Registration of ‘Ok102’ Wheat

‘Ok102’ (Reg. no. CV-941, PI 632635) is a hard red winter wheat (Triticum aestivum L.) developed cooperatively by the Oklahoma Agric. Exp. Stn. and the USDA-ARS. Ok102 was released in March 2002, primarily on the basis of its resistance to several foliar diseases, excellent milling quality, and desirable dough strength for leavened bread products.

Ok102 was derived from the cross ‘2174’/Cimarron (PI 536993), performed in 1991. 2174 has the pedigree IL71-5662/PL145’ (PI 600840)/‘2165’ and was released by the Oklahoma Agric. Exp. Stn. in 1997. Cimarron has the pedigree ‘Payne’ (Clt 17717)*2/CO725052 and was released by the Oklahoma Agric. Exp. Stn. in 1990. Ok102 traces to the bulk progeny of a single F3,4 head row harvested in 1995. The F3 and F3 generations were evaluated and harvested as bulk populations in Stillwater, OK. The head row progeny was selected in 1996 from a non-replicated nursery at Lahoma, OK, for its acceptable winterhardiness, plant and head type, heading and maturity date, leaf rust (caused by Puccinia triticina Eriks.) resistance, lodging resistance, grain yield, volume weight, kernel plumpness, and mixograph properties. Subsequent generations were advanced by bulk selfing in the field, with roguing of taller variants each year until 2002. Ok102 was evaluated as OK97508 in replicated Oklahoma performance trials from 1997 to 2001, and in the Southern Regional Performance Nursery (SRPN) in 2000 and 2001.

Ok102 is semidwarf but shorter than most HRW wheat cultivars currently in production. Its mature-plant height (77 cm) is 8 cm shorter than 2174 and ‘Ok101’ (Carver et al., 2003) and 7 cm shorter than ‘Jagger’ (Sears et al., 1997). Lodging resistance on a scale of 1 (highest) to 5 (lowest) is about 2 for Ok102, compared with values of 1 for 2174, 3 for Ok101, and 4 for Jagger. Ok102 shows an intermediate reaction to acidic, aluminum-toxic soil. With a tolerance rating of 3.2 on a scale of 1 (most tolerant) to 5 (most susceptible), Ok102 is more sensitive to Al toxicity than Ok101 (1.3) and Jagger (1.6), but similar to 2174 (3.0). Ok102 breaks winter dormancy relatively late, but its heading date (123 d) is intermediate among current cultivars. Comparative placement of cultivars for date of first-hollow-stem stage is Jagger < Ok101 < 2174 and Ok102. Precise differences are highly year-dependent. Heading date of Ok102 is 2 d later than Ok101 and Jagger, the same as 2174, and 2 d earlier than ‘2137’. This phenological pattern makes Ok102 well suited for winter grazing and grain production in a dual-purpose (graze-plus-grain) management system. Another characteristic that lends Ok102 to dual-purpose production is coleoptile elongation, or the ability to emerge from deeper seed placement. When grown at 15°C in an unheated greenhouse until dough maturity, Ok102 was 0.4 cm longer than 2174 (moderately long), and 0.4 cm shorter than Ok101 (short). Ok102 has greater dough strength than 2174 on the basis of single-kernel characterization system (SKCS) data recorded from 16 breeder trials from 1999 to 2003 and in the Southern Regional Performance Nursery (SRPN) in 2000 and 2001.

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In greenhouse tests, juvenile plants of Ok102 exhibit a susceptible reaction to leaf rust comprised ofuredinospores collected from wheat fields in spring 1999 and 2000. From 1999 to 2002, Ok102 consistently shown a resistant reaction to leaf rust races conducted in Texas and Oklahoma, having a resistance rating of 1 (resistant) on a 1 (resistant)-to-9 (susceptible) scale. Hence, Ok102 has adult-plant resistance to foliar races currently present in Oklahoma. On the basis of greenhouse tests conducted by the USDA-ARS cereal laboratory, St. Paul, MN, Ok102 is postulated to have a reaction to Barley yellow dwarf virus (1 on a 1-to-9 scale). Ok102 breaks winter dormancy relatively late, but its heading date (123 d) is similar to the reaction of one of its parents, 2174. Ok102 is moderately resistant to the races prevalent in Oklahoma, Ok102 is moderately resistant to wheat leaf rust (caused by Puccinia graminis F. sp. tritici (Pers.:Pers.) and is susceptible to stem rust (caused by Puccinia graminis f. sp. tritici (Pers.:Pers.).), and is more susceptible or susceptible to stem rust in the field. Field trials in Oklahoma and Kansas indicate Ok102 is resistant to Wheat soilborne mosaic virus (1 on a 1-to-9 scale). Ok102 exhibits an intermediate reaction to Barley yellow dwarf virus in the field, similar to the reaction of one of its parents, 2174. Ok102 is more resistant to tan spot [caused by Pyrenophora tritici Drechs.] and resistant to powdery mildew [caused by Blumeria graminis (DC.) E.O. Speer f. sp. tritici Em.]. Ok102 produces a heterogeneous response to the seven races of stem rust (caused by Puccinia graminis f. sp. tritici (DC.) E.O. Speer f. sp. tritici Em.). Ok102 also shows a heterogeneous response to the seven (2000 tests) races of stem rust [caused by Puccinia graminis f. sp. tritici (DC.) E.O. Speer f. sp. tritici Em.]. The fall growth habit of Ok102 is semi-erect to 2174 but more erect than Ok101 and Jagger. Ok102 at the boot stage are blue-green, erect, and twisted. Spikes are white-chaffed, awned, tapering, and inclined to nodding. Kernels are red, hard textured, ovate to elongate, and midlong, and they have a midround to crease, rounded cheeks, and midsized germ. Ok102 has greater grain yield than 2174 but more erect than Ok101 and Jagger. Ok102 at the boot stage are blue-green, erect, and twisted. Spikes are white-chaffed, awned, tapering, and inclined to nodding. Kernels are red, hard textured, ovate to elongate, and midlong, and they have a midround to crease, rounded cheeks, and midsized germ. Ok102 has greater grain yield than 2174 but more erect than Ok101 and Jagger. Ok102 at the boot stage are blue-green, erect, and twisted. Spikes are white-chaffed, awned, tapering, and inclined to nodding. Kernels are red, hard textured, ovate to elongate, and midlong, and they have a midround to crease, rounded cheeks, and midsized germ. Ok102 has greater grain yield than 2174 but more erect than Ok101 and Jagger. Ok102 at the boot stage are blue-green, erect, and twisted. Spikes are white-chaffed, awned, tapering, and inclined to nodding. Kernels are red, hard textured, ovate to elongate, and midlong, and they have a midround to crease, rounded cheeks, and midsized germ.