

## 2007 PACIFIC NORTHWEST MUSTARD VARIETY TRIAL RESULTS

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### ABSTRACT

A mustard variety trial with eighteen cultivars or advanced breeding lines was grown at eleven locations in Oregon, Washington, and Idaho. Cultivar mean yields ranged from 1299 to 1711 lbs. per acre when averaged across locations. Mean yields for individual location yields ranged from 504 to 2533 lbs. per acre, and the overall mean was 1470 lbs. per acre.

### INTRODUCTION

During the past fifteen years, canola acreage in the Pacific Northwest (PNW) has increased dramatically, and the PNW has become a center of canola production in the U.S.A. In preliminary trials during the early 1990s, yellow mustard (*Sinapis alba*) and oriental mustard (*Brassica juncea*) were found to be better adapted than spring canola to those areas in the PNW with high summer temperatures and low rainfall. In 1992, the University of Idaho started yellow mustard and oriental mustard breeding programs and has since released two cultivars, 'IdaGold' and 'Pacific Gold,' that are suitable for production in the PNW. The University of Idaho has also worked with a third market class of mustard, brown mustard (*B. juncea*), and a new cultivar in this class, 'Kodiak,' is currently being evaluated and increased. Unlike the situation with spring canola where several commercial companies are developing and testing new cultivars, the University of Idaho has the only mustard breeding program in the U.S.A. The success of these breeding efforts is determined in part by having good yield trials to test the adaptability of potential cultivars and parents. The Pacific Northwest Mustard Variety Trial (PNWMVT) was established in 1999 to evaluate existing cultivars as well as new breeding lines in the wide range of environments found in the inland PNW.

From 2003 to 2006, the Idaho Canola and Rapeseed Commission provided funding to support multiple location yield trials for advanced mustard breeding lines. The trial was continued in 2007 with funding from the University of Idaho Canola, Rapeseed and Mustard Program. Over the past five years we have evaluated 32 different yellow mustard cultivars/advanced breeding lines, 20 different Oriental cultivars or breeding lines, and three different Dijon/brown mustard types in trials throughout Idaho and the Pacific Northwest. Many lines have been tested for more than one year, resulting in a total number of 102 entries over the five years of testing. Approximately half of the eight to fifteen locations each year were grown in a direct seed system.

### MATERIALS AND METHODS

Eleven yellow mustard (*S. alba*) cultivars or advanced breeding lines, five oriental mustard (*B. juncea*) cultivars, and two brown mustard cultivars (*B. juncea*) were tested at 11 locations in the Inland Pacific Northwest. 'IdaGold' yellow mustard was developed at the University of Idaho and is

commercially available in the region. ‘AC Pennant’ and ‘Tilney’ yellow mustards have been grown commercially in the PNW, and seed of these cultivars is available during some, but not all years. The yellow mustard cultivars ‘Viscount’ and ‘AC Base’ are reported to have good processing quality, but they have not been widely available in the PNW. ‘Andante’ and ‘Ace’ are relatively new cultivars and they have not been tested in the PNW before this season. ‘Pacific Gold’ oriental mustard was developed at the University of Idaho and is also commercially available. ‘Cutlass’ is a Canadian oriental mustard cultivar that has been grown widely in the northern Great Plains of the U.S.A. and Canada. ‘Kodiak’ brown mustard is another University of Idaho cultivar, and Foundation Seed of it was produced in 2005. ‘Duchess’ is also a brown mustard, but it has not been grown in the PNW previously. All other numbered lines are selections from the University of Idaho breeding program. This is the third year that the two “CY” yellow mustard breeding were regionally tested, and the second year that ‘UI.3277.74’ has been tested regionally. This year is the first time that the three “BJ.OZ” breeding lines have been in the trial.

The 2007 trials were planted at eleven locations: Bonners Ferry, ID; Moscow, ID; Genesee, ID; Lewiston, ID; Craigmont, ID; Dayton, WA; Colfax, WA; Fairfield, WA; Davenport, WA; Moro, OR; and Pendleton, OR. Planting dates and tillage regimes for the harvested sites are shown in of Table 1.

**Table 1.** Location, location code, tillage regime, and planting date of trials in the 2007 Pacific Northwest Mustard 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
Lewiston, ID	LEWI	tilled	March 13
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 19
Moro, OR	MORO	tilled	March 19

At each location, the trial design was a randomized, complete block with four replications. The seeding rates were 8 lbs. of seed per acre for yellow mustard cultivars and 5 lbs. per acre for oriental and brown mustard cultivars. Plot size was 4 feet by 16 feet. All trials were grown on recrop ground after a cereal crop and were fertilized according to local practice. The date of flower onset and plant height at maturity was recorded at the Moscow and Genesee sites. 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.

## RESULTS AND DISCUSSION

The date of flowering varied from 47 to 52 days (Table 2), and yellow mustard cultivars were earlier than oriental and brown mustard cultivars by one to six days, depending on the cultivars compared. IdaGold and AC Pennant were the earliest yellow mustards, and Cutlass was the earliest oriental mustard. Lodging was observed only at the Bonners Ferry site, and most cultivars had high lodging scores (remained upright), but three breeding lines showed moderate lodging with scores between 6.0 and 7.0. One breeding line, '98.CY.50.1' had moderately severe lodging with a score of 5.0. Mean plant height of yellow mustards ranged from 58 to 62 inches, and mean plant height of oriental and brown mustards ranged from 63 to 67 inches.

