

ID02-859
Soft White Winter Wheat
Proposed name: 'UICF-Brundage'

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'UICF-Brundage' soft white winter wheat (*Triticum aestivum* L.) is proposed for release by the Idaho Agricultural Experiment Station in 2009. UICF-Brundage is a white chaffed, awnleted, semi-dwarf soft white common winter wheat with resistance to the herbicide imazamox. It has similar yield potential as the cultivar 'Brundage 96' (Zemetra et al. 2003) and similar end-use quality properties. It is blue-green in color with a semi-erect flag leaf. The kernels of UICF-Brundage are an intermediate size, white, and soft.

Pedigree and History

UICF-Brundage's pedigree is 'FS4/2*Brundage/3*Brundage 96. FS4 is a soft white wheat that carried the gene *TaAHASL1D* that confers resistance to imazamox. FS4 was developed by backcrossing the cultivar 'Madsen (Allan et al. 1989) to 'Fidel' by Texas A&M University under contract to American Cyanamid now owned by BASF. The first cross and first backcross was made to Brundage, a soft white common winter wheat released by the Idaho Agricultural Experiment Station (Zemetra et al. 1998). Three additional backcrosses were then made to Brundage 96, a reselection of Brundage with a higher level of resistance to stripe rust (caused by *Puccinia striiformis* Westend.). The original cross for UICF-Brundage was made in 1999. The F₁ plants were screened in the greenhouse with imazamox and survivors were backcrossed to Brundage. In 2002 the recurrent parent was changed to Brundage 96 and the crossing cycle was repeated three more times. The survivors were then allowed to self. Progeny from the selfed plants were screened for imazamox resistance and lines that were homozygous for resistance were harvested for field evaluation. The line 02-859 was screened in the field for resistance in single row replicated plots in 2004 and in 5 x 10 foot plots in 2006, 2007, 2008, and 2009. The line ID02-859 was entered into advanced yield testing in 2004 and in regional testing in 2006. ID02-859 was entered for evaluation in the Tri-State Extension cereal testing nursery in 2006 and evaluated for three years. In 2007, ID02-859 was evaluated by the Pacific Northwest Wheat Quality Council for its end-use quality and was found to have similar end-use quality as its recurrent parent Brundage 96. Heads were collected in 2005 and were grown during the 2005-2006 growing season at Moscow, Idaho for selection for stripe rust resistance and plant color uniformity. Seed from selected head rows were provided to X. Chen, USDA-ARS Pullman for further evaluation stripe rust resistance and remaining seed was planted out separately in 5 x 10 plots at Palouse Research, Extension and Education Center (PREEC) farm east of Moscow, Idaho fall, 2006. Plots from each head row were evaluated for plant color uniformity, stripe rust resistance and test weight. Seed from selected plots was bulked to form pre-breeder seed. Breeder seed was planted in fall, 2007 at the Kimberly Research and Extension Center at Kimberly, Idaho. Foundation seed was produced in the 2008/2009 growing season at the PREEC farm east of Moscow, Idaho. Each generation of ID02-859 was treated with imazamox to insure the presence of the herbicide resistance gene in all plants.

Area of Adaptation

UICF Brundage is a soft white common winter wheat with good to excellent straw strength that is adapted to intermediate to high rainfall dryland areas of the Pacific Northwest. Its area of adaptation is similar to that of Brundage and Brundage 96. UICF Brundage has potential in the irrigated regions of the Pacific Northwest due to its height, straw strength and heading date.

Agronomic Characteristics

UICF-Brundage is a semi-dwarf wheat that is similar Brundage 96 in its agronomic characteristics. For heading date, UICF-Brundage is similar to Brundage 96 with both being later than Brundage (Table 1). In terms of height, UICF-Brundage is similar to both Brundage and Brundage 96 under both rainfed and irrigated conditions. UICF-Brundage is more blue green than Brundage 96, having more the color of Brundage than Brundage 96. UICF-Brundage has erect to semi-erect flag leaves similar to both Brundage and Brundage 96. UICF-Brundage has excellent straw strength, similar to both Brundage 96 and Brundage. Glumes of UICF-Brundage are white, with an oblique shoulder and obtuse beak. UICF Brundage has kernel characteristics similar to Brundage 96, being white, soft, ovate with a mid-sized germ and a mid-deep to deep crease.

Response to Herbicide Application

UICF-Brundage shows a minimal level of injury to application of imazamox in the spring at either the 1X (5 ounce) or 2X (10 ounce) rate at both an early application time (3-4 leaf stage) or a late application time (prior to jointing) (Table 4). It showed a similar level of injury to the commercially available imazamox resistant cultivar ORCF-102. BASF has reviewed the performance of UICF-Brundage with their imazamox herbicide 'Beyond' and approved its release as a imazamox resistant Clearfield cultivar.

Agronomic Performance

UICF-Brundage has good to excellent yield potential and is similar to Brundage 96 under both rainfed and irrigated conditions (Table 1) varying slightly below or above Brundage and Brundage 96 depending on year and location over two years (2007 and 2008) in advanced yield trials grown in Idaho. Average performance of UICF-Brundage was also similar to Brundage 96 in two years of testing in the Western Regional Soft White Winter Wheat Nursery (Table 2). In extension evaluation in Idaho (2008), Washington (2008) and Oregon (2009), UICF Brundage performed comparable to Brundage 96 and the imazamox resistant cultivars ORCF-101, ORCF-102 and ORCF-103 for yield. In terms of test weight, UICF-Brundage can be slightly less, equal to or greater than Brundage 96 depending on the year and growing conditions (Tables 1-3). UICF-Brundage had an improved test weight in 2008 and 2009 in comparison to Brundage 96 (Tables 1-3), indicating success in the selection for improved test weight in UICF-Brundage in 2007.

End-use Quality

UICF-Brundage has excellent end-use quality for a soft white winter wheat and is similar to Brundage 96 in most areas of end-use quality (Tables 5). For percent flour protein, UICF Brundage was similar to both Brundage and Brundage 96 under both rainfed and irrigated growing conditions. For percent break flour yield and percent flour yield, UICF-Brundage was similar to Brundage and Brundage 96 over 17 site years of testing. For end-use quality, UICF Brundage had a similar cookie diameter compared to Brundage and Brundage 96 in over two years of testing. In regional testing, UICF-Brundage was similar to the check cultivar Brundage 96 for the quality parameters evaluated as part of the Western Regional Soft White Winter Wheat Nursery quality evaluation in 2007 and 2008 (Table 6). In Pacific Northwest Wheat Quality Council testing, UICF-Brundage was found to have good to excellent end-use quality, similar to the end-use quality of Brundage 96.

Disease Reactions

UICF-Brundage has resistance to stripe rust (caused by *Puccinia striiformis* Westend.) that is slightly better than that observed in Brundage 96 (Table 7). Results from the 2009 greenhouse and field tests indicate that UICF-Brundage has high temperature adult plant resistance to stripe rust. UICF-Brundage should be susceptible to strawbreaker foot rot (caused by *Pseudocercospora herpotrichoides* (Fron) Deighton) since it does not carry the *Pch1* gene that confers resistance to this disease. It is susceptible to dwarf bunt (caused by *Tilletia controversa* Kühn in Rabenh.) and would require the use of a seed fungicide treatment if grown in a region where dwarf bunt can occur.

Plant Varietal Protection will be sought for UICF-Brundage. Breeder and Foundation seed of UICF-Brundage will be maintained by the Idaho Foundation Seed Program under the direction of the Idaho Agricultural Experiment Station, University of Idaho, Moscow, ID 83844.

References

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