Registration of KS92WGRC21 and KS92WGRC22 Hard Red Winter Wheat Germplasms Resistant to Wheat Spindle-Streak Mosaic Virus, Wheat Soilborne Mosaic Virus, and Powdery Mildew

KS92WGRC21 (Reg. no. GP-389, PI 566670) and KS92WGRC22 (Reg. no. GP-390, PI 566671) are hard red winter wheat (*Triticum aestivum* L.) germplasms resistant to wheat soilborne mosaic virus, wheat spindle-streak mosaic virus, and powdery mildew [caused by *Erysiphe graminis* (DC.) f. sp. *tritici* Ém. Marchal]. They were developed cooperatively by the USDA-ARS; the Wheat Genetics Resource Center at Kansas State University; the Kansas Agricultural Experiment Station; the Cornell Agricultural Experiment Station; the North Carolina Agricultural Research Service; and University College Dublin, Republic of Ireland. They were tested under experimental numbers U1261-2-5-7 and U1273-5-18-8 (1,2), respectively, and released as germplasms in 1992.

The pedigree of KS92WGRC21 is 'TAM 200'*3/TA 2570, and that of KS92WGRC22 is 'Century'*3/TA 2567. Both are BC_2F_2–derived lines. TA 2567 and TA 2570 are two closely related accessions of *T. tauschii* (Coss.) Schmal. from Armenia. Both germplasms were highly resistant to a combined infection of wheat spindle streak and soilborne mosaic viruses in head rows at Manhattan, KS, in 1990 and in replicated experiments at Oxford, KS, in 1991. The recurrent parents, TAM 200 and Century, displayed severe symptoms in the same nurseries. At Oxford, KS92WGRC21 and KS92WGRC22 yielded 359 and 425 g m^{-2}, respectively; this is significantly more than their recurrent parents, which yielded 148 and 277 g m^{-2}, respectively.

At Ithaca, NY, in 1991 and 1992, where only the spindle-streak virus was present, KS92WGRC21, KS92WGRC22, and Century were rated as highly resistant (all with mean scores of 1.7 on a 1 to 9 scale), whereas TAM 200 was severely infected (with a mean score of 7.3). The local check cultivar, Geneva, which is considered moderately resistant, had a mean score of 5.0.

The genetic basis of resistance has not been determined, but our unpublished results suggest that resistances to the two viruses are conditioned by different loci. Resistances to both viruses in KS92WGRC21 are derived from TA 2570, and resistance to soilborne mosaic virus in KS92WGRC22 is derived from TA 2567. We do not know whether KS92WGRC22 carries a gene or genes for resistance to spindle-streak mosaic virus from TA 2567 in addition to those from Century.

In a replicated field experiment at Dublin, Ireland, in 1991, both germplasms displayed a significantly lower level of infection from powdery mildew than did their respective recurrent parents (both of which carry the *Pml7* resistance gene). In tests at Raleigh, NC, both germplasms and their recurrent parents had resistant reactions as seedlings to isolates of powdery mildew that are avirulent to *Pml7*. In absence of infection by either virus or powdery mildew, KS92WGRC21 and KS92WGRC22 are similar to TAM 200 and Century, respectively, in height, maturity, reaction to other diseases, and overall phenotype. Of the two germplasms, KS92WGRC22 has shown the better adaptation to New York conditions.

Small quantities (3 g) of seed of KS92WGRC21 and KS92WGRC22 are available upon written request. Appropriate recognition of source should be given when this germplasm contributes to research or development of new cultivars. Seed stocks are maintained by the corresponding author.

