Pulse Crop Health Initiative Funded Projects – Fiscal Year 2023

Breeding Projects

Quantifying, predicting, and parallelizing the examination of post-digestive properties of common beans

FY23 Funding: $0 (continuation of project funded in prior FY)
Christine Diepenbrock (PI), University of California-Davis, Davis, CA
Gail Bornhorst, University of California-Davis, Davis, CA
Li Tian, University of California-Davis, Davis, CA
Paul Gepts, University of California-Davis, Davis, CA
Travis Parker, University of California-Davis, Davis, CA

Chickpea genetic improvement for drought and heat stress resilient grain yield

FY23 Funding: $65,518
Ramachandra V. Penmetsa (PI), University of California-Davis, Davis, CA

Developing chickpea cultivars with radically improved nitrogen fixation rates

FY23 Funding: $112,476
Douglas Cook (PI), University of California-Davis, Davis, CA
George Vandemark, USDA-ARS, Pullman, WA

Screening of field pea accessions for combined and superior drought-tolerance and enhanced nitrogen fixation in semi-arid climates

FY23 Funding: $37,874
Donna Harris (PI), University of Wyoming, Laramie, WY
Jim Heitholt, University of Wyoming, Powell, WY

Develop efficient, genotype-independent, gene-editing systems for common bean and chickpea

FY23 Funding: $90,160
Heidi Kaeppler (PI), University of Wisconsin, Madison, WI
Shawn Kaeppler, University of Wisconsin, Madison, WI

Lentil 2.0: Targeted genomic assisted improvement of seed protein concentration

FY23 Funding: $91,423
Marilyn Warburton (PI), USDA-ARS, Pullman, WA
Yu Ma, Washington State University, Pullman, WA
Clarice J. Coyne, USDA-ARS, Pullman, WA
Zhiwu Zhang, Washington State University, Pullman, WA

Rapid and in situ screening for key quality traits in pulse crops

FY23 Funding: $95,176
Luis E Rodriguez-Saona (PI), Ohio State University, Columbus, OH
Christopher Ball, Ohio State University, Columbus, OH

Functional properties and nutritional quality of pea starch and protein as affected by genetic and environmental variables

FY23 Funding: $145,000
Rebecca McGee (PI), USDA-ARS, Pullman, WA
Alecia Kiszonas, USDA-ARS, Pullman, WA
Sintayehu Daba, USDA-ARS, Pullman, WA
Puneet Mangat, Washington State University, Pallman, WA
Chengci Chen, Montana State University, Sidney, MT

Increasing the quantity of protein in chickpeas

FY23 Funding: $56,006
George Vandemark (PI), USDA-ARS, Pullman, WA
Dilrushki Thavarajah, Clemson University, Clemson, SC

Sustainability Projects

Optimizing nodulation in chickpea for enhanced nitrogen fixation

FY23 Funding: $33,659
Audrey Kalil (PI), North Dakota State University, Williston Research Extension Center, Williston, ND
Nonoy Bandillo, North Dakota State University, Fargo, ND

Field experiments to incorporate pulse crops in cropping systems and assess soil health and plant water use efficiency

FY23 Funding: $30,000
Zachary Kayler (PI), University of Idaho, Moscow, ID
Xi Liang, University of Idaho, Moscow, ID

Assessment of soil health and nitrogen economy in lentil and pea cropping systems

FY23 Funding: $7,736
Audrey Kalil (PI), North Dakota State University, Williston Research Extension Center, Williston, ND
Frankie Crutcher, Montana State University Eastern Agricultural Research Center, Sidney, MT

Understanding environmental controls on pea protein

FY23 Funding: $0 (continuation of project funded in prior FY)
Perry Miller (PI), Montana State University, Bozeman, MT
Samuel Koeshall, Clain Jones, Kevin McPhee, Montana State University, Bozeman, MT
Andrea Basche, University of Nebraska-Lincoln, Lincoln, NE
Peggy Lamb, Montana State University, Havre, MT
Mike Ostlie, North Dakota State University, Carrington, ND
Audrey Kalil, North Dakota State University, Williston, ND
Nancy Ehlke, University of Minnesota, St. Paul, MN

Replacing fallow and cover crops with field pea and chickpea in the semi-arid northern high plains: impacts on production and sustainability

FY23 funding: $116,063
Cody Creech (PI), University of Nebraska-Lincoln, Scottsbluff, NE
Carrie Eberle, USDA-ARS, Morris, MN
Bijesh Maharjan, University of Nebraska-Lincoln, Scottsbluff, NE

