

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

in cooperation with

STATE AGRICULTURAL EXPERIMENT STATIONS

Results from the

UNIFORM BARLEY WINTER HARDINESS NURSERY

2007-2008

Compiled by

D. P. Livingston, Research Agronomist
T. D. Tuong, Plant Science Research Technician

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.

This report was compiled by the Agricultural Research Service, U. S. Department of Agriculture, and is not intended for publication nor should it 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.

USDA-ARS
South Atlantic Area
Department of Crop Science
North Carolina State University
Raleigh, NC 27695

CONTENTS

Cooperating Agricultural Experiment Stations and Personnel	Page 2
Digest and Comments	3
Table 1. Entries in the 2006-2007 Uniform Barley Winter Hardiness Nursery	4
Top Ten Ranked Survival Entries	5
Table 2. Uniform Barley Winter Hardiness Nursery Control Tests	6
Table 3. Percent Survival at the Various Stations (sorted by entry no.)	7
Table 4. Percent Survival at the Various Stations (sorted by rank)	8

COOPERATING AGRICULTURAL EXPERIMENT STATIONS AND PERSONNEL

Country	State	AES Location	Personnel
USA	ID	Aberdeen	D.Obert
USA	KS	Hays	T.J.Martin
USA	NC	Laurel Springs	J.P.Murphy
USA	NE	Mead/Lincoln	S.P.Baenziger
USA	OR	Pendleton	P.Hayes, A.Corey, K.Rhinhart
USA	SC	Clemson	B.Edge
USA	CO	Fort Collins	S.Dorsch
USA	TN	Knoxville	D.West
USA	VA	Blacksburg	C.A.Griffey
Russia	Krasnodar	Krasnodar Research Institute	V.Shevtsov
Canada	Ontario	Nairn	M. Etienne

DIGEST

NUMBER OF TESTS:	11 tests (9 US States, 2 foreign countries)	
NUMBER OF ENTRIES:	26	
EXPERIMENTAL DESIGN:	Single-row, 5-foot plot Two replications Randomized complete block	
DATA RECORDED:	Percent winter survival	
DATA NOT USED IN ANALYSIS:	Knoxville, TN	100% Survival
	Pendleton, OR	100% Survival
	Clemson/Florence, SC	Data not received
	Aberdeen, ID	Data not received
	Fort Collins, CO	Data not received

COMMENTS:

US STATE/COUNTRY	LOCATION	COOPERATORS' COMMENTS
TN	Knoxville	Very mild winter.
Canada	Ontario	Good emergence going into winter--most damage due to freeze-thaw cycles in January and February

Table 1. Entries in the 2007-2008 Uniform Barley Winter Hardiness Nursery.

Entry No	Entry name	Pedigree	Yrs in Nursery	Contributors
1	Tenn. Winter(ck)	CI 6034	72	
2	Trebi (ck)	CI 936	68	
3	Kearney (ck)	CI 7580	60	
4	Kenosha (wht ck)	CI 14025	33	
5	Dicktoo (ck)	CI 5529	60	
6	Kentucky 1 (ck)	CI 6050	72	Baenziger
7	NB99875	Robust/Perkins/Dundy	3	
8	NB018187	NB93760/NB94723	1	
9	NB018199	NB94723/NB93727	1	
10	NB99845	Krasnodar K304/NB90701	1	Baenziger
11	NB03429	NB92711/NB86954	1	Baenziger
12	NB05419	NE98890/NE98885	1	Baenziger
13	NB05420	NE98885/NE93760	1	Baenziger
14	VA 03H-61(Hulless)	96-41-17/SC872143 (Rep3 Hulless Adv)	3	Griffey
15	VA04H-53(Hulless)	H-585/95-41-33 (Rep1 Hulless Prel)	3	Griffey
16	VA01H-68(Hulless)	SC860974/94-42-13 (Seed Source: Rep3 Hulless Adv Warsaw)	5	Griffey
17	VA04B-180(Hulled)	97B-416//96-41-25/96-44-307	3	Griffey
18	VA06H-60	VA96B-315/SC871077//WYSOR	1	Griffey
19	VA06H-79	VA96B-315/SC871077//WYSOR	1	Griffey
20	VA06H-121	VA96B-315/SC871077//WYSOR	1	Griffey
21	Strider	OR1860164/Steptoe	2	Hayes
22	Maja	Strider/88ab536	2	Hayes
23	Luca		1	Hayes
24	Stab47/Kab51-7	Stab 47/Kab 51-7	1	Hayes
25	Maja/Kab50-21	Maja/Kab 50-21	1	Hayes
26	Stabbc 42-4-5	Strider/88ab536//88ab536 42-4-5	1	Hayes

