

**OREGON AGRICULTURAL EXPERIMENT STATION
OREGON STATE UNIVERSITY
CORVALLIS, OR 97331**

**PROPOSAL FOR RELEASE OF 'ORCF-103'
CLEARFIELD SOFT WHITE WINTER WHEAT**

'ORCF-103' is a soft white wheat (*Triticum aestivum* L.) developed by Oregon Agricultural Experiment Station, Oregon State University, in cooperation with BASF Corporation and USDA-Agricultural Research Service. ORCF-103 possesses the CLEARFIELD herbicide resistance trait owned by BASF Corporation and protected under U.S. Patent law (U.S. Patents 6,211,438; 6,211,439; 6,222,100, and others pending). ORCF-103 follows the release of OSU CLEARFIELD varieties ORCF-101 and ORCF-102 in 2003 and 2004, respectively. ORCF-103 is being proposed for release for its utility for grassy weed control in the Pacific Northwest and complementary adaptation to ORCF-101 and ORCF-102. ORCF-103 was tested under the experimental designation ORI2042037.

ORCF-103 carries a form of the acetohydroxyacid synthetase gene, designated ALS-1, which has been altered through chemical mutagenesis. This is the same gene carried by ORCF-101 and ORCF-102. The altered gene is not affected by Beyond™, an imidazolinone-based herbicide, at normal application rates. When used in combination with Beyond™ at the labeled rate, the CLEARFIELD* technologies provide growers with an effective tool for control of grassy weeds such as goatgrass, wild rye, downy brome, Italian ryegrass, wild oat, and volunteer cereals.

ORCF-103 is derived from the three-way cross 'Eltan'/3/'CV9804'/'OR939481'. CV-9804, also known as 'FS-4', is the donor of the CLEARFIELD* trait, developed through mutagenesis of the cultivar 'Fidel'. OR939481 is a selection from the cross 'Stephens'/'Madsen'. The initial single cross of CV9804/OR939481 was made in the spring of 1998. A doubled-haploid selection from the F1 was derived in 1999, then topcrossed with Eltan in 2000. Both crosses were made in the field at the Hyslop Agronomy Farm. ORCF-103 is an F3 derived line, identified as an F4 headrow at the Hyslop Farm in 2003. The selection was given the experimental number ORI2042037 in 2004 when it was grown as a single plot at the Rugg site.

The primary advantage of ORCF-103, as compared with currently released CLEARFIELD varieties ORCF-101 and ORCF-102, is improved winter cold-tolerance and tolerance to snow mold. Crown freezing assays conducted by USDA-ARS suggest that ORCF-103 has cold-tolerance similar to its topcross parent Eltan. This cold-tolerance is notably superior to that of ORCF-101 or ORCF-102, which have similar tolerance as the variety Stephens. Cold-tolerance of ORCF-101 and ORCF-102 is considered inadequate for many areas of the Pacific Northwest. This has limited their utility and increased production risks when grown in northern areas. Cold tolerance of ORCF-103 was confirmed in WSU Extension Cereals Variety Trials in 2006 through 2008.

ORCF-103 is moderately resistant to snow mold with reaction similar to Madsen and approaching that of Eltan. Over three sites in 2008, ORCF-103 had an average snow mold rating of 1.7 (0-9 scale; resistant to susceptible), same as for Madsen, and slightly less than that of Eltan at 1.0. This compares with ratings of 6.0 for ORCF-101 and 2.3 for ORCF-102. In trials inoculated with Cephalosporium stripe (*Cephalosporium gramineum*), ORCF-103 has had low white head ratings, similar to Madsen, and significantly lower than ratings for Stephens, Tubbs, Tubbs 06, or ORCF-101. Response to a natural field infection of Crown rot (*Fusarium spp.*) in 2007 suggests that ORCF-103 may have tolerance to this important disease. White head ratings for ORCF-103 averaged less than 5% while ratings for Stephens, Tubbs, and Tubbs 06 ranged from 28 to 38%. ORCF-103 is susceptible to Strawbreaker footrot (*Pseudocercospora herpotrichoides*), and does not carry the VPM chromosome translocation. In USDA-ARS evaluations, ORCF-103 has been shown to possess moderate to high levels of resistance to current field races of stripe rust (*Puccinia striiformis*), with infection intensities similar to Stephens and Eltan and less than those for 'Tubbs' or 'Tubbs 06'. Response of ORCF-103 to Septoria leaf blotch (*Septoria tritici*) has been similar to that for Madsen and ORCF-102, with disease ratings lower than those for the susceptible variety Stephens.

