

## **2017 PACIFIC NORTHWEST SPRING CANOLA VARIETY TRIAL RESULTS**

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### **ABSTRACT**

The 2017 spring trial had 34 spring canola and rapeseed cultivars or advanced breeding lines from eleven companies or breeding programs, including three control cultivars, and was planted at nine locations throughout the Inland Pacific Northwest. Eight locations were rainfed, dryland sites, and one site, at Hermiston OR, received supplemental irrigation. Cultivar mean yields ranged from 1,089 to 1,838 lbs. per acre when averaged across the eight dryland sites with an overall mean of 1,512 lbs. per acre. Mean seed yield by site ranged from 800 lbs. per acre at Bonners Ferry ID to 2,479 lbs. per acre at Dayton WA. The yield at Bonners Ferry was unusually low due to weather-induced establishment difficulties and severe flea beetle pressure. The five cultivars with highest yields were ‘HyCLASS 930 RR’, ‘NCC 101S’, ‘HyCLASS 955 RR’, ‘DKL 71-14BL RR’, and ‘DG 200 CL’.

### **INTRODUCTION**

The acreage of canola (*Brassica napus*, *B. juncea*, and *B. rapa*) in the Pacific Northwest continues to slowly increase as more growers show an interest in the crop, because canola offers growers an alternative crop for rotation in an agricultural system predominated by small cereal grains. Currently depressed prices for wheat, caused by a worldwide surplus, have also contributed to the increase interest in canola.

To support the grower community, comprehensive yield trials are needed to evaluate new cultivars throughout the varied environments found in the Inland Pacific Northwest (PNW). With this objective in mind, researchers at the University of Idaho established the PNW Canola Variety Trial (PNWCVT) in 1994 and the PNW Winter Canola Variety Trial (PNWWVT) in the fall of 1995. These trials have successfully attracted cultivar entries from a number of seed companies, with 176 winter varieties from 22 companies and 326 spring varieties from 33 companies submitted for testing over the lifespan of the trials.

In 2017, 13 different commercial companies and public breeding programs submitted 52 distinct cultivars or breeding lines for testing, 21 winter types and 31 spring types. The 2017 trials were funded by USDA-NIFA Supplemental and Alternative Crops Competitive Grants Program and by the commercial companies that submitted their cultivars or advanced breeding lines to be tested in the PNW trials.

### **MATERIALS AND METHODS**

The 2017 spring trials were grown at nine locations throughout Idaho, Washington, and Oregon. Three cultivars, ‘Westar’, ‘Profit’, and ‘Goldrush’, were used as controls in the trial. All entries are *Brassica napus* cultivars with the exception of Goldrush, which is *B. rapa* cultivar.

All entries are canola-quality with the exception of ‘Gem’ and ‘07.SI.8.A10’ which are industrial rapeseed varieties with low glucosinolate seed meal. Entries ending in “RR” are Roundup Ready<sup>®</sup> types (resistant to glyphosate herbicide); those with “LL” are Liberty Link<sup>®</sup> cultivars (resistant to glufosinate herbicide); “SU” indicates resistance to sulfonylurea herbicides, and “CL” denotes Clearfield<sup>®</sup> canola (resistant to imazamox herbicide) or other cultivars that are resistant to the imidazolinone herbicides. Tillage regimes and planting dates for each site are shown in Table 1.

For each site, a randomized complete block design with 4 replicates was used, and plot dimensions were 4 feet by 16 feet. The seeding rates were approximately 6 lbs. of seed per acre for *B. napus* cultivars and 5 lbs. per acre for the *B. rapa* cultivar; although lower seeding rates were used for cultivars with small seed size to achieve approximately 450,000 live seed per acre. Seed from each variety was treated with either Helix<sup>®</sup> Xtra, Helix<sup>®</sup> Vibrance, Prosper<sup>™</sup> Evergol or Prosper<sup>™</sup> 400 prior to planting for control of flea beetles and seedling diseases. All trials were grown on recrop ground and were fertilized according to local practice. The companies that entered varieties for testing are shown with the yield results in Table 2.

