2020

Montana Statewide Spring Canola Variety Trial

MONTANA
STATE UNIVERSITY
College of
AGRICULTURE
&
MONTANA AGRICULTURAL
EXPERIMENT STATION

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Montana Statewide Spring Canola Variety Trial 2020

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INTRODUCTION

Montana has become a consistent leader in canola production nationwide, second only to North Dakota. The growing interest in canola among Montana farmers creates a need for hybrid performance assessments in areas of the state traditionally dominated by wheat. Performance of 22 canola hybrids was evaluated at six locations in Montana (Corvallis, Havre, Huntley, Kalispell, Moccasin, and Sidney) under both dryland and irrigated conditions.

OBJECTIVES

The objective of the Montana Statewide Spring Canola Variety Trial is to evaluate the agronomic performance of available canola hybrids and breeding lines submitted by commercial entities at research locations across the state. The information obtained from these trials is intended to provide canola growers in Montana with reliable, unbiased information regarding which canola hybrids are best suited to their specific production environment.

METHODS

In spring 2020, 22 canola varieties (*Brassica napus*) with six herbicide tolerance systems (including one cultivar with no herbicide tolerance) were submitted by eight sponsors (Table 1). The seed was distributed to six Montana State University agricultural research centers (Figure 1a): Central Ag near Moccasin (CARC), Eastern Ag near Sidney (EARC), Northern Ag near Havre (NARC), Northwestern Ag near Kalispell (NWARC), Southern Ag near Huntley (SARC), and Western Ag near Corvallis (WARC). Different combinations of hybrids were tested at each location. However, 16 cultivars were established at every location.

Plots were seeded at 14 PLS/ft^2, with a goal of 12 established plants/ft^2. Seed was treated prior to seeding with Lumiderm® or Helix XTra® for control of flea beetle. Select varieties were also treated with Prosper® Evergol®. Varieties were grown in small plots ranging from 70 to 100 ft^2 and were replicated four times in a randomized complete block design, with the exception of the trial located at SARC. This location employed an alpha-lattice design. Hybrids were compared for plant density (COUNT), canopy height (CNPY HT), flowering date (FLWR DATE), lodging (LDGE), shattering (SHTTR), grain yield (YIELD), test weight (TEST WT), and oil content (OIL). Lodging and shatter were ranked on a 0 to 9 scale, where 0 indicates no lodging or shattering. Grain yield was adjusted to 8.5% moisture. Seeding and harvest dates, fertilizer and pesticide applications, row spacing, tillage systems, and field crop histories were recorded for each location. (Table 2). Meteorological and soils data were also recorded (Table 3).

INTERPRETING RESULTS

Performance data are presented by location in Tables 4-10. The Least Significant Difference (LSD) values are presented for making pairwise comparisons between treatment means (varieties). If the difference between two treatment values within a column exceeds the LSD value, the entries are considered statistically different from one another for that particular response variable. If the difference does not exceed the LSD value, the entries are considered statistically equivalent. The LSD value is replaced with 'NS' for 'non-significant' when the coefficient of variation (CV) value exceeds 15% (YIELD only) and/or the probability value (*P*-Value) exceeds 0.05. A *P*-Value of 0.05 indicates that 19 times out of 20, a difference would be detected among treatment means if the study was repeated. A *P*-Value of 0.001 probability indicates that 999 times out of 1000, a difference would be detected among treatment means if the study was repeated. Within columns where *P*-Values are less than 0.05 and LSDs are not equal to 'NS', the

value of the 'top performer' is ***bolded and italicized***. The variety or varieties with the highest plant denisty, canopy height, yield, test weight, and oil and the lowest Julian flowering date, lodging, and shatter scores are considered top performers. If the difference between the value of the top performer(s) and that of given variety within the same column does not exceed the LSD, then the latter is **bolded**, indicating statistical equivalence to the top performer. That is, a **bolded** yield value, for example, is equivalent to a ***bolded and italicized*** yield value, despite being arithmetically lower.

Note that all hybrids at a given location were established in the same trial and weeds were managed uniformly across herbicide tolerance systems. In other words, imidazolinone herbicides were not used for in-crop weed control in plots containing Clearfield® hybrids; nor glufosinates for in-crop weed control on Liberty Link® hybrids; nor glyphosate on Roundup Ready® hybrids. Rather, glyphosate was applied for weed control either pre-plant or pre-emergence, depending on the location (Table 2) and weeds were controlled during the growing season by means of hand-weeding and/or alternative chemicals, not by means of herbicides paired to tolerance systems represented in the trial.

RESULTS & DISCUSSION

The following results are for informational purposes only. The presentation of data for the hybrids evaluated does not imply approval or endorsement by Montana State University.

Just 16 of the 22 cultivars included in the trials were tested at all six locations (Table 1). Only these 16 cultivars are considered in comparisons discussed in the next paragraph.

