

ATTACHMENT B: Variety Description

Cultivar 455 is a semi-dwarf, late heading and late maturing Hard White Spring Wheat that has been evaluated in Aberdeen, ID in 1996-98; Corvallis, OR in 1996 and 1998; in the WRSWN from 1997-98; and in the WSU Spring Wheat Variety Trials in 1998; and in other more limited -site trials in Idaho, Washington and Oregon. The following description is the results of these evaluations.

Description: Juvenile plant growth of 455 is semi-erect and plant color is green (#137A-B on R.H.S. color chart). Mature flag leaves are medium-large and recurved at heading with no twisting. Ear emergence is approximately one day earlier than Fieldwin (Logan, UT), Pomerelle (Aberdeen, ID), Wakanz (E. WA), and three to four days later than ID377s. Anther color is yellow. Mature plant height of 455 averages one inch taller than Penawawa over four years grown in Southeastern ID and an average of two inches taller over two years in Corvallis, OR. 455 plant height is two inches shorter than Fielder (two year average in Royal Slope, WA) and one inch shorter than Alpowa (one year in Corvallis, OR). Under optimum fertilization and moisture, mature plants can be expected to be 37-38 inches. On the mature stem of 455, anthocyanin is absent as is waxy bloom; hairiness on the last internode of rachis is present. Number of internodes ranges from 3 to 5 and are hollow. Peduncle is present and averages 14cm in length with a range of 4cm to 18cm. The mature spike of 455 is long, awned, middense and tapering. The curvature of mature spikes is variable depending on fertility, moisture and yield potential; inclined spikes can range from 60% to 80%, with the remaining spikes erect. 455 has white, long (ca. 9mm) and wide (ca. 4mm) glumes. The shoulders of the glumes are oblique and beaks are acuminate. Seed size is generally larger and heavier than 377s. Mature seeds are classified as white, however, seeds may appear a vitreous-light amber. Seed texture is hard and phenol reaction is fawn. Average mature seeds are ovate with rounded cheeks and medium, non-collared brush. Seed crease width is generally 60% or less of kernel and shallow- being 20% or less of kernel.

The Oregon State Seed Certification Service and the Oregon State Seed Laboratory noted two variants in the Experimental 'F' seed lot grown in Albany, OR. There may be an occasional bronze-chaffed plant- no more than (1) per 40,000 plants in Foundation seed lots. And Sodium Hydroxide tests, performed for the first time then, indicate that a trace number of red kernel variants may occur at a frequency of (4) or fewer per pound in Foundation seed lots.

Diseases and Tolerances: A complete study of disease resistance has not been made, however, foliar and head disease resistances/tolerances have been one of 455 strengths. 455 is Resistant to stripe rust, Resistant to Moderately Resistant to leaf rust, fusarium, septoria tritici, Susceptible to Hessian Fly and moderately tolerant to BYDV and scab. In Corvallis, OR extension trial in 1998, under severe disease pressure, rust readings identified Penawawa and Alpowa as VS while 455 was graded MS and the most resistant variety in the nursery.

Quality: Quality tests of 455 indicate it has some strong milling qualities, with consistently higher flour yields than 377s or Klasic. Flour extraction rates have been very strong- from 72.5% at Aberdeen and Corvallis to 75% at Royal Slope. Samples evaluated at the Wheat Marketing Center in Portland, the USDA Wheat Quality Lab in Pullman and the Wheat Quality Lab in Aberdeen (from a variety of environments) have measured more gluten strength than 377s and larger loaf volume for the same protein- but significantly lower than Klasic. 455 has consistently produced a bright flour color and samples from a variety of environments have sustained flour color and noodle sheet color over a 24hr period. A sample tested by the Portland Wheat Quality Lab in 1996 indicates that in noodle making 455 scored as well as or better than the control except for firmness. The sample tested from Royal Slope had a low flour protein for a HWS (9.9%), but a sample grown in Aberdeen had a flour protein of 14.3%, the same as 377s and a percent below Klasic, indicating that fertility and moisture probably play a role in protein levels. Quality tests further indicate 455 shows promise for Chinese wet noodles, certain other Asian noodles as a blend and even more promise for the Chinese steam bread.

Test weights for 455 follow seed size and 1000 kernel weight. The two-year average for TWT in Aberdeen ID was just under that for Centennial. At Royal Slope, WA and Corvallis, OR in 1996 TWT was over 62lbs.. As a bread wheat 455 performs in line with most other HWS wheats.

ATTACHMENT A. Origin and Breeding History of 455

The original cross that produced 455 was made in CYMMIT in 1980 with the following Pedigree: BOW-NAC/NA 160-HNF x DOVE. 1983 to 1986 produced f2 through f6 generations using pedigree plant selection in the Willamette Valley, Oregon. Another generation was advanced in 1987 using modified bulk selection. In 1988, 455 was evaluated for yield potential in a replicated yield trial grown in Yamhill County Oregon. Seed from this evaluation was sent to G. L. Rubenthaler at the Western Wheat Quality Lab in Pullman, WA for clarification of class and quality evaluations. The results from the Pullman evaluations revealed that 455 would be classified as a Hard White Spring. As there was no ready market for this selection, 455 was put into storage until 1992 when a bulked sample was grown and individual heads were selected. Final selection of 455 was performed in 1993 from an individual head-row.

Preliminary yield evaluation and seed increase of 455 was conducted in 1994. Further seed increases and yield evaluations were made at the Western State Mt. Vernon Extension Research Center under the direction of Dr. Andy Anderson in 1995. From 1994 stock seed increases, 455 was also entered in the Univ. of Idaho Commercial Nursery in 1995 and 1996, in the Oregon State University Corvallis Extension Variety Trials in 1996 and 1998, the Western Regional Spring Wheat Nursery in 1997 and 1998, the Washington State Spring Variety Trial at Royal Slope in 1996, 1997, and 1998, and all 16 locations of the Washington State Spring Variety Trials in 1998.

Experimental Foundation F¹ seed was grown in Albany, OR in 1998 from a breeder seed increase in Moses Lake, WA in 1997. Seed from the Moses Lake increase was also tested in the Noodle Quality Evaluation by the Wheat Marketing Center in Portland, OR in 1997 and 1998. A composite selection of seed from the 1998 Washington Spring Variety Trial was made by the Western Wheat Quality Lab in Pullman, WA and evaluated by the Pacific Northwest Wheat Quality Council in 1998 and 1999.