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Registration of 'Clear White' Wheat

'Clear White' (Reg. no. CV- 970, PI 635044) is a hard white spring wheat (*Triticum aestivum* L.) developed and released by the University of California, Davis (UCD hereafter). Clear White was selected for its good grain yield potential, resistance to stripe rust (caused by *Puccinia striiformis* Westend.) and leaf rust (caused by *Puccinia triticina* Eriks), and its excellent breadmaking and Asian noodle quality.

Clear White, previously designated UC1361, was selected from the cross UC366/'Yecora Rojo' (Citr 17414)/'Klasic' (PI 486139) made by Cal Qualset and Herb Vogt in 1982. UC366 is a selection from the cross 'Anza' (Citr15284, Qualset et al., 1984)'/Davis 6301/'Nainari 60' (Citr 13747) and Davis 6301 is a selection from the cross 'Mayo 54' (Citr 13585)/'Norin 10' (PI 156641)'/Brevor 29-1C' (Citr 12385, Heyne, 1959). Bulk populations of F₂ to F₁₀ generations were grown at UCD from 1983 through 1996, and 136 heads were selected the last year and planted as F_{10:11} head rows in 1998 at UCD. On the basis of agronomic appearance, 13 head rows were selected and advanced to a single replicate observation plot trial at UCD in 1999. Based on yield and protein values, four sister lines were selected and advanced to a replicated preliminary yield trial grown at UCD in 2000. One line was selected based on yield, agronomic traits, and rust resistance, and was advanced as UC1361 to multilocation testing in California. The elite yield trials were grown at Davis, Colusa, and Kings counties in 2001 and 2002. The regional yield trials were grown at Butte, Davis, Delta, Madera, Kern, and Kings counties in 2002 and 2003 and Colusa, Glen, Solano, and Tulare counties in 2003. One thousand head rows were planted in 2004 at the Tulelake Intermountain Research and Extension Center to produce Breeder Seed. Foundation Seed was produced at UCD in 2004 to 2005.

Clear White has an erect growth habit with recurved flag leaf. It has middense white spikes with long awns (9–11 mm). The glumes are large, wide, and acuminate with a rounded shoulder. The kernel is oval, white, with a long brush.

Clear White was compared to standard Hard White Spring (HWS) cultivars in two years of yield trials in California at a total of 13 environments under irrigation. Clear White has an average plant height of 94 cm and showed no significant differences when compared with the varieties 'Blanca Grande' (96 cm) and 'Plata' (95 cm) (both varieties from Resource Seed Inc.) but is significantly different ($P < 0.05$) from Klasic (PI 486139, 83 cm). Clear White is an early flowering variety (139 d from sowing to flowering at UCD 2002–2003) with heading times similar to Blanca Grande (137 d), Klasic (137 d), and Plata (143 d). In the 13 irrigated yield trials from the San Joaquin Valley, Sacramento Valley, and Delta, Clear White's average grain yield (5311 kg ha⁻¹) was lower than Blanca Grande (6113 kg ha⁻¹) and Plata (6388 kg ha⁻¹) and higher than Klasic (4300 kg ha⁻¹), but the differences were not statistically significant ($P > 0.05$). No significant differences in yield were observed among varieties under rainfed conditions in 2003 in Tulare, Solano, and Glen counties, California. Combining the irrigated and rain-fed location-years described above, the average grain volume weight of Clear White (812 kg m⁻³) was not significantly different from Blanca Grande (825 kg m⁻³) and Plata (825 kg m⁻³) but was significantly

higher ($P < 0.05$) from Klasic (768 kg m⁻³). Clear White showed significantly better ($P < 0.05$) resistance to lodging (4%) than Blanca Grande (14%) and Klasic (18%) in the nine irrigated location-years where data was recorded.

Observations for disease resistance showed that Clear White has resistance to the field races of leaf rust, stripe rust, and Septoria blotch (caused by *Septoria tritici* Roberge in Desmaz.) present in the environments tested. Average severity under natural infection of leaf rust infections from 10 location-years for Clear White (3%) was not significantly different from Blanca Grande (16%), Plata (19%), and Klasic (19%). Average severity under natural infection of stripe rust infections from 15 location-years for Clear White (8%) was not significantly different from Blanca Grande (3%) and Plata (2%), but was significantly lower ($P < 0.05$) than Klasic (60%). In two locations where Septoria blotch was detected, the disease severity of Clear White (1%) was similar to Blanca Grande (1%), Plata (1%), and Klasic (1.2%). Disease resistance genes present in Clear White are currently unknown.

Grain protein content was measured in 12 location-years. The average grain protein content of Clear White (123 g kg⁻¹) was significantly different ($P < 0.05$) from Blanca Grande (130 g kg⁻¹) but not from Plata (121 g kg⁻¹) and Klasic (127 g kg⁻¹). Complete milling and baking tests for Clear White and standard checks were performed at the California Wheat Commission Quality Laboratory (CWC) using grain from yield trials grown at Davis and Kings during 2001 and 2002. Clear White had good flour extraction (737 g kg⁻¹), loaf volume (947 mL), and baking score (4.7) which was similar to Klasic (5.0), Blanca Grande (4.0), and Plata (4.0) (CWC baking scale 1 = lowest and 5 = highest). Clear White has good quality attributes for Asian noodles. Clear White is currently the only HWS variety from California with low levels of polyphenol oxidase enzyme (PPO), which prevents noodle discoloration. In summary, Clear White has good quality characteristics for both Asian noodles and bread products.

The Department of Plant Sciences, UCD will maintain Breeders seed. Foundation seed will be produced and distributed by the Foundation Seed program of the University of California, Davis. The University of California has applied for PVP for Clear White under Serial No. 200400244. Small amounts of seed for research purposes may be obtained by contacting the corresponding author.

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