University of Idaho
Cooperative Extension System

The Cereal Sentinel

A newsletter for Treasure Valley cereal producers

October 15, 1998 Issue No. 17

Topics: **Page**

Important Dates:

Malheur CountyWheat League Annual Meeting	Nov. 19, 1998
Idaho Grain Producers Annual Convention	Nov. 16-18, 1998

The goal of this newsletter is to serve the best interests of Treasure Valley cereal producers. It will be issued periodically as information warrants. Correspondence and inquiries should be addressed to: **Parma Research and Extension Center, 29603 U of I Lane, Parma, ID 83660 (208-722-6701) (Fax-208-722-6708) (Email** bradb@uidaho.edu). **The *Cereal Sentinel* is made possible in part by a grant from the Idaho Wheat Commission.**

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Winter Cereal Variety Performance

Irrigated Trials

The 1998 season marked the 14th season of the Southwestern Idaho Cooperative Extension Winter Wheat Performance Trials. The trials, supported by the Idaho Wheat Commission and Idaho Barley Commission, enable the testing of public and private varieties and advanced lines under the irrigated and dryland conditions of the Treasure Valley.

Four irrigated winter wheat trials were conducted during the 1998 season. One of the trials was early October planted and three were planted in early to mid November for evaluation of varieties under late planted conditions.

The Parma site, planted October 7, and the Weiser trial planted November 5 were likely limited in yield due to inadequate available N. Soft white winter wheat protein averaged only 9.8% at Parma and 9.7% at Weiser, about 0.5% to 0.8% protein lower than protein levels associated with optimum available N.

Table 1. 1998 Early October Planted Irrigated Soft White Winter Wheat Performance in the Treasure Valley.

Variety	Yield	Protein	Test Weight	Height	Lodging
	bu/acre	%	lb/bu	in	%
		Parma (planted Oct. 7)			
Brundage	137	9.8	62.6	41	11
BU6W93-477	132	9.6	62.6	43	25
ID8610420A	128	9.6	62.1	48	0
Lambert	121	9.3	61.0	45	30
MacVicar	133	9.7	60.3	41	20
Malcolm	136	9.7	61.3	41	0
Rohde (club)	111	10.3	62.0	43	43
Stephens	134	9.7	60.3	41	0
Tres (club)	105	10.2	62.0	46	35
WPB 470	141	10.4	63.4	42	0
XWH 1017	136	9.8	61.0	46	0
XWH 1019	146	9.7	62.4	44	3
XWH 1020	128	9.1	61.1	44	0
$LSD_{.10}$	10	0.6	1.1	1	19

Another Parma trial was planted November 18 and the Mtn Home trial was planted November 17. Wheat in the off station trials were shorter than trials at the station. All November plantings resulted in later maturity, more heat stress, and reduced test weight compared to the earlier planting at Parma.

Soft White Winter Wheat

The soft white winter wheat results for the 1998 trials are given in Tables 1 and 2. **Stephens,** released in 1978, is still the most commonly grown winter wheat in western Idaho. It's primary weaknesses are straw strength, test weight, protein levels higher than desirable for many Pacific Rim customers, and for sprinkler irrigation it can be too tall. It has very good yield potential and may be especially competitive in later plantings.

Malcolm has performed at least as well or better than **Stephens** in high yield environments in most of our evaluations, particularly under mid October or earlier plantings. It tends to lose its yield advantage over **Stephens** under later plantings. **Malcolm** tends to lodge less than **Stephens** and has slightly better leaf rust resistance.

MacVicar, the most recent OSU release, has been less consistent in yield relative to **Stephens**. In many trials over the years **MacVicar** has been superior to **Stephens**.

The new Idaho release **Brundage** is shorter than **Stephens**, a couple days earlier heading, and it's test weight ranged from 1.1 to 2.3 lb per bushel higher than **Stephens**. **Brundage** protein is typically **lower** than **Stephens**. **Brundage** has excellent straw strength and either did not differ or lodged less than **Stephens**. It has yielded as well or better than **Stephens** in the absence of stress, but lower than **Stephens** when stress conditions during vegetative growth reduced plant height. **Brundage** is therefore most competitive when produced under good management conditions. Foundation seed of **Brundage** will be available for fall 1998.

