Cover Stories:

Major Scientific Publications Featuring NRI-Funded Research

National Research Initiative
Competitive Grants Program

United States Department of Agriculture

Cooperative State Research, Education, and Extension Service

2007 No. 13

Jorge Dubcovsky and Jan Dvorak, 2007
Genome Plasticity a Key Factor in the Success of Polyploid Wheat Under Domestication,
Science, 316 (5833) 1862-1866.

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The success of wheat as a food crop can be traced through thousands of years of genetic changes that occurred as wheat was domesticated for human use. Domestication of wheat began roughly 10,000 years ago as people in western Asia transitioned from a hunting and gathering society to raising crops and animals. Traits selected during the domestication process include increased grain size, decreased toughness of chaff allowing wheat to be easily threshed, and retention of the grain on the plant to prevent scattering in the wind before or during harvest. Wheat provides one fifth of the calories consumed by people around the world and understanding of past improvements is critical for future advances.

Fast gene mutations and the presence of multiple chromosome sets (polyploidy) enabled modern wheat to overcome the loss of diversity that occurred during wheat domestication. Bread wheat compensated for this reduction in diversity by capturing a relatively large proportion of the variability present in wild wheat. In addition, new variation is rapidly generated in the dynamic wheat genomes through gene deletions and insertions of repetitive elements into coding and regulatory gene regions. Because most genes are duplicated in polyploid wheat, these mutations are expressed as quantitative gene dosage differences. Synergy between the high mutation rates and the buffering effects of polyploidy makes it possible for polyploid wheat to capitalize on the diversity generated by its dynamic genomes.

This research was supported by the National Research Initiative's Plant Genome and Plant Biology programs in the Competitive Programs Unit of the USDA Cooperative State Research, Education, and Extension Service. This research was conducted at the Department of Plant Sciences University of California, Davis.