Registration of ‘HiFi’ Oat

‘HiFi’ spring oat (Avena sativa L.) (Reg. no. CV-372, PI 633006) was developed at the North Dakota Agricultural Experiment Station in cooperation with USDA-ARS and released by the Agricultural Experiment Station—North Dakota State University in 2001. It was designated ND9508252 during development and testing. HiFi was developed from a series of crosses with the pedigree Amagalon/4/M23/RL3038/’Otana’/3/Froker/RL3038/’Hudson’/5/MN78142/4/W80-20/3/Hudson/’Dal’ with the final cross made in 1993. The Amagalon line used in this cross was a selection from a synthetic hexaploid developed by Rothman (1984). The Amagalon source in this pedigree was designated 801441 by Rothman. Amagalon contributed Pc-91 that confers crown rust (incited by Puccinia coronata Cda. f. sp. avenae Eriks.) resistance in HiFi. A portion of the HiFi plants possess an uncharacterized source of resistance to stem rust (incited by Puccinia graminis Pers.: Pers. f. sp. avenae Eriks. and Henn.) race NA67. This resistance was putatively derived from Amagalon. RL3038 was provided by R.I.H. McKenzie (Agriculture Canada Research Station, Winnipeg, Manitoba) and was described by McMullen et al. (1997). MN78142 is a high yielding experimental line developed at the University of Minnesota with the pedigree ‘Otter’/3/’Garland’/PI267989/MN836/’Avon’.

The F1 generation consisting of approximately 2000 plants was grown in the field in 1993 and panicles were selected on the basis of plant reaction to natural infection of stem rust and crown rust. F2 seed from approximately 200 selected F1 plants was planted in the greenhouse and advanced by modified single seed descent. F2 seedlings that were susceptible to a composite of P. coronata races that are virulent on Pc-38 and Pc-79 and P. graminis race NA27 were removed from the population and resistant seedlings were grown to maturity. F2 lines from 39 resistant F1 plants were grown in panicle-hill plots in 1994 at Fargo, ND, and F3 panicles were selected from stem and crown rust resistant hill plots. Seed from 32 selected F3 panicles was sown in hill-plots, comprised of two hills in 1995, and seed from a selected F3 hill-plot was bulked to produce the line that was designated ND9508252. Breeder seed of HiFi was produced in 1999 by roguing off-type plants from an F1 bulk and harvesting the remaining plants.

HiFi has been evaluated for grain yield in North Dakota since 1995, and in the Uniform Midseason Oat Performance Nursery (UMOPN) in 2000 and 2001. Based on 20 location-years in North Dakota and 23 location-years in the UMOPN, HiFi is high yielding and flowering averages 4 d later than ‘Jerry’ (McMullen et al., 1997). In North Dakota, its average grain yield was 16% higher than Jerry and test weight was 1% less than Jerry. HiFi has low hull content and high experimental milling yield. In North Dakota, HiFi was similar in height to Jerry and exhibited similar lodging resistance. HiFi possesses Pc-91 plus other unknown genes that together confer excellent resistance to prevalent crown rust pathotypes in ND. It possesses Pg-13 that confers resistance to many stem rust pathotypes and a portion of the plants possess resistance to stem rust NA67 that is likely conferred by factors contributed by Amagalon. HiFi has moderate tolerance to Barley yellow dwarf virus. HiFi was released to provide a crown and stem resistant cultivar, with high grain yield potential and higher groat β-glucan or soluble fiber concentration than other available cultivars. The name HiFi is intended to connote the high soluble fiber concentration of the grain. HiFi is adapted to North Dakota and adjacent regions of South Dakota and Minnesota.

Culms and leaf margins of HiFi are glabrous and ligules are present. It has equilateral panicles with ascending branches. Spikelet separation occurs by fracture and floret separation by heterofracture. Lemmas are glabrous and basal hairs are absent. Kernels of HiFi are white, fluorescent, medium to large, and midplump. Awns are absent, but weak awns develop under some environmental conditions.

Variety protection will be sought under the Plant Variety Protection Act, Public Law 91-577 with the option that the HiFi may be sold for seed by name only under the certified seed classes designated as Breeder, Foundation, Registered, and Certified. Breeder and Foundation seed will be maintained by the Seedstock Project, Agric. Exp. Stn., North Dakota State Univ., Fargo, ND 58105-3051. Limited quantities of seed for research are available upon request from the corresponding author. Recipients of seed are asked to make appropriate recognition of the source of HiFi if it is used in the development of a new cultivar, germplasm, parental line, or genetic stock.

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References


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