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'ORH010085'
Soft White Winter Wheat

'ORH010085' is a soft white winter wheat (*Triticum aestivum L.*) developed by the Oregon Agricultural Experiment Station, Oregon State University, in cooperation with USDA-Agricultural Research Service. ORH010085 is noted for its superior yield potential and package of traits, including winterhardiness, disease resistances, and end-use qualities, which are complementary to currently grown varieties. ORH010085 is best adapted to dryland production areas of north central and northeast Oregon and southeast Washington where the variety Stephens has commonly been grown.

ORH010085 is a semidwarf winter wheat from the cross 'Dusty'/'ZGP-4074'//'Unknown' which was made in 1995. ZGP-4074 is an experimental line believed to originate from the Institute for Breeding and Production of Field Crops, located in Zagreb, Croatia. The 'Unknown' parent is believed to be a variety or breeding line from Oregon State University. ORH010085 is an F_5-derived line which was identified as a headrow in 2000 by breeders of Hybritech Seed International, Inc., a division of the Monsanto Company. ORH010085 was among the HybriTech germplasm donated by Monsanto to Oregon State University in 2000. In 2001, it was selected as a single F6 plot grown in Pendleton, OR, and given the experimental number ORH0100085.

ORH010085 has high grain yield potential, similar to or greater than that of Tubbs. ORH010085 was evaluated in the Oregon Winter Elite Yield Trials (OWEYT) in 2005, 2006, and 2007. Average grain yield for ORH010085 over 34 site years was 90.7 bu/a as compared with 87.4, 90.4, 85.8, and 90.7 bu/a for Stephens, Tubbs, ORCF-101, and ORCF-102, respectively. When considering only the 22 sites in the Columbia Basin, grain yield of ORH010085 averaged 81.8 as compared with 79, 80.3, 78.8, and 83.6 for Stephens, Tubbs, ORCF-101, and ORCF-102, respectively. ORH010085 has superior grain test weight as compared with either Stephens or Tubbs. Test weight for ORH010085 averaged 60.5 lb/bu over 24 OWEYT sites in 2006 and 2007. This compares to 59.0, 58.7, and 60.2 for Stephens, Tubbs, and ORCF-102, respectively. Average grain protein concentrations of ORH010085 were equal to Stephens and 0.5 percentage points higher than for Tubbs.

ORH010085 was evaluated in the USDA-ARS Western Regional Soft Winter Nursery in 2006 and 2007. Average grain yield of ORH010085 over 23 site-years was 102.4 bu/a, less than that of Stephens and Madsen at 106.1 and 103.4 bu/a, respectively. ORH010085 ranked relatively lower in irrigated sites and sites outside of the Columbia Basin production area. ORH010085 was entered in the 2008 WSU Extension Cereals Variety Trials for more extensive evaluation in Washington.

In 2007, six varieties, including ORH010085, were evaluated at four planting dates in field trials at Moro and Pendleton. When planted in mid-September or early October,

grain yield of ORH010085 was not significantly different from Stephens or Tubbs 06. However, when planted in mid-November, grain yield of ORH010085 was significantly greater than Stephens at both the Moro (67.9 vs 53.5 bu/a) and Pendleton (55.0 vs 48.0 bu/a) test sites. As compared with Tubbs at this seeding date, ORH010085 had similar yield at Moro (67.9 vs 66.2 bu/a), but less at Pendleton (55.0 vs 62.2 bu/a). Grain test weight of ORH010085 was superior to Stephens and/or Tubbs 06 over each the four planting dates. The response of these varieties to early vs late seedings is being further investigated in 2008.

ORH010085 is moderately early in maturity, with heading date similar to Stephens and averaging nearly 2 days earlier than Tubbs. Plant height of ORH010085 also is similar to Stephens, averaging 32.8 inches as compared with 33.7 and 36.7 for Stephens and Tubbs, respectively. Straw strength of ORH010085 is considered similar or slightly less than Stephens. Significant lodging has been observed in only one trial in the past three years. ORH010085 has been shown to have relatively smaller heads, but with high spikelet fertility and high 1000 kernel weights as compared with Tubbs.