InVigor L345PC, DKTF91SC, and DKTFLL21SC were among the top performers for establishment in 4 out of 5 trials where differences were detected. NCC101S was among the top performers for flowering date in 5 out of 5 trials where differences were detected. DG 761TM was among the top performers for canopy height in 3 out of the 5 trials where differences were detected. InVigor LR344PC, CP930RR, and CP9919RR were among the top performers for lodging in just 1 of 2 trials where differences were detected (all others were top-performers in both trials). DKTFLL21SC, NCC101S, and CP9919RR were among the top performers for shattering at Huntley, the only site where shattering differences were detected. CP930RR was among the top performers for yield at 3 of 4 locations and for oil content at 5 of 6 locations where differences were detected. Finally, DG 760TM, DG 761TM, and NCC101S were among the top performers for test weight at 4 of 5 locations where differences were detected.

No shattering or lodging was observed at Havre, Kalispell, or Moccasin. Grasshopper pests and soil variability contributed to unfavorably high yield CV% values at Huntley and Corvallis, respectively. Deer and bird pests were reported at Kalispell, though performance impacts were minimal.

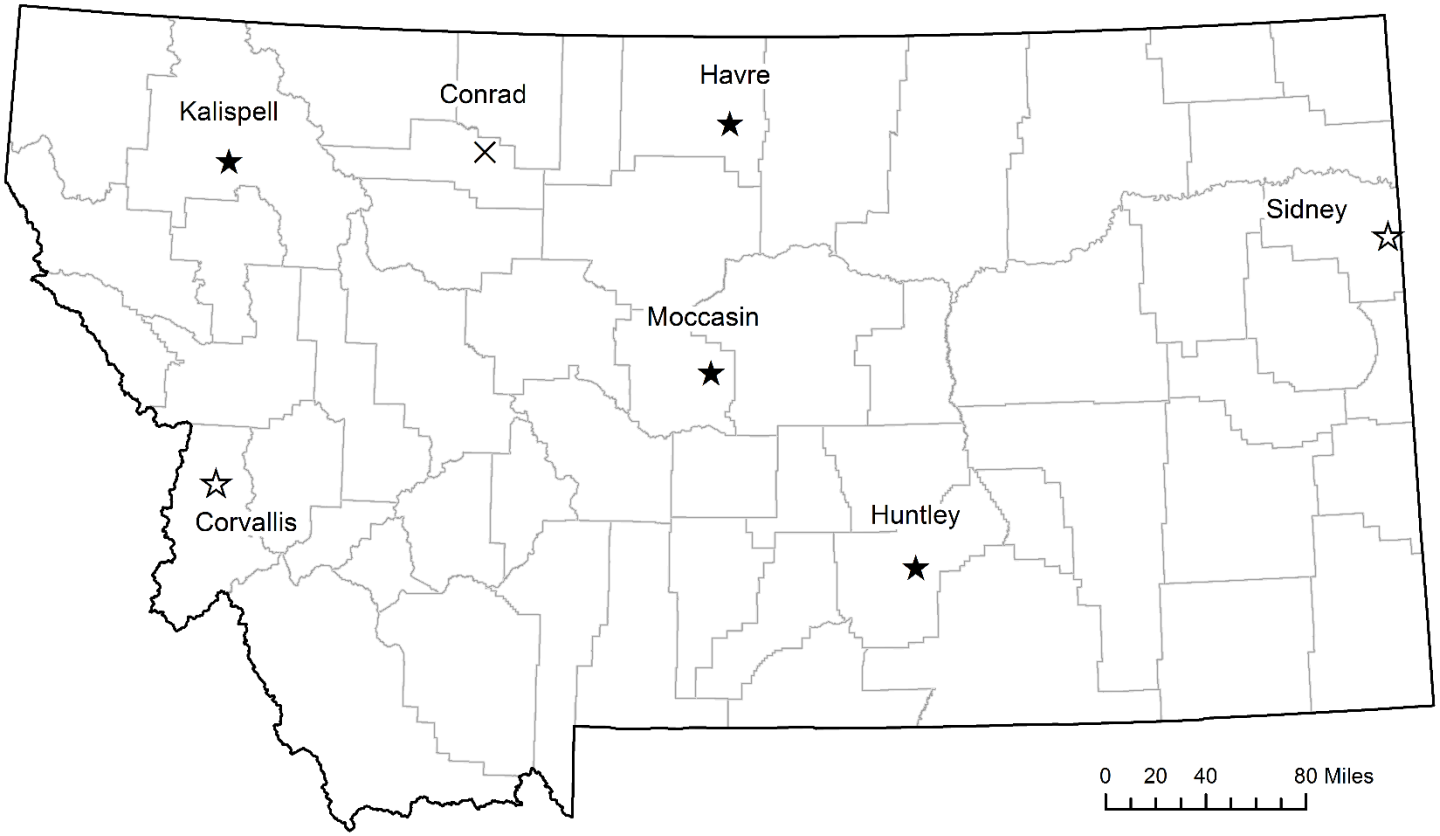
Yield data are summarized for all locations in Table 4. Cultivar performance at each location is summarized in Tables 5-10.

