Funded Research Projects for FY 97-98

Title: Evaluation of various materials and practices contributing toward economic crop production under flexible, continuous and other cropping systems in Montana.

Institution: MSU

Department: Research Centers

Amount Funded: $102,000

Objectives:

1) To evaluate the effects of differing systems on crop and variety performance under diverse environments represented across the Montana Agricultural Experiment Station - Research Center network.

2) To evaluate the potential fit of other materials, concepts and techniques with various cropping systems employed.

Title: Development of An Integrated Management Program for the Wheat Stem Sawfly

Institution: MSU

Department: Entomology

Researchers: Dr. Greg Johnson

Amount Funded: $80,000

Objectives:

1) Evaluation of selected cultural control tactics for wheat stem sawfly.

2) Explore the potential of managing wheat stem sawfly using biological control agents.

3) Promote the use of resistant varieties for wheat stem sawfly management.

4) Study population dynamics and behavior of larval and adult wheat stem sawfly management.

5) Determine if behavior modifying chemicals (i.e., pheromones) are being used by wheat stem sawfly for aggregation and mating activities.

6) Conduct on-farm field tours and winter meetings to discuss progress in wheat stem sawfly management.

Title: Winter Wheat Breeding/Genetics

Institution: MSU

Department: Plant Soil and Environmental Sciences

Researchers: Phil Bruckner

Amount Funded: $70,000

Objectives:

1) Develop improved cultivars of winter wheat adapted to Montana climatic conditions and cropping systems, which possess superior grain yield potential, winter hardiness, adequate and durable pest resistance, stress tolerance, superior agronomic characteristics, and end-use qualities.

2) Advance early-generation segregating bulk populations and evaluate derived lines at Research Center locations under natural and enhanced selection pressure for winter survival and pest resistance and select favorable plant types for further testing.

3) Investigate environmental, genetic, and management factors which influence wheat productivity and end-use in Montana including 1997 projects: identification and incorporation of new sources of stem solidness and WSMV resistance, evaluation of North Dakota winter wheat germplasm, optimal N fertility for McGuire winter wheat, sawfly-resistant hybrid evaluation, foliar chloride fertilization, and cultivar variability for cold tolerance, residue production, and coleoptile length.

4) Coordinate Montana statewide winter wheat variety testing program and provide long-term performance data necessary for cultivar release decisions, variety recommendations, and producer management decisions.

Title: Spring Wheat Breeding and Genetics

Institution: MSU

Department: Plant, Soil, and Environmental Sciences

Researchers: Dr. Luther Talbert

Amount Funded: $70,000

Objectives:

1) To develop spring wheat varieties for Montana with good yield potential, high protein, and overall agronomic acceptability. In addition, we are breeding for the following specific attributes: a) resistance to the wheat stem sawfly, b) resistance to wheat streak mosaic virus, c) resistance to the Russian wheat aphid, d) hard white wheat spring wheat.

2) To coordinate the varietal testing program for Montana.

3) To develop information, germplasm and procedures to insure the long-term productivity of the Montana spring wheat breeding program.

Title: Developing Improved Barley Varieties for Montana

Institution: MSU

Department: Plant, Soil and Environmental Sciences

Researchers: Dr. Tom Blake

Amount Funded: $60,000

Objective: Continue development of improved lines of barley to fit defined market needs.
Title: A precision N management program to optimize wheat grain quality and yield

Institution: MSU

Department: Northern Research Center, Havre

Researchers: Dan Long

Amount Funded: $40,000

Objectives:

1) Identify N deficient sites within fields from measured grain protein and yield acquired with on-the-go sensing technologies, and b) use this information to develop N management maps for basing variable rate N fertilization.

2) Test effectiveness of a strategy of maximizing grain quality and yield in dryland wheat fields based on maps of grain protein, yield, and N removal, and variable rate N application.

Title: Development of Superior Wheat for Montana by Genetic Transformation

Institution: MSU

Department: Plant, Soil, and Environmental Sciences

Researchers: Dr. E. Sivamani

Amount Funded: $26,000

Objectives:

1) Greenhouse evaluation of transgenic wheat engineered with WSMV replicase and/or coat protein genes for disease resistance.