WPB 470 is a Western Plant Breeders release and was evaluated for the third year. It has excellent yield potential, yielding as well as or better than **Stephens**. **WPB 470** has outstanding test weight averaging from 2.9 to 4.6 lb per bushel better than **Stephens** in 1998. **WPB 470** is slightly taller than **Stephens** but is generally less susceptible to lodging.

A mixture of **Stephens** and **WPB 470** was also evaluated at the late planted sites. The mixture averaged from 5 to 15 bu/A higher in yield and 1.5 to 2.1 lb/bu higher in test weight than **Stephens** depending

Table 2. 1998 Late Planted Irrigated Soft White Winter Wheat Performance in the Treasure Valley.

Variety	Yield	Protein	Test Weight	Height	Lodging
	bu/acre	%	lb/bu	in	%
		Weiser (planted Nov. 7)			
Brundage	**103**	**9.5**	**59.3**	**35**	**0**
BU6W93-477	**126**	**9.6**	**58.3**	**40**	**23**
ID8610420A	**128**	**9.5**	**59.3**	**44**	**0**
Lambert	**122**	**9.2**	**58.5**	**40**	**0**
MacVicar	**126**	**9.3**	**56.5**	**38**	**0**
Malcolm	**120**	**9.5**	**56.9**	**38**	**0**
Rohde (club)	**110**	**9.8**	**58.1**	**38**	**18**
Stephens	**121**	**10.5**	**57.1**	**38**	**0**
Ste/470 mix	**126**	**9.8**	**58.6**	**37**	**0**
WPB 470	**120**	**10.6**	**60.6**	**37**	**0**
XWH 1017	**120**	**10.1**	**56.0**	**39**	**3**
XWH 1019	**133**	**9.9**	**60.1**	**38**	**0**
XWH 1020	**120**	**9.4**	**54.9**	**40**	**0**
$LSD_{.10}$	**9**	**0.4**	**1.6**	**1**	**15**
		Parma (planted Nov. 18)			
Brundage	**120**	**10.7**	**60.0**	**37**	**0**
BU6W93-477	**114**	**11.0**	**58.8**	**43**	**40**
ID8610420A	**126**	**9.8**	**59.0**	**46**	**3**
Lambert	**123**	**10.6**	**59.0**	**44**	**0**
MacVicar	**114**	**10.8**	**55.1**	**41**	**0**
Madsen	**114**	**10.9**	**59.3**	**45**	**8**
Malcolm	**114**	**10.8**	**55.0**	**41**	**0**
Rod	**113**	**10.4**	**56.8**	**41**	**3**
Stephens	**121**	**11.1**	**58.9**	**41**	**18**
Ste/470 mix	**136**	**11.1**	**60.9**	**41**	**0**
WPB 470	**128**	**11.0**	**63.0**	**40**	**0**
XWH 1017	**116**	**10.7**	**57.3**	**42**	**0**
XWH 1019	**130**	**11.0**	**60.1**	**41**	**0**
XWH 1020	**114**	**10.6**	**56.0**	**42**	**0**
$LSD_{.10}$	**9**	**0.7**	**1.1**	**1**	**11**
		Mtn Home (planted Nov. 17)			
BU6W93-477	**132**	**10.7**	**58.8**	**40**	**3**
ID8610420A	**137**	**10.2**	**60.3**	**44**	**0**
Lambert	**138**	**10.2**	**59.0**	**41**	**0**
MacVicar	**141**	**9.5**	**57.9**	**38**	**0**
Madsen	**112**	**12.1**	**57.4**	**43**	**45**
Malcolm	**132**	**10.4**	**57.0**	**38**	**0**
Rod	**135**	**10.6**	**56.1**	**40**	**3**
Stephens	**134**	**10.4**	**57.4**	**38**	**0**
Ste/470 mix	**139**	**11.6**	**59.5**	**37**	**13**
WPB 470	**145**	**11.3**	**61.0**	**37**	**13**
XWH 1017	**133**	**10.7**	**57.1**	**40**	**0**
XWH 1019	**137**	**10.8**	**60.8**	**37**	**0**
XWH 1020	**120**	**10.2**	**56.0**	**39**	**0**
$LSD_{.10}$	**10**	**1.1**	**1.5**	**1**	**13**

on the site. The mixture yielded from 6 bu/A less to 8 bu/A higher than **WPB 470**.

Lambert, a UI release, does not appear to have a yield advantage over **Stephens** in high or moderate yielding conditions and is 3" to 4" taller than **Stephens**.

