

UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE

and

Cooperating State Agricultural Experiment Stations

**2006-07**

**UNIFORM WINTER BARLEY TRIAL**

**Final Report**

Coordinator: David Marshall/Myron Fountain

This is a joint progress report of cooperative investigations underway in the Agricultural Research Service of the U. S. Department of Agriculture and the State Agricultural Experiment Stations containing preliminary data which have not been sufficiently confirmed to justify general release; interpretations may be modified with additional experimentation. Confirmed results will be published through established channels. This report is primarily a tool for use by cooperators and those persons having direct and special interest in the development of agricultural research programs. This report includes data furnished by the State Agricultural Experiment Stations and is not intended for publication and should not be referred to in literature citations or quoted in publicity or advertising. Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

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The purpose of the Uniform Winter Barley Trial (UWBT) is to evaluate winter-habit (fall planted) barley advanced lines for adaptation to those areas in the United States where winter barley is grown commercially. Fourteen entries were submitted by public/private barley breeding programs of Cargill, NE, and VA in the 2006-07 UWBT. Thirteen testing locations were used for the 2006-07 UWBT, with one in each state of Georgia, Maryland, Nebraska, Texas; two in each of South Carolina, Virginia, and Washington; three in North Carolina.

**Griffin, GA:** Plot size=50ft<sup>2</sup>; Reps=3; Planted=15 Nov 06; Harvested=23 May 07. Cooperator-J.W.Johnson.

**Queenstown, MD:** Not harvested (flooded). Cooperator-J.M.Costa.

**Mead, NE:** Cooperator-P.S.Baenziger.

**Kinston, NC:** Wet during Nov, very dry spring, freeze damage during early April, moderate leaf rust, no lodging. Plot size=45ft<sup>2</sup>; Reps=2; Planted=25 Oct 06; Harvested=30 May 07. Cooperators-M.O.Fountain, D.S.Marshall.

**Laurel Springs, NC:** Winterkill screening location in mountain region (elevation 3000ft); mild temperatures during most of winter, no significant winterkill. Plot size=45ft<sup>2</sup>; Reps=2; Planted=2 Oct 06; Harvested=23 Jul 07. Cooperators-M.O.Fountain, D.S.Marshall.

**Waynesville, NC:** Not harvested due to severe damage from freeze during early April. Screening nursery for winter kill (elevation=2,500 ft). Warm fall, cold Jan. Plot size=20ft<sup>2</sup>; Reps=2; Planted=5 Oct 06. Cooperators-M.O.Fountain, D.S. Marshall.

**Clemson, SC:** No data reported. Cooperator-B.Edge.

**Florence, SC:** Not harvested (severe drought). Cooperator-B.Edge.

**Prosper, TX:** No data reported. Cooperator-R.Sutton.

**Blacksburg, VA:** Plot size=45ft<sup>2</sup>; Reps=3; Planted=5 Oct 06; Harvested=13 Jun 07. Cooperators-W.Brooks, C.A.Griffey.

**Warsaw, VA:** Plot size=45ft<sup>2</sup>; Reps=3; Planted=15 Oct 06; Harvested=7 Jun 07. Cooperator-W. Brooks, C.A.Griffey.

**Mt. Vernon, WA:** Stripe rust screening. Natural infection. Cooperator-X.Chen.

**Pullman, WA:** Stripe rust screening. No disease developed. Cooperator-X.Chen.

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### USDA-ARS Uniform Winter Barley Trial 2006-07

<i>Entry</i>	<i>Designation</i>	<i>Pedigree</i>	<i>Origin</i>	<i>Seed Source</i>	<i>Yrs in Trial</i>
1	Wysor	Composite cross/4/Harrison/3/Cebada Capa/Wong//awnleted Hudson (=PI501526; VA83-42-63)	VA	ARS	19
2	Perkins	Nebar selection/Dundy (=PI536646; NE851808)	NE	ARS	9
3	Price	Callao/SC830366 (=PI632708; VA96-44-321)	VA	ARS	4
4	Cargill 26	unknown	Cargill	ARS	2
5	Cargill 27	unknown	Cargill	ARS	2
6	NB018199	NB94723/NB93727	NE	ARS	3
7	NB03435	NB92716/PA8649-95	NE	NE	1
8	NB03437	NB92711/P-954	NE	NE	1
9	NB04442	Gwen/P-713	NE	NE	1
10	VA04B-180	VA97B-416//VA96-41-25//VA96-44-307	VA	ARS	2
11	Doyce	Sangregado"S"//VA90-42-56//VA90-42-22/3/Pamunkey/4/SC890585 (=PI634932; VA00H-137) (hulless)	VA	ARS	4
12	VA01H-68	SC860974/94-42-13 (hulless)	VA	ARS	4
13	VA03H-61	96-41-17/SC872143 (hulless)	VA	ARS	2
14	VA04H-53	H-585/95-41-33 (hulless)	VA	ARS	2

