IDAHO AGRICULTURAL EXPERIMENT STATION

Moscow, Idaho

Announces the Release of

UI PETTIT

Soft White Spring Wheat

'UI Pettit' soft white spring wheat (*Triticum aestivum* L., Reg. no. CV- , PI 620631) was released by the Idaho Agricultural Experiment Station in 2006 for use by grain producers in the Pacific Northwest of the United States. UI Pettit is a semi-dwarf wheat with excellent yield and milling quality, and is adapted to irrigated production with a significantly shorter plant stature than comparable soft white spring wheats.

UI Pettit was derived from the cross, 'Pomerelle' (PI 592983)*2/'Fujimi Komugi' (PI 360869) made at the University of Idaho, Aberdeen Research and Extension Center in 1996. Pomerelle is a late maturity spring wheat developed at the University of Idaho (Souza et al., 1997). Fujimi Komugi is a Japanese soft red winter wheat with very early flowering dates when grown in Idaho. The cross, designated A9659S, was advanced by the bulk method without intentional selection in the F_2 and F_3 generation. In the F_4 generation, approximately 200 heads were selected from short plants of the bulk population seeded at Aberdeen in 1999. Seed from heads was selected for white color and low polyphenol oxidase reaction based on reaction in a tyrosine solution (Bernier and Howes, 1994). Eight selections were planted as $F_{4:5}$ headrows in 2000 and two selections were advanced to unreplicated yield testing at Aberdeen in 2001, based on agronomic type and low whole grain sodium carbonate solvent retention capacity (SRC) of the harvested grain (A measure of starch damage from milling; Guttieri et al. 2004). Both

selections were advanced to replicated, multi-location testing in 2002 and 2003. In 2004, the $F_{4:8}$ selection A9659S-2 from the A9659S cross was advanced to the Tri-State Regional Nursery (Idaho, Oregon, and Washington) under the advanced line designation IDO632 and then advanced to the Western Regional Spring Wheat Nursery in 2005. IDO632 was tested in on-farm extension trials in Washington and Idaho in 2005 and evaluated by the Pacific Northwest wheat quality council in January 2006. Approximately 100 head selections from A9659S-2 were planted in 2003 at Aberdeen and seed from each headrow was planted to individual plots at Aberdeen in 2005. Headrow plots that were true-to-type were harvested, bulked, and designated as UI Pettit breeder seed. UI Pettit has been uniform, reproducible, and without visible variant for five generations.

UI Pettit is most similar in appearance to 'Alturas' soft white spring wheat (Souza et al. 2004). UI Pettit has an unpigmented coleoptile and erect juvenile growth. UI Pettit has a twisted, recurved flag leaf and an awned, erect, lax head, which is white-chaffed at maturity. Seed of UI Pettit is soft, white, ovate, rounded cheeks and large (36 mg kernel^{-1}), with a kernel type similar to Jubilee (Souza et al, 2003), but approximately 6 mg kernel^{-1} larger.

In irrigated trials in southern Idaho from 2003 to 2005 (9 trials), UI Pettit was 85 cm tall, shorter than 'Penawawa' (PI 495916, Barrett and Kidwell, 1998), Alturas, and 'Jubilee', (PI 614839, Souza et al., 2003), which had average heights of 99, 100, and 104 cm, respectively ($p<0.01$). UI Pettit is also earlier than comparable cultivars; average heading dates in irrigated trials were 166 days after January 1 (daj) for UI Pettit, 171 daj for Alturas, 172 daj for Penawawa, and 173 daj for Jubilee ($p<0.01$). Based on field evaluations in Mount Vernon, WA, and Pullman, WA, Moscow, ID, Hazelton, ID, and Aberdeen, ID from 2004 to 2005, UI Pettit has moderate adult plant resistance to stripe rust. When susceptible checks (Lemhi or Jubilee)

