Northern-Hardy Fruit Evaluation Project: Drought Returns, SWD Persists

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In 2020, the Northern-Hardy Fruit Evaluation Project provided distance learning for approximately 950 people through videos and video conference programs. We served over 100 people and educators in-state as well as from Iowa, Michigan, Minnesota, Montana and Tennessee through calls and email. Current research is concentrating on selecting better haskap cultivars for North Dakota's growing conditions through collaboration with the only North American breeder of Japanese haskaps.

In fall 2019, we received 13.1" of rain which included a deluge of 3.6" of rain September 20-21. A blizzard, October 10-12, dropped 20" of snow which melted over the next weeks when temperatures returned to normal. The CREC orchard went into winter 2019-20 with an abundance of moisture. On November 11, the temperature plunged and for three days, lows were 0 to -4.5^{o}F. Red currant and some apple production were affected.

Winter high temperatures were about normal, but low temperatures were 2.5 degrees warmer. Typical snowfall began in November and was enough to blanket the orchard plants. Spring high temperatures were over 5^{o}F cooler than average, leading to later blossoming and delayed development of most orchard fruit for a second year in a row. Rainfall was extremely short this year. Irrigation efforts began in June and continued through October. At 9.4", the April through October rainfall left us 7.6" below average and in "severe drought" conditions.

Spotted wing Drosophila (SWD) fruit flies were detected June 25 in fallen haskap fruit. Our spray program began on June 29 and continued weekly until early August. Infestation of haskap, Juneberry and early cherry was reduced but not completely eliminated. Black currants were heavily affected. The spray program will begin earlier in 2021.

Notable events in the fruit orchard:

- Fruit harvests were limited to reduce exposure of staff to the novel coronavirus.
- Data was collected for 21 new Japanese haskap plants. Older plants were pruned by one-third and were not netted or harvested.
- ‘Juliet’ cherry was harvested July 13 in good condition. Evans cherry was almost ripe July 30 but was a complete loss to SWD. ‘Romeo’ and our single unnamed plant lost most of their few fruits to birds and SWD affected these varieties.
- Juneberry fruit was ready for harvest July 6. The crop was heavy despite removal of older branches by spring pruning. Volunteers and students harvested the crop until SWD and desiccation of ‘Smoky’ fruit caused us to discard the last of the fruit.
- Two of three red currant varieties did not have a crop in 2020 due to the sudden cold temperatures in November 2019.
- Black currant fruit was again affected by SWD ovipositioning. The egg does not seem to be able to develop into larvae, but the loss of skin integrity causes the berry to shrivel and fall.
- ‘Zestar!’ and ‘Sweet 16’ apple had very small crops while ‘Honeycrisp’ apples were abundant. The November 2019 freeze is the suspected cause.
- The aronia crop faded as drought conditions persisted. A large crop in spring was reduced to a small harvest in fall despite irrigation.

Haskap flowering.

