

USDA-ARS / USWBSI
FY03 Final Performance Report (approx. May 03 – April 04)
July 15, 2004

Cover Page

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Year:	FY2003 (approx. May 03 – April 04)
FY03 ARS Agreement ID:	59-0790-9-062
FY03 ARS Agreement Title:	Spring Wheat Breeding for Scab Resistance in South Dakota.
FY03 ARS Award Amount:	\$ 71,296

USWBSI Individual Project(s)

USWBSI Research Area *	Project Title	ARS Adjusted Award Amount
VDUN	Spring Wheat Breeding for Scab Resistance in South Dakota.	\$ 71,296
	Total Amount Recommended	\$ 71,296

Principal Investigator

Date

 * BIO – Biotechnology
 CBC – Chemical & Biological Control
 EDM – Epidemiology & Disease Management
 FSTU – Food Safety, Toxicology, & Utilization
 GIE – Germplasm Introduction & Enhancement
 VDUN – Variety Development & Uniform Nurseries

Project 1: *Spring Wheat Breeding for Scab Resistance in South Dakota.*

1. What major problem or issue is being resolved and how are you resolving it?

Fusarium head blight (FHB) is a serious wheat disease that continues to pose as a production threat within South Dakota as well as the North Central region of the USA. In an attempt to alleviate the wheat production threat caused by FHB, development of resistant varieties has become a high priority within the spring wheat breeding program at South Dakota State University. An aggressive program was initiated to accelerate the development of spring wheat varieties that have improved FHB resistance and desirable agronomic traits. Established off-season nurseries and mist-irrigated greenhouse and field screening nurseries are being utilized to accelerate breeding efforts in improving resistance along with desirable agronomic characteristics. Three early generations of breeding materials are evaluated for scab resistance each year: two generations in the greenhouse and one in the field. Approximately 8,000 individual hills are evaluated in the greenhouse nurseries and 3,000 rows are screened in the field nurseries. Both the field and greenhouse nurseries are inoculated with infested corn and conidial suspensions. A mist-irrigation system is used to provide a favorable environment for infection and disease development. We continue to make a large number of crosses to introduce new resistance genes and new combinations. Sources of resistance used in the crosses include materials from the Uniform Regional Scab Nursery for spring wheat, new resistant germplasm provided by the Germplasm Introduction and Evaluation for Scab Resistance in spring wheat, other introduced sources, and advanced breeding lines that have various levels of FHB tolerance. The off-season nursery aids in the simultaneous selection for resistance and desirable agronomic characteristics.

2. What were the most significant accomplishments?

Two new varieties, “Briggs” (SD3367) and “Granger” (SD3546) were released in 2002 and 2004, respectively by the South Dakota State University spring wheat breeding and genetics program. Briggs is an early maturing variety with an FHB resistance level that is similar to “Ingot”. Granger is also an early maturing variety with an FHB resistance level that is generally higher than that of Ingot. Granger seems to be the most FHB resistant variety that has been developed by this program. In addition, both varieties consistently produce higher yield and protein quantities, and possess better leaf rust resistance, than the popular varieties “Russ” and “Oxen”.

Each year this program also contributes several experimental breeding lines to the Uniform Regional Scab Nursery, a cooperative regional effort to identify and utilize sources of scab resistance. During the 2003 URSN season, SD3776 was one of five entries submitted for testing by our breeding program. At the end of the season, we learned that SD3776 was the sixth, seventh, seventh and eighth most resistant entry (out of forty-one) with respect to disease incidence, disease severity, disease index, and DON concentrations over four mist-irrigated test locations. Although SD3776 is agronomically inferior, its FHB resistance has been utilized in several population development efforts.

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Include below a list of the publications, presentations, peer-reviewed articles, and non-peer reviewed articles written about your work that resulted from all of the projects included in your grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Draper, M.A., Ruden, K.R., Glover, K.D., Calli, E., Schilling, S.M., and Lammers, G. 2003. 2003 Uniform fungicide performance trials in South Dakota- 2003. National Fusarium Head Blight Forum, 2003 Proceedings p.66.