

OTTO

**Identification:**

1. **Crop kind and market class:** Soft White Winter Wheat

< 12" RAINFALL ZONE

2. **Selection no.:** WA8092

3. **Pedigree and experimental designation:** Eltan//Madsen/Eltan///Eltan. WA8092 has also been tested under the experimental designation J980218-6.

**General Situation:**

1. **Statement justifying preliminary seed increase:** Foot rot and stripe rust resistance are significant diseases across the state of Washington. The cultivar Madsen was the first foot rot resistant line released in the state of Washington with broadly adapted agronomic characteristics and excellent stripe rust resistance. Currently, other cultivars have been released also carrying the *Pch1* gene for foot rot resistance and stripe rust resistance, although few of these are adapted to the <12 inch rainfall zones of the state. WA8092 is the first release from the WSU Winter Wheat Breeding Program that is foot rot and stripe rust resistant and adapted to the <12 inch rainfall zone of the state. WA8092 is intended to be a compliment/replacement for the currently grown cultivars Eltan and Xerpha. WA8092 is similar to the cultivar Eltan, except that it carries the *Pch1* gene and has a slight yield advantage in many parts of the state. This line also has slightly better stripe rust resistance, as evidenced by the greenhouse seedling test in which WA8092 appears to have inherited seedling genes from Madsen. Although WA8092 does not have the full yield potential of Xerpha under dryland conditions, it has significantly better stripe rust resistance and end-use quality. Additionally, Xerpha exhibits a yellow discoloration when coming out of winter dormancy, whereas WA8092 does not exhibit this discoloration.

2. **Use-type:** Soft white common cookie, cake, and pastry wheat

3. **Description and general information:** Semi-dwarf, soft white winter wheat with late-season maturity, common head type, and white straw and glumes.

4. **Variety it is intended to replace:** WA8092 is targeted to the low (<12 inches) rainfall production zones of Washington. It is intended to replace/compliment Eltan and Xerpha, especially in areas of foot rot pressure.

**Performance Evaluations:**

1. **Yield:**

a. **Breeder Trials:**

Due to a difference in data collection methods, the grain yield data collected before 2010 were analyzed separately from the subsequent year's data (Table 1). All grain yields were averaged over all locations to give a representative yield value. Averaged over all site-years before 2010, WA8092 had significantly higher grain yield than Eltan, and was equal to the grain yield of Xerpha (Table 1). In the <16 inch precipitation zones of Washington, the grain yield of WA8092 was not significantly different than grain yields of Xerpha and Eltan (Table 1). In the >16 inch precipitation zones of Washington, WA8092 had significantly higher grain yields than Eltan, but not significantly higher grain yields than Xerpha. These higher yields are in part due

to the foot rot resistance that is present in WA8092. Tables 2 and 3 represent the agronomic data collected in our breeding nurseries in 2010 and 2011. In locations receiving less than 16 inches of annual precipitation, WA8092 had significantly higher grain yield than either Eltan or Xerpha. Other characteristics were not significantly different and should not be a concern to producers. In areas where stripe rust was not a yield limiting factor, the grain yields of WA8092 were not significantly different than Eltan or Xerpha (Table 2). In the greater than 16 inch rainfall areas, WA8092 had significantly higher grain yield than Eltan or Xerpha (Table 3). Again, when stripe rust was not a limiting factor (the Steptoe 2011 trial was sprayed with a fungicide twice), grain yields are not significantly different. Again, other agronomic data is not significantly different and should not be a concern to growers.

b. **WSU Variety Testing:** See Appendix A.

c. **Regional Testing:** This line has been tested in the Western Regional Soft trials but we have only received data back from the Waterville, WA location. There, WA8092 was the fourth highest yield line at 74 bu/A. Snowmold was evident at this location and WA8092 appears to have snowmold resistance. Eltan was not an entry in this trial so no comparisons can be made. WA8092 was also included in the OSU and U of I variety testing trials. In the OSU trials, WA8092 was in the lower half of the yield data, presumably because its heading date is too late for Oregon. We have not received back data from the U of I.

