

FACT SHEET

YMH/HYS

Selection OWW68007-2M6
Soft White Winter Wheat

Proposed Name: Hill*81

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Description

Selection OWW68007-2M6 is a soft white common winter wheat. It is midtall, midseason in heading, with white stiff straw. The spike is awned, fusiform, middense, and inclined. Glumes are white, glabrous, midlong, midwide with wanting shoulders. Awns are 3 to 8 cm long; beaks 3 to 4 mm long. Kernels are white, midlong, elliptical with a hard midsized germ. The crease is narrow to midwide. Cheeks are usually rounded.

Pedigree and History

Selection OWW68007-2M6 was developed from a cross between the two soft white winter wheat varieties, Yamhill and Hyslop. The cross was made at the Hyslop Agronomy Farm in 1968. The original selection was obtained from an F3 row with an F6 head row being bulked in 1974 for inclusion in yield tests. Head rows were reselected in 1977 for seed increase and further evaluation.

Area of Adaptation

Selection OWW68007-2M6 appears to be widely adapted to the winter wheat growing areas of the Pacific Northwest. It is somewhat more winterhardy than Stephens, but should not be recommended where specific problems exist such as snow mold or flag smut and areas which require extreme winterhardiness.

Available Seed

Three thousand five hundred pounds of breeders seed will be available for planting this fall for the production of Foundation seed.

Disease Resistance

In Table 1 the reaction pattern of Selection OWW68007-2M6 is compared to commercial cultivars for the common diseases found in the Pacific Northwest. Selection OWW68007-2M6 has good adult plant resistance to the current races of stripe rust and leaf rust. Results also indicate seedling resistance to all of the major races of stripe rust in the western region (Table 2). Such resistance could be very beneficial in reducing the spore load in the fall. Selection OWW68007-2M6 is moderately susceptible to both mildew and Septoria tritici; however yield reductions due to these two diseases are not as severe as is observed on the variety Stephens primarily because of the greater height and later heading and maturity date for Selection OWW68007-2M6 (Table 8).

*Name cleared through Trademark Division, ARS-USDA, Beltsville, Maryland.

Yield Ability and Other Agronomic Traits

Yield data over five years and five locations in Oregon are presented in Table 3. Selection OWW68007-2M6 has maintained high yields in all major growing areas of Oregon, showing a distinct yield advantage over the variety Stephens in the Corvallis area and an advantage over Daws in all areas except Madras.

Selection OWW68007-2M6 over three years of testing exhibits a relatively fast emergence rate when compared to other commercial varieties of common wheat (Table 5). Final stand counts have also been higher. This factor could be important when cultural practices require early seeding to prevent soil erosion. Rapid emergence and good stand establishment are two important traits for a variety adapted to the summer fallow farming systems of eastern Oregon and Washington.

Also of importance in the dryland farming system of the Pacific Northwest, is at least a moderate level of winterhardiness. Selection OWW68007-2M6 has exhibited a greater level of winterhardiness than Stephens, McDermid, Luke, and Hyslop, but is not as winterhardy as Daws and Nugaines (Table 6). The greater level of winterhardiness of Selection OWW68007-2M6 was evident from the yield data in the nursery at Pendleton in 1979 (Table 3). A more severe winter than normal that year eroded the usual yield advantage of Stephens allowing Selection OWW68007-2M6 to out yield Stephens by 13 bu/A.

Selection OWW68007-2M6 has shown excellent adaptation to the acid soils of many western Oregon counties in that like the variety Yamhill it has either a lower phosphorous requirement or is more efficient in phosphorous uptake. Plant analysis showed Yamhill and OWW68007-2M6 to have lower leaf P concentrations than Stephens suggesting a high P requirement for the variety Stephens (Table 7). The high yield of Selection OWW68007-2M6 when grown on acid soils with low P levels is evidence of its adaptation to acid "hill soils" and some valley floor soils that are naturally acid or have become acid with the use of nitrogen fertilizers.