Seed Requirements: GA(200g); MD(150g); NE(150g); NC-Paul(150g); NC-USDA(460g); SC(300g); TX(150g); VA(500g); WA(50g) = 2,110g total

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**2006-07 Uniform Winter Barley Trial**

Means across locations

Entry	Designation	Traits	Grain Yield bu/a	TW rank	Heading lb/bu	Julian	Winter		Height in	Lodging 0.2-10.0*	Leaf Rust 0-9	Net Blotch 0-9	Spot Blotch 0-9	Stripe Rust				Susceptible to other diseases			Flour Protein %	Flour β-glucan %	Flour Lipid %		
							Survival %	Freeze 0-9						19-Apr-07 FS 6 IT	1-Jun-07 FS 10.1 IT %			Leaf Rust	Scald	BYDV					
1	Wysor		75.8	8	47.7	118	37	2	32	1.7	5	4	3	0	0	8	60					13.8	5.25	1.58	
2	Perkins		77.7	6	51.7	119	80	1	31	1.4	3	5	5	2	2	8	100		X			15.0	5.13	1.75	
3	Price		74.4	9	47.3	118	30	3	28	0.3	4	5	5	8	5	8	100					15.2	4.81	1.84	
4	Cargill 26		77.7	7	47.2	118	0	2	25	0.4	3	5	4	8	15	8	80					13.2	4.51	2.02	
5	Cargill 27	2-row	69.0	10	48.3	126	0	2	28	0.3	2	6	6	0	0	8	40		X			14.4	3.97	1.95	
6	NB018199		86.8	1	49.9	123	73	0	33	1.5	3	5	5	0	0	8	100	X				13.9	5.54	1.73	
7	NB03435		78.8	5	46.8	119	93	0	32	2.3	6	1	2	8	5	8	100					14.2	4.97	1.64	
8	NB03437		86.7	2	49.5	119	97	0	32	1.1	5	3	3	8	2	8	100					14.5	4.81	1.87	
9	NB04442		82.8	3	48.6	119	62	1	32	1.9	3	5	5	8	5	8	100					13.0	5.09	1.77	
10	VA04B-180		81.6	4	50.7	118	38	2	27	0.5	4	2	1	0	0	8	40	X				14.1	5.14	1.74	
11	Doyce	hulless	63.7	13	56.9	117	0	6	29	0.6	3	9	7	0	0	8	60					13.3	4.40	2.00	
12	VA01H-68	hulless	56.3	14	60.2	115	0	2	28	0.3	4	6	4	2	2	8	30		X	X		14.8	4.28	2.07	
13	VA03H-61	hulless	66.4	12	60.6	119	15	1	29	0.4	4	3	2	8	30	8	100					14.8	4.72	2.23	
14	VA04H-53	hulless	67.8	11	59.2	121	30	1	32	2.7	5	0	1	8	2	8	100					14.2	4.53	2.18	
	Hundred (susceptible check)													8	5	8	30								
	Hundred (susceptible check)													0	0	8	10								
	Hundred (susceptible check)													0	0	8	10		X						
	Hundred (susceptible check)													0	0	8	10		X	X					
	Fill ('PS 279')													8	60	8	100								
	Fill ('PS 279')													8	40	8	100								
	Mean		74.7		51.8	119	40	2	30	1.1	4	4	3									14.2	4.80	1.88	
	CV (%)		17.4		4.4	3	44	29	9	73.1	43	25	36									3.8	8.26	12.69	
	LSD(0.05)		15.3		2.9	5	24	1	4	1.7	3	2	3									0.7	0.57	0.34	
	R <sup>2</sup>		0.6		0.9	0.9			0.8	0.5	0.4		0.8									0.9	0.62	0.68	
	Number of loc		5		5	4	1	1	4	2	3	1	2	1	1	1	1	1	1	1	1	4	4	4	