FUTURE PLANS

With continued support from the canola industry and research center personnel, multi-location canola evaluations will continue in 2021.

TRIAL LOCATIONS

Figure 1. Spring canola variety testing locations in 2020. Trials were established in irrigated (open symbols) and dryland (closed symbols) systems. The testing site in Conrad was abandoned in 2020 (x) due to personnel constraints. [TOC]



CULTIVAR LIST

Table 1. 2020 cultivar list grouped by source, with herbicide tolerance, genetic modification status, shatter/disease resistance status, and testing locations. [TOC]

SOURCE	CULTIVAR	HERB TOL	GM STATUS	SHTTR	BLACK-LEG	CLUB-ROOT	2020 TESTING LOCATIONS
BASF Corporation	InVigor LR344PC	LL	GM	Y	R	R	All
	InVigor L233P	LL	GM	Y	R		All
	InVigor L345PC	LL	GM	Y	R	R	All
BrettYoung Seeds	BY 6204TF	TruFlex RR	GM	N	R	R	All
	BY19-6284CL	CL	Non-GM	N	R	R	All
Bayer Crop Science (DEKALB)	DKTF91SC	TruFlex RR	GM	Y	R		All
	DKTF92SC	TruFlex RR	GM	Y	R		All
	DKTFLL21SC	TruFlex RR/LL	GM	Y	R		All
Dyna-Gro Seed	DG 200CL	CL	Non-GM	N	R		All
	DG 760TM	TruFlex RR	GM	Y	R		All
	DG 761TM	TruFlex RR	GM	Y	R		All
Meridian Seeds, LLC	CS2100	RR	GM	Y	R		Moccasin, Havre, Kalispell
	CS2300	RR	GM	N	R		Moccasin, Havre, Kalispell
	CS2500CL	CL	Non-GM	N	R		Moccasin, Havre, Kalispell
	CS2600CR-T	TruFlex RR	GM	Y	R	R	Moccasin, Havre, Kalispell
Photosyntech	NCC101S	None	Non-GM	Y	MR		All
Star Specialty Seed	Star 402	RR	GM	Y	R		Sidney, Havre
	StarFlex	TruFlex RR	GM	Y	R		Sidney, Havre
CROPLAN by WinField United	CP930RR	RR	GM	Y	R		All
	CP955RR	RR	GM	Y	R	R	All
	CP9919RR	RR	GM	Y	R		All
	CP9978TF	TruFlex RR	GM	Y	R	R	All

LL = Liberty Link; RR = Roundup Ready; CL = Clearfield; R= Resistance; MR=Moderate Resistance

MULTI- LOCATION SUMMARIES

Management Information

Table 2. 2020 spring canola variety trial management information by location. [TOC]

MANAGMENT	MOCCASIN (CARC)	SIDNEY (EARC)	HAVRE (NARC)	KALISPELL (NWARC)	HUNTLEY (SARC)	CORVALLIS (WARC)
Irrigation (inches)	none	5.81 inch	none	none	none	3.15
Tillage	no-till	conventional	no-till	conventional	minimum-till	conventional
Row Spacing (inches)	12	10	12	6	7	6
Seeding Date	4/29/2020	4/22/2020	4/24/2020	4/28/2020	4/27/2020	4/27/2020
Harvest Date	8/12/2020	8/6/2020	8/4/2020	9/11/2020		9/2/2020
Harvest Type	direct cut	direct cut	direct cut	direct cut	direct cut	direct cut
Previous Crop	spring wheat	sugarbeet	spring wheat	barley	chem fallow	chickpea
Fertilizer	50 lb/ac 20-30-20-20	60 lb N/ac and 30 lb P2O5/ac blend applied before planting	none	94-20-35-10	none	96 lbs/ac of urea
Pesticide	RT3, 32 oz/ac, pre-emerge; Grizzly Too, 2 floz/ac, senescence	Sonalan @ 2.5 pints/ac applied on 4/9/2020 , Sevin @ 16 oz/ac on 5/21/2020, Mustang Maxx sprayed @ 4 oz/ac on 5/27/2020 and 6/11/2020	RT3, 32 oz/ac, preplant, 4/20/20 Mustang Maxx, 4 oz/ac, 4 leaf stage, 6/1/20	Lambda CY-AG (6/25)	none	none
Pests	late season flea beetle (controlled)	flea beetles	early season flea-beetle (controlled)	flea beetles, birds, deer	grasshoppers	none

