UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

in cooperation with

STATE AGRICULTURAL EXPERIMENT STATIONS

Results from the

UNIFORM BARLEY WINTER HARDINESS NURSERY

2009-2010

Compiled by

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This is a joint progress report of an investigation underway in the State Agricultural Experiment Stations and the Agricultural Research Service of the U. S. Department of Agriculture. It contains 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. The report is primarily a tool for cooperators, their staff and those with special interest in agricultural research program development.

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CONTENTS

COOPERATING AGRICULTURAL EXPERIMENT STATIONS AND PERSONNEL

Country	State	AES Location	Personnel
USA	KS	Hays	T.J.Martin
USA	NC	Laurel Springs/Waynesville	D. Marshall/M. Fountain
USA	NE	Mead/Lincoln	S.P.Baenziger
USA	OR	Pendleton	P.Hayes
USA	SC	Clemson	B.Edge
USA	TN	Knoxville	D.West
USA	VA	Blacksburg	C.A.Griffey
USA	IL	Lawrenceville	L. Phillippe
USA	ID	Alberdeen	D. Obert
Russia	Krasnodar	Kuban Agrarian University	V.Shevtsov
Canada	Ontario	Nairn	M. Etienne

DIGEST

NUMBER OF TESTS:	11 tests (9 US States, 2 foreign countries)	
NUMBER OF ENTRIES:	29	
EXPERIMENTAL DESIGN:	Single-row, 5-foot plot Two replications Randomized complete block	
DATA RECORDED:	Percent winter survival	
DATA NOT USED IN ANALYSIS:	Alberdeen, ID	No data
	Knoxville, TN	No data
	Clemson/Florence, SC	No data
	Lawrenceville, IL	No data
	Laurel Springs/Waynesville, NC	100% survival

COMMENTS: None

Table 1. Entries in the 2009-2010 Uniform Barley Winter Hardiness Nursery.

Entry No	Entry name	Pedigree	Yrs in Nursery	Contributors
1	Tenn. Winter(ck)	CI 6034	74	
2	Trebi (ck)	CI 936	70	
3	Kearney (ck)	CI 7580	62	
4	Kenosha (wht ck)	CI 14025	35	
5	Dicktoo (ck)	CI 5529	62	
6	Kentucky 1 (ck)	CI 6050	74	
7	NB08409	NE95711/Legacy/NE95711	1	Baenziger
8	NB08410	NE95711/Legacy/NE95711	1	Baenziger
9	NB05419	NE98890/NE98885	3	Baenziger
10	NB07407	NE95711/Legacy	2	Baenziger
11	NB07410	NE95711/NE99868	2	Baenziger
12	NB07411	NE95713/NE99881	2	Baenziger
13	NB07412	NE95713/NE99881	2	Baenziger
14	Eve (VA01H-68)	SC860974/94-42-13 (Seed Source: Rep3 Hulless Adv Warsaw)	7	Griffey
15	VA 03H-61(Hulless)	96-41-17/SC872143 (Rep3 Hulless Adv)	5	Griffey
16	VA05H-147 T/W	Thoroughbred/SC872143 (Hulless)	2	Griffey
17	VA06H-25 W/T	Thoroughbred/SC872143 (Hulless)	2	Griffey
18	VA06B-19	VA97V-176/VA92-44-279	2	Griffey
19	VA07H-31WS	Thoroughbred/SC872143	1	Griffey
20	VA07H-35WS	Thoroughbred/SC872143	1	Griffey
21	VA06H-79	VA96B-315/SC871077//Wysor	1	Griffey
22	VA06B-48	VA98B-112/VA99B-172	1	Griffey
23	OR74	Strider/88ab536//88ab536	3	Hayes
24	OR75	Strider/88Ab536//88Ab536	2	Hayes
25	OR76	Stab 47/Kab 51	2	Hayes
26	OR78	Strider/88Ab536//88Ab536	2	Hayes
27	OR81	Strider/88ab536-RS	2	Hayes
28	OR73	Maja/Kab50	1	Hayes
29	OR712	Kold/Hoody	1	Hayes

