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TITLE: Standardization of a Near Infra-Red Reflectance Spectrometer for Use in Quality Enhancement Research Investigations of Small Grains

INSTITUTION: Montana State University

DEPARTMENT: Eastern Agricultural Research Center/Sidney

RESEARCHERS: Jerald W. Bergman, Charles R. Flynn, Renee Panasuk

AMOUNT FUNDED: \$3,000.00

OBJECTIVES:

1) To obtain Kjeldahl measurements of protein in a standard set of samples, over the range of interest for barley, spring wheat, winter wheat, oats, and durum so that these wet chemistry values may be used to standardize a Technicon Infra-Alyzer-400 recently purchased by the Eastern Agricultural Research Center of Sidney, Montana. It is proposed that a set of standards be developed for both grain and straw.

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TITLE: Food Uses for Barley Beta Glucans and the Influence on Barley-Based Foods of the Polyphenols (Tannins) Found in Barley

INSTITUTION: Montana State University

DEPARTMENT: Plant & Soil Sciences

RESEARCHERS: Charles McGuire, Kent Sugden

AMOUNT FUNDED: \$14,000.00

OBJECTIVES:

1) New uses in food products of barley constituents and the

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enhancement of barley as a food by improvement in its flavor.
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TITLE: Evaluation of Proanthocyanidin and Beta-glucans on
the Nutritional Quality of Barley

INSTITUTION: Montana State University

DEPARTMENT: Animal & Range Sciences/Home Economics

RESEARCHERS: C.W. Newman
R.K. Newman
M.K. Petersen

Margareth Overland (G.S.)
C.K. Clark (G.S.)

AMOUNT FUNDED: \$10,000.00

OBJECTIVES:

- 1) To determine the effect of proanthocyanidins and Beta-glucans on the digestibility of protein and energy in barley.
- 2) To determine if an interaction occurs between proanthocyanidins and Beta-glucans on protein and energy digestibility in barley.

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TITLE: Effect of Barley Soluble Fiber on Blood Lipid
Profiles

INSTITUTION: Montana State University

DEPARTMENT: Animal & Range Sciences/Home Economics

RESEARCHERS: C.W. Newman
R.K. Newman
April Barnes (L.A.)
Sheri Lewis (G.S.)

AMOUNT FUNDED: \$10,000.00

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OBJECTIVES:

Overall goal: To promote national and international markets for barley in human food products, by demonstrating the health-promoting quality of the unique soluble fibers in certain barley varieties.

The following objectives are steps toward this goal.

- 1) Identify barleys high in soluble fibers, such as beta-glucans.
- 2) Characterization of the specific soluble fibers.
- 3) Confirm, in chick feeding studies, earlier results showing lowering of blood cholesterol and lipoproteins by specific barley.
- 4) Test the blood lipid response of the same barleys in pigs fed a high fat diet, similar in composition to human diets.
- 5) Test the blood lipid response of these barleys in healthy middle-aged men.

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TITLE: Effect of Extrusion on the Nutritional Quality and Feed Value of Barley for Calves, Lambs and Pigs

INSTITUTION: Montana State University

DEPARTMENT: Animal & Range Sciences/Home Economics

RESEARCHERS: Mark K. Petersen
V.M. Thomas
C.W. Newman
D.G. Gray
R.K. Newman (co-op)
J. O'Palka (co-op)

AMOUNT FUNDED: \$30,000.00

OBJECTIVES:

- 1) To evaluate the nutritional quality and feed value of

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extruded barley based diets for early weaned calves, lambs and pigs.

2) To compare the carcass quality of beef calves, lambs and pigs fed extruded barley with similar animals fed conventional diets.

3) To compare the fat to lean ration, total lipid and cholesterol composition of beef, calf, lamb and pig carcasses fed extruded barley with similar carcasses from animals fed conventional diets.

4) To compare the organoleptic quality of red meat from animals fed extruded barley with that from animals fed conventional diets.

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TITLE: Spring Wheat Breeding

INSTITUTION: Montana State University

DEPARTMENT: Plant & Soil Sciences

RESEARCHERS: E.A. Hockett
D.G. Miller
Susan P. Lanning

AMOUNT FUNDED: \$38,000.00

OBJECTIVES:

- 1) To develop superior hard red spring wheat varieties for Montana.
- 2) To continue the spring wheat testing program for Montana.

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TITLE: The Influence of Intensive Crop Management Practices on Irrigated Spring Wheat Yields in Eastern Montana

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INSTITUTION: Montana State University
DEPARTMENT: Eastern Agricultural Research Center/Sidney, MT
RESEARCHERS: Jerald W. Bergman
Beverly Flynn
AMOUNT FUNDED: \$3,000.00

OBJECTIVES:

1) To determine potential yield increases and higher profits of irrigated spring wheat in eastern Montana by the use of various combinations of higher N fertility rates, higher seeding rates, fungicide disease control, growth regulator treatment and variety selection.

