U.S. Plant Variety Protection (PVP) for Bess will be filed under Title V. All seed requests should be sent to the corresponding author during the period of Protection by the PVP Certificate. Seed of this release is deposited in the National Plant Germplasm System where it will be available after the PVP expires for research purposes, including development and commercialization of new cultivars. It is requested that appropriate recognition be made if this germplasm contributes to the development of new germplasm or cultivars.

References

Registration of ‘Waxy-Pen’
Soft White Spring Waxy Wheat
C. F. Morris* and G. E. King

Waxy-Pen’ soft white spring waxy wheat (Triticum aestivum L.) (Reg. No. CV 1006, PI 677779) was released by the USDA-ARS in 2006. Waxy-Pen was developed by Dr. Craig F. Morris, USDA-ARS, Western Wheat Quality Laboratory. Waxy-Pen was released due to its fully “waxy” starch composition (<1% amylose) and unique end-use quality, and its potential for broad adaptation to U.S. Pacific Northwest (PNW) environments.

Waxy-Pen is a backcross-five derivative (Penawawa ×1/Wx2–2a) of the soft white spring wheat variety ‘Penawawa’. Penawawa (PI 495916; ‘Potam 70’/‘Fielder’) was developed by Dr. Calvin Konzak while at Washington State University (WSU), Pullman, WA, and was released in 1985 by WSU and the USDA. Penawawa is null for the granule-bound starch synthase (GBSS) (Waxy) gene on chromosome 4A (haplotype = Wx-A1a, Wx-B1b, Wx-D1a) and has an apparent amylose content of 19.9% (Zeng et al., 1997). The donor of the two additional GBSS null alleles (Wx-A1b, Wx-D1b) was the soft red spring wheat germplasm line WQL6K107BHWX-2a (PI 612545), which has the pedigree ‘Kanto 107’(PI 631445)/’Bai Huo’ (PI 606717) (Morris and Konzak, 2001). A tentative name assignment of ‘Penawawa-X’ was approved by the Seed Regulatory & Testing Branch, USDA-Agricultural Marketing Service in 2003 but was changed to Waxy-Pen in 2006.

Breeder seed of Waxy-Pen was derived by bulking seed from 27 BC1F1–derived F2 field plots grown near Bozeman, MT in 2004. The BC1F1 plants were derived from 10 randomly selected BC1F1 spikes that had been assayed for homozygous waxy trait using I2/KI (stock solution of 0.1 M of each; working dilution in the range of 5–10 mM) on several kernels each. The kernels had a small portion of the distal brush end removed with a razor blade, and the exposed endosperm was stained with iodine. Rust color, as opposed to dark purple color, was indicative of waxy starch. The waxy endosperm trait was confirmed on the BC1F1 seed.

Waxy-Pen was evaluated in 2005 in the WSU Extension Uniform Cereal Variety Testing Program (WSU Ext. UCVTP) as ‘WA7996’, by John Burns, extension agronomist; and in the Western Regional Uniform Cooperative (WRN Coop) Wheat Nurseries, Dr. Kim Garland Campbell, ARS research geneticist, coordinator, as ‘WQL7PENWX-2’. In general, Waxy-Pen is morphologically and developmentally indistinguishable from Penawawa except for the waxy endosperm trait. Across 18 WSU Ext. UCVTP locations, Waxy-Pen had significantly lower grain yield (lower at 15 of 18 sites; 1620 vs. 1730 kg ha−1, respectively, difference significant at P = 0.01), slightly lower test weight (712 vs. 718 kg m−3, difference significant at P = 0.05), and similar grain protein contents (125 and 126 g kg−1, difference not significant at P = 0.05) compared with Penawawa.

Like Penawawa, Waxy-Pen is susceptible to the stripe rust (Puccinia striiformis f. sp. tritici Westend) race(s) currently prevalent in the Pacific Northwest. Due to intense stripe-rust incidence in 2005, Waxy-Pen and Penawawa yielded from lows of 457 and 511 kg ha−1, respectively, up to 3736 and 3863 kg ha−1, respectively, across the 18 WSU Ext. UCVTP locations. In the WRN Coop Wheat Nurseries, grain yield of Waxy-Pen ranged from 1340 to 8528 kg ha−1 (data not shown).

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