Registration of ‘Stellar-ND’ Barley

‘Stellar-ND’ six-rowed spring barley (Hordeum vulgare L.), (Reg. no CV-322, PI 639694) was developed by the North Dakota Agricultural Experiment Station (NDAES) and released 10 Feb. 2005. Stellar-ND, whose experimental designation was ND16301, has the pedigree ‘Foster’/ND12200/6B88–3213. Foster (Horsley et al., 1997) has the pedigree ‘Robust’/ND3810 and ND8310 has the pedigree ND5570/ND5424. ND5570 is a sib of ‘Hazem’ (Foster et al., 1984) and has the pedigree ND1884/‘Azure’ (Foster et al., 1982). ND1884 has the pedigree ‘Nordic’/ND142 (Peterson et al., 1973), and ND142 has the pedigree ‘Dickson’/‘Trophy’ (Peterson et al., 1968; Peterson, 1964b). ND5424 has the pedigree ‘Glenn’/‘Karl’ (Foster et al., 1979; Wesenberg et al., 1976). ND12200 has the pedigree ‘Bumper’ (PI494097)/‘Hazem/‘Azure’. 6B88–3213 is a six-rowed barley line from the Busch Agricultural Resources, Inc. (BARI) barley breeding program (Ft. Collins, CO) that has the pedigree NDSU bulk selection/M30/‘Robust’/3/B1602 (Rasmusson and Wilcoxson, 1983). M30, from the University of Minnesota, has the pedigree M18/M14. M18 has the pedigree ‘Larker’/Br 5750–2/M1/Dickson (Peterson, 1964a) and M14 has the pedigree M1/Br128. Br 5750–2 is a breeding line from the Agriculture and Agri-Food Canada (AAFC) barley breeding program in Brandon, MB, with the pedigree ‘Vantage’/‘Jet’ (CIho 2222)/‘Vantmore’ (CIho 9555)/3/Br 4635–4456/4/U.M. 570 (Johnston, 1965). U.M. 570 is a breeding line from the University of Manitoba with the pedigree ‘Newal’ (CIho 6088)/‘Peatland’/‘Montcalm’ (CIho 7149) (Lambert, 1958). M1 has the pedigree ‘Trail’/Br 5750–2 (Lambert, 1958). Br 4635–4456 is an old breeding line from the AAFC barley program in Brandon of unknown parentage. B128 is a breeding line from the NDAES with the pedigree Trail/C48–8–143–2–3–8/‘Trophy’. C48–8–143–2–3–8, also a breeding line from the NDAES has the pedigree ‘Kindred’/CIho 7177–7 (Lambert, 1958). B1602, from BARI, has the pedigree Bumper/6B78–628/‘Morex’/6B78–628 (Rasmusson and Wilcoxson, 1979). 6B78–628, from BARI, has the pedigree Julia (PI 339811)/3*Beacon (Peterson et al., 1973).

The cross that led to Stellar-ND was made in 1994 and a modified-pedigree breeding method was used. The experimental line ND16301 originated from a single spike selected from an F3 row. Selection was based on maturity, plant height, straw strength, kernel color, and awn type. Seed from the spike was sown as an F3:4 headrow in an off-season nursery near Yuma, AZ, during the 1995–1996 winter for generation advancement and seed increase. Replicated agronomic and disease testing began in North Dakota in 1996 and regional testing began in 1999. Malt quality evaluation began in 1996 and industry malting and brewing evaluation began in 2001. Seed of Stellar-ND originated from the bulk of about 800 F3:12 headrows of ND16301 that had similar plant height and maturity.

The spike of Stellar-ND is medium-lax, medium-long, and semierect. Its covered kernels have long rachilla hairs and a white aleurone. Based on spike and kernel morphology, it is amplified except for slight modifications. Amplifications included PCR reaction volumes of 10 μL and visualization of PCR products using ethidium bromide staining instead of autoradiography.

In 30 trials grown in North Dakota (1996), Stellar-ND had an average grain yield of 4758 kg ha−1. In trials, average yields were 4392 kg ha−1 for Drummond, 4699 kg ha−1 for ‘Lacey’, and 4721 kg ha−1 for Legacy. The height of Stellar-ND (78 cm) was 2 cm taller than Lacey and 5 cm taller than Robust. In 11 trials where lodging was recorded, percentage of lodging of Stellar-ND was 4144 kg ha−1 for Robust, 427 kg ha−1 for Robust, 427 kg ha−1 for Legacy, and 4446 kg ha−1 for Drummond. In the same trials where lodging occurred, percent lodging of Stellar-ND, Robust, Lacey, Legacy, and Drummond were 4144 kg ha−1, 2.9 for Lacey, 3.6 for Legacy, and 2.3 for Drummond.