**Table 1.** Location, tillage regime, and seeding date of trials in the 2017 Pacific Northwest Spring Canola Variety Trial.

Location	Tillage Regime	Seeding Date
Moscow, ID	tilled	May 11
Genesee, ID	tilled	May 10
Craigmont, ID	no till	May 9
Bonner’s Ferry, ID	no till	May 18
Fairfield, WA	no till	May 19
Dayton, WA	no till	May 2
Pendleton, OR	tilled	April 4
Hermiston, OR	tilled, irrigated	March 23

The date of flower onset and plant height at maturity was recorded for each plot at the Moscow and Genesee locations. Flowering date was recorded when 50% of the plot was in bloom and is presented as days from planting to flowering. Little or no lodging was observed at any site, so plots were not scored for that trait. After harvest, the seed was weighed to determine yield, and a cleaned subsample from each plot was saved for oil content analyses. Seed oil content was estimated using a Nuclear Magnetic Resonance (NMR) analyzer after samples were dried to approximately 2% moisture.

## RESULTS AND DISCUSSION

The spring of 2017 was unusually wet, resulting in all of the sites being seeded two to four weeks later than normal. This cool, wet spring quickly gave way to warm, dry weather in June, and the plants flowered at the typical time in spite of the delayed plantings. This reduced the time between seeding and flowering and led to shorter than average plant heights, which ranged from 37 to 46 inches by cultivar with an average of 42 inches. Spring canola plant heights in the eastern Palouse usually range between 42 and 50 inches

Goldrush was the earliest cultivar, flowering at 38 days after seeding (Table 2). That is expected, because Goldrush is a *B. rapa* cultivar, and they typically flower earlier than cultivars of *B. napus*. The next earliest cultivars were ‘NCC 101S’ and 07.SI.8.A10 rapeseed, which flowered at 42 days after seeding (June 13). The rest of the flowering dates ranged from 45 to 48 days after seeding (June 16-19), with an average flowering time of 45 days after seeding. This is about five days shorter than typical for the eastern Palouse region, and is a reflection more of the delayed seeding times than of earlier cultivars. The latest cultivars were ‘DG 200 CL’, ‘CS 2200 CL’, ‘C5507 SU’, and ‘C5513 SU’.

The average seed yield across the eight dryland sites was 1,512 lbs. per acre. Individual entries ranged from 1,089 to 1,838 lbs. per acre (Table 2). The *B. rapa* control Goldrush was the lowest yielding cultivar, and the two other controls, Westar and Profit ranked 30 and 31, respectively, so nearly all the newer cultivars had yields were higher than these older benchmarks. The lowest yielding site was the Bonner’s Ferry, ID site with an average yield of 800 lbs. per acre. The highest yielding site was in Dayton, WA with an average yield of 2,479 lbs. per acre. The top five yielding varieties, from highest to lowest, were; ‘HyCLASS 930 RR’, ‘NCC 101S’, ‘HyCLASS 955 RR’, ‘DKL 71-14BL RR’, and ‘DG 200 CL’. The first three varieties were also in the top five in 2016. The average oil content for all cultivars across all sites was 44.0%, and the average oil content of individual cultivars ranged from 41.8% for ‘NCC 101S’ to 47.2% for ‘Star.402 RR’ (Table 3). Mean oil content by site ranged from 37.5% in Pendleton, OR to 46.0% in Moscow, ID.

The delayed seeding dates mentioned above are likely the cause of lower than expected yields at Bonner Ferry, Moscow, Craigmont and Fairfield. In addition, the Bonner’s Ferry site was hit with a heavy rainstorm the day after seeding, which caused soil compaction, crusting, and poor emergence. The heavy rainfall appeared to reduce the effectiveness of the insecticidal seed treatment, and those plants that did emerge were severely damaged by cabbage flea beetle (*Phyllotreta cruciferae*), which stunted their growth and caused significant yield losses. The *B. juncea* (Indian or oriental mustard) varieties in an adjacent mustard trial at Bonners Ferry seemed to be especially preferred by the flea beetle, which lead to a near-total loss of those varieties.