Northern Hardy Fruit Project - Yearly Production Records										
		No. of plants	2017		2018		2019		2020	
			Date	pounds	Date	pounds	Date	pounds	Date	pounds
Apples	Haralred	4	5-Oct	x	3-Oct	x	9-Oct	181.0	13-Oct	83.7
	Hazen	3	31-Aug	x	28-Aug	262.0	18-Sep	218.4	10-Sep	200.3
	Sweet Sixteen	4	3-Oct	x	3-Oct	119.1	9-Oct	157.0	13-Oct	14.8
	Honey Crisp	6	28-Sep	x	28-Sep	431.3	9-Oct	209.5	12-Oct	418.0
	Zestar	4	9-Jan	x	28-Aug	146.0	18-Sep	199.9	11-Sep	24.0
*** All apples are thinned to apx.*						**958.4**		**965.7**		**740.8**
one fruit per cluster.			*Weight not recorded*		*HR- not recorded*		*Forced harvest. Snow10/10*			
Aronia	Nero	4	12-Sep	12.6	10-Sep	105.8	17-Sep	19.4	19-Sep	26.3
	Raintree Seedling	4	x	x	12-Sep	70.3	18-Sep	11.8	10-Sep	15.1
	Raintree Select	4	13-Sep	7.4	31-Aug	94.2	13-Sep	23.0	11-Sep	14.4
	Viking	4	12-Sep	4.5	22-Aug	105.7	16-Sep	27.8	14-Sep	NA
	McKenzie	4	11-Sep	5.1	28-Aug	78.0	16-Sep	37.0	14-Sep	NA
	Galicjanka	4	5-Sep	1.0	27-Aug	29.0	13-Sep	23.9	12-Sep	4.3
				30.6		**483.0**		**142.9**		**(60.1)**
			Crop aborted		*Overcropped*		*Hail, SWD loss*		*Drought, fruit dropped*	
									NA= samples removed	
Hardy Cherries	SK Romeo	3					31-Jul	11.5	26-Jul	*Birds*
	SK Not Romeo	1					19-Jul	8.2	21-Jul	*Birds*
	SK Juliet	5					17-Jul	46.2	13-Jul	41.0
								65.9		**41.0**
							SWD loss			
	Evans / Bali	2	8/1-2	x	7/20	x	30-Jul	**53.5**	30-Jul	*SWD loss*
			SWD infested (all)		*SWD infested (all)*		*Heavy pruning + SWD loss*		*Still SWD loss in all*	
Black Currant	*Blackcomb*	15	31-Jul	67.2	7-Aug	60.9	14-Aug	61.7	13-Aug	48.2
New	*Cheakamus*	15	28-Jul	79.7	31-Jul	79.8	7-Aug	63.9	5-Aug	19.2
Variety Trial	*Stikine*	15	26-Jul	115.4	7/18-24	52.2	7/31-8/5	58.1	8-5	12.4
	Tahsis	15	26-Jul	77.6	26-Jul	83.5	7/31-8/6	76.9	30-Jul	47.6
	Tiben	15	8-Aug	88.0	6-Aug	82.2	16-Aug	79.2	14-Aug	64.0
	Tofino	14	1-Aug	45.9	8-Aug	14.3	*Removed*	*Removed*	*Removed*	*Removed*
	Nechako - 2 ft space	7	11-Aug	21.5	9-Aug	12.7	20-Aug	14.4	13-Aug	6.8
	Nechako - 3 ft space	7	11-Aug	26.6	9-Aug	18.6	20-Aug	25.4	13-Aug	9.4
				521.9		**404.2**		**379.6**		**207.6**
			some SWD		*Borer prune, some SWD*		*Pruning Spring +Summer*		*SWD, summer pruning*	
Black Currant	Ben Lomand	4	x	x	25-Jul	4.9	30-Jul	7.2	27-Jul	3.4
	Blackcomb	4	x	x	1-Aug	17.6	15-Aug	38.3	12-Aug	19.8
	Champion	4	x	x	25-Jul	11.5	30-Jul	9.6	30-Jul	6.4
	Minaj Smyriou	4	x	x	18-Jul	5.5	x	*SWD loss*	27-Jul	6.6
				0.0		**39.5**		**55.1**		**36.2**
Japanese	20-04	3	7-Jul	12.8	26-Jun	3.2	*Fruit fell early*	x	*did not pick*	x
Haskap	21-20	3	12-Jul	4.3	2-Jul	5.9	12-Jul	NA	*did not pick*	x
2012	22-14	3	7-Jul	8.2	28-Jun	6.5	10-Jul	4.8	*did not pick*	x
	22-26	3	7-Jul	12.0	26-Jun	8.9	12-Jul	NA	*did not pick*	x
	41-75	3	4-Jul	15.7	27-Jun	15.8	8-Jul	10.3	*did not pick*	x
	44-19	3	12-Jul	9.4	2-Jul	7.1	12-Jul	NA	*did not pick*	x
	57-49	3	11-Jul	13.0	2-Jul	10.1	10-Jul	21.8	*did not pick*	x
	88-92	3	4-Jul	6.3	27-Jun	6.2	8-Jul	5.8	*did not pick*	x
	88-102	2	4-Jul	5.8	26-Jun	4.7	5-Jul	12.9	*did not pick*	x
	108-23	3	6-Jul	17.0	26-Jun	8.9	5-Jul	18.0	*did not pick*	x
	131-08	3	12-Jul	10.8	5-Jul	8.7	12-Jul	NA	*did not pick*	x
	142-30	3	10-Jul	6.8	28-Jun	5.7	10-Jul	9.5	*did not pick*	x
	78-89	2	7-Jul	0.8	5-Jul	3.5	10-Jul	4.7	*did not pick*	x
				122.9		**95.2**		**(87.8)**	*Covid +*	
			Excellent Bbee popl.				*NA= qwk pick bc of SWD*		*Heavy prune; left to birds*	

