

2004 PACIFIC NORTHWEST SPRING CANOLA VARIETY TRIAL RESULTS

Jim B. Davis¹, Jack Brown¹, Don Wysocki² and Duane Johnson³

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

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

³Northwest Ag Research Center, Montana State University, Kalispell, MT

ABSTRACT

A canola variety trial with 28 cultivars or advanced breeding lines and five control cultivars was grown at 15 locations in Oregon, Washington, Montana, and Idaho. Cultivar mean yields ranged from 1211 to 2129 lbs. per acre when averaged for selected locations. Mean yields for individual locations ranged from 424 to 2218 lbs. per acre, and the overall mean was 1675 lbs. per acre. Mean oil content of the cultivars ranged from 38.4% to 41.2%.

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 alternate, spring-planted 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 been successful in attracting cultivar entries from seed companies marketing canola in the PNW. During the eleven years of spring canola testing, the project has evaluated 155 different spring cultivars representing 19 companies. The trial is funded in part by the Pacific Northwest Canola Research Program, the Idaho Canola and Rapeseed Commission, 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" 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 other entries are *B. napus* types with canola-quality except for 'Sterling', 'Gem', and the three "UISH" entries, 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 2004 trials were planted at fifteen locations: Dayton, WA (two sites); Colfax, WA; Rosalia, WA; Davenport, WA; Moscow, ID (two sites); Genesee, ID (two sites); Craigmont, ID; Grangeville, ID; Bonners Ferry, ID; Kalispell, MT; 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. 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 2004 Pacific Northwest Spring Canola Variety Trial.

Location	Location Code	Tillage Regime	Planting Date
Bonnors Ferry, ID	BONN	conventional tillage	April 19
Colfax, WA	COLF	direct seed	April 14
Craigmont, ID	CRAG	direct seed	April 13
Davenport, WA	DAVE	direct seed	April 22
Dayton, WA (#1)	--	conventional tillage	April 9
Dayton, WA (#2)	DAYT	direct seed	May 3
Genesee, ID	GENE	conventional tillage	April 13
Genesee, ID	GE-N	direct seed	April 7
Grangeville, ID	--	direct seed	April 13
Hermiston, OR	HERM	conventional tillage	March 25
Kalispell, MT	KALI	conventional tillage	April 26
Moscow, ID	MOSC	conventional tillage	April 11
Moscow, ID	MO-N	direct seed	April 30
Pendleton, OR	PEND	conventional tillage	March 19
Rosalia, WA	ROSA	conventional tillage	April 7

RESULTS AND CONCLUSIONS

Of the 15 sites planted, 13 were harvested for yield data. The conventional tillage site at Dayton, WA suffered from a severe wild oat infestation, and had irregular emergence and poor growth. The site at Grangeville also suffered from poor emergence, possibly due to cold and wet conditions after planting. Both sites were abandoned.

The earliest cultivar, 'Goldrush,' began flowering 53 days after planting (Table 3). Flowering dates for the remainder of cultivars varied widely with both early and late cultivars in the trial. Days to flower for *B. napus* cultivars ranged from 59 to 72 days. Mean plant height ranged from 49 to 60 inches (Table 3).

High winds just prior to harvest caused significant amounts of pod shatter and seed loss in some cultivars at two locations, Genesee direct seed and Dayton direct seed. Shattering was scored at harvest and was rated on a scale of 1 to 9, with a score of 1 assigned to plots with 100% seed loss, and a score of 9 assigned to plots with no seed loss. The lone *B. rapa* cultivar in the trial, Goldrush, had little or no seed loss due to shatter. Mean shatter scores for individual *B.*

napus varieties ranged from 5.25 to 8.75 (Table 3). The amount of seed loss due to shattering did not appear to be related to maturity; some early maturing lines had little shattering, while some late lines had a high degree of shattering.