have reaction types of 8 (Extended lesions of pustules) covering in excess of 90% of the leaf area, UI Pettit had reaction types ranging from type 2 (flecking, no pustules) to type 8 with occluded leaf areas ranging from 2% to 90%. Dominant stripe rust races during these evaluations were PST-100 and PST-102 in southern Idaho and PST-100, PST-102, PST-115, and PST-116 in Washington and north Idaho (X. Chen, personnel communication, 2006). The adult plant resistance of UI Pettit would minimize crop loss in areas of low disease pressure such as southern Idaho, but would likely be insufficient in high disease pressure areas of central and eastern Washington. UI Pettit is susceptible to the Hessian fly [*Mayetiola destructor* (Say)], similar to Alturas. UI Pettit has the high-molecular weight glutenin profile of *Glu-A1c*, *Glu-B1c*, and *Glu-D1a*. Based on flour pasting profiles using a Foss Rapid Visco-analyzer (Foss North America, Eden Prairie, MN), UI Pettit has a flour pasting profile consistent with wild-type activity for all three loci of the granule-bound starch synthase genes.

In 15 site-years in Idaho of replicated trials from 2003 to 2005, UI Pettit had a grain yield of 6750 kg ha^{-1}, compared to 6668 kg ha^{-1} for Alturas, 5750 kg ha^{-1} for Penawawa, and 5639 kg ha^{-1} for Jubilee (Standard error 197 kg ha^{-1}). In 12 irrigated trials in southern Idaho from 2003 to 2005, UI Pettit, Alturas, Penawawa, and Jubilee had grain volume weights of 769, 756, 747, and 760 kg m^{-3}, respectively. In irrigated trials most trials did not have significant lodging; however in trials where significant lodging occurred, UI Pettit had similar lodging resistance to Alturas, Penawawa and Jubilee (All four cultivars had less than 5% lodging).

UI Pettit has a high milling yield based on evaluation with the Quadrumat Senior Mill of the University of Idaho Wheat Quality Laboratory. In 6 site-years of test milling of grain from irrigated trials, UI Pettit had a total flour yield of 681 g kg^{-1}, greater than Treasure (665 g kg^{-1}, $p<0.05$) and Penawawa (620 g kg^{-1}, $p<0.01$), but similar to Alturas (678 g kg^{-1}) and Jubilee (673

g kg^{-1}). Flour of UI Pettit has relatively low damaged starch as measured by sodium carbonate SRC (Guttieri et al. 2001) with an average sodium carbonate SRC of 573 g kg^{-1} for UI Pettit compared 585 g kg^{-1} for Alturas, 588 g kg^{-1} for Jubilee, 595 g kg^{-1} for Treasure, and 629 g kg^{-1} for Penawawa ($LSD_{p<0.05}$=16 g kg^{-1}, smaller values indicate less flour damage starch). In the flour samples of the same 6 irrigated trials, UI Pettit had weaker gluten strength than the check cultivars based on latic acid SRC. UI Pettit had a lactic acid SRC of 764 g kg^{-1} compared with 872 g kg^{-1} for Jubilee, 925 g kg^{-1} for Treasure, 969 g kg^{-1} for Penawawa, and 969 g kg^{-1} for Alturas ($LSD_{p<0.05}$=48 g kg^{-1}, greater values indicate greater gluten strength; Guttieri et al., 2001). In nine evaluations (trials from Moscow, Hazelton, and Aberdeen, 2004 and 2005), UI Pettit had wire-cut cookie diameter of 8.0 cm, similar to Alturas (8.0 cm), Jubilee (8.1 cm), and Treasure (8.0 cm), yet greater than Penawawa, (7.8 cm, standard error 0.1). UI Pettit flour produces tender wire-cut cookies as measured by three-point breaking force in a TA-XT2 texture analyzer (Stable Micro-systems, London, UK). The average force for the nine wire-cut evaluations was 1901 g for UI Pettit, 2131 g for Jubilee, 2282 g for Alturas, 2583 g for Treasure, and 3002 g for Penawawa (($LSD_{p<0.05}$=149 g).

Seed of UI Pettit will be maintained by the Idaho Agricultural Experiment Station. Plant variety protection will not be requested for UI Pettit. Seed for research purposes may be obtained by contacting the University of Idaho Foundation Seed Director, Kimberly Research and Extension Center, Kimberly, Idaho.