### Using These Tables

When choosing a cultivar, growers should examine the data from the site that most resembles their own farm in regards to region, annual rainfall, etc. and compare the performance of cultivars at that site in addition to examining the overall means. The overall highest yielding cultivars are not necessarily the highest yielding at each site. Conversely, varieties that performed very well at certain sites may not have performed well at others, contributing to a lower mean. Be sure to note the LSD (least significant difference), because cultivars that do not differ by the LSD amount are not considered to be statistically different based on the precision of the trial. Examining performance over a period of several years will indicate the stability of individual cultivars and also aid in the choice of a cultivar. Some cultivars in the trial have been tested for multiple years, and data summaries from previous years are available on the UI *Brassica* Breeding website at <http://www.cals.uidaho.edu/brassica/>.

**Table 2.** 2017 PNW Spring Canola & Rapeseed Variety Trial results including mean yield (lbs./acre) and rank at all dryland sites (does not include Hermiston), yield by site (lbs./acre), mean flower date at Moscow and Genesee (days after planting), and mean plant height at Moscow and Genesee (inches).

Varieties Tested	Mean Yield and Rank at Dryland Sites		Yield by location									Mean Flower Start	Mean Plant Height
			Bonnars Ferry ID	Moscow ID	Genesee ID	Craigmont ID	Davenport WA	Fairfield WA	Dayton WA	Pendleton OR	Hermiston OR		
<b>Control Varieties</b>	<i>lbs per acre</i>	<i>rank</i>										<i>days</i>	<i>inches</i>
Westar	1,257	30	512	1,216	2,070	1,134	1,131	793	2,313	887	2,171	46	40
Profit	1,257	31	806	1,005	2,057	1,060	1,178	688	2,169	1,089	1,766	47	42
Goldrush	1,089	34	202	848	1,550	969	1,383	766	1,914	1,079	3,577	38	37
<b>Bayer CropScience LP</b>													
InVigor L140P LL	1,607	13	1,088	1,652	2,165	1,561	1,436	933	2,429	1,594	2,371	47	46
InVigor L233P LL	1,663	9	856	1,716	2,414	1,836	1,483	1,189	2,455	1,351	3,082	46	44
<b>BrettYoung Seeds</b>													
5545 CL	1,680	7	920	1,352	2,461	1,661	1,145	1,022	2,872	2,006	2,641	47	45
6074 RR	1,592	16	971	1,627	1,959	1,509	1,566	1,021	2,456	1,625	2,306	48	43
6080 RR	1,503	20	797	1,383	2,346	1,448	1,240	932	2,188	1,690	2,184	46	43
<b>Canterra Seeds</b>													
CS 2200 CL	1,599	14	1,009	1,421	2,194	1,593	1,418	1,080	2,711	1,363	2,401	48	46