2) Greenhouse assessment of transgenic Hi-Line wheat engineered with HVA1 gene

for drought tolerance.

Title: Improved Quality of Montana Hard Red and Hard White Wheats

Institution: MSU

Department: Plant, Soil and Environmental Sciences

Researchers: Dr. Luther Talbert

Amount Funded: $25,000

Objectives:

1) To determine end-use quality parameters of Montana breeding lines of hard red and hard white wheat for the spring wheat and winter wheat breeding programs.

2) To develop methods of selecting for improved noodle quality in hard white spring wheat without sacrificing bread-making quality.

3) Determine whole wheat capabilities of Montana grown spring and winter wheats.

Title: Grain Research Plot Combine Replacement

Institution: MSU

Department: Northern Ag Research Center

Researchers: Gregg R. Carlson

Amount Funded: $24,000

Objectives:

1) To replace an existing 12-year old, high hour, research plot combine with a new one featuring updated technology further affording enhanced capacity, efficiency and appropriateness for both small and large plot grain research scenarios.

2) To substantially reduce labor and time investment associated with multi-step, post-harvest sample processing now necessary for all grain plots harvested with the current combine.

3) To substantially reduce high annual repair costs and mid-harvest time loss to breakdowns now becoming common with the existing plot combine.

Title: Insect Management in Barley and Wheat: Cereal Leaf Beetle, Barley Thrips and Wheat Curl Mite

Institution: MSU

Department: Entomology

Researchers: Dr. Sue Blodgett

Amount Funded: $23,120

Objectives:

1) Determine the relationship between barley thrips populations and plant growth stage.

2) Evaluate timing of chemical applications for barley thrips control and effect on barley yield and quality.

3) Evaluate recombinant inbred barley lines for resistance to barley thrips infestations and damage.

4) Evaluate foliar applied insecticides and a systemic seed treatment for cereal leaf beetle management.

5) Evaluate ability of wheat curl mite to cross infect wheat and potential grass hosts with wheat streak mosaic virus.

Title: Rapid Feed Quality Analysis Technology for Barley

Institution: MSU

Department: Animal and Range Sciences

Researchers: Dr. Janice Bowman

Amount Funded: $20,000

Objectives:

1) To continue the development of near infrared reflectance spectroscopy (NIRS) technology to rapidly select for feed quality in barley.

2) To apply the current calibration equations for prediction of feed quality in barley to a new near infrared reflectance spectroscope dedicated to the barley quality project.

Title: Effects of wheat streak mosaic virus on Montana's wheat genotypes

Institution: MSU

Department: Plant Pathology

Researchers: Dr. Mark Young

Amount Funded: $18,400

Objectives:

1) To determine the susceptibility of Montana's wheat genotypes to WSMV by directly measuring virus titers.

2) To determine the correlation between WSMV titer and potential yield loss (under both greenhouse conditions and field conditions).

3) Establish a rapid method to screen new germplasm for susceptibility tolerance to WSMV under greenhouse conditions which will accurately predict yield reductions due to WSMV infections under field conditions.

Title: Relationship between common root rot control and susceptibility to wheat stem sawfly

Institution: MSU

Department: Plant Pathology

Researchers: Dr. Don Mathre

Amount Funded: $17,500

Objective:

To get a second year of information relative to the effect of using spring wheat isolines developed for resistance and susceptibility to common root rot as related to seed treatment and susceptibility to wheat stem sawfly.

Title: Development and Evaluation of New Food Applications for Montana Wheat and Barley

Institution: MSU

Department: Health and Human Development

Researchers: Dr. Virginia A. Hammarlund

Amount Funded: $ 16,943

Objectives:

1) To identify and quantify the amount of phytochemicals such as phytate and ferulic acid present in different barley and wheat cultivars grown in Montana.

2) To develop and evaluate new cereal grain food products that have beneficial effects on blood glucose and insulin levels.

3) To increase the demand for wheat and barley as they are incorporated into new food products.