Meteorological and Soils Information

Table 3. 2020 soil and meteorological data by location. [TOC]

METEOROLOGICAL & SOILS	MOCCASIN (CARC)	SIDNEY (EARC)	HAVRE (NARC)	KALISPELL (NWARC)	HUNTLEY (SARC)	CORVALLIS (WARC)
2020 Apr thru Aug Precip (inches)	8.6	5.12	5.59	12	-	7.29
Long-Term Average Precip & Period of Record (inches)	10.2 (1911-2020)	9.53 (1949-2020)	7.97 (1915-2020)	9.9 (1981-2020)	-	5.4 (1990-2020)
Last Killing Frost in Spring (≤ 32°F)	5/15/2020	-	5/12/2020	5/10/2020	-	4/5/2020
First Killing Frost in Fall (≤ 32°F)	9/7/2020	-	10/1/2020	9/8/2020	-	9/8/2020
Frost-free Period (days)	115	119	142	121	-	154
2-wk Avg. Air Temperature Beginning at First Flowering (°F)	57.4	-	60.9		-	60.9
Max Summer Temperature (°F)	98	-	99.4	97	-	96.5
Date of Max Summer Temperature	9/5/2020	-	8/4/2020	8/1/2020	-	8/17/2020 & 8/2/2020
Soil Type	Danvers and Judith clay loams	Savage Silty Clay Loam	Telstad Clay Loam	Creston silt loam	Fort Collins Clay Loam	Burnt Fork Loam
Elevation (feet)	4,250	1,949	2668	3,000	3,000	3,481
Note(s)	-	-	-	Significant predation by birds prior to harvest	wind, shatter, and pest-related yield loss observed	-

Yield Summary

Table 4. 2020 yield summary by location. [TOC]

CULTIVAR	SOURCE	DRYLAND YIELD				IRRIGATED YIELD	
		MOCCASIN	HAVRE	HUNTLEY	KALISPELL	CORVALLIS	SIDNEY
		----------(bu/ac)----------					
InVigor LR344PC	BASF Corporation	**29.9**	74.6	13.1	**62.7**	37.4	49.3
InVigor L233P	BASF Corporation	27.4	***82.2***	13.9	**67**	34	48.5
InVigor L345PC	BASF Corporation	27.1	76.1	14.4	***70.8***	37.2	47.8
BY 6204TF	BrettYoung Seeds	25.3	70.8	16.6	60.8	35	45.6
BY19-6284CL	BrettYoung Seeds	25.9	72	6.1	50.6	31.5	41.1
DKTF91SC	Bayer Crop Science (DEKALB)	27.4	70.9	14.3	60.8	32.6	50.9
DKTF96SC	Bayer Crop Science (DEKALB)	25.6	65.8	5.7	**66.9**	35.5	46.9
DKTFLL21SC	Bayer Crop Science (DEKALB)	25.8	68.2	12.3	61.4	39	***58.3***
DG 200CL	Dyna-Gro Seed	24.8	68.5	12.5	**61.8**	32.4	45.7
DG 760TM	Dyna-Gro Seed	27.6	76.1	16.5	**63.4**	31.9	**57.4**
DG 761TM	Dyna-Gro Seed	23.9	72.4	16.3	59.3	31.3	47.1
CS2100	Meridian Seeds, LLC	24.7	70.1	-	55.9	-	-
CS2300	Meridian Seeds, LLC	25	64.8	-	48.6	-	-
CS2500CL	Meridian Seeds, LLC	25.5	69.6	-	58.9	-	-
CS2600CR-T	Meridian Seeds, LLC	28.2	73.8	-	58.5	-	-
NCC101S	Photosyntech	***32.4***	**77.6**	9.4	57.5	39	47.8
Star 402	Star Specialty Seed	-	**76.7**	-	-	-	**57.9**
StarFlex	Star Specialty Seed	-	67	-	-	-	47.5
CP930RR	CROPLAN by WinField United	**30**	76.1	8.9	**62**	37.4	**52.2**
CP955RR	CROPLAN by WinField United	**30.4**	75.8	11.8	57	36	**53.6**
CP9919RR	CROPLAN by WinField United	27	61.6	5.8	50.7	26.7	42.3
CP9978TF	CROPLAN by WinField United	24.9	67.1	5.6	58.2	35.4	48.3
Mean		26.9	71.7	11.4	59.6	34.5	49.4
CV%		10.7	5.7	32.9	11	19.9	9.2
LSD		4.1	5.8	NS	9.3	NS	6.5
P-Value		0.004	<0.001	<0.001	0.001	0.529	<0.001

Bold/italic = top-performing cultivar; **Bold only** = statistically equivalent to top-performer; Fisher's protected LSD not significant when CV% > 15 (YIELD only) and/or P-Value > 0.05