ORCF-103 was evaluated in the Oregon Winter Elite Yield Trials (OWEYT) in 2006 and 2007. Average grain yield for ORCF-103 over 24 site-years was 87.7 bu/a, as compared with 84.0, 92.0 and 89.9 for ORCF-101, ORCF-102, and Tubbs. Grain test weight of ORCF-103 averaged 59.3 lb/bu, similar to ORCF-101 and Madsen, but less than ORCF-102 at 60.2 lb/bu. ORCF-103 was evaluated in the WSU Extension Cereal Variety Trials at three locations in 2006 and 19 locations in 2007. In 2007, ORCF-103 averaged 95.2 bu/a, as compared with 91.0, 97.9, and 100.6 bu/a for ORCF-101, ORCF-102, and Tubbs, respectively. Grain test weight of ORCF-103 averaged 58.8 lb/bu, again similar to ORCF-101 and Madsen, but less than ORCF-102 at 59.7 lb/bu. As compared with its top-cross parent, Eltan, ORCF-103 had slightly higher average grain yields, 95.2 vs 94 bu/a, but with 0.4 lb/bu lower average test weight. Over 10 trials grown in north-central Washington in 2006 and 2007, ORCF-103 had average grain yield of 74.7 bu/a, as compared with Eltan at 71.2 bu/a. These sites were selected to represent the area in Washington where Eltan is most commonly grown.

In Oregon trials, ORCF-103 has been approximately four days later in heading than ORCF-101 and ORCF-102, and two days later than Madsen. In Washington trials, ORCF-103 has been approximately 1 day later in heading than Madsen, but 1 day earlier in heading as compared with Eltan. Plant height of ORCF-103 is similar to Madsen, approximately 2 inches less than Tubbs or Eltan. Straw strength is most similar to Eltan, less than Tubbs.

Herbicide tolerance of ORCF-103 was evaluated in three Oregon trials with applications of 0, 4, 6, 8, and 12 oz of Beyond at two dates representing early (0-1 tiller stage) and late postemergence (1 to 3 tiller stage). There were no differences in herbicide response, based on non-significant variety x treatment interactions for grain yield and test weight, among ORCF-101, ORCF-102, ORCF-103 and ID02-859 (Brundage IMI). There were no differences in visual response to herbicide treatments among the CLEARFIELD varieties evaluated at Moro in 2006 or 2007. There was a significant

variety x treatment interaction in the 2007 Pendleton trials, but this trial was confounded with a late April field application of 4.75 oz/a Osprey. At the 6, 8 12 oz/a rates, ORCF-103 showed less visual response than ORCF-101 or ID02-859, similar to that of ORCF-102. Herbicide tolerance of ORCF-103, ORCF-102, and ID02-859 were evaluated by the University of Idaho at two sites in 2007. Four and 8 oz/a rates of Beyond were applied at two dates and grain yield, plant height, and heading dates were measured. Analyses of variance for grain yield, plant height, and heading date confirm that there were no differences in variety response to herbicide treatments. Herbicide tolerance of ORCF-103 was further confirmed in trials grown at two locations in 2007 by WSU Extension Cereals program. In these studies, variety response to late April application of 5 oz/a Beyond was compared with response to Olympus Flex applied in either early or late April. Eight CLEARFIELD selections were evaluated, including ORCF-101, ORCF-202, ORCF-103, and ID02-859. Analyses of grain yield showed no significant differences in variety response to herbicide treatments at either location.

End-use quality evaluations were conducted by the USDA-ARS Western Wheat Quality Laboratory on grain samples from the 2006 and 2007 OWEYT. Average grain test weight of ORCF-103 was not different from Stephens or Tubbs. However, ORCF-103 had significantly lower average kernel weight, 37.6 gm/1000, as compared with 44.1 and 39.0 for Stephens and Tubbs, respectively. The lower kernel weight contributed to lower average flour yield and milling score for ORCF-103. Mean break flour yields, however, were not different between ORCF-103, Stephens, and Tubbs. The lower kernel weight, kernel diameter, and flour yield could be attributed, in part, to the later maturity of ORCF-103, which is a disadvantage in Oregon test sites. Based on Solvent Retention Capacity tests, ORCF-103 has lower average pentosan concentration and lower water absorption as compared with Tubbs. ORCF-103 has an exceptional cookie diameter, averaging 9.6 cm as compared with 9.3 and 9.2 for Stephens and Tubbs.