Three HybriTech hybrids were evaluated for the second time in 1998. Of the three, **XWH 1019** was the best adapted to our area. This hybrid lodged less, had better test weight, and yielded at least as well as or better than **Stephens** in both early and late planted trials. HybriTech will not market this release in the near future.

The irrigated club wheat varieties as usual did not yield as well as most common soft white entries. Club wheat premiums would have to exceed 10-15% of the market price for common soft white wheat to offer equal returns. Those premiums have not been available the past two years even though the portion of club wheat in the Western White market class has increased to 25% from 10% for Japan. The premiums can be expected in years when significant winter kill reduces club wheat stocks.

Performance in any given trial is not as reliable as the combined performance over several sites and years. The yield results for each year (averaged over 2-4 sites) since 1991 are shown in Table 3.

The yearly average for **Malcolm** was either not different or higher than **Stephens** in all but one year of testing and in some years was appreciably higher than **Stephens**. The yearly average for **MacVicar** has been less consistent relative to **Stephens**.

The results for the last three years may reflect the performance of wheat planted later in the fall. In the last three years there have been more late planted trials than early October planted trials. **Brundage** under these conditions has not shown an advantage over **Stephens** as it has in more productive earlier plantings. In contrast, **WPB 470** in limited testing appears to be well adapted to late planting.

Lambert in most years provided no advantage in yield over **Stephens**.

Hard Red Winter Wheat

Hard red winter wheats are also evaluated in the Cooperative Extension Variety Performance Trials. Hard red winter wheat is generally less productive than the soft white winter varieties but market prices can be higher as they are currently. Test weight is generally higher with hard red winters.

Results for 1998 testing are shown in Table 4 and 5. Hard red winter wheat varieties were managed the

Table 3. Irrigated Soft White Winter Wheat Yield Performance, 1991-98.

Variety	1992	1993	1994	1995	1996	1997	1998
Malcolm	113	153	155	140	147	126	123
MacVicar	101	143	154	137	149	123	122
Stephens	104	144	145	138	155	124	126
Lambert	--	--	138	135	147	124	122
Brundage	--	--	--	--	144	124	120
WPB 470	--	--	--	--	--		130
XWH1017	--	--	--	--	--	124	124
XWH1019	--	--	--	--	--	133	136
XWH1020	--	--	--	--	--	111	120
$LSD_{.10}$	11	7	6	5	6	7	5

same as soft white varieties with no additional fertilizer N added for boosting protein. Protein values are correspondingly low, particularly at Parma where low N probably limited production of both soft white and hard red market classes. Winter hard reds were not evaluated in the later planted trials.

Finley, a new WSU release (WA7773), is apparently poorly adapted to our area with excessive height, poor straw strength, and lower yield potential.

Hawk is an Agripro variety (North American Plant Breeders, Inc.) that has performed well in several years of testing. It is not as tall as Finley but is taller in some years than the other varieties. It has good protein and excellent test weight.

Garland, a USU release, is the shortest of those listed and has excellent lodging resistance. The relative yield performance of **Garland** has been sporadic, sometimes doing well, other times less well. It is one of the few lines in either the soft white or hard red winter classes that fit conveniently under wheel or hand line sprinklers. **Garland** test weight is fair.

Hoff, an OSU release, has good test weight, straw strength and lodging resistance, especially for its height. **Hoff** was named after the long time superintendent of the Malheur Experiment Station, Neil Hoffman. It has good yield potential.

Meridian, a UI release tends to lodge more than **Garland** or **Hoff**. It has yield potential comparable to **Hoff** and **Hawk**. Test weight for **Meridian** is lower than **Hoff** and **Hawk**.

Table 4. 1998 Irrigated Hard Red Winter Wheat Performance in the Treasure Valley.

Variety	Yield	Protein	Test Weight	Height	Lodging
	bu/acre	%	lb/bu	in	%
			Parma (planted Oct. 7)		
Boundary	92	8.5	62.4	43	53
Finley	86	9.4	63.0	53	88
Hawk	111	9.0	63.4	44	55
Hoff	118	9.4	62.8	44	15
Meridian	113	9.0	62.3	45	38
$LSD_{.10}$	13	0.7	0.9	1	25
			Weiser (planted Nov. 7)		
Boundary	95	10.9	57.4	40	45
Finley	83	11.2	60.1	51	90
Hawk	93	11.9	60.8	40	25
Hoff	111	11.3	61.1	40	0
Meridian	92	10.9	56.3	40	28
$LSD_{.10}$	9	0.4	1.0	1	23

Table 5. Irrigated Hard Red Winter Wheat Yield Performance, 1991-98.

