

2005 PACIFIC NORTHWEST SPRING CANOLA VARIETY TRIAL RESULTS

Jim B. Davis¹, Jack Brown¹, Don Wysocki² and An Hang³

¹PSES Dept., University of Idaho, Moscow, ID 83844-2339

²Columbia Basin Agricultural Research Center, Oregon State University, Pendleton, OR

³Irrigated Agriculture Research and Extension Center, Washington State University, Prosser, WA

ABSTRACT

A canola variety trial with 27 cultivars or advanced breeding lines and five control cultivars was grown at 13 locations in Oregon, Washington, and Idaho. Cultivar mean yields ranged from 1218 to 1969 lbs. per acre when averaged across selected locations. Mean yields for individual locations ranged from 201 to 2968 lbs. per acre, and the overall mean was 1633 lbs. per acre. Mean oil content of the cultivars ranged from 37.0% to 39.7%.

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 twelve years of spring canola testing, the project has evaluated 168 different spring cultivars representing 20 companies. In 2005, 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', and UISH00.3.19.23, which are industrial rapeseed (*B. napus*) cultivars. Entries ending in "RR" are Roundup Ready[®] types (resistant to glyphosate herbicide), while "CF" denotes Clearfield[®] canola (resistant to imazamox herbicide) or varieties that are resistant to the imidazolinone class of herbicides. The companies that entered cultivars are listed with the yield data in Table 2.

The 2005 trials were planted at thirteen locations: Dayton, WA; Othello, WA; Colfax, WA; Rosalia, WA; Fairfield, WA; Davenport, WA; Moscow, ID; Genesee, ID (two sites); Craigmont, ID; Bonners Ferry, ID; Hermiston, OR; and Pendleton, OR. 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 for *B. rapa* cultivars. Plot size was 4 feet by 16 feet. All trials were grown on recrop ground and were fertilized according to local practice. The date of flower onset and plant height at maturity was 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 at eleven selected locations.

Table 1. Location, location code, tillage regime, and planting date of trials in the 2005 Pacific Northwest Spring Canola Variety Trial.

Location	Location Code	Tillage Regime	Planting Date
Bonners Ferry, ID	BONN	tilled	April 25
Moscow, ID	MOSC	tilled	April 25
Genesee, ID	GENE	tilled	April 27
Genesee, ID	GE-N	no till	April 22
Craigmont, ID	CRAG	no till	May 26
Davenport, WA	DAVE	no till	April 8
Fairfield, WA	FAIR	tilled	April 21
Rosalia, WA	ROSA	no till	April 21
Colfax, WA	COLF	no till	April 6
Othello, WA	OTHL	irrigated	April 18
Dayton, WA	DAYT	no till	May 3
Pendleton, OR	PEND	tilled	March 25
Hermiston, OR	HERM	tilled	March 31

RESULTS AND CONCLUSIONS

The earliest cultivar, ‘Goldrush,’ began flowering 48 days after planting (Table 3). Flowering dates for the remainder of the cultivars ranged from 57 to 63 days. Mean plant height ranged from 43 to 52 inches (Table 3). A limited amount of lodging was observed at several sites, but at the Bonner Ferry site, lodging was widespread and severe in some cases. Mean lodging scores there ranged from 2.3 to 8.8, with about half of the cultivars having an intermediate amount of lodging and only a few having severe lodging (Table 3).

Of the 13 sites planted, 12 were harvested for yield data. The site at Dayton was lost to severe deer and elk feeding damage. The mean yield of the trial varied widely across locations. The Genesee direct seed site had the highest yield, 2968 lbs. per acre (Table 2), and the Pendleton site, which was particularly dry in 2005, had the lowest yield, 201 lbs. per acre. Yields of the cultivars averaged across nine typical and uniform locations ranged from 1218 to 1969 lbs. per acre. Locations included in this mean were Bonners Ferry, Moscow, Genesee (conventional tillage), Genesee (direct seed/no till) Craigmont, Davenport, Fairfield, Rosalia, and Colfax. Data from three

locations were excluded from the mean. Pendleton and Hermiston were not included because numerous varieties were not planted there, and data from the Othello were not included because that site was irrigated and represented a very different growing regime.