Top Ten Ranked Survival Entries

5

Top 10 ranked survival entries for 2007-2008

Rank	Ent No.	Entry	Pedigree	% Survival (across locations)
1	4	Kenosha (wht ck)	CI 14025	96
2	7	NB99875	Robust/Perkins/Dundy	85
3	10	NB99845	Krasnodar K304/NB90701	84
4	8	NB018187	NB93760/NB94723	84
5	11	NB03429	NB92711/NB86954	81
6	13	NB05420	NE98885/NE93760	81
7	12	NB05419	NE98890/NE98885	80
8	9	NB018199	NB94723/NB93727	80
9	17	VA04B-180(Hulled)	97B-416//96-41-25/96-44-307	78
10	15	VA04H-53(Hulless)	H-585/95-41-33 (Rep1 Hulless Prel)	77
LSD (0.05)				8.3

**Table 2. Uniform Barley Winter Hardiness Nursery
Under Controlled Environment Freeze Test**

Entry #	Entry Name	Survival Rating	% Survival
1	Tenn. Winter(ck)	0.4	17.5
2	Trebi (ck)	0.0	0.0
3	Kearney (ck)	4.5	100.0
4	Kenosha (wht ck)	4.6	100.0
5	Dicktoo (ck)	2.5	72.5
6	Kentucky 1 (ck)	4.3	100.0
7	NB99875	2.8	87.5
8	NB018187	3.6	97.5
9	NB018199	3.4	95.0
10	NB99845	3.4	97.5
11	NB03429	3.7	100.0
12	NB05419	3.0	90.0
13	NB05420	3.7	97.5
14	VA 03H-61(Hulless)	2.8	90.0
15	VA04H-53(Hulless)	3.9	100.0
16	VA01H-68(Hulless)	3.0	100.0
17	VA04B-180(Hulled)	3.7	92.5
18	VA06H-60	3.5	97.5
19	VA06H-79	3.0	90.0
20	VA06H-121	1.7	70.0
21	Strider	1.8	75.0
22	Maja	0.1	2.5
23	Luca	0.6	30.0
24	Stab47/Kab51-7	0.7	30.0
25	Maja/Kab50-21	0.0	0.0
26	Stabbc 42-4-5	1.0	45.0
Average		2.5	72.2
LSD(0.05)		0.8	11.1
CV		15.2	7.5

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
- Frozen @ 1°C/hour to -14°C for 3 hours
- Thawed @ 2°C/hour to 3°C
- Roots trimmed and transplant to soil for 3 weeks at 13°C; 12 hours light/dark period; 400µmole light
- Plantssurvival ratings were visually rated for regrowth after 21 days.

% Survival:

