

Barley Research Progress Report

Project #: 4150-2400

Title: Evaluation of Barley Varieties

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Cooperators: J. Kuehner, S. Ullrich, D. von Wettstein, A. Kleinhofs, X. Chen

Reporting Period: 2008

ACCOMPLISHMENTS:

1. One winter barley and Eleven spring barley replicated nurseries were established throughout eastern Washington in 2008 that provided producers and plant breeders with performance data on a wide range of commercial and experimental lines. The winter barley nursery included 15 variety entries that were planted in nurseries at Pullman, WA. Spring nurseries evaluated 36 varieties/advanced spring breeding lines. Commercially available entries from both public and private breeding programs comprised 42% all entries in the spring nurseries. Experimental lines from the WSU Barley Program accounted for 56% of all entries and proprietary lines comprised 3% in the 2008 nurseries. No-till nurseries comprised over 45% of the spring barley nurseries utilizing a direct seed drill with cross-slot openers at the following locations: Bickleton, Endicott, Reardan, Walla Walla, and Uniontown (referred to as Genesee). The ability to direct seed plots continued to greatly enhance the capacity of the WSU Extension Uniform Cereal Variety Testing Program (Variety Testing Program) to establish nurseries at off-station sites under similar management practices used by the cooperator. Plot tours (Table 1) were held at spring barley nursery sites to discuss performance of new and existing varieties and were attended by many barley producers and agribusiness representatives. Variety performance results have been or are scheduled to be published in the WAWG *Wheat Life*, field tour brochures, WSU Extension Uniform Cereal Variety Testing Program Technical Report for 2008, WSCIA Winter and Spring Seed Buying Guides, WSU Extension Uniform Cereal Variety Testing Program Web page (<http://variety.wsu.edu/>) and electronically to Extension personnel and all other individuals requesting placement on the data release e-mail server list. All 2008 performance data was made available on both the e-mail server list and the WSU Variety Testing Web site by early September 2008. Selected seed samples from these trials were also saved and used for end-use quality analysis. Information was presented at many grower meetings/seminars throughout the state. The Variety Testing Program expanded use of a new database management system that utilizes AGROBASE™ Generation II software (Agronomix Software Inc., Winnipeg, Manitoba, Canada). This software program increased efficiency and accuracy by integrating data management, field experimental designs, and data entry and analysis.

Table 1. 2008 Crop Tours in Washington and nearby areas.

<i>Date</i>	<i>Time</i>	<i>Tour</i>	<i>Contact Information</i>
4-Jun	9:30 AM	Horse Heaven	Phil Petersen, 509-545-3511
5-Jun	6:00 PM	Connell	Phil Petersen, 509-545-3511
10-Jun	7:00 AM	Western Whitman County Research Tour	Steve Van Vleet , 509-397-6290
10-Jun	8:30 AM	Pendleton Field Day	Don Wysocki, 541-278-4396
11-Jun	7:30 AM	Moro Field Day	Don Wysocki, 541-278-4396
11-Jun	8:00 AM	Moses Lake	Andy McGuire, 509-754-2011
12-Jun	7:30 AM	U of I Weed Tour	Donn Thill, 208-885-6214
17-Jun	8:00 AM	St. John	Steve Van Vleet , 509-397-6290
18-Jun	8:00 AM	Walla Walla	John Fouts, 509-524-2685
18-Jun	8:30 AM	Organic Dryland Production Systems	Dennis Pittmann, 509-335-7484
19-Jun	8:30 AM	Lind Field Day	Bill Schillinger, 509-235-1933
20-Jun	5:00 PM	St. Andrews	Dale Whaley, 509-745-8531
24-Jun	7:00 AM	Fairfield	Diana Roberts, 509-477-2167
25-Jun	7:00 AM	Reardan	Diana Roberts, 509-477-2167
25-Jun	9:30 AM	Wilke Farm Field Day, Davenport, WA	Aaron Esser, 509-659-3210
25-Jun	7:30 AM	UI Oilseed Field Day, Parker Farm, Moscow, ID	Jack Brown, 208-885-7078
26-Jun	7:00 AM	Almira	Diana Roberts, 509-477-2167
26-Jun	7:30 AM	Bioenergy Cropping Systems Research Field Day (Palouse Conservation Field Station)	David Huggins, 509-335-3379
26-Jun	6:00 PM	Pullman	Steve Van Vleet , 509-397-6290
27-Jun	8:00 AM	Mayview	Dave Bragg, 509-843-3701
27-Jun	2:30 PM	Anatone	Mark Heitstuman, 509-243-2009
30-Jun	8:30 AM	Dayton	Paul Carter, 509-382-4741
1-Jul	6:00 PM	Pullman Twilight Pulse Crop Tour	Kevin McPhee, 509-335-9522
8-Jul	6:00 PM	Colton (Genesee/Johnson Union)	Steve Van Vleet , 509-397-6290
10-Jul	12:00 PM	Bickleton	Susan Kerr, 509-773-5817

