Registration of ‘Protection’ Wheat

‘Protection’ (Reg. no. CV-980, PI 639923) hard red winter wheat (Triticum aestivum L.) was developed by the Colorado Agricultural Experiment Station and released to seed producers in August 2004. Protection was released based on its tolerance to imazamox [2-[4,5-dihydro-4-methyl-4-(1-methyl-ethyl)-5-oxo-1H-imidazol-2-yl]-5-(methoxy methyl)-3-pyridine carboxylic acid] herbicide, competitive yield with available imazamox-tolerant winter wheat cultivars, and improved bread baking quality relative to available imazamox-tolerant winter wheat cultivars.

Protection was derived from the cross ‘Jagger’/TXGH12588–120^4/FS2 made in 1997 at Center, CO. Jagger (PI 593688) is a hard red winter wheat cultivar released by Kansas State University in 1994 (Sears et al., 1997), and TXGH12588–120 is an unreleased sister selection of the hard red winter wheat cultivar TAM 110 (PI 595757; Lazar et al., 1997). The wheat germplasm line FS2 was developed by BASF Corporation (formerly American Cyanamid) using sodium azide–induced mutagenesis of the French wheat cultivar Fidel to obtain tolerance to the imidazolinone class of herbicides (Newhouse et al., 1992). An imazamox-tolerant BC2F2 plant with the pedigree TXGH12588–120^4/FS2 was used in the final cross with Jagger.

Vernalized F1 seeds were increased in the greenhouse at Fort Collins, CO, during fall 1997. The F2 population from this increase was space-planted at Center, CO, in summer 1998. A single seed harvested from an F2 plant in early September 1998 was increased to the F3 in the greenhouse at Fort Collins in fall 1998. Seed harvested from the F3 plant was vernalized for 8 wk at 2°C in small plastic bags and hand-transplanted to the field at Center as hills in May 1999. Tolerance to imazamox herbicide of the F3:4 line was determined by recording germination of 10 remnant seeds in petri dishes in the presence of an aqueous solution (50 μL L⁻¹) of imazamox herbicide. Protection was selected as an F3:4 line in September 1999 at Center and assigned experimental number CO991132. Protection was planted in an unreplicated observation plot at Fort Collins in fall 1999. In spring 2000, the observation trial was treated with imazamox herbicide (44.8 g a.i. ha⁻¹) to confirm tolerance ratings from the petri dish germination assay. Protection was advanced from the observation trial in 2000 to replicated advanced yield trials in 2001 and replicated statewide variety trials from 2002 to 2004. Breeder seed of Protection was generated by selecting approximately 400 heads from an F2^1003 increase at Fort Collins in 2001 and growing these as headrows in Yuma, AZ, during winter 2001–2002. The F6^7 headrows were treated with imazamox herbicide (44.8 g a.i. ha⁻¹) in spring 2002 and rows with uniform appearance were composited. A bulk seed increase from the Breeder seed increase was grown in Yuma, AZ, in winter 2002–2003.

Protection is an awned, bronze-chaffed, early-maturing semidwarf hard red winter wheat. Protection is early maturing, 142 d to heading from 1 January (n = 6 observations), similar to ‘Above’ (142 d; Haley et al., 2003) and Jagger (141 d). Plant height of Protection is medium-tall (73.7 cm; n = 15). Protection is susceptible to leaf rust (caused by Puccinia triticina) and stripe rust (caused by Puccinia striiformis Westend.; natural field infection), susceptible to mosaic virus, and heterogeneous for resistance to powdery mildew. Protection is susceptible to biotype of Hessian fly [Mayetiola destructor (Say.)] and susceptible to the Russian wheat aphid [Diuraphis noxia (McD.); Newhouse et al., 1992]. Protection was released based on its tolerance to imazamox {2-[4,5-dihydro-4-methyl-4-(1-methyl-ethyl)-5-oxo-1H-imidazol-2-yl]-5-(methoxy methyl)-3-pyridinecarboxylic acid} herbicide, competitive yield with available imazamox-tolerant winter wheat cultivars, and improved bread baking quality relative to available imazamox-tolerant winter wheat cultivars.

Grain yields of Protection (3097 kg ha⁻¹) and ‘Above’ (3252 kg ha⁻¹) were similar in 2001 (seven locations), 2002 (six locations), and 2003 (six locations). Grain yields of Protection (3097 kg ha⁻¹) and ‘Above’ (3252 kg ha⁻¹) were similar in 2001 (seven locations), 2002 (six locations), and 2003 (six locations). Grain yields of Protection (3097 kg ha⁻¹) and ‘Above’ (3252 kg ha⁻¹) were similar in 2001 (seven locations), 2002 (six locations), and 2003 (six locations).