\* Belgian Lodging Scale = Area Affected (1-10) x Lodging Intensity (1-5) x 0.2

		GRAIN YIELD												TEST WEIGHT (lb/bu)						
		5-location																		
		<u>Griffin,GA</u>		<u>Mead, NE</u>		<u>Kinston, NC</u>		<u>Blacksburg,VA</u>		<u>Warsaw, VA</u>		<u>mean</u>		<u>Griffin</u>	<u>Kinston</u>	<u>L' Springs</u>	<u>Blacksburg</u>	<u>Warsaw</u>	<u>5-location</u>	
<u>Entry</u>	<u>Designation</u>	<u>Traits</u>	<u>bu/a</u>	<u>rank</u>	<u>bu/a</u>	<u>rank</u>	<u>bu/a</u>	<u>rank</u>	<u>bu/a</u>	<u>rank</u>	<u>bu/a</u>	<u>rank</u>	<u>bu/a</u>	<u>rank</u>	<u>GA</u>	<u>NC</u>	<u>NC</u>	<u>VA</u>	<u>VA</u>	<u>mean</u>
1	Wysor		82.9	1	49.0	8	71.3	6	68.3	9	107.4	5	75.8	8	47.1	51.8	48.9	42.6	48.3	47.7
2	Perkins		62.6	11	80.8	3	80.2	2	73.9	8	83.7	10	77.7	6	53.4	53.4	51.4	48.1	52.2	51.7
3	Price		79.8	3	55.4	7	65.7	11	67.1	10	108.1	4	74.4	9	41.7	52.0	47.7	44.0	51.0	47.3
4	Cargill 26		73.8	4	1.2		76.4	4	83.1	6	85.5	8	77.7	7	47.8	49.0	48.6	44.5	46.2	47.2
5	Cargill 27	2-row	70.0	6	0.0		72.4	5	55.0	11	81.8	12	69.0	10	49.4	51.6	50.8	42.0	47.9	48.3
6	NB018199		69.4	7	71.8	5	81.3	1	96.6	1	115.6	2	86.8	1	56.2	49.8	49.2	45.4	49.1	49.9
7	NB03435		65.1	9	90.7	2	63.8	12	80.7	7	103.8	7	78.8	5	46.1	48.2	48.5	43.4	47.7	46.8
8	NB03437		73.5	5	105.7	1	70.5	7	90.8	3	104.5	6	86.7	2	51.1	52.4	48.6	45.9	49.4	49.5
9	NB04442		69.2	8	76.1	4	69.1	8	94.9	2	113.9	3	82.8	3	50.6	50.7	46.9	46.2	48.7	48.6
10	VA04B-180		82.0	2	28.0	10	79.6	3	84.0	5	131.7	1	81.6	4	52.9	52.6	51.1	45.2	51.8	50.7
11	Doyce	hulless	60.7	12	0.0		68.4	10	44.5	14	83.0	11	63.7	13	58.6	60.9	58.2	47.8	58.9	56.9
12	VA01H-68	hulless	60.2	13	0.0		51.0	14	49.6	13	76.2	14	56.3	14	59.9	61.2	59.7	60.5	59.7	60.2
13	VA03H-61	hulless	59.1	14	44.9	9	60.3	13	87.6	4	81.2	13	66.4	12	60.8	59.1	58.8	62.8	61.5	60.6
14	VA04H-53	hulless	62.8	10	63.9	6	68.6	9	54.0	12	83.9	9	67.8	11	58.6	61.3	59.2	58.2	58.9	59.2
		<i>Mean</i>	69.4		47.7		69.9		73.6		97.2		74.7		52.4	53.8	52.0	48.3	52.2	51.8
		<i>CV (%)</i>	11.5		21.5		10.9		9.2		6.2		17.4			2.8		3.0	0.9	4.4
		<i>LSD (0.05)</i>	13.4		14.2		16.7		11.3		10.0		15.3			3.3		2.4	0.8	2.9
		<i>R<sup>2</sup></i>											0.6							0.9

