

UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE

in cooperation with

STATE AGRICULTURAL EXPERIMENT STATIONS

Results from the

**UNIFORM BARLEY WINTER HARDINESS NURSERY**

**2014-2015**

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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**

<b>Country</b>	<b>State</b>	<b>AES Location</b>	<b>Personnel</b>
USA	KS	Hays	G. Zhang
USA	NC	Laurel Springs/Waynesville	D. Marshall/M. Fountain
USA	NE	Mead	S.P.Baenziger
USA	TN	Knoxville	D.West
USA	VA	Blacksburg	C.A.Griffey
USA	MN	St. Paul	K.P. Smith
USA	IL	Lawrenceville	L. Phillippe
USA	OK	Ardmore	J. Anderson
USA	OR	Pendleton	P.Hayes
Canada	Ontario	Nairn	M. Etienne

**DIGEST**

NUMBER OF TESTS: 10 tests (9 US States, 1 foreign countries)

NUMBER OF ENTRIES: 21

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

DATA RECORDED: Percent winter survival

DATA NOT USED IN ANALYSIS:

Ontario, Canada	No Data
Blacksburg, VA	No Data
Lawrenceville, IL	0% Survival
Knoxville, TN	100% Survival
Pendleton, OR	100% Survival

**COMMENTS:**

Knoxville, TN Mild winter, no differential winter injury/death

Ardmore, OK Survival was recorded in early March. Plots had 100% coverage heading into winter and were clipped on Nov. 11 for forage production.

**Table 1. Entries in the 2014-2015 Uniform Barley Winter Hardiness Nursery.**

Entry No.	Entry name	Pedigree	Yrs in Nursery	Contributors
1	Tenn. Winter(ck)	CI 6034	79	
2	Trebi (ck)	CI 936	75	
3	Kearney (ck)	CI 7580	67	
4	Kenosha (wht ck)	CI 14025	39	
5	Dicktoo (ck)	CI 5529	67	
6	Kentucky 1 (ck)	CI 6050	79	
7	Dan (VA03H-61)	VA96-41-17 / SC872143	10	Griffey
8	Eve (VA01H-68)	SC860974 / VA94-42-13	12	Griffey
9	Amaze 10 (VA07H-31 WS)	Thoroughbred / SC872143	6	Griffey
10	Secretariat (VA08B-85)	VA00B-199 / VA00B-259	4	Griffey
11	VA08B-84	VA00B-199 / VA00B-259	2	Griffey
12	VA10B-43	VA99B-161 /3/ VA99B-210 // 94Ab1261 / VA00B-271	2	Griffey
13	VA11B-143 (LA)	SPONT03-44 / VA10B-44	2	Griffey
14	VA11B-141	SPONT03-44 / VA01B-44	1	Griffey
15	VA11B-102	VA99B-125 /3/ VA00B-279 // VA00B-214 / H159-005	1	Griffey
16	TCFW6-033	NB3437f / OR71	1	Hayes
17	NB12421	NB92711/NB86954/NB05432=(NE98936/NE97891)	1	Baenziger
18	NB12425	NB92711/NB86954/NB05432=(NE98936/NE97891)	1	Baenziger
19	NB12419	NB92711/NB86954/NB05432=(NE98936/NE97891)	1	Baenziger
20	NB12437	NE98936/NE97891/NB04436=(NE97971/NE94738)	1	Baenziger
21	NB12434	NE98936/NE97891/NB03439=(Perkins/88Ab926)	1	Baenziger

## Top Ten Ranked Survival Entries

### Top 10 ranked survival entries for 2014-2015

Rank	Ent No.	Entry	Pedigree	% Survival (across locations)
1	4	Kenosha (wht ck)	CI 14025	86
2	17	NB12421	NB92711/NB86954/NB05432=(NE98936/NE97891)	85
3	18	NB12425	NB92711/NB86954/NB05432=(NE98936/NE97891)	81
4	20	NB12437	NE98936/NE97891/NB04436=(NE97971/NE94738)	77
5	21	NB12434	NE98936/NE97891/NB03439=(Perkins/88Ab926)	76
6	3	Kearney (ck)	CI 7580	75
7	19	NB12419	NB92711/NB86954/NB05432=(NE98936/NE97891)	70
8	6	Kentucky 1 (ck)	CI 6050	44
9	10	Secretariat (VA08B-85)	VA00B-199 / VA00B-259	42
10	14	VA11B-141	SPONT03-44 / VA01B-44	42
<b>LSD (0.05)</b>				<b>11</b>

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

Entry #	Entry Name	Ranked means	Means Across Loc.	St. Paul MN	Ardmore OK	Mead NE	Laurel Spring NC	Hays KS
1	Tenn. Winter(ck)	13	41	5	100	0	100	0
2	Trebi (ck)	19	33	0	100	0	63	0
3	Kearney (ck)	6	75	70	100	95	100	13
4	Kenosha (wht ck)	1	86	100	100	89	58	83
5	Dicktoo (ck)	16	40	0	100	0	100	0
6	Kentucky 1 (ck)	8	44	5	100	11	100	5
7	Dan (VA03H-61)	20	32	0	100	0	58	0
8	Eve (VA01H-68)	21	31	0	100	0	53	0
9	Amaze 10 (VA07H-31 WS)	18	36	0	100	0	80	0
10	Secretariat (VA08B-85)	9	42	0	100	11	100	0
11	VA08B-84	12	41	0	100	6	98	3
12	VA10B-43	15	40	0	100	6	95	0
13	VA11B-143 (LA)	17	38	0	90	0	100	0
14	VA11B-141	10	42	0	100	11	100	0
15	VA11B-102	14	41	5	90	0	100	10
16	TCFW6-033	11	42	0	100	11	100	0
17	NB12421	2	85	70	100	100	98	55
18	NB12425	3	81	38	95	95	100	80
19	NB12419	7	70	28	90	100	99	35
20	NB12437	4	77	15	100	100	100	68
21	NB12434	5	76	30	100	95	100	55
<b>Average</b>			52	17	98	35	90	19
<b>LSD (0.05)</b>			11	18	3.2	15	38	31
<b>CV</b>			10	50	1.6	21	20	77

