

2005 PACIFIC NORTHWEST WINTER CANOLA VARIETY TRIAL RESULTS

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ABSTRACT

A winter rapeseed and canola variety trial with 15 canola or industrial rapeseed (*Brassica napus*) cultivars or advanced breeding lines and five control varieties was planted at ten locations in Oregon, Washington, and Idaho. One site was lost to severe rodent damage, and second site was not harvested due to severe lodging. Mean yields from the eight locations that were harvested ranged from 2093 to 5399 lbs. per acre. Mean yields of individual cultivars across all locations ranged from 2358 to 4277 lbs. per acre. Mean oil content of the cultivars over all locations ranged from 39.0 to 41.9%. For the third year in a row, 'Baldur' was the highest yielding cultivar when averaged across the five sites, but several University of Idaho breeding lines had similar yields.

INTRODUCTION

For many years, winter rapeseed has been grown on a few thousand acres in the inland Pacific Northwest region of the U.S.A. Until the last decade, this production had been exclusively industrial rapeseed with high levels of erucic acid in its oil. During the last fifteen years the acreage has increased, and much of this new production has been with cultivars that produce canola-quality oil and meal. Many new cultivars are now available, and yield trials throughout the region are needed to evaluate these new cultivars and to identify more areas in the region that are suited to winter canola or rapeseed production. In addition, many growers would like to plant winter canola in a recrop situation rather than planting in early August onto summer fallow as is traditional. Late planting is necessitated by recrop production, and for a winter canola or rapeseed cultivar to be successful under such conditions, it must be able to establish when planted at a later date, and it must over-winter as a small plant. Pressure from increased flea beetle populations has also pushed optimum planting times to later dates. Plant breeders at the University of Idaho have been working to develop cultivars that are suited to production in a recrop situation, and these new cultivars and other available cultivars need to be tested under recrop and late planted conditions. In addition, cultivars need to be tested using new direct seed technology to determine varietal responses to tillage method.

To address these issues, the University of Idaho founded the Pacific Northwest Winter Canola Variety Trial (PNWWVT) in fall of 1995. Both commercial cultivars and advanced breeding lines have been tested. In the last ten years, the project has evaluated 98 winter cultivars or advanced lines representing ten companies. The trial is currently funded in part by the Pacific Northwest Canola Research Program and by fees paid by the commercial companies or universities that submit their cultivars or advanced breeding lines to be tested in the PNWWVT.

MATERIALS AND METHODS

Fifteen *B. napus* canola or rapeseed cultivars and breeding lines plus five controls, 'Athena' (*B. napus*), 'Baldur' (*B. napus*), 'Dwarf Essex' (*B. napus*), Ericka (*B. napus*), and 'Salut' (*B. rapa*), were tested during the 2004-2005 crop year at ten locations (Table 1). Trials were planted during early to mid-September near Pendleton and Hermiston, OR; near Rosalia and Moses Lake, WA; near Moscow (three sites), Genesee

(two sites), and Grangeville, ID. All of the above trials except for the Moses Lake site and the second Genesee site were planted on land that previously had been fallow. Planting dates are listed in Table 1. The third Moscow site was direct seeded into chem fallowed winter wheat stubble, and the second Genesee site was direct seeded into that season's barley stubble. At each location, the trial design was a randomized, complete block with four replications. Plot size was 4 by 16 ft., and the seeding rate was approximately 8 lbs. per acre. Trials were fertilized according to local practice. The date of 50% bloom was recorded at the Moscow and Genesee sites. Due to severe lodging, plant height could not be determined accurately and was not measured. Lodging scores were taken at Genesee, Grangeville, and Moses Lake. Plots that were completely erect received a score of nine, while plots that were completely and severely lodged received a score of 1. 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, tillage regime, and planting date of trials in the 2005 Pacific Northwest Winter Canola Variety Trial.

