Registration of ‘Infinity CL’ Wheat

‘Infinity CL’ (Reg. No. CV-982, PI 639922) is a hard red winter wheat (Triticum aestivum L.) cultivar developed cooperatively by the Nebraska Agricultural Experiment Station and the USDA-ARS and released in 2005 by the developing institutions. Infinity CL was released primarily for its herbicide tolerance to imidazolinone compounds which control many previously difficult to control weeds in wheat production systems, and for its superior adaptation to rainfed wheat production systems in Nebraska and counties in adjacent states. The name Infinity CL was chosen because it is a Clearfield wheat that will be used with Beyond herbicide [active ingredient imazamox, 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-5-(methoxymethyl)-3-pyridinecarboxylic acid; BASF Corp., Triangle Park, NC].

Infinity CL was selected from the cross ‘Windstar’ (Baenziger et al., 1998)/‘Millennium’ (Baenziger et al., 2001) sib/Above’ sib. The cross between the Millennium sib (formerly NE94481) and the Above sib (TXGH12588–120×4/FS2) was made in the spring of 1997. The final cross to Windstar was made in fall 1997. The FS2 (syn. FS4) line contains a single gene at the alsI locus for acetolactate synthesis, which conveys tolerance to imidazolinone herbicides. The F₁ plants were grown in the greenhouse in 1998 and the F₂ population in the field in 1998 to 1999 where heads were selected before harvest. The initial selection was made in 1999 to 2000 in the head row nursery, which was sprayed with imazamox. The first observation plot was grown in 2000 to 2001. From 2001 and thereafter, the line was grown in replicated yield trials in Nebraska without imazamox applications to allow comparisons to herbicide susceptible lines. Infinity CL is an F₂–derived line that was selected in the F₄ generation.

Infinity CL was evaluated as NH01046 in Nebraska yield nurseries starting in 2002, and in Nebraska and Wyoming cultivar performance trials in 2003 to 2004. In the Nebraska cultivar performance trials, it has performed well throughout most of Nebraska. The average Nebraska rainfed yield of Infinity CL of 3870 kg ha⁻¹ (27 environments from 2003 to 2004) was lower than the yield of ‘Wesley’ (3990 kg ha⁻¹; Peterson et al., 2001), but was similar to that of Millennium (3860 kg ha⁻¹), and higher than ‘Wahoo’ (3790 kg ha⁻¹; Baenziger et al., 2002), and ‘Alliance’ (3620 kg ha⁻¹; Baenziger et al., 1995). The average Wyoming rainfed yield of Infinity CL of 2220 kg ha⁻¹ (five environments from 2003 to 2004) was lower than ‘Goodstreak’ (2350 kg ha⁻¹; Baenziger et al., 2004a), but was similar to ‘Buckskin’ (2280 kg ha⁻¹; Schmidt et al., 1976) and higher than Above (2080 kg ha⁻¹). Infinity CL has acceptable performance under irrigation, but other wheat cultivars with superior performance, especially with better straw strength (described below), would be recommended. Infinity CL was tested for herbicide tolerance at the recommended (35 g ai ha⁻¹) and twice (71 g ai ha⁻¹) the recommended rate of imazamox application in 2004 in six environments and performed similarly to Above for herbicide tolerance as determined by visual signs of injury or change in plant height.

Infinity CL is a semidwarf wheat cultivar. Infinity CL has a spike of medium length, rounded cheeks, large germ, and a narrow waxy bloom on the flag leaf, leaf sheath, and spike at anthesis, with the spike being mid to long, narrow, and middense. The glume is midlong and midwide, and the glume rachis is slightly longer than the semidwarf wheat cultivars such as ‘Harry’ and ‘Evergreen’. The mature plant height of Infinity CL (87 cm, 27 environments) is 1 cm shorter than Millennium (88 cm), but was similar to ‘Buckskin’ (88 cm) and 3 cm taller than the semidwarf Above. Infinity CL has moderately strong straw (44% Lodged), similar to ‘Buckskin’ and weaker than Wesley (34% Lodged) in those environments where lodging was noted (three environments). The yield of Infinity CL is good to very good and comparable to other wheat cultivars adapted to and commonly grown in Nebraska. Infinity CL is moderately resistant to stem rust (caused by Puccinia graminis Pers. f. sp. tritici Eriks & E. Henn.), and Sr24 and Sr6 data provided by Y. Jin at the USDA Cereal Disease Laboratory, 2005 are moderately resistant to leaf rust (caused by P. triticina Eriks.) and Sr24 data.Infinity CL is moderately resistant to stem rust (caused by Puccinia graminis Pers. f. sp. tritici Eriks & E. Henn.), and Sr24 and Sr6 data provided by Y. Jin at the USDA Cereal Disease Laboratory, 2005 are moderately resistant to leaf rust (caused by P. triticina Eriks.) and Sr24 data.

Infinity CL has good grain volume weight (71.9 kg m⁻³), which was lower than Millennium (74.6 kg m⁻³), but higher than Wesley (74.2 kg m⁻³). Infinity CL has good grain volume weight (71.9 kg m⁻³), which was lower than Millennium (74.6 kg m⁻³), but higher than Wesley (74.2 kg m⁻³). The milling and baking properties of Infinity CL were determined for 2 yr by the Quality Laboratory. In these tests, Millennium was used as a check cultivar. The average wheat and flour extraction of Infinity CL (128 and 113 g kg⁻¹) were lower than Millennium (142 and 127 g kg⁻¹). The average flour ash content of Infinity CL (4.6 g kg⁻¹) was lower than that of Millennium (4.6 g kg⁻¹). Dough mixing properties were acceptable and stronger than those determined by a Mixograph. Average bake score of Infinity CL (620 g H₂O kg⁻¹ flour) was lower than that of Millennium (615 g H₂O kg⁻¹ flour). The average Infinity CL (885 cm²) was less than Millennium scores for the internal crumb grain and texture, which were slightly better than those of Millennium. Use quality characteristics for Infinity CL should be acceptable to the milling and baking industries.

Infinity CL is an awned, white-glumed wheat, with an awn appearance most similar to Windstar. Above canopy is moderately open and upright. The plant canopy is moderately open and upright. The foliage is slightly twisted at the boot stage. The foliage is moderately developed, with waxy bloom on the flag leaf, leaf sheath, and spike at anthesis, which is less than Windstar. The leaves of Infinity CL are slightly longer than the semidwarf wheat cultivar in the field in 1998 to 1999 where heads were selected before harvest. The initial selection was made in 1999 to 2000 in the head row nursery, which was sprayed with imazamox. The first observation plot was grown in 2000 to 2001. From 2001 and thereafter, the line was grown in replicated yield trials in Nebraska without imazamox applications to allow comparisons to herbicide susceptible lines. Infinity CL is an F₂–derived line that was selected in the F₄ generation.