RESULTS:

Attached summary tables (Attachments 1 - 4) provide comparisons of yield and test weight of commercial varieties and experimental lines in the 2008 winter and spring barley nurseries. Detailed information for each testing location is listed on the WSU Variety Testing web page: <http://variety.wsu.edu> and in the WSU Extension Uniform Cereal Variety Testing Program, Cereal Variety Performance Trials 2008, Technical Report (in final preparation).

Winter Barley: 2008 winter barley cultivars at the Pullman location averaged 2.52 tons per acre (5030 lbs/ac) that was lower than a 3-year trial average (5720 lbs/ac). This nursery had good emergence that resulted in a very even and uniform stand with fairly large plants going into the winter. Kamiak, a Washington State University Variety released in 1971, had the highest average yield in 2008 (5650 lbs/ac), but Kamiak averaged the lowest yield of the varieties evaluated at Pullman over the last 5 years. This shows the need for evaluating cultivars over years and locations to achieve a broad picture of adaptation and performance. Average test weight was 49.6 lbs/bu and that indicates good growing condition during the season and during grain fill.

Spring Barley: Stripe rust (*Puccinia striiformis* F. sp. *Tritici*) infections were minimal throughout most of the state. Stripe rust infection summary evaluations conducted by Dr. Xianming Chen, Plant Pathologist, USDA/ARS, Pullman, WA for all varieties included in the WSU Variety Testing Program spring barley nurseries are presented in the Variety Testing Program Annual Report and are available on the website: (<http://variety.wsu.edu/>).

Of the eleven spring barley nurseries that were established and harvested in the 2008 Variety Testing Program trials; the Lamont location is not listed in the 2008 data presentation because field variation (CV %) in this nursery was outside the limits for providing accurate performance evaluations among the varieties/lines entered. Information from this location is available in other years results from the Variety Testing Program on the web site (<http://variety.wsu.edu/>). Most of the locations listed are within the vicinity of the towns listed; however, Mayview is a location in Garfield County approximately 25 miles northeast of Pomeroy, WA.

Spring barley acreage decreased slightly from 230,000 acres in 2007 to 205,000 acres in 2008. Feed barley accounted for 92% of total spring barley acres and Baronesse 2-row feed barley continued its dominance with 63% (129,200 acres) of all spring barley acres.

Summary evaluations for spring barley include 32 (2-row) and four (6-row) entries. Four hull-less, waxy cultivars were included in the spring barley trials. Average yield across all locations in 2008 was 3390 lbs/acre and that is lower than a previous three year average. This is due in part to environmental conditions expressed throughout the growing season that included drought/heat stresses from March through May, followed by a cool period in mid-June and July with some areas of frost in July. Timely precipitation was very beneficial to enable spring barley to mature and finish without significant yield reductions in some areas.

Across all locations, the released varieties Champion, Kent, Bob, and Radiant had significantly higher average yield than Baronesse that has dominated spring barley production since the early 1990's. Many of the 6-row entries (six-row entries are listed in italics in the data set) continued to be at the lower end of the yield rankings. This is fairly typical since 6-row types tend to produce few tillers and could have been more sensitive to wide swings in environmental conditions.

Test weight average values were 48.8 lbs/bu in 2008, and are higher than the 2007 average (48.5 lbs/bu). In addition to higher yield, Champion and Bob also had test weight values significantly higher than Baronesse indicative of emphasis placed on improving test weight in spring barley.

