Pulse Crop Health Initiative Funded Projects – Fiscal Year 2022

Breeding Projects

MP3: More protein, more peas, more profit

FY22 Funding: $97,405
Clare Coyne (PI), USDA-ARS, Pullman, WA
Rebecca McGee, USDA-ARS, Pullman, WA

Enhancing the nutritional and functional traits of dry bean through metabolomics, genetics, and breeding

FY22 Funding: $182,819
Phil McClean (PI), North Dakota State University, Fargo, ND
Juan Osorno, North Dakota State University, Fargo, ND
Karen Cichy, USDA-ARS, East Lansing, MI
James Harnly, USDA-ARS, Beltsville, MD
Phillip N. Miklas, USDA-ARS, Prosser, WA

Developing the next generation of flavonoid enhanced dry beans

FY22 Funding: $0 (continuation of project funded in prior FY)
Phil McClean (PI), North Dakota State University, Fargo, ND
Juan Osorno, North Dakota State University, Fargo, ND
Ray Glahn, USDA-ARS, Ithaca, NY
Phillip N. Miklas, USDA-ARS, Prosser, WA

Developing chickpea cultivars with radically improved nitrogen fixation rates

FY22 Funding: $102,794
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

FY22 Funding: $37,874
Donna Harris (PI), University of Wyoming, Laramie, WY
Jim Heitholt, University of Wyoming, Powell, WY

Chickpea genetic improvement for drought and heat stress resilient grain yield

FY22 Funding: $75,220
Ramachandra V. Penmetsa (PI), University of California-Davis, Davis, CA

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

FY22 Funding: $0 ($90,160 provided for FY22 in FY21)
Heidi Kaeppler (PI), University of Wisconsin, Madison, WI
Shawn Kaeppler, University of Wisconsin, Madison, WI

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

FY22 Funding: $90,792
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

Lentil 2.0: Targeted genomic assisted improvement of seed protein concentration

FY22 Funding: $93,855
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

Sustainability Projects

Optimizing nodulation in chickpea for enhanced nitrogen fixation

FY22 Funding: $95,106
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

FY22 Funding: $98,243
Zachary Kayler (PI), University of Idaho, Moscow, ID
Xi Liang, University of Idaho, Moscow, ID

Using native rhizobia to improve salt-tolerance in field pea

FY22 Funding: $63,677
Christopher Graham (PI), South Dakota State University, Rapid City, SD
Sen Subramanian, South Dakota State University, Brookings, SD

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

FY22 Funding: $50,519
Audrey Kalil (PI), North Dakota State University, Williston Research Extension Center, Williston, ND
Frankie Crutcher, Montana State University Eastern Agricultural Research Center, Sidney, MT

Sustainable field pea cropping systems for the Great Plains

FY22 Funding: $20,000
Kraig Roozeboom (PI), Kansas State University, Manhattan, KS
Lucas Haag, Kansas State University, Manhattan, KS
Augustin Obour, Kansas State University, Manhattan, KS
Ignacio Ciampitti, Kansas State University, Manhattan, KS
Zach Stewart, Kansas State University, Manhattan, KS
John Holman, Kansas State University, Manhattan, KS

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

FY22 funding: $114,148
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

FY22 Funding: $100,000
Upendra Sainju (PI), USDA-ARS, Sidney, MT

Understanding environmental controls on pea protein

FY22 Funding: $94,733
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

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

FY22 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

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

FY22 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

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

FY22 Funding: $71,577
Francisco E. Gomez (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

FY22 Funding: $62,232
Kurtis L. Schroeder (PI), University of Idaho, Moscow, ID

Food Technology Projects

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

FY22 Funding: $99,968
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

Optimization in the production of protein hydrolysates from chickpea as novel functional food ingredients in the prevention of type-2 diabetes

FY22 Funding: $27,400
Elvira de Mejia (PI), University of Illinois, Urbana, IL

Impact of storage on functionality and nutritional and phytochemical compositions of pea, lentil, and chickpea