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

Entry #	Entry Name	Ranked means	Means Across Loc.	St. Paul MN	Ardmore OK	Mead NE	Laurel Spring NC	Hays KS
4	Kenosha (wht ck)	1	86	100	100	89	58	83
17	NB12421	2	85	70	100	100	98	55
18	NB12425	3	81	38	95	95	100	80
20	NB12437	4	77	15	100	100	100	68
21	NB12434	5	76	30	100	95	100	55
3	Kearney (ck)	6	75	70	100	95	100	13
19	NB12419	7	70	28	90	100	99	35
6	Kentucky 1 (ck)	8	44	5	100	11	100	5
10	Secretariat (VA08B-85)	9	42	0	100	11	100	0
14	VA11B-141	10	42	0	100	11	100	0
16	TCFW6-033	11	42	0	100	11	100	0
11	VA08B-84	12	41	0	100	6	98	3
1	Tenn. Winter(ck)	13	41	5	100	0	100	0
15	VA11B-102	14	41	5	90	0	100	10
12	VA10B-43	15	40	0	100	6	95	0
5	Dicktoo (ck)	16	40	0	100	0	100	0
13	VA11B-143 (LA)	17	38	0	90	0	100	0
9	Amaze 10 (VA07H-31 WS)	18	36	0	100	0	80	0
2	Trebi (ck)	19	33	0	100	0	63	0
7	Dan (VA03H-61)	20	32	0	100	0	58	0
8	Eve (VA01H-68)	21	31	0	100	0	53	0
<b>Average</b>			52	17	98	35	90	19
<b>LSD (0.05)</b>			11	18	3.2	15	38	31
<b>CV</b>			10	50	1.6	21	20	77

**Table 4. 2014-15 Uniform Barley Winter Hardiness Nursery  
Under Controlled Environment Freeze Test**

Entry #	Entry Name	Survival Rating <sup>1</sup>	% Survival <sup>2</sup>
1	Tenn. Winter(ck)	1.0	45
2	Trebi (ck)	0.9	30
3	Kearney (ck)	3.7	100
4	Kenosha (wht ck)	3.6	100
5	Dicktoo (ck)	1.8	63
6	Kentucky 1 (ck)	2.1	75
7	Dan (VA03H-61)	2.1	75
8	Eve (VA01H-68)	1.7	55
9	Amaze 10 (VA07H-31 WS)	0.9	38
10	Secretariat (VA08B-85)	1.2	48
11	VA08B-84	0.6	23
12	VA10B-43	0.4	23
13	VA11B-143 (LA)	0.8	38
14	VA11B-141	1.1	50
15	VA11B-102	0.9	38
16	TCFW6-033	1.9	68
17	NB12421	1.9	80
18	NB12425	2.3	93
19	NB12419	1.5	60
20	NB12437	1.4	58
21	NB12434	0.6	30
<b>Average</b>		1.5	56
<b>LSD(0.05)</b>		0.6	15.0
<b>CV</b>		17.0	13.0

**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)
- Whole plants were 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
- Whole plants were rated for regrowth after 21 days by visually assessing leaves and roots.

**<sup>1</sup>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

**<sup>2</sup>Survival (%):**

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



**Table 5. Across Location Percent Survival Means for  
Check Cultivars in Previous Winter Hardiness Nurseries**

<b>Nursery</b>							
<b>Year</b>	<b>Tenn. Winter</b>	<b>Trebi</b>	<b>Kearney</b>	<b>Kenosha</b>	<b>Dicktoo</b>	<b>Kentucky 1</b>	<b>LSD (0.05)</b>
<b>2000-01</b>	50	35	56	87	58	58	14
<b>2001-02</b>	49	10	95	94	92	87	24
<b>2002-03</b>	76	61	91	100	86	93	29
<b>2003-04</b>	96	69	90	97	100	97	48
<b>2004-05</b>	43	22	62	89	65	64	23
<b>2005-06</b>	59	28	76	94	81	74	21
<b>2006-07</b>	32	7.6	59	94	50	59	14
<b>2007-08</b>	50	35	72	96	76	74	27
<b>2008-09</b>	53	31	66	98	75	68	6.4
<b>2009-10</b>	55	23	65	96	69	65	11
<b>2010-11</b>	33	17	67	96	65	43	13
<b>2011-12</b>	79	41	86	91	79	85	9.4
<b>2012-13</b>	94	48	100	98	88	88	7.7
<b>2013-14</b>	73	46	83	-	69	63	11.1
<b>2014-15</b>	41	33	75	86	40	44	11
<b>Avg.</b>	<b>59</b>	<b>34</b>	<b>76</b>	<b>94</b>	<b>73</b>	<b>71</b>	