Variety	1991	1992	1993	1994	1995	1996	1997	1998
Garland	--	102	138	134	139	137	--	--
Hawk	113	108	125	147	130	154	121	102
Hoff	114	96	134	137	128	148	117	115
Meridian	108	103	131	145	120	139	116	103
$LSD_{.10}$	6	11	10	5	5	9	10	9

Winter Barley

Winter barley was evaluated in the two earliest planted irrigated trials at Parma and Weiser (Table 6). Plant height was slightly lower at Weiser. Lodging and later maturity reduced the test weight of many varieties, especially at Weiser.

Kold and **Strider**, OSU releases, are the only varieties tested with barley stripe rust resistance. Stripe rust was present in both trials but the infection occurred late enough to cause minimal loss at Parma or Weiser.

Sunstar Pride was one of the shortest varieties tested but tended to have the highest percentage of thins. **WPB Sprinter** averaged among the highest in test weight and lowest in thins even with significant lodging.

ORW10 and **ORW11** are OSU advanced lines with Stripe Rust resistance. **ORSW10** was lost at Parma due to bird feeding.

Table 6. 1998 Irrigated Winter Barley Performance.

Variety	Yield	Test Weight	Height	Lodging	Thins
	bu/A	lb/bu	in	%	%
		Parma (planted Oct. 7)			
Boyer	**117**	**46.7**	**43**	**74**	**4.4**
Kold	**125**	**48.0**	**43**	**35**	**2.3**
ORW11	**108**	**49.6**	**44**	**33**	**2.5**
Strider	**150**	**48.3**	**43**	**48**	**1.7**
Sunstar Pride	**130**	**49.1**	**39**	**65**	**5.2**
WPB Sprinter	**105**	**49.8**	**42**	**86**	**1.4**
$LSD_{.10}$	**16**	**1.1**	**1**	**23**	**1.5**
		Weiser (planted Nov. 7)			
Boyer	**98**	**46.9**	**41**	**50**	**3.8**
Kold	**110**	**45.9**	**40**	**80**	**3.0**
ORW10	**101**	**50.1**	**40**	**63**	**1.5**
ORW11	**99**	**48.3**	**40**	**83**	**1.2**
Strider	**114**	**47.3**	**39**	**88**	**2.9**
Sunstar Pride	**93**	**42.5**	**38**	**83**	**13.0**
WPB Sprinter	**112**	**50.4**	**41**	**40**	**1.3**
$LSD_{.10}$	**19**	**1.8**	**4**	**36**	**1.5**

Dryland Trials

Dryland winter wheat and barley production in southwestern Idaho's outlying areas generally receives less than 15 inches annual rainfall. Much of this land is currently in the Conservation Reserve Program, but these contracts may expire within the next few years and growers may not want or be able to participate in the CRP program.

A dryland variety performance trial has been conducted near Midvale since 1995. Rainfall was above normal and yields were high for this wheat fallow production system in 1996, closer to normal in 1995 and 1997, then appreciably higher than normal in this past 1998 season. The performance results for 1995-1998 are given in Table 7.

Winter Wheat

Results from the trials conducted prior to 1991 indicated that hard red winter wheat was as productive as the soft white winter wheat commonly grown. In addition, the hard red winter class averaged about three pounds per bushel higher test weight. Results with more recent varieties are similar.

Average yield for the two market classes has not differed significantly in the last four years. Test weight has averaged from 2.1 to 3.3 lbs per bushel higher for the hard red class. Lower test weight for soft whites makes it more difficult to produce No. 1 grade wheat.

Protein in the hard red class has been too low in the last three years of testing to be consistently eligible for protein premiums at the 12% or 13% level. However, prices for the low protein hard red winter have ranged from 11 to 49 cents per bushel higher than soft whites in Portland. In low yielding years with higher protein (12%) the price difference has ranged from 27 to 57 cents per bushel higher for hard red winter wheat.

As with the irrigated trials, the hard red varieties are not managed differently than the soft whites. There is no provision made for boosting protein with supplemental fertilizer nitrogen, as might be the case with commercial production.

Club wheat does not yield as well as the common soft white wheat types in this environment. Club wheat would have to command an appreciable premium to common types to provide comparable gross income.