Four hull-less, waxy barleys were included in the trial (Meresse and Merlin from Westbred, LLC, and two WSU lines) that had exceedingly high test weight values due to most of the kernel being naked after harvest because the hulls come off. Test weight values for these cultivars had a range of 53.9 lbs/bu to 55.8 lbs/bu. Waxy barley is a type of specialty barley that has several quality traits that make it adaptable to many end uses. Most notably, waxy barley has a modified starch profile and increased levels of beta-glucans that are desirable for many food and industrial applications. Limitations of waxy barley: Generally waxy barley varieties have reduced yield between 20 and 30% compared to normal feed barley varieties. This yield reduction is in some part because most waxy barley varieties are also hull-less thus reducing their production per acre on a weight basis because of losing the hulls at harvest.

PUBLICATIONS:

1. Guy, S. and Kuehner J., Cereal Variety Performance Trials – December 2008, WSU Dept of Crop and Soil Sciences Tech Report (in final preparation).
2. Guy, S., Marsh D. and Kuehner J., Variety Testing Web Site: <http://variety.wsu.edu/>, [Sep 2007, Includes current year and historical variety data.](#)

PRESENTATIONS AND REPORTS:

1. Variety Testing Program Update, 25 Nov 2008, Spokane Co. Crop Improvement Assn Meeting, Spokane, WA, 60 participants
2. Variety Testing Program Update, 17 Nov 2008, Washington State Crop Improvement Assn Annual Meeting, Spokane, WA, 140 participants
3. Variety Testing Program Update, 5 Nov 2008, Adams Co. Crop Improvement Assn Meeting, Ritzville, WA, 25 participants
4. On behalf of the Variety Testing Program, many presentations were made at field tours and other meetings by associated individuals before the new principle investigator for the project started in that capacity in October, 2008. The variety program continued during the gap when a project leader was not in place by directions from Bill Pan, the tireless hard work of John Kuehner, and many other persons who helped with the project.

Attachments:

1. 2008 WSU Winter Barley Variety Trial Summary (Pullman, WA)
2. 2008 WSU Spring Barley Variety Trial Summary, greater than 20" PPT
3. 2008 WSU Spring Barley Variety Trial Summary, 16-20" PPT
4. 2008 WSU Spring Barley Variety Trial Summary, less than 16" PPT

Attachment 1

2008 WSU EXTENSION WINTER BARLEY NURSERY AT PULLMAN, WA.

Variety Name	5 YEAR AVERAGE (LBS/A)	3 YEAR AVERAGE (LBS/A)	2 YEAR AVERAGE (LBS/A)	2008					
				YIELD (LBS/A)	TEST WT (LBS/BU)	LODGING (%)	PLANT HT	HEAD DATE	SURVIVAL (%)
KAMIAK	5862.7	6115.3	5775.9	5648.3	51.3	4.3	33.5	145.5	100.0
OR78				5623.5	52.5	0.0	30.3	149.5	97.5
OR73				5591.8	52.3	0.0	29.8	148.8	97.5
OR77				5474.0	52.5	0.0	30.0	149.5	93.8
02Ab2586				5224.8	48.8	0.0	29.0	152.8	93.8
OR711				5155.5	41.5	0.0	31.3	166.0	92.5
SUNSTAR PRIDE	6364.5	6585.2	5907.3	5062.5	49.5	0.0	24.5	163.3	92.5
WESTBRED SPRINTER	6284.5	6389.6	5917.5	5026.8	48.5	0.0	27.8	155.3	97.5
STRIDER	6405.8	6650.8	5875.5	4993.5	50.8	0.0	27.5	148.0	96.3
02Ab2471				4910.5	50.3	0.0	26.8	151.0	95.0
OR75				4860.3	52.3	0.0	28.8	150.0	96.3
CHARLES				4841.8	47.8	0.0	27.3	151.3	88.8
02Ab2739				4745.5	48.3	0.0	27.0	154.5	91.3
HUNDRED	5953.7	6132.8	5511.5	4556.3	48.5	0.0	26.5	161.0	96.3
02Ab2701				4474.5	49.3	0.0	27.8	151.8	96.3
BOYER	6068.8	6095.9	5485.1	4281.0	49.3	0.0	27.3	156.0	98.8
C.V. %	9.9	9.3	10.9	13.2	1.8	--	--	--	--
LSD '@.10'	307.1	371.4	497.7	788.1	1.0	--	--	--	--
Average	6156.6	6328.3	5716.3	5029.4	49.6	0.3	28.5	153.4	95.3
Highest	6405.8	6650.8	5917.5	5648.3	52.5	4.3	33.5	166.0	100.0
Lowest	5862.7	6095.9	5485.1	4281.0	41.5	0.0	24.5	145.5	88.8