INDIVIDUAL LOCATION SUMMARIES

Central Ag Research Center, Moccasin, MT

Table 5. 2020 Spring canola variety trial, CARC, Moccasin, MT. [TOC]

CULTIVAR	SOURCE	COUNT (sqft)	FLWR DATE (julian)	CNPY HT (in)	LDGE (0-9)	SHTTR (0-9)	YIELD (bu/ac)	TEST WT (lb/bu)	OIL (%)
InVigor LR344PC	BASF Corporation	10.1	178.2	46	0	0	**29.9**	**52.6**	50.8
InVigor L233P	BASF Corporation	10.5	178	45.9	0	0	27.4	**52.6**	50.5
InVigor L345PC	BASF Corporation	**12.9**	178.5	***48***	0	0	27.1	**52.5**	50.2
BY 6204TF	BrettYoung Seeds	6.8	178.8	39.6	0	0	25.3	51.8	47.4
BY19-6284CL	BrettYoung Seeds	7.9	178.8	**46.6**	0	0	25.9	**52.5**	51.5
DKTF91SC	Bayer Crop Science (DEKALB)	**12.1**	177	41	0	0	27.4	51.7	51.1
DKTF96SC	Bayer Crop Science (DEKALB)	**11.7**	177.2	39.5	0	0	25.6	***52.7***	49.4
DKTFLL21SC	Bayer Crop Science (DEKALB)	***14.4***	176.5	39	0	0	25.8	50.8	50.5
DG 200CL	Dyna-Gro Seed	**11.5**	179	44.9	0	0	24.8	**52.1**	49.2
DG 760TM	Dyna-Gro Seed	10.6	177	43.5	0	0	27.6	**52.2**	49.9
DG 761TM	Dyna-Gro Seed	**12.8**	178.8	44.2	0	0	23.9	**51.9**	48.9
CS2100	Meridian Seeds, LLC	8.7	177.2	42.5	0	0	24.7	51.2	49.1
CS2300	Meridian Seeds, LLC	9.7	179	**47.6**	0	0	25	51.4	51.9
CS2500CL	Meridian Seeds, LLC	11	178	44.4	0	0	25.5	**52.4**	51.9
CS2600CR-T	Meridian Seeds, LLC	**13.2**	177	42.1	0	0	28.2	**51.9**	51
NCC101S	Photosyntech	9	***173***	40.3	0	0	***32.4***	**52.3**	49.7
CP930RR	CROPLAN by WinField United	10.8	175	40	0	0	**30**	50.9	***53.3***
CP955RR	CROPLAN by WinField United	8.8	175.8	40.8	0	0	**30.4**	**52**	51.4
CP9919RR	CROPLAN by WinField United	8	174.8	38.8	0	0	27	51.2	51.4
CP9978TF	CROPLAN by WinField United	8.2	176.2	42.5	0	0	24.9	51.3	48.7
Mean		10.4	177.2	42.9	0	0	26.9	51.9	50.4
CV%		20.5	0.3	3.2			10.7	1.2	1.6
LSD		3	0.7	1.9			4.1	0.9	1.2
P-Value		<0.001	<0.001	<0.001			0.004	<0.001	<0.001

Bold/italic = top-performing cultivar; **Bold only** = statistically equivalent to top-performer; Fisher's protected LSD not significant when CV% > 15 (YIELD only) and/or P-Value > 0.05

Eastern Ag Research Center, Sidney, MT

Table 6. 2020 Spring canola variety trial, EARC, Sidney, MT. [TOC]

