2007 PACIFIC NORTHWEST SPRING CANOLA VARIETY TRIAL RESULTS

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ABSTRACT

A spring canola and rapeseed variety trial with 40 cultivars or advanced breeding lines and five control cultivars was grown at ten locations in Oregon, Washington, and Idaho. Cultivar mean yields ranged from 1404 to 2338 lbs. per acre when averaged across six uniform sites. Mean yields for individual locations ranged from 757 to 2957 lbs. per acre, and the overall mean was 1973 lbs. per acre.

INTRODUCTION

Growers in the Pacific Northwest continue to show a strong interest in spring canola (*Brassica napus* and *B. rapa*). Spring canola offers growers an alternative crop for rotation in an agricultural system predominated by small cereal grains. Comprehensive yield trials are needed to evaluate new cultivars and to determine which areas of the Pacific Northwest are best suited to the available cultivars. With this objective in mind, researchers at the University of Idaho established the Pacific Northwest Canola Variety Trial (PNWCVT) during 1994. This trial has successfully attracted cultivar entries from a number of seed companies marketing canola in the PNW. During the fourteen years of spring canola testing, the project has evaluated 195 different spring cultivars representing 21 companies. In 2007, the trial was funded in part by the Pacific Northwest Canola Research Program and by fees paid by the commercial companies that submit their cultivars or advanced breeding lines to be tested in the PNWCVT.

MATERIALS AND METHODS

The *B. napus* or "Argentine" canola cultivars ‘Hyola 401’, ‘Profit’ and ‘Westar’ and the *B. rapa* or "Polish" cultivar ‘Goldrush’ were used as controls in the trial. In addition, the *B. napus* industrial rapeseed cultivar ‘Hero’ was included as a control for industrial cultivars. All test entries are *B. napus* types with canola-quality except for ‘Sterling’, ‘Gem’, UISH00.3.19.23, and the two “03.IH” entries which are industrial rapeseed (*B. napus*) cultivars. Entries ending in “RR” are Roundup Ready® types (resistant to glyphosate herbicide), while “CL” denotes Clearfield® canola (resistant to imazamox herbicide) or other cultivars that are resistant to the imidazolinone class of herbicides. The companies that entered cultivars are listed with the yield data in Table 2. Note that ‘MB52140 RR’ has been licensed to Croplan Genetics, and it will be marketed in the PNW as ‘HyCLASS 940’ with seed available in 2009. ‘MB52142 RR’ will be marketed by Monsanto as ‘DKL30-42’.

The 2007 trials were planted at 10 locations: Dayton, WA; Colfax, WA; Fairfield, WA; Davenport, WA; Bonners Ferry, ID; Moscow, ID; Genesee, ID; Craigmont, ID; Hermiston, OR; and

Pendleton, OR. Unlike previous years, no site was grown at Kalispell, MT due to personnel changes at Montana State University. Tillage regimes and planting dates are shown in Table 1.

At each location, the trial design used was a randomized, complete block with four replications. The seeding rates were approximately 8 lbs. of seed per acre for *B. napus* cultivars and 6 lbs. per acre the *B. rapa* cultivar; although lower seeding rates were used for some cultivars as requested by the entering company. Plot size was 4 feet by 16 feet. All trials were grown on recrop ground and were fertilized according to local practice.

The dates of flower onset and plant height at maturity were recorded at Moscow and Genesee. Lodging was scored at Bonners Ferry just prior to harvest and was rated on a scale of 1 to 9, with a score of 1 assigned to plots with all plants severely lodged, and a score of 9 assigned to plots with all plants completely erect. After harvest, the seed was weighed to determine yield. Oil content was estimated using a Nuclear Magnetic Resonance Analyzer (NMR) on a subsample of seed from each plot harvested.

Table 1. Location, location code, tillage regime, and planting date of trials in the 2007 Pacific Northwest Spring Canola Variety Trial.