<b>Cibus</b>													
C5507 SU	1,396	26	364	1,378	1,896	1,384	1,467	882	2,626	1,174	2,599	48	43
C5513 SU	1,433	23	693	1,352	2,067	1,376	1,489	893	2,526	1,069	2,083	48	43
C5522 SU	1,456	21	483	1,467	2,208	1,352	1,459	942	2,518	1,217	2,538	47	42
<b>Crop Production Services</b>													
DG 200 CL	1,691	5	1,399	1,479	2,149	1,290	1,910	1,103	2,604	1,593	2,572	48	45
DG 533G RR	1,615	11	1,219	1,538	2,632	1,435	1,472	794	2,352	1,478	2,457	47	43
DG 540G RR	1,671	8	1,357	1,665	2,259	1,651	1,371	1,148	2,258	1,658	*	47	42
<b>Croplan by Winfield</b>													
HyCLASS 930 RR	1,838	1	1,009	1,466	2,896	1,443	2,194	1,344	2,811	1,539	2,581	45	42
HyCLASS 955 RR	1,733	3	781	1,695	2,246	1,496	1,966	1,104	2,770	1,803	2,816	45	41
HyCLASS 970 RR	1,584	18	1,038	1,549	2,125	1,381	1,757	1,009	2,582	1,233	2,142	46	42
<b>Monsanto Company</b>													
DKL 35-23 RR	1,686	6	1,179	1,546	2,383	1,777	1,481	1,114	2,684	1,327	2,340	44	43
DKL 70-10 RR	1,631	10	957	1,421	2,480	1,526	1,429	1,003	2,651	1,579	2,349	46	43
DKL 71-14BL RR	1,710	4	921	1,771	2,131	1,636	1,742	1,186	2,568	1,721	2,597	44	41
<b>Photosyntech</b>													
NCC 101S	1,744	2	610	1,743	2,101	1,699	1,766	1,206	2,835	1,994	3,175	42	38
<b>Rubisco Seeds</b>													
Drago	1,554	19	885	1,425	2,397	1,457	1,324	958	2,797	1,185	2,437	46	40
Lumen	1,585	17	1,015	1,308	2,405	1,522	1,435	983	2,778	1,236	2,519	46	43
Trapper	1,593	15	856	1,706	2,389	1,413	1,307	938	2,599	1,532	2,684	42	40
<b>Star Specialty Seed, Inc</b>													
Star 402 RR	1,607	12	1,083	1,557	2,143	1,564	1,456	971	2,651	1,434	2,361	44	43
<b>University of Idaho</b>													
Empire	1,412	24	534	1,431	2,231	1,344	1,274	894	2,238	1,352	2,086	44	38
Cara	1,338	28	618	1,276	1,782	1,327	1,575	751	2,332	1,041	1,854	43	39
07SC27.19.B3	1,234	32	440	1,219	1,607	1,277	1,191	808	2,349	982	1,458	46	39
07.IR.5.5.5.8 RR+IMI	1,125	33	295	1,164	1,955	1,115	1,004	703	2,095	672	1,650	47	46
07.IR.7.8.8.2 RR+IMI	1,405	25	611	1,378	2,007	1,423	1,605	826	2,419	969	2,146	45	41
07.IR.7.8.8.7 RR+IMI	1,391	27	563	1,505	2,305	1,226	1,524	889	2,180	937	2,519	46	42
Gem Rapeseed	1,278	29	425	1,488	1,908	1,063	1,101	884	2,327	1,029	1,961	45	40
07.SI.8.A10 Rapeseed	1,441	22	703	1,438	2,341	1,374	1,391	892	2,223	1,167	2,010	42	39
<b>Mean</b>	1,512		800	1,447	2,184	1,421	1,461	960	2,479	1,341	2,377	45	42
<b>LSD (<math>p = 0.05</math>)</b>	122		372	286	418	282	490	237	324	361	1,030	0.8	5.7
<b>C.V. (%)</b>	18.3		33.0	14.1	13.7	14.6	24.1	18.0	9.4	19.7	31.0	1.2	4.9