T. S. Cox,* M. E. Sorrells, G. C. Bergstrom, R. G. Sears, B. S. Gill, E. J. Walsh, S. Leath, and J. P. Murphy (3)

References and Notes

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3. T.S. Cox, USDA-ARS and Dep. of Agronomy, R.G. Sears, Dep. of Agronomy, and B.S. Gill, Dep. of Plant Pathology Kansas State University, Manhattan, KS 66506; M.E. Sorrells, Dep. of Plant Breeding and Biometry, and G.C. Bergstrom, Dep. of Plant Pathology, Cornell University, Ithaca, NY 14853; E.J. Walsh, University College Dublin, Dublin, Republic of Ireland; and S. Leath, USDA-ARS and Dep. of Plant Pathology, and J.P. Murphy, Dep. of Crop Science, North Carolina State University, Raleigh, NC 27695.
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Registration of KS91WGRC11, KS92WGRC15, and KS92WGRC23 Leaf Rust–Resistant Hard Red Winter Wheat Germplasms

KS91WGRC11 (Reg. no. GP-391, PI 566668), KS92WGRC15 (Reg. no. GP-392, PI 566669), and KS92WGRC23 (Reg. no. GP-393, PI 566672), are hard red winter wheat (*Triticum aestivum* L.) germplasm lines resistant to leaf rust (caused by *Puccinia recondita* Roberge ex Desmaz.) and developed cooperatively by the Wheat Genetics Resource Center of Kansas State University, the USDA-ARS, and the Kansas Agricultural Experiment Station.

KS91WGRC11 seedlings produced low infection types (01C to 23X) when inoculated with cultures PRTUS19, PRTUS24, and PRTUS25 of *P. recondita*. Adult plants exhibited low infection types in the field in Manhattan and Hutchinson, KS, in 1991, 1992, and 1993. The pedigree of KS91WGRC11 is 'Century'*3/TA2450. TA2450 is an accession of *T. tauschii* (Coss.) Schmal. collected by Kyoto University, Japan, near Behshahr in north central Iran. KS91WGRC11 is a BC_2F_2–derived line homozygous for the leaf rust-resistance gene *Lr42* from TA2450. *Lr42* is on chromosome 1D, linked to the *Lr21* locus, with a recombination value of 28 $\pm$ 2 units. KS91WGRC11 is similar to Century in height, maturity, and overall phenotype, but Century (which carries the *Lr24* gene) exhibits a high infection type (88P) when inoculated with PRTUS19, PRTUS24, and PRTUS25. KS91WGRC11 was released as germplasm in 1991.

KS92WGRC15 seedlings produced a low infection type (01C to 03C) when inoculated with cultures PRTUS19, PRTUS24, and PRTUS25 of *P. recondita*. Adult plants exhibited low infection types in the field at Manhattan and Hutchinson, Kansas in 1991, 1992, and 1993. KS92WGRC15 is an F_4–derived line with the pedigree 'Karl'//'TAM 200'/KS86WGRC2. It results from an effort to transfer an allele of *Lr21* from KS86WGRC2 into a more desirable agronomic background. KS92WGRC15 is similar to Karl in height and overall phenotype and heads 1 d later. Under an early and severe leaf rust infection at Hutchinson, KS, in 1992, KS92WGRC15 yielded 22 percent more than

Karl, whereas at Manhattan, where the leaf rust epidemic occurred later in the growing season, KS92WGRC15 and Karl had equal grain yields. KS92WGRC15, released in 1992, should prove to be a more useful source of leaf rust resistance for wheat breeding programs than was KS86WGRC2.

KS92WGRC23 seedlings exhibited a very low infection type (0lC) when inoculated with cultures PRTUS19, PRTUS24, and PRTUS25 of *P. recondita*. Adult plants displayed an immune reaction under heavy leaf rust infection at Manhattan and Hutchinson, KS, in 1991, 1992, and 1993. KS92WGRC23 is a BC_2F_2–derived line with the pedigree Karl*3//PI 266844/PI 355520. Karl was pollinated with an F_1 plant of *T. monococcum* (PI 266844/PI 355520), and the three-way hybrid was backcrossed twice to Karl. Leaf rust-resistant F_3 progeny of one F_2 plant were selected in the field in 1991, and resistant BC_2F_2–derived F_4 progeny were produced in 1992. KS92WGRC23 is similar to Karl in height and overall phenotype but contains plants that range in heading date from the same day as Karl to 6 d later. Karl seedlings exhibit intermediate infection types (56X to 78X) with cultures that elicit a 0lC infection type with KS92WGRC23. Late in the 1992 growing season, KS92WGRC23 remained free of leaf rust, whereas Karl was heavily rusted. KS92WGRC23 was released as germplasm in 1992.