Among the soft whites, few of the varieties were actually released for this production system. Nevertheless, the OSU soft whites **Stephens**, **Malcolm**, and **MacVicar** were as productive over the four years as **Eltan** and **Madsen**, the WSU soft white releases targeted for the wheat fallow system. **Madsen** in particular is popular in eastern Washington due to it's strawbreaker footrot resistance. **Eltan** was released for its excellent emergence, winter hardiness, and resistance to snow mold, common bunt, and dwarf bunt.

Among the hard reds, OSU's **Hoff** and UI's **Meridian** were irrigated releases that have done reasonably well in these trials. **Bonneville**, a UI release, has resistance to snow mold and dwarf bunt, but yield has tended to lag behind the most productive varieties the past four years.

Hatton, an older WSU variety ('79), was released for its excellent emergence and winter hardiness, but it also has not yielded with more recent varieties. **Judith**, a '89 Montana State release also has not yielded as well as others over four years of testing.

The more productive hard reds were **Promontory** (USU, '91) and **Buchanan** (WSU, '89). **Buchanan** was released for it's excellent ability to emerge from deeper planting depths, and winter hardiness due in part to moderate snow mold tolerance. **Promontory** has both snow mold and dwarf bunt resistance. **Promontory** appears to have two advantages over **Buchanan**, higher test weight and higher protein.

Table 7. Dryland Winter Cereal Performance, Midvale, 1995-1998.

Variety	Yield					Protein	Test Weight	Height
	1995	1996	1997	1998	1995-98	1998	1998	1998
	bu/acre					%	lb/bu	inches
Soft White Winter Wheat								
Commons								
Brundage	--	55	34	61	--	7.4	62.3	30
BU6W93-477	--	--	--	65	--	7.4	59.5	34
Eltan	35	57	37	54	46	6.9	59.4	33
Lambert	--	59	36	56	--	7.3	59.3	35
MacVicar	39	50	41	65	49	7.2	60.6	33
Madsen	40	56	36	64	49	7.7	61.3	37
Malcolm	41	55	38	60	49	7.1	60.0	32
Rod	--	61	32	61	--	6.9	58.3	32
Stephens	43	55	32	61	48	7.2	59.8	32
WPB 470	--	--	--	48	--	7.8	63.9	30
Clubs								
Hiller	--	53	30	51	--	6.7	56.9	32
Temple	--	49	29	46	--	7.3	60.3	30
Rohde	38	43	26	41	37	8.3	62.8	29
Tres	--	51	32	56	--	7.2	60.6	32
Average	39	53	34	56	46	7.3	60.4	32
LSD$_{.10}$	9	6	6	12	4	0.3	0.9	3
Hard Red Winter Wheat								
Bonneville	36	52	36	41	42	8.1	62.8	42
Boundary	--	--	--	50	--	7.2	60.5	33
Buchanan	44	56	39	53	48	7.4	60.3	42
Finley	--	--	--	51	--	7.7	63.1	43
Hatton	37	47	32	52	42	6.9	64.4	40
Hawk	--	--	36	58	--	7.5	62.6	34
Hoff	40	50	41	49	45	8.2	62.9	33
Judith	36	47	31	51	42	7.3	62.8	43
Meridian	38	57	38	52	46	8.1	62.5	32
Promontory	45	59	37	58	50	7.7	64.0	34
Utah 100	41	57	37	53	47	8.0	59.8	36
Average	40	54	37	52	45	7.6	62.2	37
LSD$_{.10}$	7	9	7	9	4	0.3	0.9	3
Winter Barley								
Boyer	--	--	42	50	--	--	49.5	32
Kold	--	63	28	52	--	--	49.4	31
ORW10	--	--	26	34	--	--	51.4	29
ORW11	--	--	33	30	--	--	51.9	33
WPB Sprinter	--	64	35	67	--	--	52.8	33
Strider	--	--	34	51	--	--	48.9	30
Average	42	63	33	47	--	--	50.6	31
LSD$_{.10}$	4	7	10	6	--	--	0.9	1

Winter Barley

Winter barley was also planted in the dryland trial. Winter kill was not observed in the winter barley varieties as it was in 1997. Winter barley typically has less winter hardiness than winter wheat.

WPB Sprinter was the most productive barley this season with yields averaging 15 bu per acre higher than the next highest dryland entry. **WPB Sprinter** also has excellent test weight for a six row feed type.

