

Registration of 'Finch' Wheat

Finch soft white winter wheat (*Triticum aestivum* L.) (Reg. no. CV-966, PI 628640) was developed by the USDA-ARS with assistance from the Washington Agricultural Experiment Station and the Oregon Agricultural Experiment Station and released in February 2001. Finch was released because of its yield potential and disease resistance combined with the excellent end-use quality characteristics desired for soft white wheat in the Pacific Northwest. Finch is best suited to the low to intermediate rainfall zones of Washington State, Oregon, and northern Idaho, especially south of U.S. Route 2.

The pedigree of Finch is 'Dusty' (Peterson et al., 1987)//WA7164/Dusty. The pedigree of WA7164 is 'VPM1'/'Moisson951'/'Yamhill' (Kronstad et al., 1972a)/'Hyslop' (Kronstad et al., 1972b). The final cross was made under the direction of R.E. Allan in 1985. The population was advanced without selection to the F₂ generation as 85X619. The F₃ generation was evaluated in 1.5-m² head rows. The F₄ through F₆ generations were evaluated in 3.75-m² yield trials. Selection criteria were disease resistance, agronomic characteristics, uniformity, and plot yield. Finch was reselected in the F_{2.7} generation because it was segregating for chaff color. In 1992, 39 F_{2.7} heads were selected for uniformity of head type, chaff color, maturity, and height. Progeny from a single head row were selected in 1993, advanced, and designated A96118. Subsequently, in 1997, A96118 was renamed WA7853.

Over 44 location-years in eastern Washington and northeast Oregon from 1997 to 2000, the average yield of Finch (5582 kg ha⁻¹) was 5% greater than 'Madsen' and 'Eltan' (both 5313 kg ha⁻¹) and 9% greater than 'Stephens' (5111 kg ha⁻¹). The yield advantage of Finch over Madsen is more evident in the low rainfall locations (less than 28 cm annual rainfall). Finch had 8% greater yields (3968 kg ha⁻¹) than Madsen (3698 kg ha⁻¹) at low rainfall locations. At intermediate rainfall locations (28–43 cm annual rainfall), Finch yielded 5581 kg ha⁻¹, 7% greater than Madsen (5178 kg ha⁻¹). The test weight of Finch is high, averaging 799 kg m⁻³, 13 kg m⁻³ heavier than that of Madsen, and 26 kg m⁻³ heavier than Eltan.

In the Washington State University Commercial Winter Wheat Variety Trial from 1998 to 2000 (over 52 location-years), Finch yielded 6538 kg ha⁻¹, 4% better than Eltan, 8% better than Stephens, and equal to Madsen and 'Rod'. In those trials the test weight of Finch was 786 kg m⁻³, 2% heavier than that of Madsen, 3% heavier than Eltan and Stephens, and 4% heavier than Rod.

The appearance of Finch is most similar to Madsen with coleoptiles and auricles that lack anthocyanin, semierect juvenile plant growth, and hollow internodes. The plant color at boot stage is green. Finch is late maturing with an average heading date of 157 d from January 1, 1 d later than Eltan and 6 d later than Madsen. Finch is a semidwarf with height equal to Madsen and Eltan (87 cm averaged over 44 location-years). Lodging resistance of Finch is good, similar to Madsen (less than 1% over 44 location-years).

Spikes are lax, awned, and fusiform and inclined at maturity. Glumes are glabrous, white, long and midwide with oblique shoulders and narrow, acuminate beaks, 2 to 3 mm in length. Kernels are soft and white, 6 to 8 mm in length 3 to 4 mm wide with an oval shape and sides tapering at both ends. Kernel surface texture is smooth, the germ is medium to large and rounded to oblong. The brush is light, germ angle is low, cheeks are rounded to sharp, and the crease is straight and flared at tips. Kernel weight has ranged between 32 and 35 g per 1000 seed depending on the harvest season, similar to that of Madsen and Eltan but less than Stephens.

Finch is resistant to strawbreaker foot rot [caused by

Tapesia yallundae Wallwork & Spooner = *Pseudocercospora herpotrichoides* (Fron) Deighton] and carries the *Pch1* gene for resistance derived from *Aegilops ventricosa* Tausch. The *Pch1* gene is located on chromosome 7DL and can be identified through its linkage with the *Ep-D1b* band of endopeptidase (McMillin et al., 1986). Yield losses due to strawbreaker foot rot were 10% for Finch and Madsen compared with 25% for the susceptible cultivar Eltan, averaged over 4 yr in the inoculated USDA-ARS strawbreaker foot rot yield loss nursery at Pullman. Lodging due to strawbreaker foot rot was less than 1% for Finch in the same inoculated nursery while lodging of Eltan was greater than 50%.