TABLE: 2008 WSU SPRING BARLEY TRIAL SUMMARY
Precipitation Zone= >20"

VARIETY NAME (6-row in italics)	FARMINGTON	GENESEE	PULLMAN	AVERAGE YIELD	FARMINGTON	GENESEE	PULLMAN	AVERAGE TEST WEIGHT
	YIELD (LBS/A)				TW (LBS/BU)			
04WZN-124	4493	5616	4915	5008	47.0	46.9	50.8	48.2
KENT	4608	5308	5093	5003	48.3	46.6	50.0	48.3
2004NZ151	4046	5181	5494	4907	48.7	47.3	51.2	49.1
04WA-102.49	3489	5730	4870	4696	48.4	46.5	51.2	48.7
03NZ199	3592	5693	4752	4679	46.8	45.6	48.8	47.1
2004NZ163	4313	4711	4931	4652	49.1	47.5	51.5	49.4
RADIANT	3238	5894	4629	4587	47.2	48.0	48.6	47.9
04WZN-286	4347	5021	4263	4544	48.6	49.0	52.3	50.0
04WA-122.9	4115	4778	4580	4491	49.9	48.0	51.1	49.7
04WA-113.22	4650	3809	5009	4489	49.7	47.3	49.5	48.8
02WA-7028.9	4213	4244	4933	4463	48.5	46.7	51.3	48.8
BOB	3535	4669	5142	4449	48.7	46.9	51.5	49.0
CHAMPION	4375	3429	5505	4436	50.3	46.7	52.4	49.8
RWA 1758	3723	4287	5226	4412	48.9	47.9	50.4	49.1
01NZ384	3126	5085	4797	4336	43.4	44.0	47.7	45.0
BARONESSE	3540	4217	5051	4269	48.0	48.0	49.7	48.6
04WA-122.20	4318	4672	3604	4198	47.3	47.2	50.3	48.3
CDC COPELAND	3183	5189	4092	4154	46.9	45.7	48.6	47.1
AC METCALFE	3395	4617	4424	4145	48.0	45.5	49.7	47.7
03WA-109.2	3061	4642	4605	4103	47.7	46.8	51.4	48.6
03WA-129.18	3919	3602	4729	4083	47.1	45.6	50.8	47.8
HARRINGTON	3991	3796	4344	4044	47.0	45.5	48.2	46.9
LENETAH	2641	4492	4753	3962	49.0	46.7	52.9	49.5
02WZN-1095	2504	5186	4100	3930	47.4	46.2	50.7	48.1
01NZ706	3061	3928	4596	3862	45.9	43.7	47.4	45.7
04WZN-90	2599	4232	4665	3832	48.6	48.4	50.5	49.2
04WA-101.45	2865	4033	4569	3822	48.1	47.6	51.3	49.0
04WA-113.A	3032	4132	4206	3790	48.7	47.0	52.7	49.5
LEGACY	3544	3322	4500	3789	46.8	44.7	47.9	46.5
HAXBY	1831	4852	4445	3709	48.6	48.9	52.7	50.1
SPAULDING	2141	4223	4111	3492	50.6	48.3	52.6	50.5
<i>MOREX</i>	3111	2606	4165	3294	46.9	42.6	48.8	46.1
Waxy Hulless								
01WA-13860.5	3291	3635	4109	3678	53.8	49.2	53.8	52.3
MERESSE	2721	3337	4573	3544	53.1	51.4	55.0	53.2
WA 9820-98	2629	3591	4353	3524	54.4	50.3	54.7	53.1
MERLIN	2414	3008	3566	2996	52.3	52.3	56.5	53.7
STATISTICS								
CV (%)	14	8	9	10	2.5	1.8	1.6	2.0
LSD (0.10)	644	452	568	321	1.6	1.1	1.1	0.7
Average	3435	4410	4603	4149	48.6	47.1	51.0	48.9
Highest	4650	5894	5505	5008	54.4	52.3	56.5	53.7
Lowest	1831	2606	3566	2996	43.4	42.6	47.4	45.0

TABLE: 2008 WSU SPRING BARLEY TRIAL SUMMARY
Precipitation Zone= 16"-20"