The OSU advanced lines **ORW10** and **ORW11** were the least productive of the entries in this season of higher rainfall. **Strider**, **Boyer**, and **Kold** were intermediate in yield.

Planting Mixed Varieties

One way to spread the risks of diseases or variable variety performance is to plant mixtures. A mixture in our area would likely address the weaknesses in **Stephens** wheat, namely poor test weight and good but not excellent straw strength.

A mixture of **Stephens** and **WPB 470** was evaluated at three November planted sites this past season. The performance for each site is found in Tables 3, 5, and 6. The average performance across all sites is given in Table 8.

Yield for the mixture was significantly higher than for **Stephens** and the **WPB 470** yield was intermediate. **WPB 470** test weight was best, **Stephens** the poorest, and the mixture was intermediate. Lodging did not differ among the entries. Lodging of these varieties was low in all the 1998 sites.

The results are for only one year, but they demonstrate at least the potential for mixtures to improve grain quality. Stephens would have graded No.3 on the basis of test weight alone. Using a mixture improved the grade to No. 2. Whether mixtures will consistently result in improved yields remains to be seen. But test weight can be improved consistently with this mix. Mixtures will continue to be evaluated in future trials.

Table 10. Variety mixture performance across three sites. 1998.

Entry	Yield	Test Weight	Lodging
	Bu/A	lb/bu	%
Stephens	**125**	**57.8**	**6**
WPB 470	**131**	**61.5**	**4**
Stephens/WPB 470	**134**	**59.7**	**4**
$LSD_{.10}$	**8**	**1.0**	**10**

Seed Availability

Occasionally variety performance will be reported in the ***Cereal Sentinel*** for varieties that are not readily available in western Idaho. If you have interest in a particular variety check first with your regular seed supplier. If not in their inventory they may be able to secure seed from a more distant source.

Some of the proprietary varieties have been particularly difficult to find. Western Plant Breeders, for example, until recently did not market their varieties any closer than Le Grande or Burley. This has changed with the opening of the Western Seed subsidiary in Ontario. Western Seed is an outlet for Western Plant Breeders so their seed should be more available now.

I will maintain a list of available varieties at the various seed dealers. The list will then be available at local county UI Cooperative Extension offices.

Reducing Production Costs

Current prices for soft white wheat will not cover the costs of production for most growers. Worse yet, there does not seem to be much relief in the year to come. Many growers may opt to plant other crops for their irrigated rotation in lieu of wheat.

Nevertheless, many will continue their traditional rotation which for most has included irrigated winter or spring wheat. For these growers it is more important than ever before to reduce all unnecessary production costs, or increase the production gained from the same production costs

The following topics include some ideas for reducing production costs or increasing production efficiency for irrigated winter wheat in particular. Very few operations will be able to employ all the suggestions and many won't be able to reduce costs any further than what they already have. But for those interested in reducing their historical production costs or improving production efficiency you might consider the following.

Reduced Tillage

Some of the crops preceding wheat or barley involve minimal plant debris and little compaction. If herbicide residues don't need removed from the surface, compaction is limited, and plant debris otherwise won't significantly hinder small grain plantings, consider chisel plowing, ripping or simply disking rather than mold board plowing to reduce tillage expenses.

Soil compaction from tractor and/or truck traffic can significantly reduce small grain yields the following year. But compaction is more than a surface phenomena as it extends well beyond the plow depth in some soils. Moldboard plowing does not address the deeper compaction that may limit root expansion and soil water holding capacity.

Most producers aren't interested in tilling anymore than they have to. That is especially critical with current prices.

Seeding Rates

Using seeding rates higher than necessary for maximum yield (1) increases production costs and reduces returns, (2) increases the potential for lodging, with the associated reduction in yield and/or quality, (3) increases the moisture requirement and the sensitivity to drought, (4) increases the nitrogen requirement and sensitivity to N shortages, and (5) increases stubble remaining after harvest that must be dealt with.

For early fall plantings there is seldom a need for more than 90 to 100 lb of seed per acre when using **Stephens**, and less if using smaller seeded varieties. The later the planting or the more adverse the conditions for planting and rapid emergence, the greater the response to seeding rate. However, increased seeding rates have failed to fully compensate for later plantings and delayed emergence.