## 2. **Agronomic characteristics:**

a. **Heading Date:** The heading date of WA8092 is one to two days later than that of Eltan and Xerpha (Table 1-8).

b. **Plant Height:** The plant height of WA8092 (37 inches) is equal to that of both Eltan (37 inches) and Xerpha (37 inches; Table 8).

c. **Grain Protein Content:** The grain protein content of WA8092 (11.5%) is significantly higher than both Eltan (11.1%) and Xerpha (10.9%; Table 8).

d. **Test Weight:** The test weight of WA8092 (59.0 lb/bu) is equal to that of Xerpha (59.1 lb/bu) and significantly lower than that of Eltan (59.4 lb/bu; Table 8).

3. **End-use quality assessment:** See Appendix B and Supplemental Data.

## 4. **Resistance to diseases and pests:**

**Stripe Rust Resistance:** See Appendix C.

**Foot Rot Resistance:** WA8092 carries the *Pch1* gene for foot rot resistance based on the SSR markers *Xorw1*, *Xorw5* and *Xorw6*. Yield results from field trials confirm that WA8092 is foot rot resistant due to the significantly higher yields than known susceptible cultivars (Eltan and Xerpha). In the 2008/2009 cropping year, the yield of WA8092 in Pullman under foot rot pressure was 138 bu/A, significantly higher than Xerpha (104 bu/A) and Eltan (82 bu/A). In 2009/2010 field trials conducted by Dr. Tim Murray,

WA8092 had a significantly lower (38.1) rating on the disease index (0-100) as compared to Xerpha (70.3) and Eltan (69.2). The grain yield of WA8092 in this trial was 163 bu/A, significantly higher than Eltan (130 bu/A) but similar to Xerpha (161 bu/A). The disease index of WA8092 was not significantly different than Madsen (42.0), Finch (40.7), or Cara (40.7), known resistant lines. In the 2010/2011 field trials, WA8092 had a disease index of 28, whereas Eltan had an index of 34.1 and Xerpha an index of 73.5. We are not sure why Eltan performed significantly better in this year's trial than in previous years. Yield data is not yet available from this trial.

**Cephalosporium Stripe:** Based on a single year's observation in the field, WA8092 appears to be susceptible to Cephalosporium Stripe. In Dr. Murray's 2010 inoculated field trials, WA8092 had a disease index rating of 82.2 and was statistically similar to the susceptible standard Stephens (93.2). In 2011, the disease index rating was 58.9, which was higher than either Eltan (44.1) and Xerpha (51.8).

**Powdery Mildew:** No data available for assessment.

**Leaf Rust:** No data available for assessment.

5. **Winter hardiness:** WA8092 is winter hardy and has shown no sign of winter kill over the years of testing. In freeze tests performed by Dr. Skinner, USDA, WA8092 had a survival rating of 56.5% when frozen to -14° F, whereas Eltan had a rating of 42.1% and Xerpha had a rating of 38.0%.

6. **Area of adaptation:** WA8092 appears to be most adapted to the <12 inch rainfall zones of the state of Washington and to areas with Foot Rot disease.

7. **Seedling emergence:** WA8092 emerges similar if not better than Eltan under field observations. The coleoptile length of WA8092 (66 mm) is similar to Eltan (66 mm) and greater than Xerpha (60 mm).

8. **Other important traits:** WA8092 has snowmold resistance similar to that of Eltan. In the 2011 trials, snowmold was evident in Mansfield, Waterville, and Almira. In all three locations, WA8092 has statistically similar snowmold ratings.

9. **Weaknesses:** WA8092 shows no significant yield increase over other currently grown cultivars in the <12 inch rainfall zones of Washington when foot rot and stripe rust are not limiting factors. It will show significant yield advantages over current cultivars when under foot rot pressure and stripe rust pressure. WA8092 also has a slightly low test weight. Although it is above average compared to other cultivars and similar to Eltan and Xerpha, it does not consistently make 60.0 lb/bu.

10. **FGIS results:** Grades as soft white common wheat.

11. **Other comments:**