Entry	Designation	Traits	DAYS TO HEADING (JULIAN)					HEIGHT (in)					LODGING (0.2-10.0*)		
			Mead	Kinston	Blacksburg	Warsaw	4-location	Mead	Kinston	Blacksburg	Warsaw	4-location	Blacksburg	Warsaw	2-location
			NE	NC	VA	VA	mean	NE	NC	VA	VA	mean	VA	VA	mean
1	Wysor		140	102	116	113.0	118	26	28	36	38	32	0.7	2.7	1.7
2	Perkins		141	98	123	118.0	119	27	25	38	35	31	1.1	1.6	1.4
3	Price		142	100	118	112.0	118	20	27	29	31	28	0.2	0.4	0.3
4	Cargill 26		0	100	119	115.3	118	6	22	30	29	25	0.3	0.4	0.4
5	Cargill 27	2-row	0	110	123	121.0	126	0	29	30	26	28	0.2	0.4	0.3
6	NB018199		143	106	122	120.0	123	28	30	38	36	33	1.7	1.3	1.5
7	NB03435		139	99	121	118.0	119	29	28	38	34	32	2.5	2.1	2.3
8	NB03437		139	98	122	117.7	119	29	27	39	36	32	1.3	0.9	1.1
9	NB04442		140	102	119	115.3	119	30	25	38	37	32	2.1	1.6	1.9
10	VA04B-180		143	101	116	113.0	118	21	24	29	32	27	0.2	0.7	0.5
11	Doyce	hulless	0	98	120	112.0	117	0	29	30	30	29	0.2	0.9	0.6
12	VA01H-68	hulless	0	98	115	110.0	115	0	26	32	31	28	0.2	0.3	0.3
13	VA03H-61	hulless	141	101	119	117.0	119	24	25	36	33	29	0.3	0.4	0.4
14	VA04H-53	hulless	141	105	120	117.0	121	26	31	36	35	32	4.3	1.1	2.7
		Mean	135	101	120	115.7	119	19	27	34	33	30	1.1	1.1	1.1
		CV (%)	7	6	1	0.2	3	19	11	4	4	9	56.0	37.0	73.1
		LSD (0.05)	2	13	1	0.4	5	5	6	3	2	4	1.0	0.7	1.7
		R <sup>2</sup>					0.9					0.8			0.5

\* Belgian lodging scale = area affected (1-10) x lodging intensity (1-5) x 0.2

**DISEASE AND OTHER TRAITS**

Entry	Designation	Leaf Rust								Net Blotch				Spot Blotch				Stripe Rust*				Susceptible to other diseases			Winter Survival	Spring Freeze	Spring Growth Habit		
		Kinston		Blacksburg		Warsaw		3-location		Blacksburg		Blacksburg		Warsaw		2-location		Mt. Vernon, WA		19-Apr-07		1-Jun-07		Mt. Vernon, WA			Mead	Blacksburg	Kinston
		NC	VA	VA	VA	mean	VA	VA	VA	mean	VA	VA	VA	mean	IT	%	IT	%	Leaf Rust	Scald	BYDV	%	NE	VA	NC				
		0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	IT	%	IT	%	Leaf Rust	Scald	BYDV	%	0-9	0-9	0-9				
1	Wysor	4	8	4	5	4	3	2	3	0	0	8	60								37		2	5					
2	Perkins	2	5	3	3	5	6	3	5	2	2	8	100		X						80		1	4					
3	Price	2	7	3	4	5	5	4	5	8	5	8	100								30		3	5					
4	Cargill 26	1	5	4	3	5	4	3	4	8	15	8	80								0		2	7					
5	Cargill 27	2	2	2	2	6	8	3	6	0	0	8	40		X						0		2	8					
6	NB018199	1	4	4	3	5	6	3	5	0	0	8	100	X							73		0	7					
7	NB03435	3	9	6	6	1	1	2	2	8	5	8	100								93		0	5					
8	NB03437	2	7	6	5	3	3	2	3	8	2	8	100								97		0	5					
9	NB04442	3	3	3	3	5	6	4	5	8	5	8	100								62		1	8					
10	VA04B-180	1	7	5	4	2	1	1	1	0	0	8	40	X							38		2	8					
11	Doyce	5	1	2	3	9	7	6	7	0	0	8	60								0		6	6					
12	VA01H-68	4	6	3	4	6	4	3	4	2	2	8	30				X	X			0		2	5					
13	VA03H-61	4	4	3	4	3	3	1	2	8	30	8	100								15		1	7					
14	VA04H-53	2	9	4	5	0	0	2	1	8	2	8	100								30		1	8					
	Hundred (susceptible check)									8	5	8	30																
	Hundred (susceptible check)									0	0	8	10																
	Hundred (susceptible check)									0	0	8	10	X															
	Hundred (susceptible check)									0	0	8	10	X	X														
	Fill ('PS 279')									8	60	8	100																
	Fill ('PS 279')									8	40	8	100																
	Mean	2	5	4	4	4	4	3	3	4	9	8	69								40		2	6					
	CV (%)	74	14	30	43	25	24	24	36												44		29	41					
	LSD (0.05)	4	1	2	3	2	2	1	3												24		1	5					
	R <sup>2</sup>				0.4				0.8																				