Location	Tillage Regime	Planting Date
Genesee, ID (#1)	conventional fallow	Sept 9, 2005,
Genesee, ID (#2)	direct seed, recrop	Sept 22, 2005
Grangeville, ID	conventional fallow	Sept 3, 2005
Moscow, ID (#1)	conventional fallow	Sept 9, 2005
Moscow, ID (#2)	late-planted, conventional fallow	Sept 21, 2005
Moscow, ID (#3)	direct seed, chem fallow	Sept 17, 2005
Hermiston, OR	irrigated	Sept 16, 2005
Pendleton, OR	conventional fallow	Sept 14, 2005
Moses Lake, WA	irrigated recrop	Sept 10, 2005
Rosalia, WA	conventional fallow replanted	Sept 10, 2005 Sept 24, 2005

RESULTS AND DISCUSSION

Mean flower date at Moscow was day 127 (days from Jan 1 *i.e.* May 7). The *B. rapa* cultivar Salut was the earliest, flowering on day 121. The date of flowering for *B. napus* cultivars ranged from day 124 to day 131 (Table 2). Due to rains during flowering and pod fill, all cultivars lodged to some degree. Athena was most resistant to lodging, with a score of 7.0, and several breeding lines had similar performance with scores of 6.7 and 6.9. Dwarf Essex and UIR.05.4 exhibited the worst lodging with scores of 4.2 and 4.1, respectively.

Of the ten locations planted, eight were harvested. The Genesee direct seed site was lost to severe rodent damage during the winter, and the Moscow late-planted, fallow site was so severely lodged that harvesting the plots individually was not possible. Mean yields from the sites ranged from 2093 lbs. per acre at the Moscow direct seed site to 5399 lbs. per acre at the Rosalia site (Table 2). Cultivar yields ranged from 2358 lbs. per acre to 4277 lbs. per acre when average across all locations. The trial mean was 3349 lbs. per acre, and seven University of Idaho canola breeding lines yielded above 3500 lbs. per acre, which was better than all the controls except Baldur. The cultivar with the highest mean yield was 'Baldur.' Mean oil content across all varieties and locations was 40.3% and ranged from 39.0 to 41.9% by variety (Table 3). Seed from the Moscow no till site had the highest mean oil content, 41.2%, and seed from the site at Moses Lake had the lowest, 38.9%.

Table 2. Yield results for 20 cultivars in the 2005 Winter Canola Variety Trial including mean yield (lbs. per acre), rank by mean yield, yield by location (lbs. per acre) , mean days to flower start from Jan. 1, and lodging score (1-9, where 1 equals prostrate and 9 equals erect).

Variety	Mean	Yield Rank	Moses Lake	Rosalia	Moscow	Moscow NoTill	Genesee	Grangeville	Pendleton	Hermiston	Flower Start	Lodging Score
Controls												
Dwarf Essex	3490	6	3870	6121	2196	2344	3691	3421	2945	3334	128	4.2
Ericka	2902	16	3708	3956	2481	1630	3712	2300	3097	2329	124	6.9
Athena	3379	11	4354	5064	3149	1916	4086	3486	2501	2475	126	7.0
Salut	2358	20	2753	3437	2518	1368	2876	2726	1457	1726	121	6.3
Baldur	4277	1	4223	6630	3494	3521	6290	3595	3254	3210	126	6.4
U of I Industrial Rapeseed												
UIR.03.2	2744	18	2392	4879	1793	1585	3835	2910	2021	2535	130	5.2
UIR.03.5	3277	12	4292	4950	3600	1667	3847	3019	2259	2579	127	6.3
UIR.05.1	3191	14	4142	5033	2423	1989	3596	2902	2522	2925	127	6.7
UIR.05.2	3225	13	3908	5606	3062	1793	3867	2308	2239	3017	129	4.7
UIR.05.3	2961	15	3624	5129	1919	1536	4026	2745	1730	2977	129	5.2
UIR.05.4	2677	19	2990	4542	2061	1960	3356	2072	2009	2423	131	4.1
UIR.05.5	2894	17	3295	4561	2404	1996	4034	1957	2035	2871	131	4.8
U of I Canola												
UIC.03.1	3763	3	4165	6933	3172	1926	4731	3594	3023	2560	127	6.9
UIC.03.2	3405	10	4402	4968	2877	2274	4141	3537	2453	2588	125	6.1
UIC.04.1	3618	7	4293	6117	3096	2507	3912	3350	2743	2926	130	6.6
UIC.04.2	3745	4	4097	5943	3321	2329	4718	3929	2812	2813	127	6.9
UIC.04.3	4139	2	4454	6712	2981	2566	5719	4383	3274	3027	127	6.7
UIC.04.5	3532	8	4687	4978	3020	2616	4230	2907	2970	2849	127	5.1
UIC.04.8.1	3727	5	4347	6726	3446	2339	4461	2822	2725	2947	127	5.5
UIC.04.8.2	3672	6	4807	5694	2695	2003	4949	3206	2849	3174	126	6.3
Mean	3349		3940	5399	2785	2093	4204	3058	2546	2764	127	5.9
LSD (p = 0.05)	846		901	947	1097	856	809	879	489	786	1.5	2.1