Haskap/honeyberry.

Weather Summary

Monthly Temperatures (°F) and Normals

	Max Temp				Min Temp				Monthly Avg. Temp			
Month	2020	Norm*	2019	2018	2020	Norm*	2019	2018	2020	Norm*	2019	2018
Apr	48	55	51	44	26	31	31	23	37	37	41	33
May	63	68	63	75	41	43	38	46	52	54	50	61
June	81	76	77	79	55	53	53	57	68	63	65	68
July	81	82	80	81	60	58	58	56	71	65	69	68
Aug	79	81	75	81	56	55	53	52	67	65	64	67
Sept	70	71	68	67	44	45	48	42	57	58	58	55
Avgs:	70	72	69	71	47	47	47	48	59	57	58	59

*Normals = 1981-2010 averages

Monthly Precipitation (in) and Normals

	2020 Monthly Precipitation*				
Month	NDAWN	NOAA	Normal[1]	2019	2018
Apr	0.45	0.95	1.17	0.92	0.06
May	1.18	1.48	2.76	1.46	1.28
June	1.23	0.71	3.77	3.00	4.63
July	5.00	5.97	3.39	3.64	2.65
Aug	1.06	1.23	2.31	3.08	0.24
Sept	0.13	0.17	1.91	8.26	0.75
Totals:	9.04	10.51	15.31	20.36	9.61

[1] Normals = 1981-2010 averages * NDAWN and NOAA are two different weather stations at the CREC.

Monthly Growing Degree Days and Normals

	Wheat GDD				Sunflower GDD				Corn GDD			
Month	2020	Norm*	2019	2018	2020	Norm*	2019	2018	2020	Norm*	2019	2018
Apr	274	357	308	225	---	---	---	---	---	---	---	---
May	641	736	593	872	333	386	303	575	222	282	202	431
June	1081	982	986	1085	721	626	630	725	536	448	458	544
July	1193	1182	1141	1130	821	810	769	758	625	624	585	573
Aug	1097	1119	980	1070	725	747	610	704	539	561	444	515
Sept	762	775	788	685	434	437	441	383	312	320	298	273
Totals	5048	5155	4796	5026	3034	3006	2753	2914	2234	2235	1987	2336

*Normals = 1981-2010 averages

Growing season GDD Totals, Normals, and Killing Frost Dates

Year	Frost Date	Corn Temp (°F)	Total GDD	Frost Date	Sunflower Temp (°F)	Total GDD
2018	Sept 28	27	2336	Sept 28	27	3142
2019	*Oct 2	32	1987	**Oct 10	29	2637
2020	*Sept 8	29	2002	**Sept 9	27	2496
*Normal Corn GDD for date =			2020	**Normal Sunflower GDD for date =		2513
Total corn GDD = May 1 to frost date				Total sunflower GDD = May 20 to frost date		

Normals=1981-2010 averages Source: NDAWN