Top 10 ranked survival entries for 2009-2010

Rank	Ent No.	Entry	Pedigree	% Survival (across locations)
1	4	Kenosha (wht ck)	CI 14025	96
2	11	NB07410	NE95711/NE99868	84
3	12	NB07411	NE95713/NE99881	78
4	10	NB07407	NE95711/Legacy	78
5	13	NB07412	NE95713/NE99881	77
6	9	NB05419	NE98890/NE98885	74
7	5	Dicktoo (ck)	CI 5529	69
8	16	VA05H-147 T/W	Thoroughbred/SC872143 (Hulless)	69
9	3	Kearney (ck)	CI 7580	65
10	6	Kentucky 1 (ck)	CI 6050	65
			LSD (0.05)	**11**

Table 2. Winter Barley Survival (%) at Various Stations (sorted by entry number)

Entry #	Entry Name	Ranked means	Means Across Loc.	Ontario Canada	Mead NE	Hays KS	Blacksburg VA	Krasnodar Russia	Pendleton OR
1	Tenn. Winter(ck)	25	55	83	80	63	78	25	0
2	Trebi (ck)	29	23	58	4	0	78	0	0
3	Kearney (ck)	9	65	68	80	100	93	33	20
4	Kenosha (wht ck)	1	96	85	100	100	100	100	90
5	Dicktoo (ck)	7	69	93	75	100	75	65	8
6	Kentucky 1 (ck)	10	65	85	80	100	70	31	25
7	NB08409	19	60	43	48	100	55	68	45
8	NB08410	15	62	40	55	100	70	65	45
9	NB05419	6	74	58	80	100	80	66	60
10	NB07407	4	78	70	70	100	75	81	70
11	NB07410	2	84	83	80	100	88	80	75
12	NB07411	3	78	83	78	100	75	61	75
13	NB07412	5	77	83	80	100	73	63	65
14	Eve (VA01H-68)	28	41	25	13	70	75	63	3
15	VA 03H-61(Hulless)	26	52	65	68	80	80	14	8
16	VA05H-147 T/W	8	69	50	58	100	80	71	55
17	VA06H-25 W/T	17	60	73	75	100	75	24	15
18	VA06B-19	21	56	25	60	100	75	70	8
19	VA07H-31WS	22	56	45	78	95	78	10	30
20	VA07H-35WS	27	52	58	60	100	75	17	3
21	VA06H-79	23	55	45	68	93	70	55	3
22	VA06B-48	11	65	38	73	100	65	79	35
23	OR74	13	64	83	75	100	70	53	5
24	OR75	16	61	80	68	100	78	32	10
25	OR76	24	55	75	55	100	78	18	5
26	OR78	12	65	93	90	80	70	35	20
27	OR81	20	58	93	70	100	70	11	3
28	OR73	18	60	90	80	100	75	9	5
29	OR712	14	64	90	83	100	80	30	3
	Average		63	67	68	92	76	46	27
	LSD (0.05)		11	28	25	28	13	6	30
	CV		9	20	18	15	8	6	55

*ns = not significant

Table 3. Winter Barley Survival (%) at Various Stations (sorted by rank)

