

**USDA-ARS/  
U.S. Wheat and Barley Scab Initiative  
FY07 Final Performance Report (approx. May 07 – April 08)  
July 15, 2008**

**Cover Page**

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<b>Fiscal Year:</b>	2007
<b>USDA-ARS Agreement ID:</b>	59-0790-4-118
<b>USDA-ARS Agreement Title:</b>	Breeding Soft Winter Wheat with Multiple FHB Resistance.
<b>FY07 ARS Award Amount:</b>	\$ 113,964

**USWBSI Individual Project(s)**

<b>USWBSI Research Area *</b>	<b>Project Title</b>	<b>ARS Adjusted Award Amount</b>
HGR	Introgression of Fusarium Head Blight Resistance of Thinopyrum into Wheat.	\$30,244
VDUN	Improvement of Soft Winter Wheat for Fusarium Head Blight Resistance.	\$ 83,720
	<b>Total Award Amount</b>	<b>\$ 113,964</b>

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Principal Investigator

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Date

\* CBCC – Chemical, Biological & Cultural Control  
 EEDF – Etiology, Epidemiology & Disease Forecasting  
 FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain  
 GET – Genetic Engineering & Transformation  
 HGR – Host Genetics Resources  
 HGG – Host Genetics & Genomics  
 IIR – Integrated/Interdisciplinary Research  
 PGG – Pathogen Genetics & Genomics  
 VDUN – Variety Development & Uniform Nurseries

**Project 1:** *Introgression of Fusarium Head Blight Resistance of Thinopyrum into Wheat.*

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

Fusarium head blight is a serious and frequently recurring disease of wheat (*Triticum aestivum*) in Indiana and surrounding regions. Effective, but only partial resistance has been identified in certain germplasm lines of wheat. We have identified resistance in tall wheatgrass, (*T. ponticum*) that is related to wheat.

**2. List the most important accomplishment and its impact (how is it being used?).  
Complete all three sections (repeat sections for each major accomplishment):**

**Accomplishment:** We have introgressed a segment of chromosome 7E of tall wheatgrass that replaced the distal 1/3 of the long arm of wheat chromosome 7D and that has a FHB resistance QTL, *Qfhs.pur-7EL* that we have documented as having a strong resistance effect in wheat by itself, and that augments the resistance of *Fhb1* and other FHB resistance genes/QTL. We have also developed a wheat line that has a shorter 7E segment, the distal 1/5 of the long arm of 7DS-7DL7EL, and have mapped *Qfhs.pur-7EL* to the distal region of the chromosome.

**Impact:** No commercial impact yet. We are developing adapted soft winter wheat lines in which *Qfhs.pur-7EL* is combined with other FHB resistance QTL from wheat.

**As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:**

We project that we will have one or more adapted soft winter wheat lines with *Qfhs.pur-7EL* available for seeding in the field by USWBSI cooperators in fall 2009.

**Project 2:** *Improvement of Soft Winter Wheat for Fusarium Head Blight Resistance.*

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

Fusarium head blight (FHB) is a serious and frequently occurring disease of wheat in Indiana and surrounding regions. Some soft winter wheat cultivars have been released that have partial FHB resistance, but ‘yield drag’ in cultivars that have FHB resistance from unadapted parent lines from other areas in the world has been a limitation and there is need to develop cultivars with more effective resistance by combining multiple resistance genes/QTL.

**2. List the most important accomplishment and its impact (how is it being used?).  
Complete all three sections (repeat sections for each major accomplishment):**

**Accomplishment:** In 2007 we released cultivar INW0731 and in 2008 we released the cultivars INW0801 and INW0803 – all three having partial FHB resistance. INW0731 especially, and more variably INW0801 and INW0803 have ranked first or in the upper 10% of entries in Indiana multilocation tests conducted by Purdue University and in regional tests conducted by Wheat Tech Services. INW0731 is especially adapted to drought conditions. INW0803, with short and strong straw performs well under high management conditions. INW0801 matures early and is very desirable for doublecropping with soybeans following wheat harvest in the same season.

**Impact:** Acreage of INW0731 is rapidly increasing (indicated by high demand for basic seed). Impacts of INW0801 and INW0803 will be more clearly determined in 2009.

**As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn’t have before?:**

These three cultivars provide additional opportunities for wheat producers in Indiana to overcome the significant limitation of FHB to wheat production and grain quality.

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

Shen, X., L. Kong, and H. Ohm. 2008. Marker-assisted reduction of a chromosome segment of *Thinopyrum ponticum* carrying Fusarium head blight resistance. Purdue University Agriculture Research Programs, Journal paper no. 2008-18271. Crop Science (submitted).

Ohm, H., J. Anderson, and G. Buechley. 2008. Registration of INW0731. Journal of Plant Registrations (will submit in August 2008).

Ohm, H., J. Anderson, and G. Buechley. 2008. Registration of INW0801. Journal of Plant Registrations (will submit in August 2008).

Ohm, H. and G. Buechley. 2008. Registration of INW0803. Journal of Plant Registrations (will submit in August 2008).