VARIETY NAME (6-row in italics)	DAYTON	MAYVIEW	REARDAN	ST. JOHN	WALLA WALLA	AVERAGE YIELD	DAYTON	MAYVIEW	REARDAN	ST. JOHN	WALLA WALLA	AVERAGE TEST WEIGHT
	YIELD (LBS/A)						TEST WEIGHT (LBS/BU)					
CHAMPION	3335	4435	2728	4906	2698	3620	48.3	54.1	51.3	49.5	48.6	50.4
LENETAH	3162	4109	2502	5042	2758	3515	48.4	51.7	49.4	49.3	48.5	49.5
BOB	2904	3723	2573	5134	3096	3486	48.8	51.6	50.9	49.7	47.9	49.8
2004NZ163	3239	3794	2343	5136	2770	3456	48.3	50.6	49.5	49.3	48.0	49.1
04WZN-90	3279	3865	2350	4783	2907	3437	48.8	51.4	50.0	48.7	48.7	49.5
RWA 1758	3094	3860	2216	4769	3172	3422	47.4	51.3	49.8	49.2	47.6	49.1
KENT	3145	4035	3040	3825	2908	3391	45.8	48.6	47.9	46.2	47.6	47.2
04WZN-124	2541	3584	2735	5257	2833	3390	47.5	49.2	48.6	46.9	46.3	47.7
RADIANT	3258	3792	2193	4768	2745	3351	47.2	49.4	50.2	46.7	45.4	47.8
BARONESSE	3012	4018	2351	4804	2499	3337	47.1	50.4	50.3	49.1	47.2	48.8
04WZN-286	2756	3596	2498	5000	2622	3294	48.2	51.6	49.7	49.7	49.0	49.6
04WA-113.22	3042	3378	2264	4473	3308	3293	47.5	51.2	49.4	48.0	47.5	48.7
04WA-122.9	2856	3903	2470	4411	2789	3286	49.1	51.2	48.9	48.6	47.7	49.1
HAXBY	3365	3884	2008	4622	2519	3280	49.6	53.4	51.7	50.6	50.7	51.2
04WA-122.20	2472	3980	2690	4357	2762	3252	47.6	49.8	48.3	46.8	46.9	47.9
04WA-101.45	2815	3822	2510	4315	2734	3239	48.0	51.1	49.3	47.9	47.8	48.8
SPAULDING	3021	3622	2859	3761	2828	3218	49.0	51.6	51.9	49.1	47.8	49.9
03WA-109.2	2827	3898	2730	4120	2397	3195	47.1	49.9	49.1	47.6	48.1	48.4
04WA-102.49	2599	3683	2554	3964	3101	3180	46.6	50.4	48.8	46.6	46.9	47.9
CDC COPELAND	2633	3233	2336	4696	2981	3176	46.2	47.2	48.7	46.2	45.1	46.7
02WZN-1095	2983	3653	2615	3929	2591	3154	48.4	51.4	49.6	47.1	47.4	48.8
02WA-7028.9	2230	3594	2903	4589	2426	3148	48.0	51.0	49.5	48.5	47.4	48.9
03NZ199	2562	3416	2550	4088	2783	3080	46.4	47.9	48.5	46.4	46.1	47.1
2004NZ151	2867	3711	2101	3773	2411	2973	47.4	49.8	49.8	46.0	47.4	48.1
HARRINGTON	2727	3520	2102	4313	1914	2915	46.1	48.2	48.6	47.2	43.2	46.7
03WA-129.18	2477	3454	1848	3861	2672	2862	47.4	50.4	48.5	48.6	47.2	48.4
04WA-113.A	2659	3593	2238	3270	2374	2827	48.9	51.5	49.4	47.9	48.0	49.1
<i>LEGACY</i>	2541	3366	1311	4067	2761	2809	45.0	48.6	45.8	46.0	46.7	46.4
AC METCALFE	2202	3195	2192	3814	2416	2764	48.0	48.8	49.0	47.3	45.8	47.8
<i>01NZ384</i>	2509	3308	1227	3795	2204	2608	45.3	47.3	44.3	45.1	44.8	45.4
<i>01NZ706</i>	1935	3325	1284	3813	2408	2553	43.6	47.1	44.9	45.0	45.3	45.2
<i>MOREX</i>	1821	2817	1089	2747	2000	2095	45.7	49.6	46.3	46.3	47.2	47.0
Waxy Hulless												
WA 9820-98	2471	3180	2142	3507	2051	2670	52.3	58.6	56.5	52.6	56.3	55.3
MERLIN	2322	2978	1465	2992	2157	2383	51.7	58.9	52.2	52.8	54.5	54.0
01WA-13860.5	2225	3016	2196	2869	1441	2349	52.4	59.0	54.3	52.7	54.9	54.7
MERESSE	2296	2730	1505	2620	1806	2191	54.2	59.4	54.4	53.9	55.9	55.6
	STATISTICS						STATISTICS					
CV (%)	10	5	9	12	16	11	1.2	1.4	1.4	1.5	1.5	1.4
LSD (0.10)	378	259	286	702	552	206	0.8	1.0	0.9	1.0	1.0	0.4
Average	2727	3585	2242	4172	2579	3061	48.0	51.2	49.6	48.3	48.1	49.0
Highest	3365	4435	3040	5257	3308	3620	54.2	59.4	56.5	53.9	56.3	55.6
Lowest	1821	2730	1089	2620	1441	2095	43.6	47.1	44.3	45.0	43.2	45.2

