

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

in cooperation with

STATE AGRICULTURAL EXPERIMENT STATIONS

Results from the

UNIFORM BARLEY WINTER HARDINESS NURSERY

2010-2011

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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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	S.P.Baenziger
USA	OR	Pendleton	P.Hayes
USA	TN	Knoxville	D.West
USA	VA	Blacksburg	C.A.Griffey
USA	IL	Lawrenceville	L. Phillippe
USA	ID	Alberdeen	D. Obert
USA	MN	St. Paul	K.P. Smith
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: 24

EXPERIMENTAL DESIGN: Single-row, 5-foot plot
Two replications
Randomized complete block

DATA RECORDED: Percent winter survival

DATA NOT USED IN ANALYSIS:

Lawrenceville, IL	No Data
Blacksburg, VA	No Data
Nairn, Canada	No Data
Alberdeen, ID	No Data
Pendleton, OR	100% survival
Knoxville, TN	100% survival

COMMENTS:

Russia	Krasnodar	In general winter was normal. In the field, snow cover was enough to protect barley plants from freezing.
USA	Knoxville, TN	Entries 1 and 2 had no germination.
USA	Laurel Spring, NC	Cold Nov and Dec with snow cover. Cold Jan without snow cover.

Table 1. Entries in the 2010-2011 Uniform Barley Winter Hardiness Nursery.

Entry No	Entry name	Pedigree	Yrs in Nursery	Contributors
1	Tenn. Winter(ck)	CI 6034	75	
2	Trebi (ck)	CI 936	71	
3	Kearney (ck)	CI 7580	63	
4	Kenosha (wht ck)	CI 14025	36	
5	Dicktoo (ck)	CI 5529	63	
6	Kentucky 1 (ck)	CI 6050	75	
7	NB08428	NE98888/NE98936	1	Baenziger
8	NB07412	NE95713/NE99881	3	Baenziger
9	NB07442	NE98893//TX-15/Hitchcock	1	Baenziger
10	NB09405	P-954/ NE94737	1	Baenziger
11	NB09433	NE97891/ P-713	1	Baenziger
12	NB09440	VA01H-124/ P-919 (NE98919)	1	Baenziger
13	Dan (VA03H-61)	VA96-41-17/SC872143	6	Griffey
14	Eve (VA01H-68)	SC860974/VA94-42-13	8	Griffey
15	VA06H-25 WS	Thoroughbred/SC872143	3	Griffey
16	VA07H-31 WS	Thoroughbred/SC872143	2	Griffey
17	VA07H-35 WS	Thoroughbred/SC872143	2	Griffey
18	VA06H-79	VA96B-315/SC871077//Wysor	2	Griffey
19	VA06B-19	VA97B-176/VA92-44-279	3	Griffey
20	VA06B-48	VA98B-112/VA99B-172	2	Griffey
21	OR76	Stab47/Kab51	3	Hayes
22	OR712	Kold/Hoody	2	Hayes
23	OR818	Bu27/Stab47, F1/3/Maja/Stab47	1	Hayes
24	Maja	Strider/88Ab536	3	Hayes

Top Ten Ranked Survival Entries

Top 10 ranked survival entries for 2010-2011

Rank	Ent No.	Entry	Pedigree	% Survival (across locations)
1	4	Kenosha (wht ck)	CI 14025	96
2	10	NB09405	P-954/ NE94737	89
3	9	NB07442	NE98893//TX-15/Hitchcock	88
4	11	NB09433	NE97891/ P-713	87
5	12	NB09440	VA01H-124/ P-919 (NE98919)	85
6	7	NB08428	NE98888/NE98936	78
7	8	NB07412	NE95713/NE99881	78
8	20	VA06B-48	VA98B-112/VA99B-172	77
9	21	OR76	Stab47/Kab51	77
10	13	Dan (VA03H-61)	VA96-41-17/SC872143	72
LSD (0.05)				13