CULTIVAR	SOURCE	COUNT (sqft)	FLWR DATE (julian)	CNPY HT (in)	LDGE (0-9)	SHTTR (0-9)	YIELD (bu/ac)	TEST WT (lb/bu)	OIL (%)
InVigor LR344PC	BASF Corporation	8.7	167.2	**52.9**	6.3	0	49.3	50.7	46.3
InVigor L233P	BASF Corporation	6.8	167	50.1	**0.6**	0	48.5	**51.5**	50
InVigor L345PC	BASF Corporation	**10.2**	167	50.2	**0.6**	0	47.8	**51.3**	48.5
BY 6204TF	BrettYoung Seeds	6.8	167.5	**52.1**	**0.7**	0	45.6	**52.2**	48.9
BY19-6284CL	BrettYoung Seeds	6.8	168.2	51	**1.4**	0	41.1	50.1	49.2
DKTF91SC	Bayer Crop Science (DEKALB)	***11.3***	163	46.1	**0.5**	0	50.9	50.9	50.5
DKTF96SC	Bayer Crop Science (DEKALB)	8.1	167	48.4	***0.3***	0	46.9	**52**	49.8
DKTFLL21SC	Bayer Crop Science (DEKALB)	**9**	163.2	47	**0.5**	0	***58.3***	**51.5**	49.2
DG 200CL	Dyna-Gro Seed	8.7	153.5	***54.5***	**1**	0	45.7	50.9	49.1
DG 760TM	Dyna-Gro Seed	8.3	162.8	49.9	**0.8**	0	**57.4**	**51.8**	50.1
DG 761TM	Dyna-Gro Seed	8.5	166.5	**54.4**	**1.1**	0	47.1	**52**	50.5
NCC101S	Photosyntech	8.6	161	43	**0.9**	0	47.8	**51.5**	46
Star 402	Star Specialty Seed	8.4	165.2	49.2	**0.5**	0	**57.9**	**51.3**	***52.5***
StarFlex	Star Specialty Seed	8.2	167.2	50.2	**1**	0	47.5	**51.8**	50.6
CP930RR	CROPLAN by WinField United	**8.9**	161.5	44.9	2.4	0	**52.2**	**51.7**	**51.5**
CP955RR	CROPLAN by WinField United	7.2	167	49.9	**1.1**	0	**53.6**	**52.2**	51
CP9919RR	CROPLAN by WinField United	6.3	161	42.2	**1.8**	0	42.3	46.9	48.4
CP9978TF	CROPLAN by WinField United	7.6	164.5	47.3	**1.5**	0	48.3	***52.5***	50.8
Mean		8.2	164.5	49.1	1.3	0	49.4	51.3	49.6
CV%		20.7	4.4	4.5	94.6		9.2	2.1	1.9
LSD		2.4	NS	3.1	1.7		6.5	1.5	1.3
P-Value		0.018	0.443	<0.001	<0.001		<0.001	<0.001	<0.001

Bold/italic = top-performing cultivar; **Bold only** = statistically equivalent to top-performer; Fisher's protected LSD not significant when CV% > 15 (YIELD only) and/or P-Value > 0.05

Northern Ag Research Center, Havre, MT

Table 7. 2020 Spring canola variety trial, NARC, Havre, MT. [TOC]

CULTIVAR	SOURCE	COUNT (sqft)	FLWR DATE (julian)	CNPY HT (in)	LDGE (0-9)	SHTTR (0-9)	YIELD (bu/ac)	TEST WT (lb/bu)	OIL (%)
InVigor LR344PC	BASF Corporation	9	167.5	40.2	0	0	74.6	**50.8**	44.1
InVigor L233P	BASF Corporation	12.6	166	43	0	0	***82.2***	**51**	43.5
InVigor L345PC	BASF Corporation	**14.4**	167.5	43.2	0	0	76.1	**50.8**	43.8
BY 6204TF	BrettYoung Seeds	8.9	169	43.8	0	0	70.8	50.2	42.4
BY19-6284CL	BrettYoung Seeds	8.1	167	42.8	0	0	72	***51.5***	44.5
DKTF91SC	Bayer Crop Science (DEKALB)	11	164.2	40	0	0	70.9	49.8	44.4
DKTF96SC	Bayer Crop Science (DEKALB)	9.8	167.5	39.8	0	0	65.8	50.7	43.6
DKTFLL21SC	Bayer Crop Science (DEKALB)	10.9	165	43.2	0	0	68.2	49.9	45.2
DG 200CL	Dyna-Gro Seed	10.2	169.2	43.8	0	0	68.5	**51**	42.5
DG 760TM	Dyna-Gro Seed	10.9	165.5	41	0	0	76.1	**50.8**	43.7
DG 761TM	Dyna-Gro Seed	8	167.5	43	0	0	72.4	**50.8**	44
CS2100	Meridian Seeds, LLC	9.5	166	42.5	0	0	70.1	**50.9**	43
CS2300	Meridian Seeds, LLC	9.9	170	***47.5***	0	0	64.8	50.2	44.2
CS2500CL	Meridian Seeds, LLC	10.2	167	43.5	0	0	69.6	**51.3**	44.6
CS2600CR-T	Meridian Seeds, LLC	***14.5***	166.8	40.5	0	0	73.8	**50.9**	44.2
NCC101S	Photosyntech	11.5	***163***	38.5	0	0	**77.6**	**51.3**	41.2
Star 402	Star Specialty Seed	10	**164**	39	0	0	**76.7**	49.6	**46.9**
StarFlex	Star Specialty Seed	8.2	166	39.8	0	0	67	50	45.9
CP930RR	CROPLAN by WinField United	10	***163***	38	0	0	76.1	49.9	***48.1***
CP955RR	CROPLAN by WinField United	11.1	165.2	42.8	0	0	75.8	50.1	44.5
CP9919RR	CROPLAN by WinField United	9.9	164.2	39	0	0	61.6	49	44.2
CP9978TF	CROPLAN by WinField United	9.5	165	40.5	0	0	67.1	**50.8**	42.7
Mean		10.4	166.2	41.6	0	0	71.7	50.5	44.2
CV%		9	0.4	4.6			5.7	1	2.1
LSD		1.3	1	2.7			5.8	0.7	1.3
P-Value		<0.001	<0.001	<0.001			<0.001	<0.001	<0.001