The mean yield of the trial varied widely across locations. The Dayton direct seed site had the highest yield, 2218 lbs. per acre (Table 2), and the Davenport site had the lowest yield, 872 lbs. per acre. Yields of cultivars averaged across eight typical and uniform locations ranged from 1211 to 2129 lbs. per acre. Locations included in this mean were Bonners Ferry, Moscow (conventional tillage), Moscow (direct seed), Genesee (conventional tillage), Craigmont, Davenport, Rosalia, and Colfax. Data from four locations were excluded from the mean. Pendleton and Hermiston were not included because several varieties were not planted there, and data from the Dayton and the Genesee direct seed sites were not included because those sites had differential seed loss among varieties from pod shatter as discussed above.

Mean oil content at each site ranged from 36.7% at Colfax to 42.2% at Rosalia (Table 3). Cultivar oil content, averaged across nine selected locations, ranged from 38.4% to 41.2%. Oil data from two locations, Pendleton and Hermiston, were not included in the mean, because several varieties were not planted at those sites.

Most cultivars produced acceptable yields, and yields were higher than those in 2003. The best performing cultivars were Hyola 401, DKL 223 RR, SW Marksman RR, and Hyola 357 Magnum RR. All four lines yielded 1900 lbs. per acre or above when averaged across the eight locations.

Table 2. Yield data for 33 cultivars in the 2004 Pacific Northwest Spring Canola Variety Trial including mean yield, rank by mean yield, and yield by location. Mean yield is the mean of the data from the BONN, MOSC, MO-N, GENE, CRAG, DAVE, ROSA, and COLF locations. Trials at GE-N and DAYT sites had differential seed loss due to pod shattering and were not included in the mean, and the trials at the PEND and HERM sites had fewer entries that the other sites and also were not included in the mean. 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	MO-N	GENE	GE-N	CRAG	DAVE	ROSA	COLF	DAYT	PEND	HERM	KALI
	lbs. per acre		----- lbs. per acre -----												
Trial Controls															
Westar	1527	21	1472	3371	1048	932	1048	1726	917	1433	1321	1786	1827	1518	1343
Profit	*		1140	*	1597	2126	1597	*	808	*	*	1591	1275	1958	1740
Hyola 401	2129	1	2191	3221	1705	2460	1705	2108	1318	1943	2087	2859	2417	2211	1772
Goldrush	1595	18	1055	3005	1284	1699	1284	1884	731	1681	1422	2739	1802	1828	1027
Hero	1401	27	1014	2951	1534	1200	1534	1287	917	1263	1045	1407	1642	1480	1371
University of Idaho															