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

Entry #	Entry Name	Ranked means	Means Across Loc.	St. Paul MN	Mead NE	Hays KS	Krasnodar Russia	Laurel Spring NC
1	Tenn. Winter(ck)	23	33	0	0	100	55	10
2	Trebi (ck)	24	17	0	0	75	0	3
3	Kearney (ck)	13	67	10	75	100	55	98
4	Kenosha (wht ck)	1	96	100	100	100	100	80
5	Dicktoo (ck)	15	65	48	55	100	64	60
6	Kentucky 1 (ck)	22	43	16	20	100	61	20
7	NB08428	6	78	70	75	100	54	90
8	NB07412	7	78	50	85	100	84	70
9	NB07442	3	88	75	80	100	88	95
10	NB09405	2	89	95	100	100	53	95
11	NB09433	4	87	100	75	100	69	93
12	NB09440	5	85	85	65	100	88	88
13	Dan (VA03H-61)	10	72	40	65	100	64	93
14	Eve (VA01H-68)	21	58	6	25	100	64	95
15	VA06H-25 WS	17	64	4	45	100	78	95
16	VA07H-31 WS	18	64	1	50	100	71	100
17	VA07H-35 WS	12	68	2	85	100	57	98
18	VA06H-79	20	62	1	60	100	55	95
19	VA06B-19	11	69	10	80	100	66	90
20	VA06B-48	8	77	15	95	100	74	100
21	OR76	9	77	65	70	100	68	83
22	OR712	19	63	15	55	100	61	85
23	OR818	16	65	10	75	100	47	93
24	Maja	14	67	1	75	100	59	100
Average			68	34	63	99	64	80
LSD (0.05)			13	37	43	ns	7.1	16
CV			9	52	33	ns	5.4	10

*ns = not significant

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

Entry #	Entry Name	Ranked means	Means Across Loc.	St. Paul MN	Mead NE	Hays KS	Krasnodar Russia	Laurel Spring NC
4	Kenosha (wht ck)	1	96	100	100	100	100	80
10	NB09405	2	89	95	100	100	53	95
9	NB07442	3	88	75	80	100	88	95
11	NB09433	4	87	100	75	100	69	93
12	NB09440	5	85	85	65	100	88	88
7	NB08428	6	78	70	75	100	54	90
8	NB07412	7	78	50	85	100	84	70
20	VA06B-48	8	77	15	95	100	74	100
21	OR76	9	77	65	70	100	68	83
13	Dan (VA03H-61)	10	72	40	65	100	64	93
19	VA06B-19	11	69	10	80	100	66	90
17	VA07H-35 WS	12	68	2	85	100	57	98
3	Kearney (ck)	13	67	10	75	100	55	98
24	Maja	14	67	1	75	100	59	100
5	Dicktoo (ck)	15	65	48	55	100	64	60
23	OR818	16	65	10	75	100	47	93
15	VA06H-25 WS	17	64	4	45	100	78	95
16	VA07H-31 WS	18	64	1	50	100	71	100
22	OR712	19	63	15	55	100	61	85
18	VA06H-79	20	62	1	60	100	55	95
14	Eve (VA01H-68)	21	58	6	25	100	64	95
6	Kentucky 1 (ck)	22	43	16	20	100	61	20
1	Tenn. Winter(ck)	23	33	0	0	100	55	10
2	Trebi (ck)	24	17	0	0	75	0	3
Average			68	34	63	99	64	80
LSD (0.05)			13	37	43	ns	7.1	16
CV			9	52	33	ns	5.4	10

*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)	0.2	8
2	Trebi (ck)	0.4	20
3	Kearney (ck)	3.7	98
4	Kenosha (wht ck)	4.0	100
5	Dicktoo (ck)	1.6	68
6	Kentucky 1 (ck)	1.8	68
7	NB08428	1.6	70
8	NB07412	2.3	90
9	NB07442	2.2	90
10	NB09405	2.0	83
11	NB09433	2.3	90
12	NB09440	2.6	98
13	Dan (VA03H-61)	2.2	78
14	Eve (VA01H-68)	1.3	58
15	VA06H-25 WS	1.9	75
16	VA07H-31 WS	1.1	48
17	VA07H-35 WS	0.9	40
18	VA06H-79	1.6	73
19	VA06B-19	2.0	78
20	VA06B-48	1.6	65
21	OR76	1.7	68
22	OR712	2.3	80
23	OR818	1.2	53
24	Maja	0.2	10
	Average	1.8	67
	LSD(0.05)	0.5	11
	CV	14	7.8

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.

¹Rating:

- 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

²Survival (%):

- 50% of plants with rating of 1 plus all plants rated >2 divided by total number of plants frozen multiplied by 100