In 30 trials (1999–2004) of the Mississippi Valley Nursery (MVBN) grown in Minnesota, North Dakota, and Manitoba, Canada, Stellar-ND average yield of 4381 kg ha−1. In the same trials, corn yield were 4144 kg ha−1 for Robust, 427 kg ha−1 for Robust, 427 kg ha−1 for Legacy, and 4446 kg ha−1 for Drummond. Kernel plumpness of Stellar-ND in MVBN trials where lodging occurred, percent lodging of Stellar-ND, Robust, Lacey, Legacy, and Drummond were 4144 kg ha−1, 2.9 for Lacey, 3.6 for Legacy, and 2.3 for Drummond. In 13 trials where lodging was recorded, Stellar-ND had lodging score of 2.4, while lodging scores for Robust, 2.9 for Lacey, 3.6 for Legacy, and 2.3 for Drummond.

Like most Midwest barley cultivars, Stellar-ND has NDB112 resistance to spot blotch [caused by Puccinia graminis f. sp. tritici Ericks. & Tenn., except Pgt-Q9], moderately susceptible to wheat streak mosaic, QCC, net blotch (caused by Pyrenophora teres), Barley yellow dwarf virus. Stellar-ND is susceptible to loose smut [caused by Ustilago nuda (C.N. Jensen)] and several Septoria spp. and Fusarium spp. that are important in the Midwest USA.

In malt quality evaluations of 10 University trials by the USDA-ARS Cereal Crops Research Unit in Madison, WI, Stellar-ND had a grain concentration of 131 g kg−1, while grain proteins were 141 g kg−1 for Robust, 134 g kg−1 for Lacey, 135 g kg−1 for Legacy, and 135 g kg−1 for Drummond. Malt quality of Stellar-ND, based on kernels retained 0.24 by 1.9-cm slotted open according to the American Malting Barley Association (AMBA), show yeast counts in 10 MVBN trials in the same years, Stellar-ND had plump kernels of 915 kg ha−1, while plump kernels were 864 g kg−1 for Robust, 893 g kg−1 for Robust, 891 g kg−1 for Legacy, and 891 g kg−1 for Drummond. The considered plump were those retained on a sieve with 0.24 by 1.9-cm slotted openings according to the American Malting Barley Association (AMBA). In the same trials, average yields were 4392 kg ha−1, 132 g kg−1 for Legacy, and 891 g kg−1 for Drummond. Kernel plumpness of Stellar-ND in MVBN trials where lodging occurred, percent lodging of Stellar-ND, Robust, Lacey, Legacy, and Drummond were 4144 kg ha−1, 2.9 for Lacey, 3.6 for Legacy, and 2.3 for Drummond. In 13 trials where lodging was recorded, Stellar-ND had lodging score of 2.4, while lodging scores for Robust, 2.9 for Lacey, 3.6 for Legacy, and 2.3 for Drummond. In the same trials where lodging occurred, percent lodging of Stellar-ND, Robust, Lacey, Legacy, and Drummond were 4144 kg ha−1, 2.9 for Lacey, 3.6 for Legacy, and 2.3 for Drummond. In 13 trials where lodging was recorded, Stellar-ND had lodging score of 2.4, while lodging scores for Robust, 2.9 for Lacey, 3.6 for Legacy, and 2.3 for Drummond. In the same trials where lodging occurred, percent lodging of Stellar-ND, Robust, Lacey, Legacy, and Drummond were 4144 kg ha−1, 2.9 for Lacey, 3.6 for Legacy, and 2.3 for Drummond. In 13 trials where lodging was recorded, Stellar-ND had lodging score of 2.4, while lodging scores for Robust, 2.9 for Lacey, 3.6 for Legacy, and 2.3 for Drummond. In the same trials where lodging occurred, percent lodging of Stellar-ND, Robust, Lacey, Legacy, and Drummond were 4144 kg ha−1, 2.9 for Lacey, 3.6 for Legacy, and 2.3 for Drummond.