Carbon footprint and greenhouse gas emissions under no-till pulse cropping systems

FY23 Funding: $100,000
Upendra Sainju (PI), USDA-ARS, Sidney, MT

Improving environmental and economic sustainability outcomes through incorporation of pulses into irrigated and dryland crop rotations

FY23 Funding: $105,874
Jessica G. Davis (PI), Colorado State University, Fort Collins, CO
Perry Cabot, Colorado State University Agricultural Experiment Station, Fruita, CO
Jasmine Dillon, Colorado State University, Fort Collins, CO
Steve Fonte, Colorado State University, Fort Collins, CO
Daniel Mooney, Colorado State University, Fort Collins, CO
Joel Schneekloth, Colorado State University Extension, Akron, CO
Jorge Vivanco, Colorado State University, Fort Collins, CO

Leveraging plant-microbe interactions to optimize symbiotic nitrogen fixation of dry bean

FY23 Funding: $64,806
David Douches (PI), Michigan State University, East Lansing, MI
Ashley Shade, Michigan State University, East Lansing, MI

Enhancing winter pea production in the annually cropped, rainfed region of the inland Pacific Northwest

FY23 Funding: $63,110
Kurtis L. Schroeder (PI), University of Idaho, Moscow, ID

Minimizing water and nutrient footprint for sustainable pulses-wheat cropping systems and enhanced soil health

FY23 Funding: $91,842
Olga S. Walsh (PI), University of Idaho, Parma, ID
Kurtis L. Schroeder, University of Idaho, Moscow, ID
Patrick L. Hatzenbuehler, Twin Falls, ID

Food Technology Projects

Improving pulse protein properties for expanded functionality using naturally derived polymeric polyphenols

FY23 Funding: $0 (continuation of project funded in prior FY)
Joseph Awika (PI), Texas A&M University, College Station, TX
Audrey Girard, Texas A&M University, College Station, TX
Miara Riaz, Texas A&M University, College Station, TX

Effects of extraction methods on lentil and dry beans extract composition and structural modifications: from extraction efficiency, functional and biological properties to fouling of industrial UHT equipment

FY23 Funding: $99,952
Juliana Maria Leite de Moura Bell (PI), University of California, Davis, California
Daniela Barile, University of California, Davis, California
David Mills, University of California, Davis, California

Developing and utilizing functionally enhanced pulse proteins as novel food ingredients

FY23 Funding: $0 (continuation of project funded in prior FY)
Yonghui Li (PI), Kansas State University, Manhattan, KS
Kadri Koppel, Kansas State University, Manhattan, KS

Dough rheology, baking performance, and bread sensory quality of pulse-fortified whole wheat flours

FY23 Funding: $0 continuation of project funded in prior FY)
Yonghui Li (PI), Kansas State University, Manhattan, KS
Kaliramesh Siliveru, Kansas State University, Manhattan, KS
Kadri Koppel, Kansas State University, Manhattan, KS

Pulse-fruit aggregate ingredients with enhanced taste, functionality, and health attributes for diversified food applications

FY23 Funding: $0 (continuation of project funded in prior FY)
Mary Ann Lila (PI), North Carolina State Univ., Plants for Human Health Institute, Kannapolis, NC
Roberta Hoskin, NCSU, Plants for Human Health Institute, Kannapolis, NC
Marvin Moncada, NCSU, Plants for Human Health Institute, Kannapolis, NC
Slavko Komarnytsky, NCSU, Plants for Human Health Institute, Kannapolis, NC
Haotian Zhang, NCSU, Plants for Human Health Institute, Kannapolis, NC

Supercritical fluid extrusion for improvement of flavor and functionality of pulse flours and protein concentrates

FY23 Funding: $110,600
Syed Rizvi (PI), Cornell University, Ithaca, NY

Improving functional & nutritional properties of pulse flours by heat-moisture treatment & developing pasta and noodle with improved health benefits

FY23 Funding: $101,525
Yong-Cheng Shi (PI), Kansas State University, Manhattan, KS
Yonghui Li, Kansas State University, Manhattan, KS

Enzymatic modification of pulse proteins to improve technical and health functionalities for diversified food applications