Mean oil content at each site ranged from 34.4% at Pendleton to 40.9 % at Bonners Ferry (Table 3). Oil content by cultivar, averaged across nine selected locations, ranged from 37.0% to 39.7%. Oil data from two locations, Pendleton and Hermiston, were not included in the mean for the reason discussed above. Oil content was not measured on samples from Rosalia due to severe wild oat contamination.

Most cultivars produced acceptable yields with 75% of the lines producing more than 1500 lbs per acre when average across nine locations. Nineteen of the test entries yielded more than four of the five controls. The highest yielding control was Hyola 401, which ranked fifth in the trial. The best performing cultivars were Hyola 357 Magnum RR, 03H252 RR, UISC00.1.3.5, V1032 RR, Hyola 401, and DKL 38-25 RR. All six lines yielded at least 1800 lbs. per acre when averaged across nine locations. SW Marksman RR, a strong performer in 2004, fell from just over 1900 lbs. per acre in 2004 to approximately 1600 lbs. per acre in 2005, possibly due to its lateness coupled with higher temperatures in 2005.

Table 2. Yield data for 32 cultivars in the 2005 Pacific Northwest Spring Canola Variety Trial including mean yield (lbs. per acre), rank by mean yield, and yield by location (lbs. per acre). Mean yield is the mean of the data from the BONN, MOSC, GENE, GE-N, CRAG, DAVE, FAIR, ROSA, and COLF locations. An asterisk (*) indicates that the variety was not tested at that site. Location codes and planting dates can be found in Table 1.

Variety	Mean Yield	Yield Rank	Yield by Location											
			BONN	MOSC	GENE	GE-N	CRAG	DAVE	FAIR	ROSA	COLF	OTHL	PEND	HERM
Trial Controls														
Hyola.401	1818	5	3035	1493	1433	3013	1081	1133	2203	1514	1456	1425	311	1683
Westar	1522	22	2119	1602	1182	2659	545	905	1641	1124	1925	1201	178	1443
Profit	1522	22	2337	1510	1121	2616	935	968	1536	1122	1549	1240	142	1131
Hero	1500	26	2176	1466	936	2918	531	1008	1676	1210	1584	1187	125	1525
Goldrush	1550	21	2318	994	965	3002	536	1308	2344	1055	1431	1004	190	1368
Cargill Specialty Oils														
IMC.111 RR	1218	31	2439	889	622	2264	360	407	1606	690	1684	681	*	*
IMC.209 RR	1326	29	1806	1115	913	2614	668	660	1429	867	1859	823	184	1666
V1030 RR	1722	11	2866	1559	1344	2924	1376	799	1576	1154	1903	1869	*	*
V1031 RR	1756	8	2809	1560	1803	3030	1279	792	1823	1077	1629	2115	*	*
V1032 RR	1835	4	2965	1815	1495	3025	1144	1244	1837	1098	1889	1156	*	*
03H252 RR	1944	2	3186	1736	1445	3394	1414	871	1917	974	2555	3014	*	*
Dow AgroSciences														
US.040501 CF	1636	17	2723	1601	1044	2919	457	821	1958	1352	1850	1339	*	*
US.040502 CF	1518	24	2727	1294	1300	2564	461	767	1834	1064	1653	780	*	*
US.040503 CF	1247	30	2153	935	809	2718	341	555	1672	706	1338	708	*	*
US.040504 CF	1651	16	2662	1390	1169	2857	326	669	2161	1620	2007	1155	*	*
US.050505	1720	13	2739	1719	1161	3135	903	930	1940	1091	1864	1681	*	*
InterState Seed/Monsanto														
DKL34-55 RR	1486	27	*	*	1139	3174	727	960	1852	1064	*	1338	*	*
DKL35-85 RR	1431	28	*	*	1108	2898	947	912	1734	989	*	1598	*	*
DKL38-25 RR	1815	6	*	*	1378	3647	1282	1233	2171	1182	*	1950	*	*
Hyola.357MagnRR	1969	1	*	*	1545	3618	1480	1320	2363	1486	*	1714	*	*
SW.Marksman RR	1608	19	*	*	1405	3091	921	978	1943	1310	*	1609	*	*
SW.Patriot RR	1721	12	*	*	1460	3156	1115	1196	2057	1339	*	1873	*	*
University of Idaho														
Sunrise	1679	15	2796	1530	1115	2885	946	1079	1736	1169	1857	1170	198	1619
Clearwater CF	1739	10	2742	1730	1294	3038	858	730	1939	1126	2194	1179	200	1509
Premier	1627	18	2751	1525	1170	2906	589	1199	1818	983	1704	1048	179	1743
Sterling	1505	25	2480	1019	1108	2919	641	960	1743	1057	1623	1387	195	1386
Gem CF	1591	20	2574	1348	1269	3063	641	974	1983	985	1486	1402	242	1517
UISC00.1.3.5	1857	3	2854	1361	1112	3177	1286	1035	2344	1555	1988	1227	255	1686
UISC00.3.1.7	1743	9	2838	1461	1033	3030	876	980	2214	1095	2156	1303	186	1600
UISC00.3.1.17	1781	7	2769	1776	1493	2996	795	1177	2490	943	1589	1081	201	1444
UISC00.3.8.DE	1698	14	2229	1433	1373	2902	740	1187	2259	1386	1773	1014	200	1651
UISH00.3.19.23	1518	24	1958	1625	1267	2836	660	1279	1566	884	1583	656	237	1896
Mean	1633		2579	1442	1219	2968	839	970	1918	1133	1774	1341	201	1554
LSD	349		464	302	290	450	299	218	301	260	560	357	NS	NS

