REGISTRATIONS OF CULTIVARS

Registration of ‘Hopewell’ Wheat

‘Hopewell’ soft red winter wheat (Triticum aestivum L.) (Reg. no. CV-909, PI 595678) was developed by the Ohio State University–Ohio Agricultural Research and Development Center (OSU–OARDC) and released in February 1995. Previous experimental numbers for Hopewell were ‘R19182B-33-2’ and ‘OH490’. Hopewell was released because of its superior yield, excellent straw strength, and diverse pedigreed. Hopewell was named after the Native American mound building peoples that flourished in the Ohio valley 2100 yr ago.

Hopewell’s pedigree is ‘Logan’/Hart/3270A/Rousalka/3/TN1685/’IA22’/6767216-6-3 (Lafever, 1968; Sechler et al., 1977). 32070A was an Ohio experimental line with the pedigree: 2669F/Logan. 2669F, was an Ohio experimental F3 population with the pedigree ‘S410/Logan/Logan’/Arthur’ (Patterson et al., 1974). S410 was a dwarf spring wheat of unknown ancestry. TN1685 was an Ohio experimental line from the cross ‘Heines VII’/Pur5752cl-7/Talbot’ (Whiteside and Gfeller, 1964). Pur5752cl-7 was an Indian AEMS experimental line. 6767 was an Ohio experimental line with the pedigree TN1493/Pur 5724B3-SP-8-2. TN1493 was an Ohio experimental line with the pedigree ‘Redcoat’/TN1345 (Patterson et al., 1978). TN1345 was an Ohio experimental line with the pedigree ‘Lucas/Citr 12530 (Heyne, 1960). Materials received through the International Rust and Powdery Mildew Nursery Program include Rousalka (P1520076), a winter wheat cultivar developed by CIMMYT; ‘IA22’ (IAPAR 22–Guarauna), a T.aestivum cultivar developed in Brazil; and 216-6-3, a French experimental line of unknown pedigree possessing resistance to Stagonospora nodorum (Berk.) Castellani & E.G. Germano.

The final cross, designated R19182B, was made by H.N. Lafever in 1982. The population R19182B was advanced without selection to the F3 generation at the OSU–OARDC research farm, Wooster OH. Thirty spikes were harvested randomly. The F3 generation was evaluated for maturity, height, and disease resistance as 30 hill plots, each containing grain from a single F2 spike. Two spikes were selected from a single F1 hill plot based on visual selection for height, heading date, and resistance to powdery mildew (caused by Erysiphe graminis D.C. f. sp. tritici Ém. Marchal; syn. Blumeria graminis (DC.) E.O. Speer). The F3 generation was evaluated for maturity, height, and disease resistance as two hill plots, each containing grain from a single F2 spike, and one plot, designated R19182B-33-2, was selected as above. A single-row F4 plot, 3.3 m in length, was evaluated for heading date, height, resistance to powdery mildew, glume blotch, leaf rust (caused by Puccinia triticina Eriks.), standability, and uniformity. Harvested grain was evaluated for yield, test weight, and milling and baking quality. R19182B-33-2 was advanced from the F3–F5 generation in replicated yield trials, initially at Wooster and then throughout Ohio. R19182B-33-2 was renamed OH490 in the F5 generation. OH490 was also evaluated in the Uniform Preliminary and Advanced Four-state (now Five-state) nurseries, a cooperative effort between the small grains breeders at Ohio State University, Purdue University, University of Illinois, University of Missouri, and University of Kentucky from 1991 to 1993.

A separate purification head row nursery was initiated in the F3 generation from 60 hill plots, each containing grain from a single F2 spike. The purification hill plots were evaluated for similarity of heading date, height, plant and spike morphology. Selected hill plots were harvested and advanced with selection for uniformity for two more generations. In 1994, the F5 generation was compiled from selected uniform purification increase drill strips and grown as Breeder Seed by Ohio Foundation Seed, Croton, OH.

The juvenile growth habit of Hopewell is erect. Plant color at Zadoks growth stage 45 (boot stage) is dark green (Y = 11.04; x = 0.327; y = 0.428), as determined by the Minolta Cr-300 Chroma meter using the CIE Yxy color system (Minolta Corp., Ramsey, NJ). Stems are hollow with 4 nodes, and auricles possess anthocyanin. Spikes are mostly erect and average 72 mm in length at maturity. Hopewell is apically awnleted with tip awns measuring 18 to 20 mm in length. The last rachis internode is glabrous. Glumes are glabrous, medium long, and wide with oblique shoulders and acute beaks. Chaff is red (Y = 20.31; x = 0.384; y = 0.372). Hopewell’s phenol reaction is dark brown. Kernels are ovate with rounded checks and a medium and shallow crease. The brush is medium and noncollared. Kernels average 6.8 mm in length, 3.4 mm in width, and 33 mg in weight. Uniformity and stability had been observed across four generations at the time of release. In Breeder Seed nurseries, Hopewell exhibited <0.3% total variants involving tall plants, awned spikes, and spikes exhibiting bluegreen coloration.

In 22 location–years of replicated yield trials in Ohio between 1991 and 1994, Hopewell averaged 4465.3 kg ha−1, as compared with Freedom (4371.2 kg ha−1) (Gooding et al., 1997). At locations in northern and western Ohio, where most of the wheat crop is grown, Hopewell averaged 4593.2 kg ha−1, as compared with 4531.1 kg ha−1 for Freedom. The test weight of Hopewell (72.9 kg hl−1) was slightly better than that of Freedom (72.1 kg hl−1). Hopewell’s heading date was 3 d earlier than Freedom (Day of Year 144 vs. 147). Straw strength of Hopewell was good, with 1.3% lodging recorded across 22 location–years. Plant height of Hopewell was 86.4 cm, as compared with 88.9 cm for Freedom.

Hopewell carries no known resistance genes to leaf rust, as determined by the USDA Cereal Disease laboratory, St. Paul, MN, and is considered moderately susceptible to leaf rust. Hopewell carries powdery mildew resistance genes Pm2 and Pm6 (no longer effective against prevalent races of powdery mildew in Ohio) (Pershad et al., 1994). Hopewell has a moderate level of partial resistance to powdery mildew, and has consistently rated 5 on a 1 to 10 scale of resistance to that trait across 4 yr of disease trials (Lipps and Madden, 1989). Hopewell has no known resistance genes for Hessian Fly (Mayetiola destructor Say), as determined by the USDA-ARS crop protection unit in West Lafayette, IN. Hopewell has shown moderate resistance to the glume blotch phase of S. nodorum in field ratings and is moderately susceptible to scab (caused by Fusarium graminearum Schwabe).

Hopewell is considered to possess adequate soft wheat milling and baking quality, as determined by tests at the USDA-ARS Soft Wheat Quality Laboratory in Wooster, OH. Data from three crop years from 1992 to 1995 indicated that the flour yield of Hopewell (743 g kg−1) was similar to that of Freedom (750 g kg−1); break flour yield of Hopewell (383 g kg−1) was 5.8% greater than that of Freedom (329 g kg−1); flour ash was equal to Freedom (03.7 g kg−1). Protein flour, alkaline water retention capacity, and cookie diameter for Hopewell were 800 g kg−1, 54.5%, and 17.9 cm, respectively, vs. 746 g kg−1, 53.3%, and 17.4 cm for Freedom.

Hopewell is sold as a class of Certified Seed. U.S. Plant