FY23 Funding: $0 (continuation of project funded in prior FY)
Haotian Zheng (PI), North Carolina State University, Raleigh, NC
Mary Ann Lila, North Carolina State Univ., Plants for Human Health Institute, Kannapolis, NC
Andrew Neilson, North Carolina State Univ., Plants for Human Health Institute, Kannapolis, NC
Marvin L. Moncada, North Carolina State Univ., Plants for Human Health Institute, Kannapolis, NC

Isolating and characterizing protein fractions from black beans and lentils for use as novel oil structuring agents: Development, optimization, and nutritional implications

FY23 Funding: $95,000
Andrew J. Gravelle (PI), University of California, Davis, CA
Juliana Maria Leite Nobrega de Moura Bell, University of California, Davis, CA
Gail M. Bornhorst, University of California, Davis, CA

Processing effects on the composition of pulses (beans, peas, chickpeas, and lentils) and the resulting benefits in the prevention of type-2 diabetes

FY23 Funding: $54,455 (UIUC) & $20,000 (ARS)
Elvira de Mejia (PI), University of Illinois, Urbana, IL
Erick Damian Castaneda Reyes, University of Illinois, Urbana, IL
Brajendra Sharma, USDA-ARS, Peoria, IL
Madhav P. Yadav, USDA-ARS, Peoria, IL
Davanand L. Luthria, USDA-ARS, Beltsville, MD

Enhancing pea protein functionality through glycation following a novel and efficient upcycling approach

FY23 Funding: $107,480
B. Pam Ismail (PI), University of Minnesota, St. Paul, MN
Fernanda Dias, University of Minnesota, St. Paul, MN

Impact of structural modification techniques on pea (Pisum sativum L.) protein's ability to moduate human gut microbiota

FY23 Funding: $63,787
Leqi Cui (PI), Florida State University, Tallahassee, FL
Ravinder Nagpal, Florida State University, Tallahassee, FL
Prashant Singh, Florida State University, Tallahassee, FL

Re-structuring pulse proteins into valuable fibrils via biocatalysis

FY23 Funding: $178,286
Yi Zhang (PI), Pennsylvania State University, University Park, PA
Joshua D. Lambert, Pennsylvania State University, University Park, PA
Helene Hopfer, Pennsylvania State University, University Park, PA
Misha Kwasniewski, Pennsylvania State University, University Park, PA

Improving extraction yield, purity, and functionality of proteins from pulse grains using enzyme-assisted green extraction

FY23 Funding: $168,195
Bingcan Chen (PI) North Dakota State University, Fargo, ND
Jiajia Rao, North Dakota State University, Fargo, ND

Accessible cultivar and processing strategies for improved pulse flour quality

FY23 Funding: $166,839
Karen Cichy (PI), USDA-ARS East Lansing, East Lansing, MI
Emily J. Mayhew, Michigan State University, East Lansing, MI
Sharon Hooper, Michigan State University, East Lansing, MI
George Vandemark, USDA-ARS Pullman, Pullman, WA

Human Health Projects

Pulse resistant starch: Interplay between processing, the microbiome and health

FY23 Funding: $0 (continuation of project funded in prior FY)
Darrel Cockburn (PI), The Pennsylvania State University, University Park, PA

Gut microbiota dependent and independent impacts of dietary pulses on pre- and postprandial metabolism and inflammation in overweight/obese humans

FY23 Funding: $0 (continuation of project funded in prior FY)
Mary Miles (PI), Montana State University, Bozeman, MT
Brian Bothner, Montana State University, Bozeman, MT
Carl Yeoman, Montana State University, Bozeman, MT
Seth Walk, Montana State University, Bozeman, MT
Colleen McMilin, Montana State University, Bozeman, MT
Wan-Yuan Kuo, Montana State University, Bozeman, MT
Mark Greenwood, Montana State University, Bozeman, MT

Understanding the pulse-gut relationship and its role in modifying systemic inflammation and insulin sensitivity in humans

FY23 Funding: $0 (continuation of project funded in prior FY)
Indika Edirisinghe (PI), Illinois Institute of Technology, Bedford Park, IL
Amandeep Sandhu, Illinois Institute of Technology, Bedford Park, IL
Britt Burton-Freeman, Illinois Institute of Technology, Bedford Park, IL

Pulse consumption improves gut health, metabolic outcomes, and bone biomarkers of postmenopausal women

FY23 Funding: $0 (continuation of project funded in prior FY)
Edralin Lucas (PI), Oklahoma State University, Stillwater, OK
Brenda Smith, Oklahoma State University, Stillwater, OK
Sam Emerson, Oklahoma State University, Stillwater, OK
Jiangchao Zhao, University of Arkansas, Fayetteville, AR
Guadalupe Davila-El Rassi, Oklahoma State University, Stillwater, OK

