Oregon Agricultural Experiment Station
Oregon State University
Corvallis, OR 97331

Proposal for Release of 'OR2040726'
Soft White Winter Wheat

OR2040726 is a soft white winter wheat (*Triticum aestivum L.*) developed by Oregon State University in cooperation with USDA-Agricultural Research Service. OR2040726 is being proposed for release for its superior yield potential, disease resistance, short stature, and adaptation to Oregon production conditions. The name was chosen to recognize the leadership and contributions of Mary Verhoeven to the Oregon State University wheat breeding program and the Oregon wheat industry.

OR2040726 is a semidwarf soft white winter wheat from the cross 'Stephens/Madsen/3/WA 7163 SISTER/SA 463-GBR//Stephens' which was made in 1998. WA 7163 SISTER is a Madsen sibling line. SA 463-GBR is a South African line for green bug resistance. OR2040726 is an F_5-derived line which was identified as a headrow in 2003. In 2004, it was selected as a single F_6 plot grown in Pendleton, OR, and given the experimental number OR2040726.

OR2040726 is best adapted to the wheat production regions of northeastern Oregon and southeastern Washington. Crown freezing tests conducted by USDA-ARS suggest that OR2040726 has increased cold tolerance than Stephens, more similar to the variety Tubbs. OR2040726 is a winter wheat that requires vernalization to initiate flowering. Field evaluations of OR2040726 in both Oregon and Washington confirm these results.

In USDA-ARS stripe rust (*Puccinia striiformis* Westend.) evaluations, OR2040726 has a moderately resistant/resistant reaction type with low infection intensities; most similar to ORSS-1757, Stephens, and ORCF-101, less than Tubbs 06. OR2040726 is susceptible to Septoria leaf blotch (*Septoria tritici* Roberge in Desmaz.), Cephalosporium stripe (Cephalosporium gramineum Nis. & Ika.), *Fusarium* Crown Rot (Dryland Foot Rot), and strawbreaker foot rot (*Psuedocercosporella herpotrichoides* (Fron.) Deighton); similar to Stephens.

OR2040726 was evaluated in Oregon and Washington statewide variety trials from 2009 to 2010. Over 19 site by year combinations from Oregon trials, OR2040726 averaged 88.7 bu/a, as compared with Goetze, Legion, ORCF-101, ORCF-102, Madsen, Skiles, Stephens, Tubbs 06, Westbred 528, and Xerpha at 80.9, 87.8, 82.9, 87.6, 83.4, 86.1, 82.2, 80.7, 89.1, and 81.9 bu/a, respectively. In 40 site by year combinations in Washington, OR2040726 averaged 100.3 bu/a, as compared with Legion, ORCF-102, Madsen, Skiles, Stephens, Tubbs 06,

Westbred 528, and Xerpha at 102.6, 102.8, 96.3, 100.0, 93.8, 97.7, 96.0, and 103.9 bu/a, respectively. Grain test weight of OR2040726 has been similar to ORCF-102, averaging 60.5 lb/bu over 19 locations in Oregon, approximately 1 to 2 lbs/bu greater than that for Goetze, Legion, Stephens, Tubbs 06, and Xerpha. Grain protein concentration of OR2040726 is similar to Goetze, Legion, ORCF-102, and Tubbs 06, averaging 9.7% across 19 locations in Oregon, 0.3 to 0.5% lower in grain protein than Skiles, Stephens, Madsen, or Westbred 528. OR2040726 averages 1 day earlier in heading date than Stephens and 2 to 3 days earlier than ORCF-101, ORCF-102, Madsen, and Tubbs 06. Plant height of OR2040726 averages 33.7 inches; similar to Skiles, about 1 inch shorter than Stephens and 4 inches shorter than Tubbs 06. OR2040726 has good straw strength, comparable to Stephens.

End-use quality of OR2040726 was evaluated by the USDA-ARS Western Wheat Quality lab from the 2004 through 2009 harvests. There were 16 head-to-head comparisons with Stephens, and 14 with Tubbs/Tubbs 06 (Tubbs) including 12 head-to-head comparisons with both check varieties at multiple locations in Oregon in the 2008 and 2009 harvest years. Milling and baking evaluations indicate that OR2040726 has overall quality slightly superior to Stephens primarily as a result of superior break flour yield. OR2040726 has overall quality generally superior to Tubbs. OR2040726 is considered acceptable for soft wheat applications. Significant differences are reported at a probability level of 5%.

Grain protein: OR2040726 with a mean grain protein of 10.0% was equal to Stephens and Tubbs. *Grain hardness*: OR2040726 had a mean hardness index of 32.2, equal to Stephens (28.0) and significantly softer than Tubbs (40.0). *Seed diameter*: OR2040726 (2.76 mm) had smaller mean kernel diameter than Stephens (2.93 mm) but was equal to Tubbs (2.76 mm). *Test Weight*: OR2040726 (61.4 bu/ac) had mean test weight equal to Stephens (60.7 bu/ac) but significantly superior to Tubbs (59.6 bu/ac). *Flour yield*: OR2040726 (69.6%) had mean flour yield (expressed as a percentage of clean wheat loaded onto the mill) equal to Stephens (68.9%) and Tubbs (68.0%). *Break flour yield*: OR2040726 (50.5%) had break flour yield (the proportion of particles <150 µm from the break-rolls of the experimental mill) significantly superior to both Stephens (46.8%) and Tubbs (47.0%). Superior break flour yield is a hallmark of good soft white quality and OR2040726 shows a valuable improvement over Stephens. *Flour ash concentration*: OR2040726 (0.39%) had mean flour ash equal to Stephens (0.40%) but significantly lower than Tubbs (0.43%). *Absorption capacities*: Mean water retention capacity of OR2040726 (55.1%) was equal to Stephens (56.1%) but significantly superior to Tubbs (58.0%). For starch damage from milling as adjudicated by sodium carbonate solution retention capacity OR2040726 (69.4%) was equal to Stephens (68.9%) but significantly superior to Tubbs (72.9%). For soluble fiber content as indicated by sucrose-solution retention capacity OR2040726 (96.3%) was equal to Stephens (95.9%) and Tubbs (99.6%). *Sugar snap cookie diameter*: OR2040726 (9.30 cm) has cookie baking performance similar to Stephens (9.28 cm) and significantly

superior to Tubbs (9.07 cm). *Flour swelling volume* tests suggest that OR2040726 (18.7 ml) has normal starch properties, with average volume equal to Stephens (19.7 ml) and Tubbs (18.7 ml).

OR2040726 grain harvested in 2008 and 2009 was evaluated through the PNW Wheat Quality Council. Pilot scale milling showed it to have lower overall ash content and a superior cumulative ash curve to Stephens in both years. Overall scores from industrial assessors ranked OR2040726 ahead of Stephens also in both years. OR2040726, notably, was ranked higher in overall quality compared to the known high quality variety Brundage 96 in the 2008 harvest testing and equal to Brundage 96 in the 2009 harvest testing. OR2040726 was considered to have acceptable milling and baking quality for the soft white market class.

In fall, 2009, 1,500 heads of OR2040726 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. Foundation seed will be available in August, 2011. OR2040726 is being submitted for open release with Plant Variety Protection, but without the Title 5 option. Seed of OR2040726 has been 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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Release of OR2040726 approved:

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