TABLE: 2008 WSU SPRING BARLEY TRIAL SUMMARY
Precipitation Zone= <16"

VARIETY NAME (6-row in italics)	YIELD (LBS/A)			TW (LBS/BU)		
	ALMIRA	BICKLETON	AVERAGE YIELD	ALMIRA	BICKLETON	AVERAGE TEST WEIGHT
CHAMPION	4025	3677	3851	50.3	49.5	49.9
BOB	3681	3442	3561	49.3	47.6	48.5
RADIANT	3727	3167	3447	48.0	46.7	47.4
LENETAH	3507	3350	3429	49.0	47.6	48.3
HAXBY	3751	3065	3408	50.9	50.7	50.8
04WA-113.22	3610	3090	3350	48.6	48.2	48.4
04WA-122.9	3644	3048	3346	48.7	47.8	48.3
04WZN-124	3639	3027	3333	47.9	45.6	46.8
KENT	3415	3226	3320	46.8	45.6	46.2
04WA-113.A	3650	2987	3319	49.9	49.0	49.5
04WZN-286	3471	3025	3248	50.0	49.6	49.8
BARONESSE	3272	3131	3202	47.2	47.6	47.4
2004NZ163	3399	2944	3171	48.6	47.6	48.1
02WZN-1095	3483	2778	3130	48.9	46.0	47.5
RWA 1758	3145	3105	3125	47.5	48.1	47.8
04WZN-90	3373	2874	3123	48.3	47.7	48.0
2004NZ151	3161	3035	3098	46.7	47.8	47.3
02WA-7028.9	3279	2894	3086	48.7	47.8	48.3
04WA-102.49	3295	2848	3072	47.3	46.0	46.7
03WA-109.2	3286	2853	3069	47.1	46.9	47.0
03WA-129.18	3135	2877	3006	48.1	47.8	48.0
04WA-122.20	3239	2763	3001	46.8	46.7	46.8
04WA-101.45	3095	2790	2943	47.1	47.1	47.1
<i>01NZ384</i>	3189	2635	2912	45.6	43.4	44.5
LEGACY	3070	2736	2903	46.7	44.3	45.5
03NZ199	3130	2614	2872	45.4	45.4	45.4
SPAULDING	3117	2612	2864	47.7	47.4	47.6
AC METCALFE	2947	2695	2821	45.8	46.0	45.9
HARRINGTON	2908	2682	2795	46.0	44.8	45.4
<i>MOREX</i>	3049	2536	2792	47.4	46.5	47.0
CDC COPELAND	2794	2627	2711	43.1	42.8	43.0
<i>01NZ706</i>	2876	2502	2689	44.1	43.7	43.9
Waxy Hulless						
WA 9820-98	3093	2322	2708	56.3	50.0	53.2
MERESSE	2797	2523	2660	56.5	54.0	55.3
01WA-13860.5	2907	2090	2498	55.9	54.0	55.0
MERLIN	2344	2283	2314	56.2	51.2	53.7
	STATISTICS			STATISTICS		
CV (%)	6	11	9	1.6	2.3	2.0
LSD (0.10)	271	419	248	1.1	1.5	0.9
Average	3264	2857	3060	48.6	47.5	48.1
Highest	4025	3677	3851	56.5	54.0	55.3