Entry #	Entry Name	Ranked means	Means Across Loc.	Ontario Canada	Mead NE	Hays KS	Blacksburg VA	Krasnodar Russia	Pendleton OR
4	Kenosha (wht ck)	1	96	85	100	100	100	100	90
11	NB07410	2	84	83	80	100	88	80	75
12	NB07411	3	78	83	78	100	75	61	75
10	NB07407	4	78	70	70	100	75	81	70
13	NB07412	5	77	83	80	100	73	63	65
9	NB05419	6	74	58	80	100	80	66	60
5	Dicktoo (ck)	7	69	93	75	100	75	65	8
16	VA05H-147 T/W	8	69	50	58	100	80	71	55
3	Kearney (ck)	9	65	68	80	100	93	33	20
6	Kentucky 1 (ck)	10	65	85	80	100	70	31	25
22	VA06B-48	11	65	38	73	100	65	79	35
26	OR78	12	65	93	90	80	70	35	20
23	OR74	13	64	83	75	100	70	53	5
29	OR712	14	64	90	83	100	80	30	3
8	NB08410	15	62	40	55	100	70	65	45
24	OR75	16	61	80	68	100	78	32	10
17	VA06H-25 W/T	17	60	73	75	100	75	24	15
28	OR73	18	60	90	80	100	75	9	5
7	NB08409	19	60	43	48	100	55	68	45
27	OR81	20	58	93	70	100	70	11	3
18	VA06B-19	21	56	25	60	100	75	70	8
19	VA07H-31WS	22	56	45	78	95	78	10	30
21	VA06H-79	23	55	45	68	93	70	55	3
25	OR76	24	55	75	55	100	78	18	5
1	Tenn. Winter(ck)	25	55	83	80	63	78	25	0
15	VA 03H-61(Hulless)	26	52	65	68	80	80	14	8
20	VA07H-35WS	27	52	58	60	100	75	17	3
14	Eve (VA01H-68)	28	41	25	13	70	75	63	3
2	Trebi (ck)	29	23	58	4	0	78	0	0
	Average		63	67	68	92	76	46	27
	LSD (0.05)		11	28	25	28	13	6	30
	CV		9	20	18	15	8	6	55

*ns = not significant

Table 4. Uniform Barley Winter Hardiness Nursery Under Controlled Environment Freeze Test

Entry #	Entry Name	Survival Rating[1]	% Survival[2]
1	Tenn. Winter(ck)	0.8	35
2	Trebi (ck)	0.4	18
3	Kearney (ck)	3.9	98
4	Kenosha (wht ck)	4.0	100
5	Dicktoo (ck)	2.5	83
6	Kentucky 1 (ck)	3.3	95
7	NB08409	1.9	63
8	NB08410	2.1	78
9	NB05419	3.7	98
10	NB07407	2.7	88
11	NB07410	2.6	90
12	NB07411	2.6	88
13	NB07412	2.5	88
14	Eve (VA01H-68)	1.2	45
15	VA 03H-61(Hulless)	2.2	75
16	VA05H-147 T/W	2.4	83
17	VA06H-25 W/T	2.6	88
18	VA06B-19	2.3	83
19	VA07H-31WS	1.2	48
20	VA07H-35WS	0.9	35
21	VA06H-79	1.7	65
22	VA06B-48	1.8	70
23	OR74	2.2	83
24	OR75	2.2	85
25	OR76	2.0	73
26	OR78	2.0	78
27	OR81	1.5	60
28	OR73	1.7	65
29	OR712	2.5	85
	Average	2.2	74
	LSD(0.05)	0.5	9.5
	CV	11	6.3

Parameters:

-2 reps/10 plants per rep planted in cone-tainers (Livingston et al. 2005, Crop Science, 45:1545-1558)
-5 weeks at 13°C; 12 hours light/dark period; 400µmole light intensity
-3 weeks at 3°C; 12 hours light/dark period; 350µmole light intensity
-3 days @ -3°C in the dark (subzero acclimation)
-Frozen @ 1°C/hour to -14°C for 3 hours
-Thawed @ 2°C/hour to 3°C
-Plants were watered once with 0.001% (v/v) Vitavax fungicide solution
-Plants were allowed to recover for 3 weeks in the greenhouse
-Plants were rated for regrow after 21 days by visually assessing leaves and roots.

[1]Rating:
0 = Completely dead
1 = 1 survived (green) shoot or 1 primary root
2 = 1 or 2 survived (green) shoots or 1 survived shoot and 1 or 2 primary roots
3 = 1 or 2 survived shoots with developed roots (primary and secondary roots)
4 = 95% survived shoots with well developed roots
5 = 100% survived with very little or no sign of freeze damage; same as unfrozen plants

[2]Survival (%):
-50% of plants with rating of 1plus all plants rated >2 divided by total number of plants frozen multipled by 100