Panhandle: A New Wheat Variety with Unexpected Characteristics

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Crop: wheat, barley, triticale

Panhandle (tested as NE05548) is a hard red winter wheat variety developed cooperatively by the Nebraska Agricultural Experiment Station and the USDA-ARS and released in 2014. It was released primarily for its superior adaptation to rainfed wheat production systems in western Nebraska and in adjacent wheat producing states. Panhandle genetically is a semi-dwarf wheat, containing the RhtB1b allele (formerly known as Rht1); phenotypically, however, it is a tall wheat, but possesses good agronomic performance and straw strength. Hence it combines the height needed for drought prone environments with the higher yield of the Green Revolution semi-dwarf cultivars. In addition, as part of our studies on nitrogen use efficiency where we looked at mineral content and its possible role in nitrogen use efficiency, Panhandle is one of the best lines for low cadmium accumulation. Cadmium is a heavy metal and harmful to humans, hence low levels are necessary. Most soils are low in cadmium, hence cadmium is normally not a problem, but in soils which are higher in cadmium, this trait will be very important for human health. Without molecular markers, we would not have known its genotype for the semi-dwarf genes or mapped the low cadmium accumulation gene; and without trying to understand nitrogen use efficiency and the role of minerals, we would not have known it was a low cadmium accumulator. Panhandle is an excellent new wheat variety and will be an important parent for future varieties.

Indicate all funding sources
- USDA - NIFA/AFRI
- USDA - ARS
- Hatch Funds (These are also known as USDA formula funds. They are often used for salary support for agricultural faculty and technicians, and to fund experiment station operating costs)
- Commodity Groups
- Industry
- AFRI (Agriculture and Food Research Initiative)
- OREI (Organic Agriculture research and extension initiative)

What problem was addressed by this success?
- Environmental Stress
- Quality
- Yield

Please indicate all stake holders that benefited from this success story
- Growers
- End-users
- Consumers
- Students
- Plant Breeders

Indicate the number of each type of participant in this success story
- Undergraduate = 8 (2 from a minority)
- Graduate Student = 3 (1 from a minority)
- Post Doc = 0
- Research Technician = 3
- Other = 0

What are the outputs? Output = (product, goods and services resulting from success e.g. varieties or germplasm released, new genetic tools etc)
- A new variety and a better understanding of mineral accumulation in wheat.

What are the impacts? Impact = (long term, sustainable change due to success story e.g. change in disease, yield, quality including acreage planted)
- The variety will most likely have a life of 5 to 7 years. As a parent, it will have an impact for 25 years and be an important source of the low cadmium accumulation gene. Our breeding program will incorporate low cadmium accumulation as an important human health trait.

Which category below best describes this success story?
- Varieties released