Seeding rates wth **Malcolm** and/or **Stephens** have been evaluated in several trials at the Parma Research and Extension Center (Table 9). In several comparisons involving early to mid fall established wheat, yield with 60 and 120 pound seeding rates either did not differ significantly, or decreased with higher seeding rates (generally due to increased lodging). **Stephens** yield in

1989 increased with the higher seeding rate but the yield for **Malcolm** did not (data not shown). Averaged over the six early to mid fall comparisons of the two seeding rates, the average yields did not differ.

With late fall establishment the two seeding rates did not consistently differ. But across five seeding rate comparisons there was a 5 bu per acre average advantage to the 120 pound per acre rate.

Occasionally we have evaluated higher seeding rates of 180 pounds per acre. Under no conditions have seeding rates this high improved yield over those of 120 pound rates.

For early to mid fall plantings, **Malcolm** and **MacVicar** have been as productive as **Stephens** and require 10 to 15% less pounds of seed per acre.

Varieties can differ appreciably in seed size and seed size of any variety can differ appreciably from lot to lot. **Stephens** is a large kernel compared to **Malcolm**, and many others. Large seeded varieties generally require more pounds of seed per acre to establish the same number of plants. Seed size differences should be considered when setting a drill for planting.

Table 9. Seeding rate effects as affected by fall establishment of Stephens wheat.

Year	Seeding Rate	Yield	Year	Seeding Rate	Yield
	lb/A	**bu/A**		**lb/A**	**bu/A**
Early-midfall establishment			***Late fall establishment***		
1983	**60**	**168**	**1983**	**60**	**157**
	120	**158**		**120**	**167**
1984	**60**	**156**	**1984**	**60**	**140**
	120	**158**		**120**	**142**
1985	**60**	**139**	**1985**	**60**	**131**
	120	**124**		**120**	**126**
1988	**60**	**108**	**1995**	**60**	**135**
	120	**107**		**120**	**143**
1989	**60**	**118**	**1997**	**60**	**132**
	120	**138**		**120**	**141**
1996	**60**	**167**			
	120	**168**			
average	**60**	**143**	**average**	**60**	**139**
	120	**142**		**120**	**144**

We used the same drill settings for **Stephens** and **Malcolm** wheat in two different years. The seed was weighed and counted after operating the drill for a given distance (Table 10). Small differences in seed size and variety made a big difference in the number of seeds planted.

Using **Malcolm** seed that was 7.86% smaller in the second year resulted in almost a 30% increase in the number of seeds planted. Likewise, using 1.7% smaller **Stephens** seed the second year resulted in almost a 12% increase in seed drop. The same drill setting can deliver quite different seed numbers. **Malcolm** seed that weighed less than **Stephens** resulted in less seed drop in 1988 and greater seed drop in 1989. Seed drop is a function of more than just seed size. Growers should adjust their drill settings according to the seed actually delivered.

Table 10. Variety and seed size effects on seed drop. Parma 1988, 1989.

Variety	Original Weight of 200 Seed	Seed Drop
	(g)	**(1000/A)**
	1988	
Stephens	**9.36**	**704**
Malcolm	**8.65**	**631**
	1989	
Stephens	**9.20**	**788**
Malcolm	**7.97**	**820**

Seed Quality

Seed tested for germination is generally a useful first line of defense against planting poor quality seed. But the germination test does not always identify poor seed quality. It simply measures and quantifies the emergence of the root radicle. Germination testing provides no indication of germinated seed survival.

We witnessed one field northeast of Nampa that was planted to one of the better varieties that we've tested. Germination on the blue certified seed tag was over 90%. But it was a very poor stand. When the planted seed was uncovered we found most of the seed had indeed germinated, but then died soon after.

Several conditions may lead to such problems of poor seedling survival. Washington State University faculty maintain that seed can be damaged under some conditions from late watering. Swelling of the seed with late season moisture can split the germ and cause seedling death soon after germination. Sprouted seed is also more susceptible to seedling dying. Late season frost during grain filling can also weaken the seed to where it will germinate and then die.

Cold vigor seed tests for small grains are available that can identify seed weakened from these conditions. The tests are available at the Idaho Department of Agriculture Seed Laboratory in Boise (208-332-8630).

Planting Dates

Most producers will not delay their wheat planting unless other farm activity such as crop harvests interfere. Delayed planting can appreciably reduce yield potential of winter wheat. Research at the Parma Station indicates that yield of wheat planted in mid November as compared to mid or early October ranges from 4 to 20% lower.