In 2008, milling and baking quality of ORCF-103 was evaluated through the Pacific Northwest Wheat Quality Council. ORCF-103 was generally considered to have acceptable end-use quality attributes for the soft white wheat market. Milling yield, flour ash, cookie diameter, cake volume, and alkaline noodle color stability were similar to the check variety Eltan. ORCF-103 was noted as having lower gluten strength than Eltan, as indicated by reduced farinograph peak and mixing tolerance values and reduced scores for lactic acid component of solvent retention capacity tests. This would be considered an advantage in processing and baking of most soft wheat products.

In fall 2006, approximately 1,500 heads of ORCF-103 were threshed, screened for seed color and seed size, and provided to Washington State Crop Improvement Association (WSCIA) Foundation Seed Program. These were planted as individual headrows and off-type rows were removed prior to bulk harvest. In fall 2007, this seed was used to bulk plant a 20 acre field for production of Foundation seed.

ORCF-103 will be submitted for Plant Variety Protection with the Title 5 option. ORCF-103 will be released to the seed industry through OSU's non-exclusive CLEARFIELD variety licensing program, which is already in place for ORCF-101 and ORCF-102. Foundation and Registered seed stocks may be sold only to those granted a license by OSU. Certified seed stocks may be used to plant a single commercial crop and may not

be used to generate seed stocks for replanting. Seed stocks that fail to meet certification standards cannot be sold as seed, nor used as seed.

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Release of ORCF-103 approved:

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Date

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Summary of grain yield and agronomic data from the Oregon Winter Elite Yield Trial, 2005-2007.

| Variety | Mean Grain Yield | | | | | | Agronomic Data | | | | | | | |
|------------|------------------|------------------|------------------|-----------------------------|------------------|------------------|----------------|------------------|---------------|------------------|--------------|------------------|--------------|-----------------|
| | OWEYT | | | Columbia Basin [†] | | | Test Weight | | Grain Protein | | Plant Height | | Heading Date | |
| | 2007 | 2-Years | 3-Years | 2007 | 2-Years | 3-Years | 2007 | 2-Years | 2007 | 2-Years | 2007 | 2-Years | 2007 | 2-Years |
| | 12-Sites | 24-Site Years | 34-Site Years | 8-Sites | 16-Site Years | 22-Site Years | 12-Sites | 24-Site Years | 10-Sites | 21-Site Years | 11 Sites | 22-Site Years | 6 sites | 8-Site Years |
| bu/a | bu/a | bu/a | bu/a | bu/a | bu/a | lb/bu | lb/bu | % | % | in | in | from 1/1 | DOY | |
| Stephens | 92.6 | 86.6 | 87.4 | 80.8 | 77 | 79 | 59 | 59 | 10 | 10.2 | 34.7 | 33.7 | 142.3 | 143.9 |
| Madsen | 91.1 | 84.9 | 86 | 81.9 | 75.9 | 77 | 59.7 | 59.2 | 10.1 | 10.3 | 35.2 | 34.1 | 145.4 | 147.5 |
| Gene | 87 | 78 | 83.3 | 81.8 | 71.5 | 76.1 | 58.5 | 57.9 | 10.3 | 10.6 | 34.5 | 30.4 | 139.9 | 141.6 |
| Tubbs | 96 | 89.8 | 90.4 | 84.7 | 80.6 | 80.3 | 58.7 | 58.7 | 9.4 | 9.7 | 38 | 36.7 | 144.2 | 146.1 |
| Tubbs-06 | 97.5 | 91.8 | | 88.3 | 82.2 | | 58.8 | 58.8 | 9.4 | 9.6 | 38.1 | 37 | 143.6 | 145.7 |
| Goetze | 90.7 | 87.7 | 91.4 | 79.1 | 77.1 | 79.3 | 59.3 | 58.9 | 9.5 | 9.8 | 32.8 | 31.8 | 140.9 | 141.9 |
| ORH010085 | 94.8 | 88.5 | 90.7 | 88.4 | 80 | 81.8 | 60.3 | 60.5 | 9.8 | 10.2 | 34.5 | 32.8 | 142.3 | 144.4 |
| OR2050910 | 96.2 | | | 82.2 | | | 58.4 | | 9.8 | | 36.2 | | 145.3 | |
| ORSS-1757 | 89.6 | 84.9 | 86.4 | 82 | 76.3 | 76.5 | 59.3 | 59.3 | 9.1 | 9.3 | 35.7 | 34.4 | 141.9 | 143.5 |
| ORCF-101 | 88.7 | 84 | 85.8 | 79.7 | 76.4 | 78.8 | 59.5 | 59.2 | 9.8 | 10.1 | 35.3 | 34.1 | 143.5 | 145.5 |
| ORCF-102 | 99.2 | 92 | 90.7 | 92.7 | 84.7 | 83.6 | 60.3 | 60.2 | 9.7 | 9.8 | 38 | 36.3 | 143.8 | 145.7 |
| ORCF-103 | 94.1 | 87.7 | | 87 | 79.3 | | 59.5 | 59.3 | 9.6 | 9.8 | 35.3 | 34.4 | 147.6 | 149.8 |
| Mean | 93.1 | 86.9 | 88 | 84.1 | 78.3 | 79.2 | 59.2 | 59.1 | 9.7 | 10 | 35.5 | 34.2 | 143.4 | 145.1 |
| LSD (0.05) | 4.9 | 3 | 2.5 | 5.3 | 3.2 | 2.7 | 0.5 | 0.5 | 0.4 | 0.3 | 0.7 | 0.6 | 0.8 | 0.7 |