The mean yield at each location varied widely. The Bonners Ferry site had the highest yield, 2533 lbs. per acre (Table 2), and the Craigmont site had the lowest yield, 504 lbs. per acre. The Craigmont yield was quite low for that area, and the poor performance there can be attributed to severely dry conditions coupled with a late June frost. Seed yields of the individual cultivars averaged across the eleven locations varied from 1299 to 1711 lbs. per acre, with the overall mean of the cultivars being 1470 lbs. per acre.

All cultivars and most breeding lines showed acceptable performance. Top performing yellow mustards from previous years, IdaGold, AC Pennant, Viscount, and Tilney remained in a pack with yields in the range of 1300 to 1400 lbs. per acre as in previous years. University of Idaho breeding lines and new-to-the-trial variety, Ace had the highest yields among the yellow mustards. Pacific Gold oriental mustard continues to be the best mustard cultivar available for the high and intermediate rainfall zones of the Inland Pacific Northwest.

When examining the yield data, readers should pay close attention to the difference in performance of the two mustard species at each location. In some locations, such as Davenport, performance of the two species was similar; however, that is not always the case. At Moro, the yield of the *S. alba* cultivars (1453 lbs. per acre) exceeded that of the *B. juncea* cultivars (1157 lbs. per acre), while the reverse was true at other locations such as Fairfield, where the *B. juncea* cultivars had a mean yield of 1896 lbs. per acre and the *S. alba* cultivars had a mean yield of 1341 lbs. per acre. Typically, yellow mustards (*S. alba*) perform better in hotter, drier regions, and oriental and brown mustards (*B. juncea*) perform better in cooler, wetter regions. In addition to these yield considerations, growers should also consider marketing, contract availability, and pricing when choosing a type of mustard to produce.

Table 2. Results of the 2007 PNWMVT including mean yield across sites (lbs./ac.), yield rank, yield by location (lbs./ac.), flower start (days after planting), plant height (inches), and lodging score (1 equals completely lodged, 9 equals completely erect).

Variety	Mean	Rank	BONN	MOSC	GENE	LEWI	CRAG	DAVE	FAIR	COLF	DAYT	PEND	MORO	Flower Start	Plant Height	Lodging Score
<b>Yellow Mustard</b>																
IdaGold	1323	8	1975	2071	2212	668	418	1012	1389	1549	1222	781	1259	47.3	61.8	7.0
Ace	1401	4	2063	1868	2110	1001	498	1079	1369	1703	1464	755	1498	49.6	61.8	7.8
Andante	1377	6	2136	2090	2334	967	405	940	1242	1567	1251	661	1553	48.9	59.3	8.3
AC.Base	1391	5	1941	2083	2280	999	388	1062	1231	1634	1313	819	1550	48.3	60.5	7.5
AC.Pennant	1368	7	2010	2138	2185	1164	435	911	1233	1504	1204	698	1565	47.4	57.8	7.5
Tilney	1316	10	1837	1860	2202	991	436	1005	1153	1528	1217	725	1518	47.9	59.8	7.8
Viscount	1319	9	1975	1789	2097	767	444	1070	1324	1543	1399	684	1419	48.8	59.6	7.3
Martigena	1299	11	1749	1886	2213	916	375	994	1371	1514	1343	743	1183	48.4	61.5	6.7
98.CY.50.1	1547	1	2453	2244	2283	956	465	1290	1526	1876	1643	775	1507	48.6	62.5	5.0
98.CY.54.7A	1526	3	2445	2275	2532	1027	478	1163	1382	1721	1566	802	1391	49.0	61.5	6.5
UI.3277.74	1541	2	2277	2007	2647	1003	480	1102	1534	1888	1615	857	1535	47.5	59.6	6.5
<b>Mean</b>	1401		2078	2028	2281	951	438	1057	1341	1639	1385	755	1453	48.3	60.5	7.1
<b>Oriental and Brown Mustard</b>																
Pacific Gold	1711	1	2394	2298	3314	917	553	1172	2182	1926	2200	522	1339	50.9	63.2	7.8
Cutlass	1600	5	2325	2452	2775	779	649	1118	1797	1770	1799	675	1460	49.9	63.2	8.3
BJ.OZ.6	1311	7	1663	1983	2626	387	488	868	1730	1615	1826	546	686	52.8	66.9	6.8
BJ.OZ.24	1640	2	2172	2240	2753	881	702	1126	1960	1930	2269	860	1152	50.9	65.2	7.8
BJ.OZ.36	1603	4	2508	2104	2754	862	626	966	1785	1788	2172	962	1105	52.1	65.2	8.0
Kodiak*	1616	3	2159	2336	3305	605	666	956	1922	1949	1998	722	1156	51.9	66.9	7.8
Duchess*	1574	6	1978	2470	2969	679	557	1085	1898	1785	2000	686	1203	52.0	63.0	7.7
<b>Mean</b>	1579		2171	2269	2928	730	606	1042	1896	1823	2038	710	1157	51	65	8
<b>Overall Mean</b>	1470		2114	2122	2533	865	504	1051	1557	1711	1639	737	1338	49.6	62.2	7.3
<b>LSD p=0.05</b>	83		346	303	428	359	192	ns	241	268	201	144	288	0.6	1.7	1.1
<b>CV</b>	15.1		11.4	10.0	11.9	29.2	26.8	16.9	10.9	11.0	8.6	13.7	15.2	1.7	3.8	10.6

\* Kodiak and Duchess are brown mustards