Table 3. Performance of 32 cultivars in the 2005 PNW Canola Variety Trial including mean days to flowering from planting date, mean plant height (inches), mean lodging score, mean oil content (%), and oil content by location (%). Mean oil content is the mean of the data from the BONN, MOSC, MO-N, GENE, GE-N, CRAG, ROSA, COLF, and DAYT sites. An asterisk (*) indicates that the variety was not tested at that site. Location codes and planting dates can be found in Table 1.

Variety	Days to Flower	Plant Height	Lodging Score	Mean Oil Content	Oil Content by Location											
					BONN	MOSC	GENE	GE-N	CRAG	DAVE	FAIR	COLF	OTHL	PEND	HERM	
Trial Controls																
Hyola.401	57	43	7.3	37.2	41.0	36.4	35.7	40.0	37.3	36.5	37.4	35.1	35.4	34.3	40.7	
Westar	60	46	6.3	37.9	40.2	37.7	35.7	40.0	36.4	37.9	38.2	38.1	36.9	33.5	40.0	
Profit	60	45	3.8	39.3	41.8	38.9	37.5	40.4	39.7	37.6	39.4	39.7	38.6	34.8	41.7	
Hero	59	46	4.8	38.8	40.2	38.9	36.8	41.1	37.3	38.7	39.7	37.8	38.3	33.3	40.5	
Goldrush	48	45	4.8	37.4	40.1	36.4	35.3	41.0	34.9	39.1	39.3	34.6	35.9	32.8	38.8	
Cargill Specialty Oils																
IMC.111 RR	63	50	8.3	37.4	41.3	36.9	34.5	41.2	36.2	34.4	38.1	37.4	37.1	*	*	
IMC.209 RR	62	51	8.8	38.6	40.8	38.1	37.0	40.3	37.1	37.5	39.2	39.5	38.2	35.1	40.7	
V1030 RR	60	50	8.3	39.2	41.7	38.4	37.6	40.7	38.9	37.8	39.8	38.4	39.3	*	*	
V1031 RR	60	51	5.8	39.5	41.7	38.4	37.2	42.0	39.6	37.3	40.4	38.9	40.0	*	*	
V1032 RR	60	50	8.5	38.7	41.0	38.2	37.2	41.3	37.8	37.7	39.4	38.4	37.1	*	*	
03H252 RR	60	50	9.0	39.1	41.6	38.3	37.5	42.0	39.6	36.8	38.7	38.9	38.9	*	*	
Dow AgroSciences																
US.040501 CF	61	48	8.0	37.3	39.4	37.2	35.1	38.8	36.0	35.2	39.1	37.9	36.7	*	*	
US.040502 CF	62	48	8.3	38.3	40.9	39.0	36.1	41.3	37.9	35.9	39.0	38.8	36.4	*	*	