[†] Columbia basin OWEYT sites include: Moro, Moro-Kaseberg, Arlington, Condon, Hermiston, Pendleton – No-Till, Pendleton – Ruggs, LaGrande, North Powder, and Lexington.

Summary of grain yield and agronomic data from WSU Variety Trials in 2006 and 2007.

| Selection | 2006-2007 | 2006 3-site mean ** | | | | | 2007 19-site mean | | | | | |
|-----------|-------------------------------|---------------------|----------|---------------|--------------|------------------------|-------------------|----------|---------------|--------------|--------------|--------------------------|
| | 10 site mean* 'Eltan area' | Yield | Test wt. | Grain protein | Plant height | Heading date (2 sites) | Yield | Test wt. | Grain protein | Plant height | Heading date | Spring growth (16-sites) |
| | bu/a | bu/a | lb/bu | % | cm | from 1/1 | bu/a | lb/bu | % | cm | from 1/1 | rate 1-9 |
| STEPHENS | 68.4 | 61.4 | 60.0 | 11.6 | 72.6 | 141.3 | 93.9 | 58.7 | 11.6 | 83.1 | 149.9 | 7.6 |
| MADSEN | 71.4 | 68.1 | 60.5 | 12.1 | 77.0 | 143.4 | 90.7 | 59 | 12 | 85.6 | 154.7 | 6.7 |
| TUBBS | 76.4 | 75.2 | 60.3 | 11.4 | 81.5 | 140.9 | 100.6 | 58.2 | 11.1 | 90.7 | 152.2 | 7.5 |
| TUBBS-06 | 71.1 | 66.1 | 59.9 | 11.4 | 80.3 | 142.4 | 96.1 | 58 | 11.4 | 91.2 | 152.7 | 6.8 |
| ORCF-101 | 71.2 | 65.6 | 60.5 | 12.0 | 77.0 | 141.7 | 91 | 58.9 | 11.8 | 86.1 | 151.7 | 7 |
| ORCF-102 | 73.3 | 72.3 | 60.8 | 11.5 | 81.3 | 142.4 | 97.9 | 59.7 | 11.5 | 90.6 | 151.7 | 7.4 |
| ORCF-103 | 74.7 | 70.6 | 60.6 | 11.6 | 79.3 | 143.2 | 95.2 | 58.8 | 11.7 | 85.1 | 155.5 | 7.3 |
| Eltan | 71.2 | 66.2 | 60.7 | 12.2 | 78.2 | 148.8 | 94 | 59.2 | 11.4 | 90.2 | 156.4 | 7.5 |

* Ritzville, Connell, Harrington in 2006; Almira, Creston, Harrington, Lind, Ritzville, Reardan, St. Andrews in 2007

** Ritzvill, Connell, Harrington in 2006

Evaluation of tolerance to Beyond herbicide in 2006 and 2007.