\* Infection Type (IT) was recorded based on the 0-9 scale with ITs 8 and 9 combined as 8 (the most susceptible reaction) in field data. Generally, IT 0-3 are considered resistant, 4-6 intermediate, and 7-9 susceptible. Heterogenous reactions of an entry were indicated by two or more ITs separated by ", " for most plants with the first IT and few plants with the second IT or connected with "-" for entries containing plants with continuous ITs. Entries with a high IT in the first note, but a low IT in the second note may indicate that they have high-temperature, adult-plant (HTAP) resistance.



Entry	Designation	Traits	FLOUR PROTEIN PERCENT*					FLOUR $\beta$ -GLUCAN PERCENT*					FLOUR LIPID PERCENT*				
			Griffin	Kinston	L' Springs	Warsaw	4-location	Griffin	Kinston	L' Springs	Warsaw	4-location	Griffin	Kinston	L' Springs	Warsaw	4-location
			GA	NC	NC	VA	mean	GA	NC	NC	VA	mean	GA	NC	NC	VA	mean
1	Wysor		13.8	15.6	12.9	12.6	13.8	5.16	5.16	5.12	5.56	5.25	2.22	1.57	1.41	1.13	1.58
2	Perkins		15.8	16.1	15.2	13.1	15.0	5.81	4.80	5.28	4.63	5.13	2.25	1.83	1.38	1.55	1.75
3	Price		16.2	16.2	15.5	13.3	15.2	5.24	4.65	5.21	4.12	4.81	2.23	1.67	1.56	1.91	1.84
4	Cargill 26		14.6	14.7	12.8	10.8	13.2	4.70	3.97	4.41	4.94	4.51	2.15	1.72	1.91	2.29	2.02
5	Cargill 27	2-row	15.0	15.7	14.7	12.3	14.4	4.32	3.80	3.84	3.92	3.97	2.22	1.92	2.13	1.52	1.95
6	NB018199		14.1	15.0	14.4	12.2	13.9	5.83	5.28	5.98	5.08	5.54	2.19	1.61	1.45	1.65	1.73
7	NB03435		14.6	15.5	14.1	12.7	14.2	5.02	4.24	5.34	5.29	4.97	2.19	1.59	1.48	1.28	1.64
8	NB03437		15.7	15.6	14.6	12.2	14.5	5.09	4.77	4.87	4.50	4.81	2.06	2.04	1.50	1.89	1.87
9	NB04442		13.7	14.4	12.8	11.3	13.0	5.07	5.36	4.79	5.13	5.09	1.97	1.82	1.45	1.84	1.77
10	VA04B-180		15.6	15.5	12.8	12.7	14.1	5.09	5.02	5.08	5.38	5.14	2.11	1.76	1.38	1.70	1.74
11	Doyce	hulless	13.4	14.8	13.1	11.9	13.3	3.82	4.48	4.50	4.78	4.40	2.40	2.10	1.75	1.75	2.00
12	VA01H-68	hulless	15.1	16.6	14.2	12.7	14.8	4.26	4.57	3.77	4.51	4.28	2.40	1.56	2.02	2.31	2.07
13	VA03H-61	hulless	16.0	16.3	14.6	12.3	14.8	4.87	4.36	4.23	5.43	4.72	2.50	2.24	2.08	2.10	2.23
14	VA04H-53	hulless	15.1	15.1	14.9	12.4	14.2	4.33	4.93	4.03	4.82	4.53	2.44	2.29	1.38	2.59	2.18
		<i>Mean</i>	14.9	15.5	14.0	12.3	14.2	4.90	4.67	4.75	4.86	4.80	2.24	1.84	1.64	1.82	1.88
		<i>CV (%)</i>		3.5													12.69
		<i>LSD (0.05)</i>		1.2													0.34
		<i>R<sup>2</sup></i>															0.68

\* Hulled entries were pearled (hulls removed) for analysis