Location	Location Code	Tillage Regime	Planting Date
Bonners Ferry, ID	BONN	tilled	April 27
Moscow, ID	MOSC	tilled	April 24
Genesee, ID	GENE	tilled	April 21
Craigmont, ID	CRAG	direct seed	April 11
Davenport, WA	DAVE	direct seed	April 13
Fairfield, WA	FAIR	tilled	April 25
Colfax, WA	COLF	direct seed	April 16
Dayton, WA	DAYT	direct seed	April 12
Pendleton, OR	PEND	tilled	March 28
Hermiston, OR	HERM	tilled	March 28

RESULTS AND CONCLUSIONS

The earliest cultivar, 'Goldrush,' began flowering 44 days after planting (Table 2). Flowering dates for the remainder of the cultivars ranged from 51 to 65 days. The latest cultivars were 'Nexera 828' and 'Nexera 830' from DOW AgroSciences. 'HyCLASS 712 RR' was also quite late. Mean plant height ranged from 46 inches ('Hyola 401') to 60 inches ('InVigor 5550'). Very little lodging was observed at most sites, but at the Bonners Ferry site lodging was moderate. Mean lodging scores there ranged from 5.3 to 9.0, with most commercial cultivars having only slight to moderate lodging and scores above 7.0. 'Westar' and 'UISC00.3.8.DE' had the greatest degree of lodging, and both suffered lodging in 2006 as well.

All 10 sites planted were harvested for yield data. The Moscow, ID site had the highest mean yield, 2957 lbs. per acre (Table 2), and the Craigmont, ID site had the lowest mean yield, 757 lbs. per acre. The Craigmont yield was quite low for that area, which can be attributed to the

severely dry conditions experienced there in 2007, coupled with a late June frost. Yields of individual cultivars averaged across the eight locations that had a complete compliment of cultivars ranged from 1404 to 2338 lbs. per acre. Locations included in this mean were Bonners Ferry, Moscow, Genesee, Craigmont, Davenport, Fairfield, Colfax, and Dayton. Data from Pendleton and Hermiston were omitted from the mean, because several cultivars were not included at those sites.

Mean oil content at each site ranged from 33.2% at Craigmont to 42.4 % at Dayton (Table 3). The mean oil content at Colfax was also low, 33.3%, and both this site and Craigmont were impacted by dry conditions prior to and during the growing season. Oil content by cultivar averaged across the eight locations that had a uniform number of entries ranged from 36.5% to 40.4%.

Over three quarters of the cultivars had yields above 1800 lbs. per acre when averaged over eight locations and six cultivars had higher yields than the highest yielding control, Hyola 401, long a benchmark variety for the PNW. Nearly all commercial companies and breeding groups represented in the trial had one or more cultivars that produced yields statistically similar to Hyola 401. The DOW AgroSciences lines did not perform as well as in past years, probably due to the combination of their late flowering time and the dry conditions encountered this season. Some Roundup Ready® cultivars performed very well as in previous years, indicating that this technology is a viable alternative for weed control in PNW spring canola crops; however, growers should carefully weigh the cost of this technology and consider the weed situation on their farms when making comparisons to conventional cultivars. The high proportion of lines in the trial with high yields, even in a dry year such as 2007, indicates that breeders are continuing to improve spring canola for production in the PNW, and farmers here should be able to look forward to continued yield increases in the future.

Table 2. Results of the 2007 PNWCVT including mean yield (lbs./ac.) of the ID and WA sites (not including OR sites), yield rank, yield by location (lbs./ac.), flower date (days after planting), plant height (inches), and lodging score (1 equals completely lodged and 9 = completely erect).