Description:

2006 Clearfield Efficacy Trial: Early postemergence treatments were applied on February 8, 2006, when the wheat was at the 0 to 1 tiller stage at Pendleton. Late postemergence applications were applied on March 14, 2006, when the wheat was in the 1 to 3 tiller stage at Pendleton. Treatments were applied with a hand-held CO₂ sprayer delivering 16 gpa at 30 psi.

2007 Clearfield Efficacy Trial: Early postemergence treatments were applied on February 14, 2007, when the wheat was at the 0 to 1 tiller stage at Pendleton and November 8, 2006, when the wheat was at the 0 to 1 tiller stage at Moro. Late postemergence applications were applied on March 23 and February 23, 2007, when the wheat was in the 2 to 3 tiller stage at Pendleton and Moro, respectively. Treatments at the both sites were applied with a hand-held CO₂ sprayer delivering 16 gpa at 30 psi.

Analyses of variance for Clearfield efficacy trials Oregon trials in 2006 and 2007

| | Yield and Visual DF | Test Weight DF | 2006 | | | 2007 | | | | | |
|---------------------|---------------------|----------------|-----------|-------------|---------------|-------|-------------|---------------|-------|-------------|---------------|
| | | | Pendleton | | | Moro | | | Pend | | |
| | | | Yield | Test Weight | Visual Injury | Yield | Test Weight | Visual Injury | Yield | Test Weight | Visual Injury |
| Replication | 3 | 1 | *** | *** | N.S. | *** | N.S. | ** | *** | N.S. | N.S. |
| Treatment | 9 | 9 | *** | ** | *** | N.S. | N.S. | *** | *** | *** | *** |
| Replication*Trt | 27 | 9 | ** | ** | *** | *** | N.S. | *** | *** | *** | *** |
| Variety | 3 | 3 | *** | *** | N.S. | ** | ** | *** | *** | *** | *** |
| Treatment*Variety | 27 | 27 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | ** |
| Replication*Variety | 9 | 3 | *** | N.S. | ** | ** | N.S. | N.S. | *** | N.S. | N.S. |

| | | | | | | | | | |
|----------|------|------|-------|------|------|-------|------|------|-------|
| R-Square | 0.80 | 0.85 | 0.87 | 0.70 | 0.74 | 1.00 | 0.86 | 0.89 | 0.96 |
| CV | 6.40 | 1.55 | 87.76 | 7.34 | 0.83 | 18.88 | 4.91 | 1.08 | 39.47 |

Summary of grain yield for Clearfield efficacy trials in 2006 and 2007

| | Pendleton - 2006 | | | | | | | | | | Mean |
|----------|------------------|-------|-------|-------|------|-------|-------|-------|-------|------|-------|
| | Early | | | | | Late | | | | | |
| | 0E | 4E | 6E | 8E | 12E | 0L | 4L | 6L | 8L | 12L | |
| ORCF-101 | 92.8 | 99.0 | 95.9 | 95.6 | 86.7 | 92.8 | 96.1 | 102.6 | 88.4 | 92.6 | 94.2 |
| ORCF-102 | 102.0 | 104.0 | 102.2 | 101.6 | 89.8 | 101.2 | 99.5 | 102.5 | 99.9 | 96.7 | 99.9 |
| ORCF-103 | 102.1 | 103.5 | 97.7 | 93.9 | 83.1 | 100.9 | 99.9 | 102.2 | 100.7 | 90.4 | 97.5 |
| ID02-859 | 103.8 | 113.0 | 108.5 | 101.8 | 99.6 | 103.5 | 105.2 | 104.9 | 107.2 | 93.9 | 104.1 |

| | Pendleton - 2007 | | | | | | | | | | Mean |
|----------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Early | | | | | Late | | | | | |
| | 0E | 4E | 6E | 8E | 12E | 0L | 4L | 6L | 8L | 12L | |
| ORCF-101 | 102.7 | 118.7 | 116.5 | 115.1 | 111.0 | 112.8 | 118.7 | 114.8 | 106.0 | 100.9 | 111.7 |
| ORCF-102 | 114.2 | 114.3 | 119.2 | 123.1 | 112.1 | 118.6 | 118.6 | 118.0 | 109.0 | 102.7 | 115.0 |
| ORCF-103 | 100.9 | 103.0 | 102.7 | 111.7 | 97.0 | 110.9 | 108.2 | 105.8 | 92.9 | 89.6 | 102.3 |
| ID02-859 | 111.4 | 118.2 | 108.5 | 113.6 | 105.1 | 121.0 | 116.7 | 114.8 | 101.3 | 97.5 | 110.8 |

