Research Question

The objectives of this proposal are to i) develop improved varieties and germplasm combining high grain yield, disease resistance, and end-use quality; and ii) provide performance data on wheat varieties adapted to the state of Minnesota.

Results

‘Sabin’ (MN03358-4) was released in 2009. Sabin is a mid-maturity hard red spring wheat with high grain yields and good scab resistance. The pedigree of Sabin is MN98389/MN97518. MN03358-4 has been a consistently high yielder in Minnesota and the hard red spring wheat region, performing well in the 2006 and 2007 regional performance nurseries. Grain protein and test weight are average compared to other cultivars. Sabin is moderately resistant to pre-harvest sprouting with good falling numbers. Straw strength is below average. Sabin is resistant to stem rust and moderately resistant to prevalent races of leaf rust and other leaf diseases. Sabin has moderate resistance to Fusarium head blight (scab), comparable to ‘Tom’ and better than ‘RB07’.

During the 2008/2009 crossing cycle, 271 crosses were made. The Variety Trial, which contained 30 released varieties, 11 University of Minnesota experimental lines, and 4 experimental lines from other programs and was grown at Crookston, Lamberton, Morris, St. Paul, Stephen, Waseca, and 3 on-farm locations in the Red River Valley. During the 2009 growing season, 199 advanced experimental lines were evaluated in replicated advanced yield trials at Crookston, Morris, and St. Paul. A total of 247 preliminary yield trial lines were tested in unreplicated plots at Crookston, Morris, and St. Paul. Fusarium-inoculated, misted, replicated nurseries were established at Crookston, Morris, and St. Paul. The disease nurseries involve collaboration with agronomists and plant pathologists at Crookston and Morris and with personnel from the Plant Pathology Department and the USDA-ARS. Data from the yield and scab nurseries are summarized and published in Prairie Grains and the U of M Extension Service’s Minnesota Varietal Trials Results.

One advanced experimental line, MN05214-3 has been sent for winter seed increase during 2009/2010. MN05214-3 has excellent straw strength and scab resistance equivalent to the best varieties available today. MN05214-3 has above average grain protein, similar to RB07. The grain yields of MN05214-3 are less than the highest varieties available, but in the northern region where it is best adapted it outyields all varieties that have the same scab resistance rating (3 on 1-9 scale).

Application/Use

Experimental lines that show improvement over currently available varieties are recommended for release. Improved germplasm is shared with other breeding programs in the region. Scientific information related to efficiency of breeding for particular criteria is presented at local, regional, national, and international meetings and published.

Materials and Methods

All yield nurseries are grown in small, replicated plots (typically 40-50 sq. ft. harvested area per plot). Fusarium-inoculated nurseries at Crookston, Morris, and St. Paul consist of single 4 to 6 ft. rows, with 1 to 3 replications. Fusarium-infected corn seed or spray-applied macroconidia are used as inoculum. The plot areas are misted periodically to maintain a high humidity environment for at least three weeks after anthesis.

Economic Benefit to a Typical 500 Acre Wheat Enterprise

Choice of variety is one of the most important decisions growers make each year. The development of high-yielding varieties that are resistant to the prevalent diseases and have good end-use quality are necessary to increase grower profit and protect against constantly changing pathogens and pests. As an example, a new variety that yields 4% higher will produce 3 extra bushels in a field that averages 75 bu/A.
Related Research

These funds provide general support for our breeding/genetics program. Additional monetary support for breeding-related research comes from the Minnesota Agricultural Experiment Station and the U.S. Wheat and Barley Scab Initiative via USDA-ARS.

Publications


