Registration of Five Genetic Stocks of Wheat Carrying Null Alleles at the Glu-D1 Locus

Five genetic stocks of hard red winter wheat (*Triticum aestivum* L.) (Reg no. GS-91 to GS-95, PI 591816 to PI 591820) lacking *Glu-D1*-encoded high molecular weight (HMW) glutenin protein subunits, were developed and released jointly by the USDA-ARS and the University of Nebraska, Lincoln, NE, in 1995. HMW glutenin alleles, especially those arising from the *Glu-D1* locus, contribute significantly to genetic variation in wheat processing quality (1). N86L090 (GS-91, PI 591816) was an F_{3.4} selection descended from the cross ‘Brule’/3/‘Atlas 66’/NapHal//‘Lancota’-sib/‘Aurora’. In addition to the *Glu-D1* null-allele, N86L090 carries a 1BL-1RS wheat–rye chromosomal translocation derived from Aurora, NapHal, L7843 (GS-92, PI 591817), L7844 (GS-93, PI 591818) and L7845 (GS-94, PI 591819), the latter two lines were developed at the University of Nebraska, Lincoln, as near-isogenic lines of the hard red winter wheat cultivar ‘Aurora’. These genetic stocks are adapted to Great Plains environments. Flour protein concentration of all five genetic stocks, based on results from a minimum of two harvest years, were equivalent to that of *Lancota*, a hard red winter wheat. These genetic stocks are characterized by approximately 50% reduced flour dough strength and performance, as measured by the Mixograph, compared to the hard red winter wheat ‘Chinese Spring’. The loss of quality is a direct consequence of the absence of the *Glu-D1* null-allele (4,5). The *Glu-D1* null-allele genetic stocks will be useful as near-negative controls in studies designed to test the quality effects of new HMW glutenin alleles in genetic backgrounds adapted to the North American Wheat Belt. These genetic stocks would also be useful to develop wheats with highly extensible doughs and reduced gluten strength, attributes of potential importance to the soft wheat industry.

NapHal was identified as a source of genes for both high protein and high lysine concentration (6); however, attempts to develop wheats with elevated lysine and acceptable end-use quality were rarely successful. Since HMW glutenin protein lysine content it seems likely that NapHal and its derivatives do not carry any active genes for higher lysine. Rather, the increase in lysine is probably an indirect consequence of the absence of *Glu-D1* encoded HMW glutenin proteins, with a subsequent compensation in the wheat kernel by proteins with higher lysine content. Two-gram seed samples of these genetic stocks are available upon written request to the corresponding author.


References and Notes

10. J.F. Pedersen and J.J. Toy, USDA-ARS and Dep. of Agronomy, Univ. of Nebraska-Lincoln, Lincoln, NE 68583-0937; B.E. Johnson, Dep. of Agronomy, Univ. of Nebraska-Lincoln, Lincoln, NE 68583-0915. Joint contribution of the USDA-ARS and the Dep. of Agronomy, Univ. of Nebraska-Lincoln, as Journal Series Paper no. 11535. Registration by CSSA. Accepted 30 Nov. 1996. *Corresponding author (agro137@unblv.nebraska.edu).