| | Moro - 2007 | | | | | | | | | | Mean |
|----------|-------------|--------|-------|--------|-------|--------|--------|--------|-------|--------|------|
| | Early | | | | | Late | | | | | |
| | 0E | 4E | 6E | 8E | 12E | 0L | 4L | 6L | 8L | 12L | |
| ORCF-101 | 81.25 | 84.075 | 80.73 | 80.25 | 77.05 | 74.5 | 78.625 | 84.3 | 80.78 | 80.55 | 80.2 |
| ORCF-102 | 76.93 | 79.5 | 78.1 | 82.65 | 73.78 | 79.65 | 78.85 | 84.275 | 78.93 | 80.475 | 79.3 |
| ORCF-103 | 84.38 | 81.125 | 73.85 | 75.3 | 79.25 | 78.625 | 89.075 | 80.35 | 81.93 | 80.875 | 80.5 |
| ID02-859 | 83.65 | 81.575 | 82.08 | 85.475 | 82.8 | 79.325 | 88.275 | 83.675 | 81.93 | 84.025 | 83.3 |

Note: The 2007 Pendleton trials were affected by mid-late April application of 4.75 oz/A of Osprey (mesosulfuron-methyl), which is an ALS inhibitor in the same chemical 'family' as Beyond.

Summary of grain test weight for Oregon Clearfield efficacy trials in 2006 and 2007

| | Pendleton - 2006 | | | | | | | | | | Mean |
|----------|------------------|--------|-------|--------|-------|--------|--------|--------|-------|--------|------|
| | Early | | | | | Late | | | | | |
| | 0E | 4E | 6E | 8E | 12E | 0L | 4L | 6L | 8L | 12L | |
| ORCF-101 | 59.83 | 58.82 | 59.25 | 59.525 | 57.23 | 58.085 | 58.59 | 60.03 | 59.06 | 58.01 | 58.8 |
| ORCF-102 | 60.85 | 61.275 | 60.42 | 60.305 | 59.49 | 60.38 | 60.375 | 60.615 | 60.93 | 60.025 | 60.5 |
| ORCF-103 | 60.07 | 60.3 | 59.49 | 59.795 | 59.83 | 58.665 | 58.9 | 57.97 | 58.44 | 57.54 | 59.1 |
| ID02-859 | 59.49 | 58.395 | 59.6 | 59.52 | 58.17 | 58.59 | 59.485 | 59.365 | 58.63 | 57.585 | 58.9 |

| | Pendleton - 2007 | | | | | | | | | | Mean |
|----------|------------------|------|------|------|------|------|------|------|------|------|------|
| | Early | | | | | Late | | | | | |
| | 0E | 4E | 6E | 8E | 12E | 0L | 4L | 6L | 8L | 12L | |
| ORCF-101 | 59.0 | 59.7 | 60.0 | 60.0 | 59.8 | 59.7 | 59.2 | 59.2 | 58.3 | 57.8 | 59.2 |
| ORCF-102 | 60.6 | 60.6 | 60.1 | 61.1 | 60.3 | 60.6 | 60.4 | 60.5 | 60.0 | 58.8 | 60.3 |
| ORCF-103 | 59.6 | 59.6 | 60.1 | 59.9 | 59.8 | 59.7 | 59.3 | 59.9 | 58.8 | 57.7 | 59.4 |
| ID02-859 | 58.3 | 58.9 | 58.6 | 59.1 | 58.5 | 59.6 | 60.0 | 60.3 | 58.3 | 57.6 | 58.9 |

| | Moro - 2007 | | | | | | | | | | Mean |
|----------|-------------|------|------|------|------|------|------|------|------|------|------|
| | Early | | | | | Late | | | | | |
| | 0E | 4E | 6E | 8E | 12E | 0L | 4L | 6L | 8L | 12L | |
| ORCF-101 | 61.5 | 61.7 | 61.2 | 61.5 | 61.0 | 60.7 | 61.6 | 61.2 | 61.7 | 61.6 | 61.4 |
| ORCF-102 | 60.9 | 60.3 | 61.1 | 61.4 | 61.4 | 61.4 | 60.8 | 61.0 | 61.2 | 61.4 | 61.0 |
| ORCF-103 | 59.9 | 60.3 | 60.5 | 60.5 | 60.2 | 60.8 | 60.6 | 60.8 | 61.1 | 60.9 | 60.5 |
| ID02-859 | 60.8 | 60.4 | 60.9 | 60.9 | 60.4 | 60.4 | 61.1 | 60.6 | 61.5 | 61.2 | 60.8 |

