

IDAHO AGRICULTURAL EXPERIMENT STATION
Moscow, Idaho

Announces the Release of

MORELAND
Hard Red Winter Wheat

'Moreland' hard red winter wheat (*Triticum aestivum* L.) was developed by the Idaho Agricultural Experiment Stations for use by grain producers in the Pacific Northwest of the United States. Moreland is a semi-dwarf wheat adapted to irrigated production at elevations above 1000 m with excellent grain yield and bread baking quality.

Moreland was derived from a cross made at the University of Idaho, Aberdeen Research and Extension Center in 1980, designated A86327W with the pedigree (Donna 05/11-00-155//Hegler//3//Wainior//Kiova//170303//C//Puma//Frontana//Yaqul//V//Winnor//4//McCall//5//Hegler//7//WAIL//2//Barah//Necley. A86327W was advanced by the bulk method without intentional selection in the F₂ generation. In the F₃ generation, heads were selected from short plants and planted as F_{3,4} headrows in 1989. Heads from short plants were selected and advanced by pedigree selection in 1990 and 1991 to form F_{6,7} headrows, which were harvested in 1992. From these headrows, the selection A86327W-3-2-2 was advanced to testing yield trials in southeastern Idaho in 1993. In 1996, A86327W-3-2-2 was designated IDO517 and entered into the Tri-State Irrigated Winter Wheat Nursery for two years. IDO517 was advanced into the Western Regional Winter Wheat Nursery for two years of testing (2000 and 2001). In 2001, IDO517 was evaluated in the Pacific Northwest Wheat Quality Council. IDO517 was also evaluated in the on-farm extension trials from 1999 to 2001 in Idaho and in 2001 in Oregon and Washington. In 2000, 200 head selections were planted at Aberdeen, ID and selected in summer 2001 for uniform plant type to form Moreland breeder seed. Seed from headrows that were true-to-type were harvested and planted at Aberdeen in 2001 to form foundation seed.

Moreland is most similar in appearance to 'DW' hard red winter wheat, yet is less resistant to dwarf bunt than DW. Moreland has an unpigmented subtlety and semi-erect juvenile growth. Moreland has an erect, twisted flag leaf and an awned, erect, lax head, which is bronze-chaffed at maturity. Moreland is 85 cm tall, similar to 'Brundage' soft white winter wheat, yet 8 cm shorter than 'Boundary' hard red winter wheat and 15 cm taller than 'Garland'. Moreland is similar in heading date to 'Brundage', heading, on average in southern Idaho, on Julian day 156. Moreland heads 4 d earlier than Boundary and 5 d earlier than Garland. Seed of Moreland is hard, red, ovate, and plump, with a kernel type similar to Neeley. Based on field evaluations in Washington and Idaho, Moreland has moderate adult plant resistance to stripe rust [caused by *Puccinia striiformis* (Westend.)] and leaf rust [caused by *P. recondita* (Roberge ex Desmaz.)]. Moreland is tolerant of black blight (analogous organism *Xanthomonas campestris* p.v. *tritici*). Moreland has greater winter hardiness than Stephens and Boundary, yet poorer snow mold (causal organisms *Typhula* spp.) tolerance than Boundary and greater susceptibility to dwarf bunt (*Tilletia controversa* Kühn in Rabenh) than Boundary.

In 16 site-years of southeastern Idaho irrigated replicated trials from 1994 to 2001, Moreland had a grain yield of 9161 kg ha⁻¹ compared to 9117 kg ha⁻¹ for Stephens, and 8907 kg ha⁻¹ for Garland. In a set of 10 irrigated trials from southern Idaho, 1997 to 2001, Moreland had a grain yield of 9205 kg ha⁻¹ compared to 9739 kg ha⁻¹ for Boundary, and 9062 kg ha⁻¹ for Garland. In the same trials, Moreland, Boundary, and Garland had average flour proteins of 113, 107, and 110 g kg⁻¹, respectively. Moreland lodges less than Boundary, yet similar is similar to Garland for lodging. Moreland has moderate milling yield. In 10 irrigated trial site-years of test milling from with a Quadrumat Senior Mill by the University of Idaho Wheat Quality Laboratory, Moreland had a total flour yield of 672 g kg⁻¹, greater than Garland (642 g kg⁻¹) yet less than Boundary (692 g kg⁻¹). In the same quality evaluations, Moreland had a dough mixing development time of 3.8 min, longer than Boundary and Garland, 3.0 min and 2.1 min, respectively. The average of the 10 site-years of irrigated trials, Moreland had a loaf volume of 1009 ml compared with 892 ml for Boundary and 935 ml for Garland. Bread baked from flour of Moreland also had better internal texture and crumb grain than Boundary and Garland.

Seed of Moreland will be maintained by the Idaho Agricultural Experiment Station. Foundation seed may be obtained by contacting the Foundation Seed Program at the University of Idaho, Kimberly Research and Extension Center, Kimberly, Idaho. Plant variety protection is requested for Moreland.

Director, Idaho Agricultural Experiment Station
Moscow, Idaho

Date

Plant Variety Protection Application: Morland

Exhibit D. Additional Description of Variety

Moreland has an unpigmented coleoptile and semi-erect juvenile growth.

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Memorandum

July 29, 2004

To: Greg Lowry
Idaho Crop Improvement

From: Ed Souza


A handwritten signature in black ink, appearing to read "Ed Souza", with a long horizontal line extending to the right.

Re: Variance Certified Seed Production Fields of Moreland.

I am writing to indicate a variance for white-chaffed plants in the bronze chaffed cultivar 'Moreland' derived from foundation seed produced at Aberdeen Idaho in 2002. This variance indicates that for 3,000 plants, 2 variant plants should be considered part of the varietal description for Moreland certified seed production fields deriving from this seed lot. These variants include bronze-chaffed awnless heads and white-chaffed awnless heads of similar height to the standard Moreland plant type. It also includes a white-chaffed awned variant of similar height to the standard Moreland plant height. The variant plants also include a low count (approximately 1/100,000 plants) of bronze chaffed awned plants that are 3" to 4" taller than the standard Moreland plant height.

This variance modifies the earlier variance written last year on this cultivar. It will not apply to other seed lots of Moreland Hard Red Winter Wheat derived from different foundation seed lots than the 2002 Aberdeen lot.

c.c. K. Stewart-Williams, Mike Allen Agrisource Inc,
Michael Bouck, Montie Miller.

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