Preliminary studies by Dr. Te May Ching indicate that Selection OWW68007-2M6 has a lower level of reducing sugar produced per gram of seed per hour than any of the other cultivars tested from the Corvallis area, even lower than a promising hard red cultivar (Table 8). A lower level of reducing sugar would indicate a lower level of alpha amylase activity. Alpha amylase is the enzyme which triggers the conversion of starch to sugar and indirectly the initiation of sprouting. A soft white wheat variety which is slower to initiate sprouting would offer the farmer some additional protection in those harvest seasons where late summer rains delay harvest.

Although Selection OWW68007-2M6 is several centimeters taller than other varieties in commercial production, it exhibits excellent straw strength even with high soil fertility levels as was the case in Pendleton in 1981 (Table 9).

During the 1980-81 growing season in the Willamette Valley, test weights for most of the commercial varieties were down due to the high incidence of Septoria which affected seed development. While Selection OWW68007-2M6 sustained some foliar damage due to the disease, grain filling appeared not to be hindered as evidenced by the high test weight (Table 9).

Milling and Baking Quality

Milling and baking quality data for Selection OWW68007-2M6 in comparison with commercial varieties are presented in Table 10. These data were obtained from samples grown in Corvallis, Oregon and are consistent with samples evaluated from other locations.

The Western Wheat Quality Laboratory has identified Selection OWW68007-2M6 as having particularly promising overall quality characteristics. In most characteristics it closely parallels the variety Yamhill which is recognized for its excellent milling and baking quality.

Cooperators

Data for this fact sheet were provided by R. J. Metzger, C. R. Rohde, M. Kolding, S. James, T. L. Jackson, D. Sullivan, T. M. Ching, J. A. Hoffman, R. F. Line, R. E. Allan, and the cooperators growing the Uniform Western Regional White Wheat Nursery. The milling and baking data were provided by the Western Wheat Quality Laboratory which is under the direction of G. Rubenthaler.

Table 1. Reaction of Selection OWW68007-2M6 and commercial varieties to stripe rust, leaf rust, Septoria tritici, mildew and common bunt.

Variety	Stripe ¹ Rust	Leaf ¹ Rust	Septoria ¹	Mildew ¹	Common ² Bunt Genes For Resistance
Stephens	5MR	TMR	4	3	4
Yamhill	80S	30MR	8	5	S
Hyslop	40MS	TMR	8	5	1,?
Luke	10MR	10MS	5	7	3,9,10
Daws	10MR	30S	7	7	4,10
OWW68007-2M6	5MR	5MR	6	5	4,?

¹Readings taken in Corvallis, Oregon

²Data taken by J.A. Hoffman at Pullman, Washington and Pendleton, Oregon

Table 2. Resistance of winter seedlings to stripe rust races¹

<u>Cultivar</u>	Infection type of races ²						
	<u>CDL 1</u>	<u>CDL 3</u>	<u>CDL 5</u>	<u>CDL 6</u>	<u>CDL 7</u>	<u>CDL 9</u>	<u>CDL 17</u>
OWW68007-2M6	2	0	2	0-2 ³	2	2	2
Stephens	0	2-8 ³	2-8 ³	1-8 ³	2	2-8 ³	2
Daws	8	8	8	2	8	8	8
Hyslop	8	7-8 ³	8	8	8	9	6

¹Data from Roland F. Line, Washinton State University

²0-3 = resistant, 7-9 = susceptible

³Variation in reaction type

Table 3. Summary of grain yield obtained for Selection OWW68007-2M6, Stephens, and Daws at five locations in Oregon during the years 1977-1981.