**Table 3.** 2017 PNW Spring Canola & Rapeseed Variety Trial seed oil content estimations (percent) as determined by NMR analysis including mean oil content of Idaho and Washington sites, and oil content of varieties at individual sites.

Variety	Mean Oil Content and Rank at Idaho and Washington Sites		Oil Content by Location							
			Moscow ID	Genesee ID	Craigmont ID	Davenport WA	Fairfield WA	Dayton WA	Pendleton OR	Hermiston OR
<b>Control Varieties</b>	<i>percent</i>	<i>rank</i>	<i>percent</i>							
Westar	43.3	25	45.3	44.6	40.5	41.9	43.5	43.8	36.7	37.3
Profit	44.1	15	45.4	45.5	41.9	43.3	45.0	43.8	39.4	37.2
Goldrush	40.9	34	41.4	41.6	39.1	40.6	42.3	40.5	37.4	36.7
<b>Bayer CropScience LP</b>										
InVigor L140P LL	43.2	26	45.2	44.5	41.3	42.4	43.4	42.4	37.6	38.1
InVigor L233P LL	43.6	20	45.7	44.2	41.9	42.1	44.2	43.5	36.8	37.1
<b>BrettYoung Seeds</b>										
5545 CL	44.0	17	46.1	44.4	42.7	42.3	45.1	43.4	37.7	38.1
6074 RR	44.3	13	46.7	44.8	43.2	43.2	44.5	43.2	37.7	37.5
6080 RR	44.5	10	46.6	44.6	42.9	44.0	44.4	44.3	39.2	39.2
<b>Canterra Seeds</b>										
CS 2200 CL	44.5	9	46.3	45.7	43.2	43.6	44.8	43.3	36.6	36.3
<b>Cibus</b>										
C5507 SU	44.0	18	45.7	44.9	42.2	43.0	44.1	44.1	37.2	37.6
C5513 SU	43.6	21	45.6	43.9	42.4	42.7	44.1	43.1	37.1	36.2
C5522 SU	44.2	14	46.3	45.0	41.5	43.7	44.4	44.2	37.1	37.8
<b>Crop Production Services</b>										
DG 200 CL	43.4	23	45.9	44.4	40.9	42.6	43.7	43.2	36.7	36.0
DG 533G RR	43.6	22	45.9	44.5	41.5	43.3	43.7	42.8	37.6	37.3
DG 540G RR	44.5	11	46.9	45.3	42.8	42.9	44.6	44.2	*	*
<b>Croplan by Winfield</b>										
HyCLASS 930 RR	45.9	3	48.4	46.2	43.0	45.6	46.2	45.7	40.6	39.8
HyCLASS 955 RR	46.1	2	48.5	47.1	44.1	45.2	46.3	45.4	40.4	40.2
HyCLASS 970 RR	45.2	6	47.1	46.3	43.4	44.0	45.9	44.4	38.1	37.9
<b>Monsanto Company</b>										
DKL 35-23 RR	45.2	5	47.2	46.0	43.6	44.1	45.6	45.0	38.0	38.6
DKL 70-10 RR	44.1	16	45.8	45.2	42.1	43.2	44.7	43.5	38.0	39.3
DKL 71-14BL RR	45.3	4	48.2	46.2	41.9	45.6	46.0	44.1	39.2	38.9
<b>Photosyntech</b>										
NCC 101S	41.8	33	44.9	41.5	39.6	41.1	42.4	41.2	33.7	36.4
<b>Rubisco Seeds</b>										
Drago	43.0	29	44.5	43.8	41.5	41.6	43.8	43.2	34.3	37.9
Lumen	44.3	12	45.6	45.5	42.4	43.2	44.8	44.6	36.8	38.7
Trapper	42.7	31	45.0	43.8	40.7	40.4	43.8	42.3	35.2	37.8
<b>Star Specialty Seed, Inc</b>										
Star 402 RR	47.2	1	49.2	48.8	44.8	45.8	47.2	47.3	39.0	40.6
<b>University of Idaho</b>										
Empire	42.9	30	45.3	43.7	40.4	41.4	44.2	42.6	37.0	38.3
Cara	43.9	19	46.3	45.4	41.2	43.3	44.2	42.9	38.5	39.1
07SC27.19.B3	43.3	24	45.4	44.0	41.9	41.7	44.5	42.5	38.3	37.3
07.IR.5.5.5.8	42.6	32	43.7	44.1	41.4	41.8	43.4	41.4	36.4	35.4
07.IR.7.8.8.2	43.1	28	45.0	44.2	39.5	43.2	44.6	42.1	37.3	36.9
07.IR.7.8.8.7	43.1	27	44.7	44.3	39.9	42.4	44.0	43.4	36.4	37.1
Gem Rapeseed	44.7	8	46.9	45.4	42.2	43.9	45.3	44.7	38.3	37.9
07.SI.8.A10 Rapeseed	44.8	7	46.9	44.8	42.4	44.4	45.9	44.2	38.7	38.7
<b>Mean</b>	44.0		46.0	44.8	41.9	43.0	44.5	43.5	37.5	37.8
<b>LSD (p=0.05)</b>	0.5		1.0	1.1	1.6	1.6	1.0	1.3	1.2	2.2
<b>C.V.</b>	2.1		1.5	1.8	2.7	2.7	1.6	2.1	2.4	4.1