Summary of visual ratings of herbicide response in 2006 and 2007 Oregon trials.

| | Pendleton - 2006 | | | | | | | | | | Mean |
|----------|------------------|-----|-----|------|-------|------|------|-----|------|-------|------|
| | Early | | | | | Late | | | | | |
| | 0E | 4E | 6E | 8E | 12E | 0L | 4L | 6L | 8L | 12L | |
| ORCF-101 | 0 | 0 | 0.5 | 0.5 | 10 | 0 | 0 | 0.5 | 3 | 8.75 | 2.3 |
| ORCF-102 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 4.75 | 10 | 2.3 |
| ORCF-103 | 0 | 0.5 | 0.5 | 3.5 | 14.25 | 0 | 0 | 1 | 2.25 | 8 | 3.0 |
| ID02-859 | 0 | 0.5 | 0 | 4.75 | 11.25 | 0 | 1.25 | 0 | 6.25 | 11.25 | 3.5 |

| | Pendleton - 2007 | | | | | | | | | | Mean |
|----------|------------------|-----|-----|-----|------|------|-----|-----|------|------|------|
| | Early | | | | | Late | | | | | |
| | 0E | 4E | 6E | 8E | 12E | 0L | 4L | 6L | 8L | 12L | |
| ORCF-101 | 0.0 | 0.0 | 1.3 | 2.5 | 10.0 | 0.0 | 2.5 | 6.3 | 22.5 | 30.0 | 7.5 |
| ORCF-102 | 0.0 | 0.0 | 0.0 | 0.0 | 6.3 | 0.0 | 0.0 | 0.0 | 22.5 | 27.5 | 5.6 |
| ORCF-103 | 0.0 | 1.6 | 1.3 | 0.0 | 12.5 | 0.0 | 1.3 | 2.5 | 18.8 | 25.0 | 6.3 |
| ID02-859 | 0.0 | 0.0 | 0.0 | 5.0 | 15.0 | 0.0 | 1.3 | 6.3 | 23.8 | 32.5 | 8.4 |

| | Moro - 2007 | | | | | | | | | | Mean |
|----------|-------------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|
| | Early | | | | | Late | | | | | |
| | 0E | 4E | 6E | 8E | 12E | 0L | 4L | 6L | 8L | 12L | |
| ORCF-101 | 0.0 | 0.0 | 0.5 | 1.3 | 8.0 | 0.0 | 0.0 | 0.0 | 1.8 | 3.8 | 1.5 |
| ORCF-102 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.4 |
| ORCF-103 | 0.0 | 0.0 | 1.3 | 1.3 | 6.8 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 1.0 |
| ID02-859 | 0.0 | 0.0 | 0.0 | 0.5 | 2.5 | 0.0 | 0.0 | 0.0 | 1.3 | 1.3 | 0.6 |

Analyses of variance for Clearfield efficacy trials Idaho trials in 2007

| | d.f. | 2007 | | | | | |
|-----------------|------|--------|---------|--------|-----------|---------|--------|
| | | Moscow | | | Kambitsch | | |
| | | Yield | Heading | Height | Yield | Heading | Height |
| Replication | 2 | N.S. | N.S. | N.S. | N.S. | N.S. | ** |
| Treatment | 4 | *** | ** | ** | N.S. | N.S. | ** |
| Rep x Treatment | 8 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Variety | 2 | *** | *** | *** | *** | *** | *** |
| Trt x Variety | 8 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Rep x Variety | 4 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |

| | | | | | | |
|----------|------|------|------|------|------|------|
| R-Square | 0.81 | 0.91 | 0.93 | 0.71 | 0.84 | 0.94 |
| CV | 5.80 | 0.84 | 3.19 | 6.80 | 0.87 | 3.50 |