Cultivar	Location	1977		1978		1979		1980		1981		Average	
		Bu/A	Q/Ha	Bu/A	A/Ha	Bu/A	Q/Ha	Bu/A	Q/Ha	Bu/A	Q/Ha	Bu/A	Q/Ha
OWW68007- 2M6	Corvallis	87.9	59.2	52.7	35.5	122.8	82.6	61.9	41.7	83.9	56.5	81.8	55.1
	Moro	22.1	14.9	36.3	24.4	39.9	26.9	60.4	40.6	65.8	44.3	44.9	30.2
	Pendleton	56.6	38.1	80.8	54.4	79.0	53.2	85.4	57.5	93.9	63.2	79.1	53.2
	Madras	54.8	36.9	94.1	63.3	90.6	61.0	132.4	89.1	134.1	90.2	101.2	68.1
	Ontario	130.1	87.6	59.9	40.3	104.4	70.3	125.8	84.7	139.4	93.8	111.9	75.3
Stephens	Corvallis	80.9	54.4	56.6	38.1	111.5	75.0	60.7	40.9	76.8	51.7	77.3	52.0
	Moro	27.2	18.3	33.7	22.7	40.4	27.2	59.8	40.2	83.2	56.0	48.9	32.9
	Pendleton	67.6	45.5	90.9	61.2	66.2	44.6	96.1	64.7	95.7	64.4	83.3	56.1
	Madras	78.9	53.1	108.0	72.7	75.6	50.9	144.2	97.0	140.7	94.7	109.5	73.7
	Ontario	132.9	89.4	58.4	39.3	117.4	79.0	110.6	74.4	146.2	98.4	113.1	76.1
Daws	Corvallis	73.3	49.3	57.0	38.4	108.9	69.9	31.7	21.3	60.4	40.6	65.3	43.9
	Moro	26.6	17.9	27.1	18.2	37.2	25.0	57.3	38.6	67.1	45.2	43.1	29.0
	Pendleton	51.3	34.5	87.9	59.2	70.6	47.5	78.0	52.2	96.3	64.8	76.8	51.7
	Madras	54.4	36.6	97.2	65.4	80.5	54.2	151.9	102.2	136.9	92.1	104.2	70.1
	Ontario	129.9	87.4	62.0	41.7	107.9	72.6	111.2	74.8	135.3	91.1	109.3	73.5

Table 4. Average yields of selection OWW68007-2M6 and selected varieties from the Western Regional White Winter Wheat Nursery grown in the Western region in 1978, 1979 and 1980.

Variety	1978						1979						1980					
	50 Bu/A			50 Bu/A			50 Bu/A			50 Bu/A			50 Bu/A			50 Bu/A		
	Loc	Bu/A	q/ha	Loc	Bu/a	q/ha	Loc	Bu/A	q/ha	Loc	Bu/A	q/ha	Loc	Bu/A	q/ha	Loc	Bu/A	q/ha
OWW68007-2M6	7	45.0	30.3	13	86.5	58.2	9	40.8	27.5	13	84.0	56.5	5	40.2	27.1	14	86.2	58.0
Stephens	7	45.5	30.6	13	93.5	62.9	9	33.7	22.7	13	79.5	52.5	5	35.7	24.0	14	76.0	51.1
Hugaines	7	35.6	23.9	13	78.9	53.1	9	39.5	26.6	13	78.1	52.6	5	38.1	25.6	14	70.3	47.3
Moro	7	32.6	21.9	13	58.1	39.1	9	39.3	26.4	13	68.8	46.3	5	37.2	35.0	14	59.2	39.8
Faro	7	41.1	27.6	13	73.3	49.3	9	39.6	26.7	13	71.4	48.1	5	36.1	24.3	14	71.3	48.0

Table 5. Emergence rate index (ERI) and final stand (FS) means for selection OWW68007-2M6 and selected cultivars grown in the Western Regional White Winter Wheat Nursery at Pomeroy, Washington in 1977, 1978 and 1979.¹

<u>Cultivar</u>	ERI				FS			
	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>\bar{x}</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>\bar{x}</u>
OWW68007-2M6	114	227	148	163	74	71	74	73
Stephens	147	198	138	161	75	70	68	71
Hyslop	114	206	121	147	76	76	58	70
Nugaines	105	220	92	139	67	76	52	65
Daws	110	154		132	68	52		60
WA6363 (Lewjain)	142	277	95	171	68	74	51	64

¹From a study by R.E. Allan, Washington State University.

Table 6. Winter survival of selection OWW68007-2M6 and other winter wheat cultivars tested near LaGrande, Oregon in 1979.

