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:	**59-0790-9-036**
FY03 ARS Agreement Title:	**Development of hard red spring wheat cultivars resistant to scab.**
FY03 ARS Award Amount:	**$ 73,171**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
VDUN	Development of hard red spring wheat cultivars resistant to scab.	$ 73,171
	Total Amount Recommended	**$ 73,171**

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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: ***Development of hard red spring wheat cultivars resistant to scab.***

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

Hard Red Spring Wheat (HRSW) in North Dakota (ND) and neighboring states is a major economic crop. Fusarium Head Blight (FHB), a major problem for HRSW can reduce significantly the grain yield and quality characteristics. FHB had tremendous implications on HRSW producers in ND, users and export market worldwide. Developing and growing adapted and genetically resistant cultivars is the best strategy for an efficient, economical, and safe control of FHB in HRSW produced in North Dakota while protecting our environment. In 2003-04 growing season, FHB problem have been addressed by the development and selection of elite parental genotypes, elite lines and breeding populations to incorporate diverse genetic resistance to FHB with desired agronomic and quality traits into a HRSW cultivar adapted to ND. The combination of classical breeding and novel method to screen several types/sources of resistance to FHB from diverse germplasm sources into adapted cultivars should provide a strategic long-term solution to the control of FHB not only in ND but in the entire HRSW growing region

2. What were the most significant accomplishments?

a- 'Steele-ND', a new HRSW cultivar with moderate resistance –comparable to Alsen- to FHB was released in 2004. Steele-ND FHB resistance is unique since it is not derived from a Chinese background, particularly 'Sumai 3". Steele-ND resistance to FHB, believed to derive from *T. dicoccoides* (3A chromosome), is being investigated.

b- Two breeding lines (ND747 and ND751) selected from crosses involving Sumai-3 with FHB resistance, accepted for a pre-release are increased and will be submitted for release for 2005.

c- One breeding line ND 800 with the same level of resistance and origin than Steele-ND (resistance from non-Chinese source) is being pre-released. ND 800 is a very high yielding and good quality line.

d- Elite and advanced breeding lines derived from populations involving different sources/types of resistance to FHB were screened and evaluated (in filed and greenhouse) for their resistance to FHB and agronomic traits (Grain yield and quality).

e- Advanced lines and new populations combining sources from Chinese (Alsen, ND 747, ND 751…) and non-Chinese (Steele-ND and ND 800) resistance to FHB are being evaluated.

f- Resistance from durum wheat located on chromosome 3A was successfully transferred to spring wheat and derived lines are being tested and screened under greenhouse and field conditions.

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 you grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Abstracts:

Stack R. W., R. C. Frohberg, J.M. Hansen and M. Mergoum. 2003. Expression of Resistance to Fusarium head blight from wild emmer chromosome 3A in bread wheat. *In* Annual Meetings Abstracts, November 2-6, 2003, Denver CO, www.asa-cssa-sssa.org/anmeet

Proceedings/Refereed Journals/Chapters:

Stack, R.W., R.C. Frohberg, J. M. Hanson, and Mergoum M. 2003. "Transfer and Expression of Resistance to Fusarium Head Blight from Wild Emmer Chromosome 3A to Bread Wheat". In: Canty, S.M., Lewis, J., Sliver, L. and Ward R.W (eds.), Proceeding of the National Fusarium Head Blight Forum; 2003 Dec 13-15; Bloomington, MN. pp 232.

Stack, R.W. 2003. History of Fusarium Head Blight with Emphasis on North America. p.1-34. IN: K.J. Leonard, W.R. Bushnell, eds. Fusarium Head Blight. of Wheat and Barley. APS Press, St. Paul, MN. 530p.

Stack, R.W. 2003. History and Status of Fusarium Head Blight. p 29-30. in R.Clear, ed., Proc. Third Canadian Workshop on FHB. Winnipeg, MB, Dec. 2003. 175p.