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

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

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

Entry #	Entry Name	Ranked means	Means Across Loc.	Ontario Canada	Laurel Sprs. NC	Waynesville NC	Lincoln NE	Hays KS	Blacksburg VA	Krasnodar Russia
1	Tenn. Winter(ck)	25	50	10	100	100	8	25	95	11
2	Trebi (ck)	26	35	0	97.5	80	1	0	65	0
3	Kearney (ck)	15	72	4	100	100	90	100	90	22
4	Kenosha (wht ck)	1	96	83	100	100	100	100	90	100
5	Dicktoo (ck)	11	76	30	100	100	80	95	95	30
6	Kentucky 1 (ck)	14	74	23	100	100	70	98	95	30
7	NB99875	2	85	48	100	100	100	95	90	62
8	NB018187	4	84	45	100	100	100	98	100	43
9	NB018199	8	80	55	100	100	100	95	95	12
10	NB99845	3	84	80	100	100	100	93	95	21
11	NB03429	5	81	43	100	100	90	93	100	43
12	NB05419	7	80	33	100	100	95	95	100	41
13	NB05420	6	81	48	100	100	95	95	95	31
14	VA 03H-61(Hulless)	12	75	30	100	100	63	100	100	33
15	VA04H-53(Hulless)	10	77	43	100	100	75	100	100	19
16	VA01H-68(Hulless)	19	67	30	100	100	18	98	95	30
17	VA04B-180(Hulled)	9	78	43	100	100	90	88	95	30
18	VA06H-60	13	74	65	100	100	50	98	95	12
19	VA06H-79	21	64	40	100	100	25	75	95	12
20	VA06H-121	23	61	63	97.5	100	8	53	95	10
21	Strider	22	61	60	97.5	100	1	73	85	10
22	Maja	17	68	65	100	100	25	85	95	9
23	Luca	16	69	75	100	100	5	98	95	8
24	Stab47/Kab51-7	18	68	73	100	100	35	60	85	26
25	Maja/Kab50-21	24	57	58	100	100	6	23	90	23
26	Stabbc 42-4-5	20	67	70	100	100	15	75	85	21
Average			71.6	46.6	99.7	99.2	55.4	80.9	92.9	26.6
LSD (0.05)			8.3	27.4	2.3	11.4	30.8	31.3	15.5	4.4
CV			5.6	28.5	1.2	5.6	26.9	18.8	8.1	8.1

Table 4. Winter Barley Survival (%) at Various Stations (sorted by rank)

Entry #	Entry Name	Ranked means	Means Across Loc.	Ontario Canada	Laurel Sprs. NC	Waynesville NC	Lincoln NE	Hays KS	Blacksburg VA	Krasnodar Russia
4	Kenosha (wht ck)	1	96	83	100	100	100	100	90	100
7	NB99875	2	85	48	100	100	100	95	90	62
10	NB99845	3	84	80	100	100	100	93	95	21
8	NB018187	4	84	45	100	100	100	98	100	43
11	NB03429	5	81	43	100	100	90	93	100	43
13	NB05420	6	81	48	100	100	95	95	95	31
12	NB05419	7	80	33	100	100	95	95	100	41
9	NB018199	8	80	55	100	100	100	95	95	12
17	VA04B-180(Hulled)	9	78	43	100	100	90	88	95	30
15	VA04H-53(Hulless)	10	77	43	100	100	75	100	100	19
5	Dicktoo (ck)	11	76	30	100	100	80	95	95	30
14	VA 03H-61(Hulless)	12	75	30	100	100	63	100	100	33
18	VA06H-60	13	74	65	100	100	50	98	95	12
6	Kentucky 1 (ck)	14	74	23	100	100	70	98	95	30
3	Kearney (ck)	15	72	4	100	100	90	100	90	22
23	Luca	16	69	75	100	100	5	98	95	8
22	Maja	17	68	65	100	100	25	85	95	9
24	Stab47/Kab51-7	18	68	73	100	100	35	60	85	26
16	VA01H-68(Hulless)	19	67	30	100	100	18	98	95	30
26	Stabbc 42-4-5	20	67	70	100	100	15	75	85	21
19	VA06H-79	21	64	40	100	100	25	75	95	12
21	Strider	22	61	60	97.5	100	1	73	85	10
20	VA06H-121	23	61	63	97.5	100	8	53	95	10
25	Maja/Kab50-21	24	57	58	100	100	6	23	90	23
1	Tenn. Winter(ck)	25	50	10	100	100	8	25	95	11
2	Trebi (ck)	26	35	0	97.5	80	1	0	65	0
Average			71.6	46.6	99.7	99.2	55.4	80.9	92.9	26.6
LSD (0.05)			8.3	27.4	2.3	11.4	30.8	31.3	15.5	4.4
CV			5.6	28.5	1.2	5.6	26.9	18.8	8.1	8.1