Registration of Three Wheat Germplasm Lines

THREE HARD RED WINTER WHEAT (Triticum aestivum L.) germplasm lines: NE82438, NE82533, and NE84557 (Reg. no. GP-351 through GP-353; PI 537261 through 537263), were developed cooperatively by the Nebraska Agricultural Experiment Station and the USDA-ARS. They were released in May, 1991 as lines having unique combinations of traits that should make them valuable as parent lines in winter wheat breeding programs. All lines are increases of F1-derived F2 lines from crosses originally made by Dr. J.W. Schmidt.

NE82438 (PI 537261) is derived from the cross ‘HiPlains’/‘Wings’/3′/Parker’4′/Agent’/‘Beloterkovskaja 198′/Lancer’. It was released as germplasm because of its unique combination of traits for superior winterhardiness, lodging resistance, short stature, agronomic performance, and good quality. NE82438 is a semidwarf wheat that is superior to ‘Arapahoe’ and ‘Colt’ for winter survival, superior to Arapahoe and similar to Colt for lodging resistance, and 4 cm shorter than Arapahoe and 6 cm taller than Colt. NE82438 was tested in the Northern Regional Performance Nursery for two years (1987 and 1988). In the 1988 Northern Uniform Regional Performance Nursery, it was the highest yielding line. When compared to Arapahoe, NE82438 has yielded 2% less in regional trials (41 environments) and 11% less in Nebraska (14 environments). When compared to Colt, NE82438 has yielded 3% more in regional trials and 1% more in Nebraska. NE82438 has a low kernel weight (21.1 mg) compared to Colt (25.8 mg) and Arapahoe (25.6 mg), and is similar to Arapahoe and Colt for grain volume weight. It is resistant to stem rust (incited by Puccinia graminis Pers. : Pers.) by possessing genes Sr6 and Sr24. NE82438 expresses the heterogeneous reaction to Hessian fly (Mayetiola destructor Say, Great Plains biotype), which is believed to indicate the Marquillo-Kawvale genes for resistance. It is moderately susceptible to leaf rust (incited by P. recondita Roben ex Desmaz), and is susceptible to wheat streak mosaic virus and to wheat soilborne mosaic virus. Based on 4 yr of quality analyses in Nebraska, NE82438 is comparable to Arapahoe, but less than ‘Scout’ 66 for milling yield and has similar protein levels to Arapahoe and Scout 66. The dough mixing characteristics are similar to Arapahoe, but stronger than Scout 66. The loaf volume and internal loaf characteristics of NE82438 are superior to Arapahoe and Scout 66. Based on composite samples of the Southern Uniform Regional Performance Nursery from 1988 to 1989, NE82438 is comparable to Arapahoe, but less than ‘Scout’ 66 for milling yield and has similar protein levels to Arapahoe and Scout 66. The dough mixing characteristics of NE82438 are stronger than Arapahoe and Scout 66. NE82438 has a similar loaf volume and internal loaf characteristics to Arapahoe and Scout 66. Similar end-use quality results were obtained from the composite samples of the Southern Uniform Regional Performance Nursery. While having good yield characteristics in parts of Nebraska where overall performance did not warrant release as a cultivar, the value of this line as germplasm is its combination of moderate resistance to soilborne mosaic virus, medium-earliness, winterhardiness, yield potential, and acceptable end-use quality.

NE84557 (PI 537263) is derived from the cross ‘Warrior’/‘Wings’/3′/’Parker’*4′/‘Agent’ sib/4/NE68457/‘Centurk’. The parentage of MoW6811 is complex and includes ‘Kawvale’, ‘Tenmaq’, and ‘Vermillion’. The parentage of NE84557 also complex but mainly is ‘Ponca’ and ‘Cheyenne’ with alien introgression from ‘Sando 60’. NE84557 was released as germplasm based on its unique combination of traits of medium-tall plant height, stem rust resistance, acceptable winterhardiness under Nebraska conditions, agronomic performance, good end-use quality, and susceptibility to wheat streak mosaic virus. NE84557 has a medium-tall wheat moderate straw strength (superior to Scout 66, but less than TAM 105) that is 5 cm shorter than Scout 66 and 6 cm taller than TAM 105. NE84557 is resistant to stem rust (possessing genes Sr6, Sr7, Sr16, and Sr24), moderately resistant to moderately susceptible to wheat soilborne mosaic virus, and moderately susceptible to leaf rust. NE84557 expresses a heterogeneous reaction to Hessian fly (Great Plains biotype), which is believed to indicate the Marquillo-Kawvale genes for resistance. NE84557 has acceptable winterhardiness for Nebraska, but less winterhardiness than Arapahoe. NE84557 has been tested in Nebraska for end-use quality as determined on composite samples by the U.S. Grain Marketing Research Laboratory. NE84557 is very susceptible to wheat streak mosaic virus. It routinely dies in greenhouse wheat streak tests and in 1989 at Clay Center, NE, where there was a severe natural wheat streak infection, it was the most susceptible line in replicated trials (31 advanced lines and cultivars) in large plots (8 x 30 m) in the Southern Uniform Regional Performance Nursery. On this basis NE84557 would be an indicator line for the presence of wheat streak mosaic virus.