| | Moscow - 2007 | | | | | | | | | | | | |
|----------|---------------|-------|-------|-------|-------|-------|--------|-------|------|------|------|------|--|
| | Yield | | | | | | Height | | | | | | |
| | Early | | | Late | | | Mean | Early | | | Late | | |
| | 0 | 1E | 2E | 1L | 2L | 0 | | 1E | 2E | 1L | 2L | Mean | |
| ORCF-103 | 120.2 | 118.6 | 114.2 | 116.5 | 115.7 | 117.0 | 34.3 | 33.3 | 33.3 | 34.0 | 33.7 | 33.7 | |
| ORCF-102 | 139.7 | 127.0 | 119.2 | 129.8 | 118.2 | 126.8 | 34.3 | 33.3 | 33.7 | 34.0 | 33.0 | 33.7 | |
| ID02-859 | 134.5 | 124.9 | 122.4 | 129.9 | 115.9 | 125.5 | 30.7 | 28.7 | 29.3 | 30.0 | 27.7 | 29.3 | |
| Mean | 131.5 | 123.5 | 118.6 | 125.4 | 116.6 | - | 33.1 | 31.8 | 32.1 | 32.7 | 31.4 | - | |

| | Moscow - 2007 | | | | | |
|----------|---------------|-------|-------|-------|-------|-------|
| | Heading | | | | | |
| | Early | | | Late | | |
| | 0 | 1E | 2E | 1L | 2L | Mean |
| ORCF-103 | 167.0 | 164.3 | 164.3 | 166.3 | 167.0 | 165.8 |
| ORCF-102 | 160.3 | 160.0 | 159.0 | 161.0 | 161.0 | 160.3 |
| ID02-859 | 162.0 | 161.0 | 161.0 | 162.0 | 162.0 | 161.6 |
| Mean | 163.1 | 161.8 | 161.4 | 163.1 | 163.3 | - |

| | Kambitsch - 2007 | | | | | | | | | | | | |
|-----------|------------------|-------|-------|-------|-------|-------|--------|-------|------|------|------|------|--|
| | Yield | | | | | | Height | | | | | | |
| | Early | | | Late | | | Mean | Early | | | Late | | |
| | 0 | 1E | 2E | 1L | 2L | 0 | | 1E | 2E | 1L | 2L | Mean | |
| ORCFR-103 | 105.0 | 95.7 | 99.3 | 102.1 | 96.9 | 99.8 | 31.3 | 29.7 | 30.0 | 30.3 | 29.7 | 30.2 | |
| ORCF-102 | 108.1 | 108.4 | 114.4 | 108.1 | 102.8 | 108.4 | 32.0 | 32.3 | 31.0 | 31.3 | 31.3 | 31.6 | |
| ID02-859 | 104.4 | 102.2 | 95.6 | 102.8 | 96.0 | 100.2 | 27.7 | 26.3 | 26.0 | 26.0 | 25.0 | 26.2 | |
| Mean | 105.8 | 102.1 | 103.1 | 104.3 | 98.6 | - | 30.3 | 29.4 | 29.0 | 29.2 | 28.7 | - | |

| | Kambitsch - 2007 | | | | | |
|-----------|------------------|-------|-------|-------|-------|-------|
| | Heading | | | | | |
| | Early | | | Late | | |
| | 0 | 1E | 2E | 1L | 2L | Mean |
| ORCFR-103 | 168.3 | 167.7 | 168.5 | 168.0 | 167.0 | 167.9 |
| ORCF-102 | 164.0 | 164.7 | 164.7 | 165.3 | 166.3 | 165.0 |
| ID02-859 | 163.3 | 164.0 | 163.7 | 165.0 | 165.7 | 164.3 |
| Mean | 165.2 | 165.4 | 165.6 | 166.1 | 166.3 | - |

Robinson, Jerry

From: Peterson, Jim [cjp@oregonstate.edu]
Sent: Tuesday, September 08, 2009 11:30 AM
To: Vollmer, Gregory; Robinson, Jerry; Whittum, Ronald R
Subject: RE: Variant Description, Final Version

Let's go ahead and adopt this as the official variant description for 103. It will also go in the PVP app later this week.

Thanks to everyone for input and time to look it over.

Jim

From: Vollmer, Gregory
Sent: Tuesday, September 08, 2009 11:21 AM
To: Jim Peterson
Cc: Jerry Robinson (jrobinson@wsu.edu); Ron Whittum
Subject: Variant Description, Final Version

Jim

I discussed this with Ron this morning and he agrees that this description will work. He and Jerry have talked about this and we have Jerry's 8/20 email.

(Variety) may contain up to 8 red kernels per pound in all classes of certified seed and may contain up to 2 in 10,000 combined of naturally occurring variants in the field: plants that are 8 to 21 cm (3 ½" to 8") taller or plants with bronze (red or tan) chaff spikes.

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