

Accelerated Breeding for Scab Resistance

Principal Investigator:

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Fusarium Head Blight (scab) is a serious disease of wheat. Scab epidemics on spring wheat in 1993 caused losses of approximately \$80 million in South Dakota alone. In an attempt to reduce the threat of future scab epidemics, a major focal point within the South Dakota State University Spring Wheat Breeding and Genetics program is the development of scab resistant varieties. During the 2000 crop year, over 50 percent of the acres within our three state (SD, ND, MN) spring wheat production region were sown to varieties derived from this program. Our intent is to maintain the high acceptance level for South Dakota derived varieties within the region, and continually increase the levels of scab resistance associated with these varieties.

Background:

This program commenced an effort to elevate scab resistance levels in 1995. Joint funding from the South Dakota Wheat Commission, Minnesota Wheat Research and Promotion Council, and the South Dakota Agricultural Experiment Station was used to initiate the program. A mist-irrigated greenhouse and field screening nursery were established and disease evaluation methods were developed. Breeding materials are currently evaluated for scab resistance using three generations per year: two generations in the greenhouse and one generation in the field.

Germplasm Enhancement

SD3934

Of thirty-five spring wheat lines included in the 2006 Uniform Regional Scab Nursery, a cooperative regional effort to identify sources of scab resistance, SD3934 (NORIN34//SD3247/1319 313-3-1-3/3/FORGE/4/SD3411) was one of five entries submitted for testing by this program. It ranked as the eighth, first, second, third, and seventh most resistant with respect to disease incidence, disease severity, disease index, FDK, and DON concentrations over three mist-irrigated test locations.

SD4059

Of thirty-five spring wheat lines included in the 2006 Uniform Regional Scab Nursery, a cooperative regional effort to identify sources of scab resistance, SD4059 (PI 584914/SD3730//SD3641) was one of five entries submitted for testing by this program. It ranked as the seventh, seventh, seventh, thirteenth, and eighth most resistant with respect to disease incidence, disease severity, disease index, FDK, and DON concentrations over three mist-irrigated test locations.

FN1706-38

Of forty-eight spring wheat lines included in the 2007 Uniform Regional Scab Nursery, FN1706-38 (ND741/FHBC02-6) was one of five entries submitted for testing by this program. It ranked as the eighth, twenty-seventh, nineteenth, twelfth, and tenth most

resistant with respect to disease incidence, disease severity, disease index, FDK, and DON concentrations over five mist-irrigated test locations.

Seed of each experimental line described above has been sent to others for use as parental germplasm within several wheat breeding programs, both public and private. They have also been extensively used as parents within this program.