Finch is moderately resistant to stripe rust (also known as yellow rust) (caused by *Puccinia striiformis* Westend. f. sp. *tritici*) and possesses high temperature adult plant resistance to stripe rust at a level similar to that of 'Rod'. Only traces of stripe rust were detected from 1999–2002 in field nurseries at Pullman that had been inoculated with stripe rust races PST-17, PST-37, PST-43, and PST-45. Resistance (infection type 2 and less than 5% severity) was observed under natural infection at Walla Walla in 1998. Finch has exhibited infection types from 5-8 with less than 10% of leaf area infected under natural infection and greater disease pressure than is experienced in the wheat growing areas east of the Cascades at Mt. Vernon, WA, in tests from 1999-2001.

Finch is moderately susceptible to leaf rust (caused by *Puccinia tritici* Eriks.). It was rated moderately susceptible to moderately resistant under natural infection at Pullman in 1997 but resistant at Walla Walla in 1998. Finch does not possess the VPM-derived *Lr37*, *Sr38*, and *Yr17* [resistance to leaf, stem (caused by *graminis* Pers.:Pers. f. sp. *tritici* Eriks. & E. Henn.), and stripe rust, respectively] (Bariana and McIntosh, 1993) gene complex found on 2AS that is present in Madsen.

In 1998, under a severe natural infection of Cephalosporium stripe (caused by *Hymenula cerealis* Ellis & Everh.), at Pullman, WA, the yield of Finch was 4505 kg ha⁻¹, slightly higher than Madsen and Eltan (both 3698 kg ha⁻¹) and 33% greater than the susceptible cultivar Stephens (2958 kg ha⁻¹). Finch was rated 1.7 on a 1 to 5 visual rating scale (where 1 = no disease symptoms and 5 = severe yellowing and stunting) for symptoms of Cephalosporium stripe over 4 locations from 1998-2001. In those same trials, the susceptible cultivar Stephens rated 3.1.

Finch was rated as moderately resistant to powdery mildew (caused by *Blumeria graminis* DC. Speer f. sp. *tritici*. Marchal) at Central Ferry, WA, in 1999 (2% leaf area infected where the susceptible 'Temple' rated 33%) and at Mt. Vernon in 2001. Its dwarf bunt (caused by *Tilletia controversa* Kühn) reaction is unknown. It is susceptible to Hessian Fly [*Mayetiola destructor* (Say)], snow mold (caused by *Typhula idahoensis* Remsberg and *T. incarnata* Fr.), and Barley yellow dwarf virus.

The coleoptile and first leaf length of Finch are similar to Madsen. In 1998 and 1999, after 21 d, emergence of Finch under deep (>15 cm) sowing averaged 16% of 100 seeds sown, compared with 25% for 'Edwin', 10% for Eltan, and 4.5% for 'Coda'. Over several trials conducted from 1999–2001, cold hardiness as measured by the LT₅₀ under artificial freeze conditions was -11°C, similar to Stephens.

Finch was milled (57 nurseries representing harvest-years 1996-2000) at the USDA-ARS Western Wheat Quality Laboratory in Pullman, WA. The grain protein content of Finch was 90 g kg⁻¹, equal to Eltan and less than Madsen and Stephens (97 g kg⁻¹). The milling score of Finch was 85.6, similar to Eltan, Madsen, and Stephens. Finch has statistically superior flour yield and break flour yield but also higher flour ash than Eltan, Madsen, and Stephens. The mixograph water absorption of Finch is 53%, lower than Eltan and Madsen

(54%), and equal to Stephens. The cookie spread of Finch is 9.4 cm, wider than Madsen and Stephens (9.1 and 9.2 cm, respectively) and similar to Eltan. The flour swelling volume of Finch is lower than that of Eltan and Stephens and equal to Madsen and the flour rapid visco-analysis (RVA) is significantly lower than that of Eltan, Madsen, and Stephens.

Finch is a composite of single head selections made in the F₁₄ and F₁₆ generations at Pullman, WA. Two lots of Breeder seed, consisting of uniform head rows from 1998 (F_{7:14}) and 2000 (F_{7:16}) were combined for the Foundation seed class of Finch. Finch was released as a nonexclusive public variety to certified seed producers through the Washington State Crop Improvement Association. Finch will be sold as a class of Certified seed. The generation sequence of seed production is Breeder, Foundation, Registered, and Certified. U.S. Plant Variety Protection under the Plant Variety Act, Public Law 91-577 with the Title V exclusion was awarded PVP no. 200300327. Small samples of seed are available from the corresponding author for research purposes.

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