

### Registration of 'Golden Spike' Wheat

'Golden Spike' hard white winter wheat (*Triticum aestivum* L.) (Reg. no. CV-917, PI 614813) was developed by the Utah Agricultural Experiment Station (UAES) and released in 1999. Previous designations for Golden Spike were UT1944-158 and UT944158. Golden Spike was released to provide a high-quality, hard white winter wheat with high yields when grown under dryland conditions, where dwarf bunt (caused by *Tilletia controversa* Kühn in Rabenh.) can be severe. Golden Spike was named to commemorate the uniting of the Union Pacific and Central Pacific railroads at Promontory Point, UT, in 1869.

Golden Spike is derived from the 1984 cross 'Arbon'/'Hansel'/'Hansel/ID0281. ID0281 has the pedigree; 'Citr14106'/'Columbia'/'McCall' and is a sib of Arbon (Sunderman et al., 1980). The F<sub>2</sub> through F<sub>5</sub> generations were grown as bulk populations with selection for agronomic types including height, maturity, vigor, and resistance to common bunt [caused by *Tilletia tritici* (Bjerk.) G. Wint. in Rabenh.]. Two individual heads from each selected F<sub>5</sub> plants were harvested. One F<sub>5,6</sub> head from each selected plant was planted in 1990 at the Greenville Experimental Farm, Logan, UT, and the other head, with the same selection number, was planted at the Blue Creek Experimental Farm, Blue Creek, UT. The plants in headrows at the Greenville Experimental Farm were inoculated with dwarf bunt spores (composite of races) in the fall and selected for resistance and agronomic characteristics. Superior headrows were selected for agronomic traits at Blue Creek and resistance to dwarf bunt was determined for these selections in the Logan nursery. The resulting F<sub>5,7</sub> lines were evaluated for yield and agronomic traits in an un-replicated plot nursery at Blue Creek in 1991, and in a replicated yield trial at Blue Creek in 1992. From 1992 through 1999, Golden Spike was tested in replicated nurseries in six locations throughout Utah and was evaluated for yield, maturity, test weight, lodging, winter survival, protein content, and bread quality. The lines continued to be tested for resistance to dwarf bunt in Logan. Golden Spike was also evaluated in the Western Regional Hard Winter Wheat Nursery from 1996 through 1999. In 1994, 250 heads were selected from F<sub>11</sub> plants and grown as head rows in 1995. After roguing to remove off-type rows, approximately 200 F<sub>11:12</sub> lines were harvested and bulked as breeder seed.

The juvenile growth habit of Golden Spike is semierect and coleoptile anthocyanin is absent. Heading date is the same as 'Boundary' (Souza et al., 1999), and the flag leaf is erect and twisted. Stems are hollow, and the mature plant, at an average height of 78 cm, is generally about 5 cm taller than Boundary and 12 cm shorter than 'Weston' (Sunderman and Jennings, 1977). Golden Spike has awned, bronze chaffed (10YR/7/6 Munsell), tapering, mid-dense, and inclined spike characteristics. The kernel is elliptical, has rounded creases, with a mid-wide, mid-deep seed crease, and medium-sized brush that is

not collared. The kernel phenol reaction is fawn except for the ends of the kernels, which are light brown.

Golden Spike has a high level of resistance to dwarf bunt derived from PI178383, one of the parents of Hansel (Dewey, 1975), and from CItr14106, which is also in the pedigree of Arbon (Sunderman et al., 1980). PI178383 and CItr14106 are also likely sources of Golden Spike's intermediate resistance to snowmolds caused by *Typhula* spp. (Sunderman et al., 1986). In dwarf bunt evaluations nurseries, 'Wanser' (Nelson and Nagamitsu, 1972) was grown as a susceptible check and generally averaged over 85% infection while Golden Spike never had any detectable infected heads. In the same tests, 'Cache' (Dewey, 1967) averaged 30% infected heads. In greenhouse seedling tests with stripe rust (caused by *Puccinia striiformis* Westend.), Golden Spike was resistant to races CDL-17, CDL-37, and CDL-45, but susceptible to race CDL-43. In field tests in 1997 through 1999 in three Washington locations, Golden Spike was moderately susceptible to stripe rust (Xianning Chen, personal communication).

From 1992 to 1999 in Utah tests, Golden Spike averaged 2941 kg ha<sup>-1</sup> (47 site years) compared to 2867 kg ha<sup>-1</sup> for 'Promontory' (Hole et al., 1995). These differences are not statistically significant ( $\alpha = 0.05$ ). From 1996 through 1999, Golden Spike (38 site years), tested as UT944158, averaged 5040 kg ha<sup>-1</sup> in the Western Regional Hard Winter Wheat Nursery compared with a nursery mean of 4777 kg ha<sup>-1</sup>.

The USDA-ARS Western Wheat Quality Laboratory (WWQL) in Pullman, WA, has evaluated Golden Spike for milling and bread quality-attributes each year since 1991. Average volume weight measured by the WWQL over the previous 9 yr is 77.4 kg hL<sup>-1</sup>. Golden Spike has a longer mixograph peak time (4.5 min) than Promontory (4.0 min). Loaf volume is similar to Promontory (976 and 978 mL, respectively) with similar flour yield (698 and 699 g kg<sup>-1</sup>, respectively). Golden Spike has good color reaction in alkaline noodle testing with a mean ( $n = 5$ ) 24 h L\* (Minolta Chroma meter, Minolta Corp., Ramsey, NJ) of 82.0. Golden Spike appears to be of non-waxy starch composition with a mean ( $n = 8$ ) RVA peak pasting viscosity of 181.

Golden Spike is sold as a class of Certified seed and is available from the Utah Crop Improvement Association. Seed classes will be Breeder, Foundation, Registered, and Certified. U.S. Plant Variety Protection has been applied for (PVP Certificate no. 200100033). Small amounts of seed for research purposes may be obtained by contacting the corresponding author.

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