

RECEIVED MAY 25 1999

DRAFT

IDAHO AGRICULTURAL EXPERIMENT STATION
Moscow, Idaho

AGRICULTURAL RESEARCH SERVICE
United States Department of Agriculture

Announce the Release of

IDAHO 377S
Hard White Spring Wheat

'Idaho 377s' hard white spring wheat (*Triticum aestivum* L.) was released by the Idaho Agricultural Experiment Station in cooperation with the United States Department of Agriculture, Agricultural Research Service. Idaho 377s has exceptional alkali noodle quality and flour with high starch viscosity and low tyrosinase activity.

Idaho 377s was derived from the 1981 cross A81644S, a cross of a CIMMYT spring wheat with the pedigree 'Gallo'/'Yecora' reselection/3/'Aurora'//Kalyonsona'/'Bluebird' as the female parent with the Aberdeen, ID breeding line 59Ab10293-5 as the pollen parent. The pedigree of 59Ab10293-5 was 'Norin 10'/'Brevor'//Baart'/'Onas'. The cross A81644S was bulked in the F₂ generation. In 1983, F₃ head selections were made at Aberdeen. In 1984, the head row A81644S-2 was harvested and entered into yield testing starting in 1985. In 1988, A81644S-2 was designated IDO377 and entered into the Tri-State Spring Wheat Nursery. Head selections of IDO377 were made in 1988 because the original line was heterogeneous for plant height and maturity. Head rows were selected for short plant stature and high grain SDS sedimentation values. In 1989, 22 of selections from head rows were evaluated in replicated trials and 6 of the short and early selections from IDO377 were composited to form IDO377s which was entered into the Western Regional Spring Wheat Nursery for three years, 1991 to 1993.

Idaho 377s is most similar to 'Fieldwin' soft white spring wheat in plant appearance. Idaho 377s has a green coleoptile, erect juvenile growth habit, and green foliage, absent a waxy bloom. The heads of Idaho 377s are mid-dense, erect, and awned. Idaho 377s flowers approximately 1 day earlier than 'Penawawa' soft white spring wheat with the earliest components of Idaho 377s flowering 3 days earlier than Penawawa and the latest flowers at approximately the same time as Penawawa. Idaho 377s is 8 cm taller than Penawawa in irrigated trials, with a range in height of plants of less than 10%. At maturity, Idaho 377s has white chaff color. Glumes are acuminate, narrow, and medium in length, with elevated shoulders. Seed of Idaho 377s is hard white and elliptical in shape, with rounded cheeks, and a small germ. The seed crease is mid-wide and shallow. Idaho 377s is resistant to *Puccinia striiformis* (West., common disease name: Stripe rust) races common to Idaho and Washington states. Idaho 377s is resistant to Pacific Northwest races of *Puccinia graminis* (Pers. f.s. *tritici* Eriks. & Henn., common disease

name: Stem rust) and moderately susceptible to *Puccinia recondita* (Rob. ex Desm. f.s. *tritici*, common disease name: Leaf rust). Idaho 377s is susceptible to Hessian fly (*Mayetiola destructor*, Say) and Russian wheat aphid (*Diuraphis noxia*, Mordv.)

In replicated cooperative extension trials in south-central and southeastern Idaho, 1992 to 1994, Idaho 377s, Penawawa, and 'Klasic' had average yields of 90, 81, and 79 bu/ac, respectively. In Western Regional Nursery trials, 1991 to 1993, across the northwestern US, Idaho 377s, Penawawa, and Klasic had average yields of 97, 94, and 83 bu/ac, respectively. Idaho 377s is more prone to lodging than Penawawa; in irrigated production it is similar to Fieldwin for lodging resistance. Grain protein content of Idaho 377s is similar to Klasic, the current hard white spring standard for the Pacific Northwest. Bread quality of Idaho 377s is inferior to Klasic. Idaho 377s has a half minute to 1 minute shorter dough mixing time and a 7 to 10% smaller pup loaf volume than Klasic. In 1993 international collaborative noodle quality evaluations, Idaho 377s was identified as superior to Klasic for alkali or fried noodle quality. The superior noodle quality is likely related to the high starch viscosity and low tyrosinase reaction of Idaho 377s. In three years of Western Regional Nursery testing, Idaho 377s had a higher starch viscosity than Klasic based on analysis by Rapid Visco-analyzer (241 units for Idaho 377s v. 222 units for Klasic). In two years of testing at Aberdeen, Idaho 377s had approximately 50% of the grain tyrosinase activity of Klasic.

Seed of Idaho 377s will be maintained by the University of Idaho, and may be obtained by contacting Ed Souza, University of Idaho, Aberdeen Research and Extension Center, P.O. Box AA, Aberdeen, ID. The final date of authorization shall serve as the official date of release.

Director, Idaho Agricultural Experiment Station
Moscow, Idaho

Date

United States Department of Agriculture
Washington, D.C.

Date

Idaho 377s PVP Application

Exhibit A. Origin and Breeding History

Idaho 377s was derived from the 1981 cross A81644S, a cross of a CIMMYT spring wheat with the pedigree 'Gallo'/'Yecora' reselection/3/'Aurora'/'Kalyonsona'/'Bluebird' as the female parent with the Aberdeen, ID breeding line 59Ab10293-5 as the pollen parent. The line 59Ab10293-5 was a semi-dwarf, awnless, soft white spring wheat, similar to the cultivar 'Springfield', with the pedigree 'Norin 10/Brevor'/'Baart'/'Onas'. The cross A81644S was bulked in the F₂ generation. In 1983, F₃ head selections were made at Aberdeen. In 1984, the head row A81644S-2 was harvested and entered into yield testing starting in 1985. In 1988, A81644S-2 was designated IDO377 and entered into the Tri-State Spring Wheat Nursery. Head selections of IDO377 were made in 1988 because the original line was heterogeneous for plant height and maturity. Head rows were selected for short plant stature and high grain SDS sedimentation values. In 1989, 22 of selections from head rows were evaluated in replicated trials. Six selections of IDO377 were phenotypically similar for short stature and early maturity. Equal seed quantities of the six selections were composited to form IDO377s which was entered into the Western Regional Spring Wheat Nursery for three years, 1991 to 1993. In 1992, 150 head selections from IDO377s were planted in the field at Tetonia ID, where the head rows were rogued for uniformity, trueness to type, and white seed color.

Idaho 377s has been observed for 5 generations in the field from 1991 to 1995. It has had a consistent uniform phenotype over the 5 generations for stripe rust resistance, average heading date, head type, glume type, plant coloration, chaff color, kernel hardness, kernel color, starch viscosity, tyrosinase activity, bread quality, and noodle quality. Idaho 377s has some height variation among plants within the cultivar, approximately 5% of plants are shorter than average and 5% taller than average with no more than 10% difference in height between the tallest and shortest plants. Idaho 377s also has two biotypes for the Glu 1B locus, an approximately equal mixture of the 17+18 allele and the 7+8 allele. The height and glutenin variation is consistent from generation to generation over the 5 years observed and is characteristic of Idaho 377s.

Idaho 377s PVP Application

Exhibit B. Novelty Statement

Idaho 377s is most similar to 'Fieldwin' soft white spring wheat. The two cultivars can be distinguish by grain hardness and high molecular weight glutenin banding patterns. Fieldwin has grain hardness values consistently below 40 units on the NIR hardness scale. In four years of testing Idaho 377s has not been observed to have a grain hardness value below 60 units. Fieldwin and Idaho 377s differ for high molecular glutenin alleles at the *Glu 1D* locus. Fieldwin has the 2+12 allele and Idaho 377s has the 5+10 allele.