FY22 Funding: $121,683
Clifford Hall (PI), South Dakota State University, Brookings, SD
Atanu Biswas, USDA-ARS National Center for Agricultural Utilization Research, Peoria, IL

Optimizing pulse protein functionality

FY22 Funding: $0 (continuation of project funded in prior FY)
Michael Colle (PI), University of Idaho, Moscow, ID
Girish Ganjyal, Washington State University, Pullman, WA

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

FY22 Funding: $104,000
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

Development of meat analogues with germinated pulse protein extracts

FY22 Funding: $0 (continuation of project funded in prior FY)
Bingcan Chen (PI), North Dakota State University, Fargo, ND
Minwei Xu, North Dakota State University, Fargo, ND

Effects of roasting parameters on the functional and organoleptic properties of lentil flours

FY22 Funding: $0 (continuation of project funded in prior FY)
Girish Ganjyal (PI), Washington State University, Pullman, WA
Rebecca McGee, USDA-ARS, Pullman, WA

Developing and utilizing functionally enhanced pulse proteins as novel food ingredients

FY22 Funding: $84,709
Yonghui Li (PI), 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

FY22 Funding: $86,569
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

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

FY22 Funding: $0 ($90,979 provided for FY22 in FY20)
Yonghui Li (PI), Kansas State University, Manhattan, KS
Kaliramesh Siliveru, Kansas State University, Manhattan, KS
Kadri Koppel, Kansas State University, Manhattan, KS

Thermal and nonthermal processing of pulse protein concentrates: Impact on functionality and nutritional value

FY22 Funding: $90,483
Carmen Moraru (PI), Cornell University, Ithaca, NY
Alexandra Hall, Cornell University, Ithaca, NY

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

FY22 Funding: $99,694
Syed Rizvi (PI), Cornell University, Ithaca, NY

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

FY22 Funding: $99,812
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

FY22 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

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

FY22 Funding: $99,500
Yong-Cheng Shi (PI), Kansas State University, Manhattan, KS
Yonghui Li, Kansas State University, Manhattan, KS

Human Health Projects

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

FY22 Funding: $66,688
Darrel Cockburn (PI), The Pennsylvania State University, University Park, PA

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

FY22 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

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

FY22 Funding: $82,536
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

Comparative analysis of chickpea, dry pea, lentil, and dry bean for human health traits

FY22 Funding: $102,207
Henry Thompson (PI), Colorado State University, Fort Collins, CO

Mechanisms of dry bean mediated anti-obesogenic activity

FY22 Funding: $101,981
Henry Thompson (PI), Colorado State University, Fort Collins, CO

Effects of pulse consumption on maternal and child health

FY22 Funding: $99,944
Xiaozhong Wen (PI), State University of New York at Buffalo, Buffalo, NY
Todd Rideout, State University of New York at Buffalo, Buffalo, NY

National consumer survey of pulse consumption and views

FY22 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

Human pulse consumption, the microbiome, and meal satiety

FY22 Funding: $116,923
Katherene Anguah (PI), University of Missouri, Columbia, MO
Elizabeth J. Parks, University of Missouri, Columbia, MO
Aaron Ericsson, University of Missouri, Columbia, MO

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

FY22 Funding: $259,579
Brian Bennett (PI), USDA-ARS, Davis, CA
John Newman, USDA-ARS, Davis, CA
Francene Steinberg, University of California-Davis, Davis, CA

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

FY22 Funding: $87,094
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

FY22 Funding: $160,969
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

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

FY22 Funding: $81,891
Ravinder Nagpal (PI), Florida State University, Tallahassee, FL
Prashant Singh, Florida State University, Tallahassee, FL
Bahram Arjmandi, Florida State University, Tallahassee, FL

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

FY22 Funding: $270,203
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

Pea protein consumption to promote gut health in humans

FY22 Funding: $128,250
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

FY22 Funding: $91,250
Christopher R. Gustafson (PI), University of Nebraska, Lincoln, NE
Devin J. Rose, University of Nebraska, Lincoln, NE