Sunrise	1510	24	1667	3025	1412	1403	1412	1130	824	1444	1177	2083	1548	1841	1804
Clearwater CF	1622	16	1702	3213	1257	1969	1257	1264	604	1568	1395	2301	1586	1713	1582
Premier	1454	26	1596	2580	1044	1198	1044	1583	944	1451	1235	1836	1895	1029	1811
Sterling	1713	12	1702	2554	1556	1855	1556	1847	985	1676	1527	2080	1964	1927	2055
Gem CF	1505	25	943	2819	1235	2141	1235	1705	647	1251	1300	2330	1733	1392	1803
UISC00.1.3.5	1866	6	1720	3166	1915	2726	1915	1549	734	1680	1435	2701	2005	2051	1629
UISC00.3.1.7	1614	17	1771	2571	1507	2021	1507	1227	1246	1317	1248	2589	1773	1914	1600
UISC00.3.1.17	1637	15	1557	2943	1394	1787	1394	1702	639	1650	1425	2759	1942	1445	2125
UISC00.3.8.DE	1833	9	1587	3562	1636	1581	1636	2010	987	1761	1536	2760	1775	1298	1913
UISC02.4.18	1660	14	1709	2773	1382	2057	1382	1256	1100	1593	1412	2475	1472	1573	1760
UISH00.3.13.25	1548	20	1305	2994	1673	1850	1673	1566	812	1252	932	1687	1914	1461	2237
UISH00.3.19.23	1521	23	1426	2377	1511	2128	1511	1501	890	1469	869	1806	1821	1880	*
UISH03.2	1565	19	1489	3027	1617	1631	1617	1470	658	1432	1197	1910	1811	1898	1353
Monsanto															
DKL 223 RR	2086	2	2488	3390	1930	2266	1930	1742	1179	1740	1952	3316	1984	1701	2096
Interstate Seed															
Hylite 225	1806	10	2127	3194	1774	1787	1774	2060	637	1513	1352	2260	1931	1727	2096
Hyola 357 Magn	1900	5	1972	3192	1406	2562	1406	1598	784	1652	2033	2973	2054	2038	1827
SW Marksman RR	1923	3	2285	2864	1666	2725	1666	1836	1174	1605	1231	2314	1892	2276	2304
Hylite 292 CF	*		*	2950	*	*	*	1279	*	1495	1317	*	*	*	*
SW Arrow	*		*	3005	*	*	*	1901	*	1528	1356	*	*	*	*
SW Patriot RR	*		*	3181	*	*	*	1890	*	1753	1373	*	*	*	*
Croplan Genetics															
KAB 36 CF	1676	13	1907	2895	1255	2166	1255	1787	872	1243	1284	2466	*	*	2488
HyClass 2061 RR	1838	8	2272	3067	1522	2389	1522	1613	862	1854	1126	2282	*	*	2319
Cargill Specialty Oils															
IMC 209 RR	1387	28	1966	1882	906	1803	906	1367	662	1316	1195	1474	*	*	1831
IMC 210 RR	1526	22	1611	2756	1348	1922	1348	1829	724	1202	818	1603	*	*	1492
CNH 1501 RR	1779	11	2350	2796	1534	2051	1534	1777	992	1464	1270	2483	*	*	1827
CNH 1503 RR	1841	7	2148	3481	1466	2422	1466	1712	787	1355	1354	2144	*	*	1871
CNH 1604 RR	1906	4	2415	3365	1736	2019	1736	1815	1181	1641	1080	2139	*	*	1343
CNR 603 RR	1211	29	1310	1796	763	1638	763	1256	539	1288	1097	1393	*	*	1558
Mean	1675		1737	2908	1454	1950	2183	1612	872	1505	1315	2218	1812	1735	1792
LSD			523	692	457	502	443	388	NS	278	245	342	380	518	927
C.V.			21.4	17.0	22.3	18.3	14.4	17.2	38.5	13.2	13.2	11.0	14.8	21.1	17.8

