graminis Pers.; Pers.) and common root rot (caused primarily by Bipolaris sorokiniana (Sacc. in Sorok.) Shoem.). The germplasm line has grain yield, days to maturity, test weight, kernel weight, grain protein content, and gluten strength similar to Neepawa and the recurrent parent BW90. P8913-V2A5 is heterogeneous for leaf rust reaction (caused by P. recondita Roberge ex Desmaz.) and, at an average height of 104 cm, is 5 cm shorter than Neepawa.

HY358 and HY320, the recurrent parents of P8917-B4D4 and P8921-Q4C5, are high-yielding wheat cultivars with medium protein content, gluten strength, and kernel hardness. P8917-B4D4 has a resistant reaction to loose smut, a moderately resistant reaction to stem rust and common root rot, and a moderately resistant to moderately susceptible reaction to leaf rust. Apart from test weight similar to Neepawa, P8917-B4D4 has higher grain yield and kernel weight, and requires about 4 d more to mature. Grain protein content is less, and height is 12 cm shorter than Neepawa. P8921-Q4C5 has a resistant reaction to loose smut and is moderately resistant to stem rust and common root rot. Compared with Neepawa, P8921-Q4C5 has similar test weight, greater grain yield, a heavier kernel weight, and more resistance to leaf rust (resistant to moderately resistant); it is about 3 d later to mature. Grain protein content is less and height is 13 cm shorter than Neepawa.

Small amounts of seed, as well as more detailed information on the performance of the germplasm lines BW90, HY358, and HY-424, are available from the corresponding author.

R. E. Knox,* J. B. Thomas, R. M. DePauw, T. Demek, A. Laroche, and D. A. Gaudent (9)

References and Notes

Published in Crop Sci. 38:569–570 (1998).

Registration of NC96BGTD1, NC96BGTD2, and NC96BGTD3 Wheat Germplasm Resistant to Powdery Mildew

Soft red winter wheat (Triticum aestivum L.) germplasm lines NC96BGTD1 (Reg. no. GP-545, PI 597348), NC96BGTD2 (Reg. no. GP-546, PI 597349), and NC96BGTD3 (Reg. no. GP-547, PI 597350) were developed and released by the North Carolina Agricultural Research Service and the USDA-ARS in 1996. These germplasms were released because of their potential to broaden the genetic base of resistance to the powdery mildew fungus [caused by Erysiphe graminis DC. f. sp. tritici Em. Marchal; syn. Blumeria graminis (DC.) E.O. Speer] with resistance factors transferred from the D genome diploid Aegilops tauschii Coss. All three germplasms have consistently displayed resistance to all genotypes of the fungus in field evaluations in North Carolina during the 1994–1996 seasons.

NC96BGTD1 is a BC2F2-derived line with the pedigree Saluda*3/TA 2570. Saluda (PI 458744) is a soft red winter wheat developed and released by Virginia Polytechnic Institute and State University and is protected under the Plant Variety Protection Act (5). TA 2570 is an A. tauschii subsp. tauschii accession collected in Armenia. It was the donor parent used in the development of K92W1GR2C21, a hard red winter wheat germplasm resistant to wheat spindle streak mosaic and wheat soilborne mosaic viruses and powdery mildew (1). We have no data on the resistance of our germplasm to these viruses.

NC96BGTD2 is a BC2F2-derived line with the pedigree Saluda*3/TA 2481. TA 2481 is an A. tauschii subsp. tauschii accession collected in Iran.

NC96BGTD3 is a BC2F2-derived line with the pedigree Saluda*3/TA 2377. TA 2377 is an A. tauschii subsp. strigulata accession collected in Iran.

Seeds of all accessions were provided by the Wheat Genetic Resource Center, Kansas State University. The accessions were originally collected by scientists from Kyoto University, Japan.

In 1987 greenhouse evaluations, 5-wk-old seedlings of the three diploid accessions exhibited resistance to a mixture of powdery mildew isolates virulent against the major powdery mildew resistance genes Pm2, Pm3a, Pm3b, Pm3c, Pm4a, Pm6, and Ma. Saluda contains the Pm3a gene (4) and was susceptible in all greenhouse and field evaluations conducted in the development of the germplasms.

The direct diploid to hexaploid transfer methodology followed during the backcrossing phase of our research was outlined by Gill and Raupp (2). The hexaploid × diploid cross, F1 embryo rescue, development of BC1F1, BC2F1, and BC2F2 seed were conducted during the 1987–1991 winter greenhouse seasons. Field selection using the pedigree breeding method was initiated with BC2F2 bulks populations in the 1990–1991 and 1991–1992 seasons. Natural powdery mildew epihypototics occurred each year. Selection was primarily for mildew resistance during Feekes (3) Growth Stage 8 to 10.5, but whenever possible additional selection for heading date, plant height, and straw strength was conducted, using the Saluda phenotype as the benchmark. Each germplasm line trace to a single headrow harvested in 1996.

Laboratory evaluations for powdery mildew resistance using a detached leaf technique were conducted prior to release. Laboratory evaluations were completed with 2-cm pieces of the primary leaf floated on 0.5% (w/v) water agar amended with 50 µL L−1 benzimidazole and evaluated as summarized elsewhere (4). Each line was tested for homogeneity by inoculating two-replicate leaf sections from 16 plants with four distinct isolates.