Company	Variety	Mean Yield	Rank	BONN	MOSC	GENE	CRAG	DAVE	FAIR	COLF	DAYT	PEND	HERM	Flower Start	Plant Height	Lodging Score
Trial Controls	Hyola 401	2176	7	2838	2987	2709	1014	1458	2642	1743	2015	1072	1966	51	46	6.8
	Westar	1404	38	1835	2360	1805	352	1105	1212	1066	1495	779	1807	60	53	5.3
	Profit	1730	34	2383	2792	2335	452	839	2002	1134	1903	975	1699	57	54	7.0
	Hero	1689	36	2175	2408	2026	711	848	2071	1314	1962	1100	1707	57	53	7.3
	Goldrush	1796	31	1832	2598	2561	472	1041	1989	1890	1985	1036	1828	45	50	7.0
Bayer CropScience	InVigor 5550	2198	5	3112	3209	2707	957	1132	2278	1728	2464	1184	2392	60	60	8.3
	InVigor 5630	2135	13	2792	3253	3055	774	1355	2345	1507	2002	1259	2407	58	56	8.3
Cargill Specialty Canola Oils	V1035 RR (03H631)	2143	11	3104	2915	2312	795	1322	2478	1773	2446	1087	2091	58	55	7.5
	V2010 RR (03H252)	2021	17	3015	2991	2420	611	1020	2501	1556	2052	1129	2491	60	58	7.5
	V2018 RR (04H277)	1586	37	2546	2285	2267	360	891	1854	972	1509	*	*	62	58	8.3
	04H730 RR	2042	16	2961	3189	2712	1000	908	2184	1338	2043	1003	2062	57	59	8.0
Croplan Genetics	HyCLASS 431 RR	1914	23	2635	3049	2434	447	1067	2198	1119	2360	1022	2161	58	54	8.3
	HyCLASS 712 RR	1957	19	3053	2756	2595	664	1063	2237	976	2311	1019	2611	63	59	9.0
	HyCLASS 924 RR	2021	17	3063	2858	2294	988	1221	2279	1384	2082	919	2278	57	54	8.3
	Python CL	2169	9	3024	3516	2763	806	1281	2393	1093	2478	*	*	60	57	8.8
DOW AgroSciences	Nexera828CL	1692	35	2634	2769	2060	232	578	1697	*	1872	590	1898	65	56	9.0
	Nexera830CL	1854	28	2762	2602	2414	589	874	2028	923	2637	753	1639	64	58	8.8
Monsanto	Hyola357Magn RR	2197	6	3116	3335	2369	1082	1277	2452	1871	2070	1314	2004	53	50	6.5
	DKL38-25 RR	2075	15	3099	3359	2413	833	1199	2278	1245	2174	*	*	60	56	8.8
	MB52140 RR*	2261	3	2971	3116	2793	1001	1617	2832	1779	1977	*	*	56	52	7.3
	MB52142 RR	2338	1	3428	3258	2845	967	1417	2507	1839	2440	*	*	56	51	7.8
	IS7145 RR	2201	4	2955	3013	2830	950	1467	2684	1370	2341	*	*	58	55	7.8
	DKL52-41 RR	*	*	*	3080	2861	*	*	*	*	*	*	*	58	54	*
	IS3057 RR	*	*	*	2806	2669	*	*	*	*	*	*	*	53	50	*
Wilbur-Ellis Co.	RangeRR	2096	14	3132	2897	2311	1008	1281	2267	1616	2253	*	*	56	56	7.3
	INT 3789 RR	2290	2	3308	3463	2925	1040	1268	2490	1501	2326	*	*	57	57	7.8
University of Idaho Canola	Premier	1852	29	2579	2980	2088	643	1199	2045	1192	2090	1134	2208	56	53	6.3
	Clearwater CL	1872	25	2464	3080	2310	878	1025	2088	936	2198	1132	2107	60	56	7.3
	99CFSC.43.20 CL	1907	24	2445	2882	2427	711	1099	2143	1277	2269	1110	2046	56	55	7.5
	03.IL.1 CL	2170	8	2646	3180	2893	1064	940	2229	1822	2585	1220	2566	53	53	6.8
	03.IL.5 CL	1938	21	2605	2679	2489	625	1310	1990	1495	2314	1153	2009	53	53	6.5
	03.IL.4 CL	1856	27	2344	2895	2550	458	1347	1935	942	2378	1075	2001	54	52	6.3
	UISC00.1.3.5	1955	20	2670	2784	2502	854	1195	1995	1445	2196	1033	2025	54	54	8.3
	UISC00.3.1.17	2160	10	2651	3327	2462	1112	1333	2247	1861	2288	927	1590	52	52	6.5
	UISC00.3.8.DE	2141	12	2666	3261	2306	938	1684	2141	1762	2366	1054	1672	53	49	5.8
University of Idaho Industrial Rapeseed	Sterling	1833	30	2326	3234	2293	610	1004	2003	1257	1938	968	1795	57	51	7.0
	Gem CL	1750	33	1861	2784	2146	657	1091	1945	1199	2314	1014	1887	56	50	6.8
	03.IH.1 CL	1789	32	2183	2653	2359	478	1002	2007	1566	2066	889	1939	57	53	7.0
	03.IH.4 CL	1867	26	2120	2830	2355	684	850	2201	1366	2526	974	1784	56	53	8.0
	UISH00.3.19.23	1917	22	2132	2851	2533	954	1077	2278	1403	2106	1024	2113	57	53	7.8
	MEAN	1973		2670	2957	2480	757	1150	2188	1412	2180	1032	2026	57	54	7.5
	LSD (p=0.05)	129		407	550	350	394	278	303	284	363	291	491	1	1	1.1
	C.V.			10.9	13.3	10.1	37.1	17.1	9.9	14.3	11.9	20.0	17.2	2.5	3.6	11.0