Bold/italic = top-performing cultivar; **Bold only** = statistically equivalent to top-performer; Fisher's protected LSD not significant when CV% > 15 (YIELD only) and/or P-Value > 0.05

Northwestern Ag Research Center, Kalispell, MT

Table 8. 2020 Spring canola variety trial, NWARC, Kalispell, MT. [TOC]

CULTIVAR	SOURCE	COUNT (sqft)	FLWR DATE (julian)	CNPY HT (in)	LDGE (0-9)	SHTTR (0-9)	YIELD (bu/ac)	TEST WT (lb/bu)	OIL (%)
InVigor LR344PC	BASF Corporation	10.1	178	**59.8**	0	0	**62.7**	51.8	50.3
InVigor L233P	BASF Corporation	10.5	177.5	**59.7**	0	0	**67**	51.6	51
InVigor L345PC	BASF Corporation	10.2	177.5	57.6	0	0	***70.8***	52	50
BY 6204TF	BrettYoung Seeds	6.1	178	58.5	0	0	60.8	51.8	48.9
BY19-6284CL	BrettYoung Seeds	7.8	177.5	59.5	0	0	50.6	51.5	**51.3**
DKTF91SC	Bayer Crop Science (DEKALB)	9.5	176	56.9	0	0	60.8	51.9	50.6
DKTF96SC	Bayer Crop Science (DEKALB)	6.9	176.5	56.9	0	0	**66.9**	***52.6***	49.5
DKTFLL21SC	Bayer Crop Science (DEKALB)	9.6	176	52.9	0	0	61.4	51.6	50.8
DG 200CL	Dyna-Gro Seed	9	178	59	0	0	**61.8**	51.3	51
DG 760TM	Dyna-Gro Seed	8.9	177	57.4	0	0	**63.4**	51.7	51
DG 761TM	Dyna-Gro Seed	7.1	178	**60.1**	0	0	59.3	51.8	**51.3**
CS2100	Meridian Seeds, LLC	10.2	176.5	58.2	0	0	55.9	51.9	50.5
CS2300	Meridian Seeds, LLC	7.5	178	***64.5***	0	0	48.6	51.2	**52.2**
CS2500CL	Meridian Seeds, LLC	8.6	177.5	59	0	0	58.9	**52.1**	**51.8**
CS2600CR-T	Meridian Seeds, LLC	10.5	176.5	59	0	0	58.5	51.9	50.4
NCC101S	Photosyntech	7.4	***174***	54.7	0	0	57.5	**52.5**	47.2
CP930RR	CROPLAN by WinField United	8.5	**175**	53.9	0	0	**62**	51.6	***52.5***
CP955RR	CROPLAN by WinField United	9	176	57.3	0	0	57	51.9	**51.5**
CP9919RR	CROPLAN by WinField United	5.8	***174***	53.2	0	0	50.7	51.8	49.3
CP9978TF	CROPLAN by WinField United	7.6	176	58.8	0	0	58.2	52	50.4
Mean		8.5	176.7	57.9	0	0	59.6	51.8	50.6
CV%		26.6	0.4	5.9			11	0.7	1.9
LSD		NS	1	4.8			9.3	0.5	1.4
P-Value		0.069	<0.001	0.004			0.001	0.001	<0.001

Bold/italic = top-performing cultivar; **Bold only** = statistically equivalent to top-performer; Fisher's protected LSD not significant when CV% > 15 (YIELD only) and/or P-Value > 0.05

Southern Ag Research Center, Huntley, MT

Table 9. 2020 Spring canola variety trial, SARC, Huntley, MT. [TOC]