Table 3. Performance of 33 cultivars in the 2004 PNW Canola Variety Trial including mean days to flowering from planting date, mean plant height, mean pod shatter score, mean oil content, and oil content by location. Mean oil content is mean of the data from the BONN, MOSC, MO-N, GENE, GE-N, CRAG, ROSA, COLF, and DAYT sites. Data from the trials at the PEND and HERM were not included in the mean, because those sites had fewer entries than the other 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	Pod Shatter	Mean Oil Content	Oil Content by Location										
					BONN	MOSC	MO-N	GENE	GE-N	CRAG	ROSA	COLF	DAYT	PEND	HERM
Trial Controls															
Westar	67	55	7.9	39.1	40.7	39.6	39.4	37.1	40.8	39.7	41.5	36.7	36.4	37.7	40.0
Profit	62	54	5.4	*	40.7	*	42.0	38.2	42.7	*	*	*	39.0	38.8	40.9
Hyola 401	59	49	8.8	38.9	41.3	38.4	37.7	36.7	41.4	39.9	41.4	35.2	38.4	36.9	38.7
Goldrush	53	53	9.0	39.3	34.9	40.4	39.8	37.8	41.5	41.2	41.7	37.2	39.5	37.3	39.6
Hero	66	54	6.6	39.1	36.9	39.6	40.8	36.6	41.1	41.0	42.5	36.4	36.8	37.5	38.7
University of Idaho															
Sunrise	68	55	7.5	38.7	40.9	38.4	39.1	36.3	41.3	37.6	42.2	36.1	36.2	38.2	40.5
Clearwater CF	68	57	7.6	39.1	41.8	38.4	37.9	37.7	42.0	37.9	42.2	36.5	37.7	37.8	38.8
Premier	65	53	6.9	39.4	40.9	38.5	39.7	37.2	41.6	40.3	42.1	36.1	38.0	37.9	39.2
Sterling	66	53	7.4	39.9	41.6	39.2	38.6	37.4	42.1	41.0	43.4	38.8	37.5	39.5	38.3
Gem CF	66	53	7.4	40.6	40.3	40.3	40.2	38.4	43.5	40.6	43.7	38.5	39.8	39.8	42.6
UISC00.1.3.5	63	54	8.4	38.5	39.6	37.6	39.7	36.3	40.4	39.6	40.0	35.4	38.0	38.7	38.9
UISC00.3.1.7	64	52	8.1	40.0	42.5	37.7	41.7	38.2	42.7	40.3	40.9	36.2	40.1	39.8	40.7
UISC00.3.1.17	62	55	8.1	41.2	42.7	40.9	40.8	38.3	43.1	41.5	43.5	38.7	41.8	38.9	42.9
UISC00.3.8.DE	63	53	8.1	40.6	42.4	39.7	41.2	37.0	41.8	42.5	44.0	37.8	39.3	37.8	41.1
UISC02.4.18	65	54	8.4	39.7	40.2	39.0	41.1	37.7	41.8	41.0	42.6	35.8	38.6	37.9	39.6
UISH00.3.13.25	67	54	5.8	40.7	41.6	40.4	40.9	38.8	42.7	41.4	43.2	39.0	38.6	39.4	40.1
UISH00.3.19.23	67	54	5.9	40.0	40.0	39.8	40.2	38.3	41.9	41.1	42.6	37.9	38.7	40.5	39.5
UISH03.2	68	54	7.4	41.0	43.5	40.6	41.0	38.0	43.5	40.2	44.0	38.8	39.5	41.3	40.9
Monsanto															
DKL 223 RR	61	54	8.3	39.2	41.9	38.1	38.8	37.6	40.7	40.1	41.0	35.7	38.7	38.2	39.0
Interstate Seed															
Hylite 225	65	53	6.6	40.6	43.0	39.4	40.5	38.5	42.3	41.7	43.3	37.3	39.2	38.8	41.8
Hyola 357 Magn	62	52	8.3	39.0	40.4	38.6	39.7	37.2	40.1	39.9	41.1	35.4	38.5	38.0	37.4
SW Marksman RR	67	55	6.8	40.5	42.9	39.6	39.5	38.1	42.5	41.3	43.2	37.3	40.3	38.7	39.0
Hylite 292 CF	68	61	*	*	*	39.4	*	*	*	41.6	42.6	36.8	*	*	*
SW Arrow	69	63	*	*	*	38.7	*	*	*	40.8	41.2	36.4	*	*	*
SW Patriot RR	68	63	*	*	*	38.9	*	*	*	41.3	41.7	37.2	*	*	*
Croplan Genetics															
KAB 36 CF	67	56	8.1	39.8	42.8	39.4	39.2	37.8	41.6	41.3	41.4	36.6	38.2	*	*
HyClass 2061 RR	67	56	6.4	40.3	42.6	39.8	39.6	38.2	42.7	40.7	42.2	37.1	40.2	*	*
Cargill Specialty Oils															
IMC 209 RR	73	57	6.0	40.3	42.7	38.1	40.8	37.9	41.8	40.2	43.3	37.4	40.4	*	*
IMC 210 RR	70	54	5.3	38.4	40.4	35.9	39.8	35.3	40.6	39.5	40.7	34.6	39.3	*	*
CNH 1501 RR	69	58	6.6	39.6	41.4	38.0	40.0	37.5	41.6	40.9	42.4	35.9	39.0	*	*
CNH 1503 RR	69	60	6.4	40.8	43.4	39.5	40.7	38.3	43.3	42.1	43.0	37.4	39.4	*	*
CNH 1604 RR	68	60	6.1	40.7	42.8	39.3	40.2	38.3	42.9	42.9	43.0	36.9	39.7	*	*
CNR 603 RR	72	57	6.4	38.8	41.6	37.2	36.9	36.7	41.3	40.2	41.4	35.1	38.7	*	*
Mean	66	55	7.2	39.8	41.3	38.9	39.9	37.6	41.9	40.5	42.2	36.7	38.9	38.6	39.9
LSD					2.3	0.9	NS	1.2	1.2	1.5	1.3	0.9	1.3	2.3	2.8
C.V.					4.0	1.6	4.7	2.3	2.1	2.7	2.3	1.8	2.3	4.1	4.9