

PROJECT SUMMARY

Instructions:

The summary is limited to 250 words. The names and affiliated organizations of all Project Directors/Principal Investigators (PD/PI) should be listed in addition to the title of the project. The summary should be a self-contained, specific description of the activity to be undertaken and should focus on: overall project goal(s) and supporting objectives; plans to accomplish project goal(s); and relevance of the project to the goals of the program. The importance of a concise, informative Project Summary cannot be overemphasized.

Title: Bringing Barley To The Table: Addressing The Challenges Of Climate Change And Human Nutrition

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Our proposal addresses the goals of *Plant Breeding for Agricultural Production – A114*. Our model is food barley, a crop with significant implications for human nutrition. We will develop novel germplasm resources of a new food crop that can contribute to obesity management and reducing the risks of both Type II diabetes and heart disease. Our germplasm will be high yielding, low temperature tolerant, and disease resistant. Our specific objectives are to: 1) Initiate doubled haploid genomic selection: a breeding method that will allow for the accelerated and sustained variety development; 2) Discover new genes and novel alleles at known genes, using a genome wide association mapping panel. This panel will also serve as a training population for genomic selection; 3) Develop diverse doubled haploid lines with low temperature tolerance, resistance to diseases, and a menu of food quality characteristics; 4) Define basic parameters for barley food quality in a range of germplasm; 5) Contribute to a fundamental understanding of the genetics of food quality traits and their environmental plasticity; 7) Develop and extend a menu of barley food products. The potential impacts and expected outcomes are: (1) A new crop for U.S. farmers, bringing diversity to prevailing monocultures and reducing crop production risks associated with climate change, (2) A novel breeding system for accelerated variety development, (3) Barley germplasm and varieties for a range of heart-healthy foods for improved human nutrition, and (4) A body of knowledge regarding the genetics, management, and processing of new forms of an ancient crop.