Title: Enhanced field selection for wheat stem sawfly resistance in wheat

Institution: MSU

Department: Plant, Soil and Environmental Sciences

Researchers: Dr. Phil Bruckner

Amount Funded: $10,000

Objectives:

1) Subject early-generation segregating winter wheat bulk populations and derived lines to heavy selection pressure for wheat stem sawfly (WSS) resistance and select plant phenotypes resistant to WSS infestation and cutting damage.

2) Evaluate spring and winter wheat cultivars and advanced lines for resistance to infestation and cutting damage by WSS and for yield performance under heavy infestation by WSS.

3) Systematically evaluate selected germplasm from the U.S. National Small Grains Collection (NSGC) and other sources for enhanced stem solidness and WSS resistance.

4) Provide a field site, representative of sawfly-infested production regions, for research and demonstration to producers of effective sawfly management strategies including use of resistant cultivars.

Title: Long-term effects of tillage treatments on soil physics, soil chemistry, and soil biology

Institution: MSU

Department: Eastern Ag Research Center

Researchers: Dr. Joyce Eckhoff

Amount Funded: $9,200

Objective:

To evaluate long-term effects that continuous crop with no tillage, continuous crop with spring tillage, crop/mechanical fallow, and tall wheatgrass have on soil physics, soil chemistry, and soil biology.

Title: Evaluating the role of copper (Cu) amendments in small grain production and disease development in northern Montana.

Institution: MSU

Department: Plant Pathology

Researchers: Dr. Jack Riesselman

Amount Funded: $7,900

Objectives:

1) Determine if Cu applications affect grain yield, test weight and protein levels.

2) Determine if Cu applications reduce disease as reported in Canada.

3) Determine if foliar applications of Cu may have a negative effect on vigor and subsequent yield parameters.

4) Determine if physiological foliar leaf spotting is associated with high Cu levels in tissue.

5) Evaluate the susceptibility of four most commonly grown spring wheat and barley cultivars to Cu deficiency.

6) Evaluate Zn as an additional component to this trial.

Title: and Cultivar Susceptibility to Preharvest Sprouting with Associated Economic Quality Concerns

Institution: MSU

Department: Northwestern Agricultural Research Center

Researchers: Doug Holen

Amount Funded: $7,500

Objective:

To identify susceptibility differences among spring and winter wheat cultivars to preharvest sprouting and the effects of the sprouting on crop marketing and end-use quality.

Title: Herbicide resistant winter wheat for downy brome and jointed goatgrass management

Institution: MSU

Department: Plant, Soil and Environmental Sciences

Researchers: Dr. Phil Bruckner

Amount Funded: $6,440

Objective:

To incorporate resistance to herbicides capable of controlling downy brome and jointed goatgrass into prominent winter wheat varieties grown in Montana.

Title: Tractor Purchase for the Post Research Farm

Institution: MSU

Department: Post Research Farm

Researchers: Dr. Jeff Jacobsen

Amount Funded: $5,000

Objective:

To assist the Montana Agricultural Experiment Station in the purchase of a used tractor necessary for field operations of the Post Research Farm.

Title: Fall seed dormancy of cereal varieties and field techniques to minimize volunteer cereals

Institution: MSU

Department: Central Ag Research Center

Researchers: David Wichman

Amount Funded: $3,500

Objectives:

1) To determine the relative fall seed dormancy of varieties of winter wheat and spring wheat.

2) To determine if fall and early spring field germination of shattered cereal seed is enhanced by post harvest harrowing.

Title: Becoming an Underwriter for MONTANA AG LIVE!

Institution: MSU

Department: Plant Pathology

Researchers: Dr. Jack Riesselman

Amount Funded: $2,500

Objectives:

1) The Committee will receive significant public exposure at modest cost. Underwriters are listed monthly in the KUSM program guide, which is received by the 5500 members of Montana Public Television. In addition, underwriters receive on-air credits during each of the 16 weekly programs.

2) The Committee will help to provide grain producers with timely and relevant answers to their questions in a cost-effective manner.

3) The Committee will help interpret the day-to-day issues facing ag producers to no-ag audiences. Given the growing tensions in some sectors of Montana between producers and non-producers, a forum such as MONTANA AG LIVE! Where needs of farmers are clarified and addressed, offers a rational atmosphere for increased public awareness.