Table 3. Results of the 2007 PNWCVT including mean oil content (%) of the ID and WA sites and oil content by location (%).

Company	Variety	Mean Oil Content	BONN	MOSC	GENE	CRAG	DAVE	FAIR	COLF	DAYT	PEND	HERM
Trial Controls	Hyola 401	37.9	41.0	38.5	39.5	32.1	40.8	39.1	32.0	40.4	35.8	38.3
	Westar	38.2	40.7	39.5	39.4	31.6	40.2	39.4	33.1	42.0	35.4	38.5
	Profit	39.6	42.2	40.8	41.1	33.7	42.0	40.3	34.3	42.6	37.3	39.5
	Hero	39.4	41.5	39.2	40.4	35.7	41.2	40.6	33.7	42.8	37.2	39.6
	Goldrush	36.5	37.9	38.8	37.1	30.4	36.6	38.6	33.0	40.0	38.2	38.2
Bayer CropScience	InVigor 5550	39.0	42.5	39.5	40.6	32.6	40.9	40.2	33.5	42.6	36.7	40.6
	InVigor 5630	39.8	42.1	40.2	41.0	34.1	42.3	41.0	34.5	42.9	38.7	39.9
Cargill Specialty Canola Oils	V1035 RR (03H631)	40.1	43.1	41.0	41.9	33.4	42.8	40.7	34.5	43.6	38.9	41.7
	V2010 RR (03H252)	39.1	41.1	40.5	40.8	33.9	40.7	39.0	33.9	42.9	36.7	38.9
	V2018 RR (04H277)	39.4	42.4	39.8	41.1	33.4	40.8	40.3	35.0	42.7	*	*
	04H730 RR	39.9	42.3	41.1	40.9	34.8	41.0	40.5	35.1	43.5	38.2	40.6
Croplan Genetics	HyCLASS 431 RR	39.5	41.4	40.4	41.4	33.7	42.1	39.6	34.2	43.2	37.4	39.0
	HyCLASS 712 RR	39.3	42.2	39.3	40.1	34.7	41.8	39.1	34.3	43.2	37.1	40.1
	HyCLASS 924 RR	39.0	41.4	38.9	39.8	33.5	41.9	39.8	33.6	43.2	36.4	38.8
	Python CL	39.4	42.1	40.2	40.9	33.7	41.4	40.9	32.9	43.5	*	*
DOW AgroSciences	Nexera828CL	38.5	41.7	40.2	40.2	32.0	38.5	39.7	34.3	41.5	34.0	38.0
	Nexera830CL	39.1	42.2	40.1	40.9	34.0	40.9	38.5	33.8	42.7	34.4	39.1
Monsanto	Hyola357Magn RR	37.9	40.1	39.0	38.7	32.3	41.2	39.4	32.3	40.6	36.5	37.9
	DKL38-25 RR	39.2	40.9	41.1	40.6	34.0	41.7	39.3	33.6	42.7	*	*