A *T. monococcum* F_1 plant was used to transfer resistance to KS92WGRC23, because one of the parents, PI 266844, produces only female-sterile hybrids with hard red winter wheat. PI 355520 carries genes that allow production of female-fertile hybrids (1). The leaf rust resistance of KS92WGRC23 is conditioned by a dominant gene derived from one of the *T. monococcum* parents, probably PI 266844; genetic studies to determine the gene's location have not been completed.

KS92WGRC23 has 20 normal chromosome pairs, one pair of telocentric 6BL chromosomes, and one pair of near-telocentric chromosomes containing the entire short arm of 6B and a small proximal portion of 6BL. There is no noticeable effect of this abnormal chromosome 6B on fertility or morphology. One or more of the aberrant chromosomes may be lost in some plants, but the leaf rust-resistance gene is on another chromosome.

Small quantities (3 g) of seed of KS91WGRC11, KS92WGRC15, and KS92WGRC23 are available upon written request. Appropriate recognition of source should be given when these germplasms contribute to research or development of new cultivars. Seed stocks are maintained by the Wheat Genetics Resource Center, Dep. of Agronomy, Throckmorton Hall, Kansas State University, Manhattan, KS 66506.

T. S. Cox,* R. G. Sears, B. S. Gill, and E. N. Jellen (2)

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Registration of Tift SPM92 Sexual Guineagrass Germplasm

Homozygous sexual guineagrass (*Panicum maximum* Jacq.) germplasm, Tift SPM92 (Reg. no. GP-66, PI 570664), was developed cooperatively by the USDA-ARS and the University of Georgia Coastal Plain Experiment Station at Tifton, GA. It was released by the two agencies on 16 Apr. 1993.

A sexual tetraploid ($2n=4x=32$) plant (PI 277946), heterozygous for method of reproduction, was crossed as female with a homozygous true-breeding sexual tetraploid plant induced by treating diploid ($2n=2x=16$) guineagrass GR297 from Japan with colchicine. Twelve F_1 hybrids were identified from this cross for further study. Each hybrid had exclusively sexual reproduction based on embryo sac analyses. The F_2 progeny of all 12 hybrids segregated for sexual and/or facultative apomictic reproducing plants. Two hundred seventy-seven sexual plants from 9 of the original 12 hybrids were selfed to produce the F_3 generations and then were progeny-tested (10 plants per family). Ninety-nine of these F_3 progenies produced only sexual progeny. Four hundred eighty-two F_4 plants from these 99 F_3 plants were allowed to randomly open-pollinate in an isolation block to produce Tift SPM92 ($2n=4x=32$). Cytological observations on 25 ovules from each of 70 random plants from Tift SPM92 showed only sexual embryo sac development. Tift SPM92 plants exhibit the perennial growth habit of the sexual plant from PI 277946 and the leafiness of GR297. Tift SPM92 is morphologically diverse and shows variation for such plant characters as inflorescence length, plant height, flag leaf length and width, peduncle exsertion and tillers per plant.

Three grams of seed of Tift SPM92 may be obtained from the corresponding author. Recipients of seed are asked to make appropriate recognition of the source of the germplasm if it should contribute to the development of a new germplasm, parental line or cultivar.

W. W. Hanna* and H. Nakagawa (1)

References and Notes

1. W.W. Hanna, USDA-ARS, Univ. of Georgia, Agric. Res. Stn., Crop and Soil Sciences Dep., Coastal Plain Exp. Stn., Tifton, GA 31793; H. Nakagawa, Hiroshima Prefectural Agriculture Research Center, 6869 Hachihonmatsu, Higashihiroshima, Hiroshima, Japan. Registration by CSSA. Accepted 31 Aug. 1993. *Corresponding author.

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