Delayed plantings do not tiller, that is, produce as many stems and heads as earlier planted winter wheat. The reduced tillering can be compensated for, to a limited extent, with higher seed rates. But our results show that even higher seeding rates do not result in yields comparable to those with earlier plantings.

The other factor involved that reduces the productivity of delayed plantings is higher temperatures during grain fill, conditions that promote lighter seed. Increased seeding rates can not compensate for these higher temperatures.

Most delayed plantings can not be avoided due to other conflicts. However, if you have the option, plant winter wheat as early after October 1 as you can.

Fertilization Practices

Nitrogen

Soil test N

Few growers in western Idaho soil test to determine the residual N available for their wheat. We have conducted N rate trials in grower fields where wheat failed to respond with increased yields to applied N. Initial soil test values at these sites generally indicated sufficient available N for production and little if any yield response was anticipated.

For growers following sugarbeets, onions, potatoes, or other row crops that are highly fertilized with N, soil testing is essential to avoid unnecessary N applied to the subsequent wheat crop. In many cases N will be high enough from the previous crop carryover to satisfy wheat N requirements. Soil testing is the only way to quantify this carryover N. Soil test N can be measured preplant in the fall or in early spring.

N Sources

For those convinced of the need for some preplant N fertilizer, consider the relative costs of different N sources. The cheapest is anhydrous ammonia, if you can find a local dealer that handles it. Among dry N sources, urea is generally the cheapest and ammonium sulfate the most expensive per unit N applied. If soils don't need the sulfate-S in ammonium sulfate there is little justification for using this more expensive N source. With incorporation, all N sources have proved equally effective when preplant applied.

N Timing

Several of our trials have shown spring topdressed N to be more effective than early fall preplant incorporated N. The greater effectiveness of spring applied N suggests that lower spring N rates can probably be used as compared to fall N rates.

For urea N spring topdressed to dry soils, reduce the N rate up to 15% depending on how early the preplant N would otherwise be applied. The earlier that N would otherwise be applied in the fall (early October), the more you would reduce the spring N rate. Late fall N incorporated after soil temperatures decline to below 50° F (mid November) will likely not differ in their effectiveness from spring applied N.

The only occasion, out of thirteen trials, that spring applied N was less effective than fall applied N, was when urea was spring topdressed to wet soils. If soil moisture is sufficient to solubilize topdressed urea granules, N can be lost from the surface. Wait to apply spring N until the soil surface dries.

Phosphorus, Potassium

Wheat and barley do not use as much P and K as many of the row crops. Many growers routinely apply P and K fertilizer to row crops in their rotation. If P and K are routinely applied to row crops it is very unlikely that the wheat or barley will respond with increased yields to their application. Preplant soil samples can indicate P and K needs for small grains. If P is needed, various studies have shown an advantage to banding the P next to the seed.

Market Prospects

Idaho Extension Ag Economists released in September their estimates for prices of each wheat market class for the short range (current marketing year) in southwest Idaho. The per bushel price estimates are $2.05 for soft white wheat, $2.30 for hard red winter, and $3.20 for hard red spring. With their assumptions it appears that local prices for hard red spring wheat are expected to be over 56% higher than for the soft white class.

Actual return differences for the two market classes would likely be closer when extra fertilization and marketing costs are considered, as well as differences in yield potential. Still, with estimated 56% higher prices, some will be tempted to try an alternative to the soft white class.

Vandal hard red spring wheat was mid November planted at Parma and/or Mtn Home in five trials between 1995 and this past season. Average yield for Vandal was 127 bu/A while the average yield for all soft white winters was 139 bu/A, a yield difference of about 9%. Vandal ranged from 1% over to 17% lower yield than the average of all the soft white winter varieties evaluated. There was never a stand loss of the spring wheat Vandal due to winterkill. We will report more on this in the next newsletter.

Aberdeen Cereal Home Page

Those interested in examining cereal variety performance in other irrigated and dryland areas of southern Idaho can access those results from the University of Idaho Cereals Extension Project at Aberdeen Home Page. It can be reached on the internet at www.uidaho.edu/ag/extension/. Variety performance in Oregon production systems can also be viewed at the OSU Extension Cereals web site reached at www.css.orst.edu/cereals

Acknowledgement

The Idaho Wheat Commission has awarded a grant of $2500 to subsidize this newsletter. We are pleased to acknowledge their support for this Cooperative Extension educational project.

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