CULTIVAR	SOURCE	COUNT (sqft)	FLWR DATE (julian)	CNPY HT (in)	LDGE (0-9)	SHTTR (0-9)	YIELD (bu/ac)	TEST WT (lb/bu)	OIL (%)
InVigor LR344PC	BASF Corporation	**10.5**	170.2	46.1	0	8.2	13.1	36.6	**39.4**
InVigor L233P	BASF Corporation	**8.8**	171	44.2	0.2	8.1	13.9	38.1	**41.9**
InVigor L345PC	BASF Corporation	***10.9***	169.8	**49**	0	7.6	14.4	39	38.3
BY 6204TF	BrettYoung Seeds	**9.1**	172.2	46.4	0	8.1	16.6	**42.9**	**43.4**
BY19-6284CL	BrettYoung Seeds	7.6	172.8	44.5	0.2	7.7	6.1	34.8	37
DKTF91SC	Bayer Crop Science (DEKALB)	**10.6**	***167.5***	41.1	0.2	7.9	14.3	**43.8**	**41.8**
DKTF96SC	Bayer Crop Science (DEKALB)	**8.8**	171.5	45.6	0.2	7.7	5.7	37.5	35.6
DKTFLL21SC	Bayer Crop Science (DEKALB)	**10.2**	**168.8**	41.5	0	**7.3**	12.3	**42.4**	**39.3**
DG 200CL	Dyna-Gro Seed	8.3	172.8	46.4	0	8	12.5	**41.6**	**44**
DG 760TM	Dyna-Gro Seed	7.3	**168.8**	46.1	0	8.2	16.5	***45.9***	**44.5**
DG 761TM	Dyna-Gro Seed	**9.8**	**169.2**	***50.8***	0	7.9	16.3	**44.4**	***44.8***
NCC101S	Photosyntech	**9.2**	**169.2**	41.2	0.4	**7**	9.4	34.8	28.5
CP930RR	CROPLAN by WinField United	6.6	**168**	40.8	0.4	7.6	8.9	35.8	37.9
CP955RR	CROPLAN by WinField United	**10**	169.8	45.2	0	8.2	11.8	38.7	**41**
CP9919RR	CROPLAN by WinField United	8.3	169.5	42	1.1	***6.5***	5.8	33.8	31.4
CP9978TF	CROPLAN by WinField United	7.9	169.5	43.6	0.2	7.7	5.6	35.3	31
Mean		9	170	44.7	0.2	7.7	11.4	39.1	38.7
CV%		17.1	0.7	5.3	197.9	7.3	32.9	11.9	10.3
LSD		2.2	1.7	3.4	NS	0.8	NS	6.6	5.7
P-Value		0.004	<0.001	<0.001	0.058	0.004	<0.001	0.004	<0.001

Bold/italic = top-performing cultivar; **Bold only** = statistically equivalent to top-performer; Fisher's protected LSD not significant when CV% > 15 (YIELD only) and/or P-Value > 0.05

Western Ag Research Center, Corvallis, MT

Table 10. 2020 Spring canola variety trial, WARC, Corvallis, MT. [TOC]

CULTIVAR	SOURCE	COUNT (sqft)	FLWR DATE (julian)	CNPY HT (in)	LDGE (0-9)	SHTTR (0-9)	YIELD (bu/ac)	TEST WT (lb/bu)	OIL (%)
InVigor LR344PC	BASF Corporation	8.4	181.8	32.6	***0***	0	37.4	46.6	47.8
InVigor L233P	BASF Corporation	8.1	181.8	35.3	***0***	0	34	46.1	47.2
InVigor L345PC	BASF Corporation	8.3	184	37.7	***0***	0	37.2	45.4	46.6
BY 6204TF	BrettYoung Seeds	6.4	181.8	33.9	***0***	0	35	45.5	44.9
BY19-6284CL	BrettYoung Seeds	6.2	176.2	36.7	***0***	0.1	31.5	46.1	48.4
DKTF91SC	Bayer Crop Science (DEKALB)	***12.2***	**173**	34.5	***0***	0	32.6	43.5	46.9
DKTF96SC	Bayer Crop Science (DEKALB)	9.1	181.8	34.4	***0***	0	35.5	45.8	47.3
DKTFLL21SC	Bayer Crop Science (DEKALB)	**11**	**173**	33	***0***	0	39	45.8	**49.4**
DG 200CL	Dyna-Gro Seed	9.2	184	37.1	***0***	0	32.4	43.8	46.8
DG 760TM	Dyna-Gro Seed	8.8	176.2	32.6	***0***	0.1	31.9	45.9	47.4
DG 761TM	Dyna-Gro Seed	8.7	177.2	35.9	***0***	0.1	31.3	46.4	45.6
NCC101S	Photosyntech	7	***169***	27.2	***0***	0	39	45.8	46.4
CP930RR	CROPLAN by WinField United	9.2	**173**	30.5	***0***	0	37.4	45.8	***51.1***
CP955RR	CROPLAN by WinField United	8.2	**173.5**	33	***0***	0.2	36	45.9	**50**
CP9919RR	CROPLAN by WinField United	5.9	**173**	29.1	3.6	1.2	26.7	43.6	46.4
CP9978TF	CROPLAN by WinField United	6.2	181.2	35.5	***0***	0	35.4	46.9	46.4
Mean		8.3	177.5	33.7	0.2	0.1	34.5	45.6	47.4
CV%		20.8	1.8	12.9	461.9	437.5	19.9	4.3	3.4
LSD		2.5	4.6	NS	1.5	NS	NS	NS	2.3
P-Value		<0.001	<0.001	0.074	0.002	0.148	0.529	0.382	<0.001

Bold/italic = top-performing cultivar; **Bold only** = statistically equivalent to top-performer; Fisher's protected LSD not significant when CV% > 15 (YIELD only) and/or P-Value > 0.05