Protective effects of dietary pulse flours on the transgenerational influence of maternal obesity

FY23 Funding: $0 (continuation of project funded in prior FY)
Todd Rideout (PI), State University of New York at Buffalo, Buffalo, NY
Michael Buck, State University of New York at Buffalo, Buffalo, NY
Mulchand Patel, State University of New York at Buffalo, Buffalo, NY

National consumer survey of pulse consumption and views

FY23 Funding: $0 (continuation of project funded in prior FY)
Donna Winham (PI), Iowa State University, Ames, IA
Mack Shelley, Iowa State University, Ames, IA
Andrea Hutchins, University of Colorado, Colorado Springs, CO

Identifying the role of pulses in a healthful diet: Metabolomic signatures of dietary pulses and their benefits on cardiometabolic risk factors

FY23 Funding: $259,579
Brian Bennett (PI), USDA-ARS, Davis, CA
John Newman, USDA-ARS, Davis, CA
Francene Steinberg, University of California-Davis, Davis, CA

Using pulse resistant starch to ameliorate aging-associated dysbiosis of the gut-microbiome-brain axis

FY23 Funding: $61,439
Ravinder Nagpal (PI), Florida State University, Tallahassee, FL
Prashant Singh, Florida State University, Tallahassee, FL
Bahram Arjmandi, Florida State University, Tallahassee, FL

Human pulse consumption, the microbiome, and meal satiety

FY23 Funding: $0 (continuation of project funded in prior FY)
Katherene Anguah (PI), University of Missouri, Columbia, MO
Elizabeth J. Parks, University of Missouri, Columbia, MO
Aaron Ericsson, University of Missouri, Columbia, MO

Effects of pulse consumption on maternal and child health

FY23 Funding: $100,057
Xiaozhong Wen (PI), State University of New York at Buffalo, Buffalo, NY
Todd Rideout, State University of New York at Buffalo, Buffalo, NY

Pea protein consumption to promote gut health in humans

FY23 Funding: $112,500
David C. Montrose (PI), Stony Brook University, Stony Brook, NY
Josephine Connolly-Schoonen, Stony Brook University, Stony Brook, NY
Olga Aroniadis, Stony Brook University, Stony Brook, NY
Jinyu Li, Stony Brook University, Stony Brook, NY

Targeted messaging highlighting human health and sustainability benefits to promote pulse consumption

FY23 Funding: $27,000
Christopher R. Gustafson (PI), University of Nebraska, Lincoln, NE
Devin J. Rose, University of Nebraska, Lincoln, NE

Effects of a pulse-based USDA-diet on gut microbial metabolites and biomarkers of healthspan: A 18-week randomized controlled crossover feeding study in older adults

FY23 Funding: $211,928
Moul Dey (PI), South Dakota State University, Brookings, SD
Lee Weidauer, South Dakota State University, Brookings, SD
Samitinjaya Dhakal, South Dakota State University, Brookings, SD

Maternal supplementation of pea fiber to protect against obesity and hypertension in offspring

FY23 Funding: $150,159
Prasanth Chelikani (PI), Texas Tech University, Amarillo, TX
Michael Cruz Penn, Texas Tech University, Amarillo, TX

Impacts of pulse consumption on human health, diet cost, and environmental sustainability

FY23 Funding: $134,804
Zach Conrad (PI), College of William & Mary, Williamsburg, VA
Adam Drewnowski, University of Washington, Seattle, WA

Comparative analysis of the impact of type of pulse consumed in human subjects and pre-clinical models

FY23 Funding: $203,909
Henry J. Thompson (PI), Colorado State University, Fort Collins, CO

Controlling pulse fermentation to improve gut microbiome health

FY23 Funding: $144,079
Darrell Cockburn (PI), Pennsylvania State University, University Park, PA
Joshua Lambert, Pennsylvania State University, University Park, PA
Yi Zhang, Pennsylvania State University, University Park, PA
Vishal Singh, Pennsylvania State University, University Park, PA

Protective mechanisms of pulse crop consumption in the development of non-alcoholic fatty liver disease in mothers and offspring across life stages

FY23 Funding: $279,747
Todd Rideout (PI), State University of New York – Buffalo, Buffalo, NY
Mulchand S. Patel, University of Buffalo, Buffalo, NY