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TITLE: Development of Malting and Feed Barley Varieties Adapted to Montana

INSTITUTION: Montana State University
DEPARTMENT: Plant & Soil Sciences
RESEARCHERS: Tom Blake
Patrick Hensleigh
Don Lee

AMOUNT FUNDED: \$46,000.00

OBJECTIVES:

- 1) Development of high yielding spring barley cultivars adapted to dryland, irrigated, and recrop conditions in Montana.
- 2) Development of malting, feed, and industrial use barley genotypes adapted to specific market niches.
- 3) Incorporation of the new MSU controlled environment facility into the MSU-MAES barley breeding program.
- 4) Evaluation of winter barley populations for hardiness and yield potential.

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5) Evaluation of barley lines for industrial or commercial utility.

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TITLE: Development of Cephalosporium Stripe Resistant
Germplasm

INSTITUTION: Montana State University

DEPARTMENT: Plant Pathology

RESEARCHERS: Don Mathre
Robert Johnston

AMOUNT FUNDED: \$13,420.00

OBJECTIVES:

1) To continue the development of winter wheat lines using different sources of resistance to Cephalosporium stripe than occur in other varieties or lines released to date.

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TITLE: Development of "Swheat" Wheat -- a naturally sweet
sugarless wheat

INSTITUTION: Montana State University

DEPARTMENT: Plant Pathology

RESEARCHERS: David C. Sands

AMOUNT FUNDED: \$6,000.00

OBJECTIVES:

1) To develop a naturally sweet, low calorie wheat which could be produced exclusively in Montana and would be highly marketable as cereal product.

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TITLE: Winter Wheat Improvement

INSTITUTION: Montana State University

DEPARTMENT: Plant Pathology

RESEARCHERS: David C. Sands (Leader), Ted Kisha, Mohamed Al-Khawlani, Maher Noaman, Phil Becraft, Sami Salry, Kelly Thomas

AMOUNT FUNDED: \$59,600.00

OBJECTIVES:

- 1) General support of winter wheat breeding project.
- 2) Develop winter wheat varieties which stabilize and/or reduce grower production cost.

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

INSTITUTION: Montana State University

DEPARTMENT: Research Centers

RESEARCHERS: Various

AMOUNT FUNDED: \$30,000.00

OBJECTIVES:

- 1) To evaluate the effects of differing systems on crop variety performance under the diverse environments represented across the Montana Research Center network.
- 2) To evaluate the potential fit of other materials, concepts and techniques with various cropping systems employed.

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TITLE: Potentials of Montana Soils

INSTITUTION: Montana State University

DEPARTMENT: Plant & Soil Sciences

RESEARCHERS: Gerald A. Nielsen
Clifford Montagne

PARTICIPANTS: Pat Carr, Dan Long, Hassan Osman, Alma
Plantenberg, John Amend, Don Baldrige, Joe
Caprio, Gregg Carlson, Peter Fay, Hayden
Ferguson, Harold Houlton, Grant Jackson, Jeff
Jacobsen, Don Mathre, Joe Morris, Earl Skogley,
Steve Stauber, Allan Taylor, John Taylor, Tad
Weaver

AMOUNT FUNDED: \$15,000.00

OBJECTIVES:

The following objectives represent major components of MAES project 372 designed to obtain and deliver facts about the potentials of Montana soils. These objectives must rely largely upon the agricultural sector for funding.

- 1) Implement and improve MAPS on a near self-sustaining basis.
- 2) Develop and implement a procedure for obtaining soil performance (yield) data in relation to crop variety, management and climate at more than 50 representative sites throughout Montana in 1986.
- 3) Develop and adapt technology to produce maps and procedures for FARMING SOILS, NOT FIELDS.
- 4) Document profitability of FARMING SOILS, NOT FIELDS on up to three representative commercial farms in Montana by:
 - a. selective soil testing and fertilization practices
 - b. crop variety selection

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- c. selective weed management
- d. alternate land use determination

5) Conduct workshops to demonstrate this concept of FARMING SOILS, NOT FIELDS to dryland crop producers, agricultural consultants, fertilizer distributors, county agents, field scouts and weed control specialists.

6) Implement commercial aerial imagery and soil management map services for FARMING SOILS, NOT FIELDS.

7) Project aggregate benefits to Montana from FARMING SOILS, NOT FIELDS.

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TITLE: Market Development in the Pacific Rim Countries for
Montana Grown Hard White Wheat

INSTITUTION: Montana State University

DEPARTMENT: Plant & Soil Sciences/Agricultural Economics

RESEARCHERS: G. Allan Taylor
Gail L. Cramer
Charles F. McGuire
Gary Brester

AMOUNT FUNDED: \$17,100.00

OBJECTIVES:

1) Examine Pacific Rim (and domestic) market potential for hard white wheat.

2) Increase seed of MSU-MAES hard white winter wheat for export (and domestic) customer end-use-product evaluation.

3) Examine continuing plans beyond 1987.