<u>Cultivar</u>	<u>Winter Survival</u> <u>%</u>
OWW68007-2M6	35
Nugaines	38
Daws	63
Stephens	20
McDermid	30
Luke	35
Hyslop	8

Table 7. Effects of P fertilization on yield and P uptake by selection OWW68007-2M6 and other selected wheat varieties grown in Linn County, 1979.¹

<u>Cultivar</u>	<u>Fertilizer</u>		<u>Yield</u> g/plot	<u>Leaf Samples</u> % P
	<u>P₂O₅</u>	<u>lb/A</u>		
OWW68007-2M6	0		600	.18
	60		635	.33
Yamhill	0		490	.17
	60		520	.33
Stephens	0		290	.20
	60		560	.40
Daws	0		370	.21
	60		440	.42

¹from a study by T.L. Jackson and Dan Sullivan, Department of Soil Science, Oregon State University

Table 8. Alpha amylase activity in dry seeds of different cultivars produced in Corvallis in 1981.¹

<u>Cultivar</u>	<u>Reducing sugar per gram of seed per hour (mg)</u>
OWW68007-2M6	1.305
ALBA/GNS//FN/SN64 (hard red winter)	1.719
Stephens	3.417
Daws	3.658

¹Data provided by Dr. T.M. Ching from a preliminary study.

Table 9. Agronomic data for Selection OWW68007-2M6 in comparison to selected commercial varieties when grown at Corvallis and Pendleton, Oregon in 1980-81.

Cultivar	Days to Heading		Plant Height (cm)		Lodging (%)		Test Weight lb/Bu	
	Pendleton	Corvallis	Pendleton	Corvallis	Pendleton	Corvallis	Pendleton	Corvallis
OWW68007-2M6	153	145	102	133	10	5	61.2	61.1
Stephens	151	140	94	119	30	0	61.2	59.1
Daws	153	146	97	123	30	40	61.0	59.6
Hyslop	152	144	94	120	80	70	61.2	52.1
Nugaines	152	144	89	111	40	70	61.7	60.9

Table 10. Wheat and flour characteristics of selection OWW68007-2M6 and selected varieties grown in Corvallis Oregon in 1978 as compiled by the Western Wheat Quality Lab, Pullman, Washington.

<u>Cultivar</u>	<u>Test weight (lbs/bu)</u>	<u>Flour Yield (%)</u>	<u>Mill Score</u>	<u>Flour Ash (%)</u>	<u>Flour Protein (%)</u>	<u>Baking Absorption (%)</u>	<u>Cookie Diameter cm</u>
OWW68007-2M6 ¹	61.6	73.1	87.4	.43	10.1	61.4	8.74
Yamhill	60.0	74.4	88.4	.44	9.2	57.9	9.11
Hyslop	60.0	70.6	80.4	.49	10.7	60.3	8.60
Stephens	59.6	71.5	84.8	.44	10.9	61.2	8.99
Luke	60.4	70.5	83.5	.44	10.1	62.7	8.82
Daws	60.0	69.2	83.1	.42	9.6	61.3	8.78
Faro (club)	59.2	71.3	84.5	.44	8.8	59.2	9.00

¹Particularly promising overall quality characteristics

TEP

EP-

Department of
Crop Science



Corvallis, Oregon 97331

(503) 754-3728

September 1, 1982

August 4, 1982

MEMORANDUM

TO: Ed Hardin, Greg Volmer, Don Brewer, Ron Cook, Dale Moss, Wilson Foote

FROM: W. E. Kronstad *W.E.K.*

SUBJECT: Red Kernels in the cultivar Hill-81

With the sodium hydroxide test, there appears to be a trace amount of seed which stains suggesting the presence of red kernels in the sample tested. We have rewritten the varietal description to acknowledge this situation. Those in other states or otherwise concerned with Hill-81 should be so notified.

The amended varietal description reads as follows:

Selection OWW68007-2M6 is a soft white common winter wheat. It is midtall, midseason in heading, with white stiff straw. The spike is awned, fusiform, middense, and inclined. Glumes are white, glabrous, midlong, midwide with wanting shoulders. Awns are 3 to 8 cm long; beaks 3 to 4 mm long. Kernels are white, midlong, elliptical with a hard mid-sized germ. The crease is narrow to midwide. Cheeks are usually rounded. Using the sodium hydroxide test there appears to be a trace amount of red kernels in seed lots of Hill-81.