Table 3. Mean oil content and oil content (percent) by location of 20 cultivars in the 2005 Pacific Northwest Winter Canola Variety Trial.

Cultivar	Mean Oil Content	Moscow	Moscow No Till	Genesee	Grangeville	Moses Lake	Rosalia	Pendleton	Hermiston
Controls									
Dwarf Essex	40.4	41.6	41.0	40.9	38.7	39.8	39.7	40.2	41.5
Erica	39.0	40.2	38.7	39.9	38.2	38.8	38.0	39.3	39.0
Athena	40.0	40.6	40.1	41.0	39.0	38.7	39.5	40.9	40.6
Salut	37.7	38.3	38.4	36.7	37.1	38.2	36.4	39.0	37.6
Baldur	40.4	41.7	41.5	41.1	39.8	38.4	39.9	39.8	40.7
U of I Industrial Rapeseed									
UIR.03.2	40.9	41.6	42.1	41.7	39.8	40.0	40.5	40.5	41.0
UIR.05.1	41.9	42.9	43.1	42.8	41.6	39.7	41.9	40.9	42.1
UIR.05.2	41.5	43.1	42.5	42.7	39.8	39.8	40.3	42.3	41.5
UIR.05.3	41.5	42.5	42.0	42.4	40.6	40.1	41.3	41.5	42.0
UIR.05.4	39.9	40.2	41.6	40.8	37.7	39.0	40.1	40.9	39.4
UIR.05.5	40.8	41.4	42.3	41.8	38.4	39.5	40.5	41.3	40.8
UIR.03.5	41.7	43.0	42.5	42.7	41.6	39.4	41.4	41.3	41.6
U of I Canola									
UIC.03.1	40.1	41.1	41.5	41.4	38.5	38.0	39.7	40.2	40.8
UIC.03.2	40.6	41.0	40.9	41.5	39.9	39.1	40.0	40.8	41.4
UIC.04.1	40.1	41.3	41.3	40.6	39.3	37.9	39.8	39.9	41.0
UIC.04.2	39.7	39.9	40.5	40.3	39.8	38.4	39.1	39.8	39.6
UIC.04.3	39.6	40.4	40.6	40.3	38.8	38.3	39.8	39.3	39.6
UIC.04.8.1	40.3	41.3	41.7	40.7	39.2	38.9	39.3	40.1	40.8
UIC.04.8.2	39.1	40.4	40.2	39.9	38.7	37.7	38.1	39.0	39.2
UIC.04.5	40.1	39.9	41.0	40.6	39.1	39.3	39.4	40.4	40.9
Mean	40.3	41.1	41.2	41.0	39.3	38.9	39.7	40.4	40.5
LSD		1.0	1.4	1.0	1.6	1.2	1.0	ns	1.3