

## NOTICE OF RELEASE OF KS04WGRC48 HARD RED WINTER WHEAT GERM PLASM RESISTANT TO LEAF RUST AND POWDERY MILDEW

The Agricultural Research Service, U.S. Department of Agriculture, and the Kansas Agricultural Experiment Station announce the release of KS04WGRC48 hard red winter wheat (*Triticum aestivum* L.) germ plasm resistant to leaf rust (caused by *Puccinia triticina* Eriks.) and powdery mildew (caused by *Erysiphe graminis* D.C. f. sp. *tritici* E. Marchal.) for breeding and experimental purposes. Scientists participating in this development were G.L. Brown-Guedira, USDA-ARS, Department of Agronomy, Kansas State University, Manhattan, KS; T.S. Cox, Land Institute, Salina, Kansas; P. D. Chen, Cytogenetic Institute, Nanjing Agricultural University, Nanjing, Jiangsu, P.R. China; D.A. Van Sanford, Department of Agronomy, University of Kentucky, Lexington, Kentucky; A.K. Fritz, Department of Agronomy, Kansas State University; and B.S. Gill, Department of Plant Pathology, Kansas State University, Manhattan, Kansas.

KS04WGRC48 is a BC<sub>1</sub> F<sub>5</sub>-derived line with the pedigree 'KS94U216\*2 / 92R149'. KS94U216 is a hard red winter wheat experimental line developed from a bulk selection with gene *Lr21* derived from *Aegilops tauschii* Coss. conferring resistance to leaf rust. 92R149 is a spring wheat line developed at Nanjing Agricultural University having the gene *Pm21* conferring resistance to powdery mildew present on the translocation T6VS 6AL consisting of the short arm of the *Haynaldia villosa* (L.) Schur chromosome 6V translocated to the long arm of wheat chromosome 6A. KS04WGRC48 was selected for resistance to leaf rust and powdery mildew in field evaluations at Manhattan, KS and at Lexington, KY.

Adult plants of KS04WGRC48 displayed no visible sign of leaf rust infection when exposed to moderate to heavy inoculum levels in the field at Manhattan and Hutchinson, KS, in 2003 and 2004, and small chlorotic flecks under heavy inoculum pressure at Castroville, TX, in 2004. Seedlings of KS04WGRC48 exhibited a low infection type (IT = 0; to ;1, small flecks or small pustules with chlorosis) when inoculated with races KDBL, PNMQ, MCDL, MFBL, and TNRJ of *P. triticina*. High infection types (IT= 4, large pustules with little or no chlorosis) were observed on seedlings of the susceptible cultivar TAM 107 with all races of leaf rust tested. Presence of the 1.36-Kb fragment amplified by the primer pair KSUD14, which corresponds to a portion of the cloned *Lr21* gene, indicates that KS94U216 and KS04WGRC48 have *Lr21*. This gene provides effective resistance to all races of leaf rust in North America. No evidence of powdery mildew infection was noted on adult plants of KS04WGRC48 when exposed to heavy inoculum levels in the field at Hutchinson, KS, and Lexington, KY, in 2003 and 2004. Homogeneity of T6VS 6AL translocated chromosome in KS04WGRC48 was confirmed by amplification of the 1,265-bp DNA fragment expected with a SCAR marker linked to *Pm21* and lack of amplification of two wheat microsatellite markers located on 6AS. The *Pm21* gene provides effective resistance to all races of powdery mildew in North America.

Small quantities (2g) of seed of KS04WGRC48 are available upon written request. Appropriate recognition of source should be given when this germ plasm contributes to research or development of a new breeding line or cultivar. Seed stocks are maintained by the Wheat Genetics Resource Center, Department of Plant Pathology, Throckmorton Plant Sciences Center, Kansas State University, Manhattan, KS 66506-5502. Genetic material of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including development of new cultivars.