	MB52140 RR	39.6	41.7	40.3	40.8	32.9	43.5	40.2	33.7	43.5	*	*
	MB52142 RR	39.5	43.0	39.5	41.2	32.8	42.6	40.2	34.9	42.2	*	*
	IS7145 RR	39.9	42.8	39.4	41.3	33.8	43.7	41.1	34.3	43.0	*	*
	DKL52-41 RR	*	*	39.2	41.2	*	*	*	*	*	*	*
	IS3057 RR	*	*	40.0	40.6	*	*	*	*	*	*	*
Wilbur-Ellis Co.	RangeRR	39.2	42.3	39.5	40.5	33.5	41.3	40.0	33.3	43.1	*	*
	INT 3789 RR	38.0	40.9	38.5	39.8	31.9	40.0	38.7	32.9	41.4	*	*
University of Idaho Canola	Premier	38.1	41.3	39.9	39.0	31.7	41.4	38.8	31.1	41.9	35.6	38.5
	Clearwater CL	38.8	40.8	40.9	40.0	33.9	40.6	39.0	32.4	42.5	37.1	39.3
	99CFSC.43.20 CL	37.5	39.7	37.7	38.9	31.8	40.1	38.2	31.6	41.6	36.4	38.0
	03.IL.1 CL	36.6	39.4	38.8	37.5	31.1	38.0	37.9	31.0	39.4	35.2	37.7
	03.IL.5 CL	39.1	42.7	39.1	40.9	33.1	41.2	40.2	32.5	42.8	37.8	39.5
	03.IL.4 CL	38.3	41.0	38.6	40.4	32.3	41.5	39.0	31.0	42.3	35.6	37.2
	UISC00.1.3.5	37.1	39.9	38.2	39.0	31.0	38.7	37.8	31.7	40.5	36.5	38.3
	UISC00.3.1.17	39.9	44.3	39.9	41.3	33.4	42.6	41.7	32.5	43.5	37.6	41.0
	UISC00.3.8.DE	38.8	41.5	39.6	39.8	33.0	42.1	39.4	32.0	42.7	38.0	39.7
University of Idaho Industrial Rapeseed	Sterling	39.4	41.8	40.4	40.9	33.9	40.6	41.0	34.1	42.7	37.2	39.9
	Gem CL	40.4	42.4	41.3	41.5	35.0	41.7	40.8	36.0	44.6	38.2	39.4
	03.IH.1 CL	38.7	40.6	40.0	40.0	33.6	40.9	39.7	32.2	42.6	37.7	39.8
	03.IH.4 CL	39.2	41.6	40.9	40.7	34.3	41.2	40.2	32.2	42.5	39.4	41.0
	UISH00.3.19.23	39.4	40.9	40.3	41.4	34.9	41.6	40.5	33.2	42.6	38.5	40.5
	MEAN	38.9	41.5	39.7	40.3	33.2	41.1	39.7	33.3	42.4	37.0	39.3
	LSD (p=0.05)	0.4	0.8	1.9	1.2	1.4	1.4	1.4	1.2	1.0	1.4	1.4
	C.V.		1.4	3.3	2.1	2.9	2.4	2.6	2.5	1.7	2.7	2.6