US.040503 CF	63	48	8.8	37.5	40.4	35.9	35.4	40.9	35.9	35.2	39.5	38.0	36.1	*	*	
US.040504 CF	62	49	7.5	38.1	41.0	38.7	36.2	39.0	36.1	36.5	39.6	38.2	38.1	*	*	
US.050505	60	49	6.5	37.6	39.9	37.3	35.3	40.0	36.8	36.8	38.2	37.2	37.2	*	*	
InterState Seed/Monsanto																
DKL34-55 RR	61	49	*	38.9	*	*	37.2	40.9	38.2	38.1	39.8	*	39.3	*	*	
DKL35-85 RR	61	50	*	37.5	*	*	35.7	40.2	38.1	36.1	37.2	*	37.7	*	*	
DKL38-25 RR	61	52	*	39.3	*	*	37.7	41.1	39.9	39.4	39.7	*	38.2	*	*	
Hyola.357MagnRR	57	43	*	37.3	*	*	36.3	40.3	38.2	36.7	36.1	*	36.5	*	*	
SW.Marksman RR	59	51	*	39.2	*	*	36.7	41.3	38.5	39.7	39.8	*	39.4	*	*	
SW.Patriot RR	58	48	*	38.6	*	*	36.2	40.9	38.5	39.3	38.8	*	37.9	*	*	
University of Idaho																
Sunrise	60	45	5.3	38.1	40.9	36.5	35.0	40.4	38.3	37.3	38.7	37.8	37.6	34.2	38.8	
Clearwater CF	60	49	7.8	37.9	41.2	37.1	36.5	40.4	38.2	35.4	37.4	37.7	37.5	35.0	40.6	
Premier	59	44	6.0	37.5	41.0	37.7	35.4	39.0	35.4	37.6	36.9	37.2	37.3	33.7	41.1	
Sterling	59	43	5.3	38.0	41.2	36.3	35.4	42.5	35.5	37.8	39.4	37.1	37.3	35.0	38.9	
Gem CF	58	47	4.8	38.6	42.0	36.9	36.0	42.4	37.2	37.4	40.4	38.1	37.1	36.6	40.3	
UISC00.1.3.5	58	45	4.0	37.0	39.4	36.2	35.2	40.0	37.3	36.2	38.0	35.9	34.6	32.5	38.2	
UISC00.3.1.7	60	49	7.0	37.5	40.1	36.8	35.8	39.5	37.4	36.4	37.5	38.0	36.0	34.1	38.3	
UISC00.3.1.17	57	47	4.0	39.7	41.8	40.1	38.5	41.8	38.8	38.0	41.1	38.6	38.5	35.9	41.5	
UISC00.3.8.DE	56	45	2.3	38.5	40.9	37.9	35.9	41.1	37.0	38.7	38.5	39.0	37.6	34.9	41.4	
UISH00.3.19.23	59	46	4.3	39.1	41.3	38.2	37.3	41.7	36.9	40.0	40.1	38.4	38.0	35.5	39.9	
Mean	59	48	6.3	38.3	40.9	37.6	36.3	40.7	37.5	37.3	38.9	37.9	37.5	34.4	40.1	
LSD	1	4	1.6		0.8	1.0	1.5	2.0	1.6	1.3	2.0	1.5	1.1	1.2	1.9	