ORH010085 has superior winterhardiness as compared with either Stephens or Tubbs. Crown freezing assays conducted by USDA-ARS in 2006 and 2007 suggest that ORH010085 has significantly greater cold-tolerance than Stephens, ORCF-101, and ORCF-102. Cold tolerance ratings, a measure of plant death at increasingly cold temperatures, were 38 and 32 for ORH010085 in 2006 and 2007, respectively. This compares with 42 and 38 for Tubbs, 46 and 44 for Stephens, 52 and 51 for Goetze. The ratings for ORH010085 approach those for Eltan at 35 and 31.

ORH010085 has superior tolerance to Cephalosporium stripe (*Cephalosporium gramineum* Nis. & Ika.) as compared with Stephens and Tubbs. In four inoculated disease trials grown at Pendleton over 3 years, white head ratings of ORH010085 averaged 7%; comparable to Madsen at 11%, and significantly lower than ratings for Stephens and Tubbs at 43 and 32%, respectively. Disease ratings for ORH010085 were higher than for Madsen in an inoculated trial at Moro in 2007 (35% vs 18%). However, these ratings were still significantly less than those for Stephens and Tubbs at 50 and 45%. Ratings of natural field infections of Crown rot (*Fusarium spp.*) suggest that ORH010085 also may have tolerance to this important disease. In 2007, white head ratings of 15% for ORH010085 were significantly lower than ratings of Stephens and Tubbs at 32 and 28%, respectively. The ratings were comparable to those for Madsen at 13%. ORH010085 is susceptible to Strawbreaker footrot (*Psuedocercosporella herpotrichoides* (Fron.) Deighton) and does not carry the VPM chromosome segment. In USDA-ARS evaluations, ORH010085 has been shown to have high levels of resistance to current field races of stripe rust (*Puccinia striiformis* Westend.), with infection intensities similar or less than those for Stephens and lower than Tubbs. ORH010085 is susceptible to Powdery mildew (Erysiphe graminis f. sp. tritici) and Septoria leaf blotch (*Septoria tritici* Roberge in Desmaz.), which means it is not recommended for the Willamette valley or irrigated production conditions.

End-use quality evaluations were conducted by the USDA-ARS Western Wheat Quality lab. Grain samples were obtained from 6 sites of the OWEYT in each of 2005, 2006, and 2007. Average test weight of ORH010085 over 18 sites was 62.07 lb/bu, 1.5 and

1.0 lb/bu higher than for Tubbs and Stephens, respectively. Kernel weight and kernel diameter were lower than for Stephens, similar to Tubbs. ORH010085 has significantly softer kernel texture, with average SKCS ratings of 31 as compared with 37 and 46 for Stephens and Tubbs. ORH010085 has acceptable soft wheat milling properties. Flour yield, break flour yield, flour ash, and milling score of ORH010085 were not significantly different from Stephens. ORH010085 has normal starch characteristics, but slightly stronger gluten characteristics, as indicated in higher SDS sedimentation values compared with Tubbs. Average cookie diameter of ORH010085 was 9.5 cm, significantly better than that for Tubbs at 9.2 cm. In 2007, ORH010085 was evaluated through the Pacific Northwest Wheat Quality Council. It was considered to have good milling and end-use quality attributes for the soft wheat market. ORH010085 was noted for its softer kernel texture and superior break flour yields as compared with Stephens. ORH020085 also was considered to have superior baking attributes as compared with Stephens, with larger cookie diameters, 9.2 vs 8.9 cm, and larger sponge cake volumes, 1380 vs 1305 cc.

In fall, 2006, 1,500 heads of ORH010085 were threshed, screened for seed color and seed size, and provided to Washington Foundation Seed for production of Breeder seed. These were planted as individual headrows and off-type rows were removed prior to bulk harvest of Breeder seed. In fall, 2007, this seed was used to bulk plant a 10 acre field for production of Foundation seed. Breeder and Foundation seed will be maintained by Washington State Crop Improvement Association (WSCIA). ORH010085 is intended for open release with Plant Variety Protection, but without the Title 5 option. Certification classes recognized for ORH010085 will include Foundation, Registered and Certified. Seed of ORH010085 will be deposited in the USDA National Small Grains Collection, Aberdeen, Idaho. It is requested that the source of this material be acknowledged in future use by wheat breeding and genetics programs.

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