grapes: The grape crop was smaller this year with ongoing stress from drought and the early frost in 2020. As an example, only 5 of approximately 10 'Valiant' plants had fruit. The other half had winter damage and were re-growing their cordons or seemed slow and had fruit removed. A lot of fruit was removed in July if plants seemed slow to grow or if fruit set was uneven. (If the plants had both younger and older clusters, the younger clusters were removed.) 'Valiant' grapes were ripe very early, perhaps the earliest ever: September 1st, and other varieties ripened early, as well. 'Somerset Seedless' plants had no hanging fruit and most

were being re-trained. Because of the earlier ripening and lighter crop-load, the grapes were able to take advantage of the good moisture that fell after August 20th and prepare themselves for dormancy much earlier than normal; the first freeze was October 20th.

Haskaps and Honeyberries: Older Canadian and Japanese plants were removed in late April. These plants were not being picked and their presence may have sheltered SWD. The plants being cultivated now include original varieties of Russian honeyberry, some of the 2007 Canadian releases, the Canadian ‘Boreal’ series and Japanese haskaps from propagation years of 2007, 2012, 2017, 2018, 2019 and 2020. Our primary efforts are focused on evaluating the most recent breeder selections of Japanese haskaps.



Juneberries: Juneberries were renewal-pruned for a fifth year and one row was removed; there are now only three rows containing 25 plants each. This was done to make harvest lighter and easier and allow a new row of Haskaps to develop while being able to run the sprayer along both crops.

The Juneberry crop was not as large as in 2020, but was quite nice. We estimated a crop of 400-500 pounds. CREC students participated in the harvest as well as volunteers; 420 pounds of harvested fruit was recorded but some was missed. Picking began earlier than ever, on June 30th, for the larger varieties and finished July 14-15 with the smaller berries, ‘Honeywood’ and ‘Smoky.’ We did not need to net

the plants but we made use of the Bird-x scare device. Irrigation was applied all summer until it rained in mid-August.

Pears: The pear trees did not produce any fruit this year, undoubtedly due to the dry conditions that began on 2020. ‘Schroeder Hardy ND’ and ‘Ely’ bloomed from April 30 to May 11. The other varieties, ‘Nova, Patten and Stacey’ bloomed from May 13-18. They continue to grow vigorously, though.

PEARS	Trunk Caliper (mm) <i>apx</i>					2020	2021
	2015	2018	2019	2020	2021	Crop west/east	Ready to pick
Ayers	13-19	48	x	x	x	x	x
Ely	13-19	40	50	59	69	yes/no	~9/21
Nova	13-19	63	72	96	105	yes/no	~9/5
Patten	13-19	50	60	72	83	yes/no	~9/10
Schroeder Hardy ND	13-19	46	62	68	80	yes/yes	~9/6
Stacey	13-19	72	80	102	129	yes/no	~8/24



Hazelnuts: There was some winter injury to the Johnson hazelnuts this past year. Plant 1 should actually be removed since it does not harden off in time and always has winter injury. There was also injury to plants 2, 6 and the St. Lawrence Nursery Hazelbert shrub. Plants 3, 4 and 5 seemed fine. These three plants had nice crops, with the most on plant number 3 which has been fruiting the longest. Squirrels chewed right through my hot pepper spray efforts and the nuts were gone by August 7th.



Poor hazelnut leaf color in 2021 from drought. *Plants are numbered from R to L in this view*

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Carrington REC, 2021

