TITLE: Assessing agronomic practices to advance cereal production in Montana

TIME PERIOD: Jan 1, 2018 to Dec 31, 2018

PERSONNEL: Research Scientists at the following AES Research Centers:

1. Southern Agricultural Research Center (SARC) - Huntley
   Kent A. McVay, Extension Crop Scientist & Coordinator
2. Northern Agricultural Research Center (NARC) - Havre
   Peggy Lamb, Crop Scientist
3. Central Agricultural Research Center (CARC) - Moccasin
   Jed Eberly, Soil Microbiologist
4. Eastern Agricultural Research Center (EARC) - Sidney
   Chengci Chen, Superintendent/Crop Scientist
5. Northwestern Agricultural Research Center (NWARC) - Kalispell
   Robert N. Stougaard, Superintendent/Weed Scientist
6. Western Triangle Ag Research Center (WTARC) - Conrad
   Gadi V.P. Reddy, Entomologist

COOPERATORS: Research Scientists, Research Associates, Assistants, Technicians and Farm Managers at each research center, and cooperating producers hosting off-station research trials on farms across Montana.

OBJECTIVES:

1. To evaluate the effects of differing systems on crop and variety performance under diverse environments represented across the state of Montana.
2. To evaluate the potential fit of other materials, concepts and techniques with various cropping systems employed for cereal crop production.

BACKGROUND AND JUSTIFICATION:

Montana agricultural producers are always looking for the development and implementation of new and/or refined materials and methods for enhanced economic efficiency in cereal crop production. This project is designed to provide answers on these issues to producers across the many regions of the state.
PROJECTS:

I. Cropping System Investigations
   a. Spring grain performance following various cover crop mixes in southcentral Montana – SARC
   b. Evaluation of spring wheat under dryland recrop conditions – EARC
   c. Evaluation of durum under dryland recrop conditions – EARC
   d. Evaluation of barley under dryland recrop conditions – EARC

II. Cereal Variety Performance Evaluations
   a. Hard Red & White Winter Wheat Trials
      i. Off-station winter wheat variety performance trials in south central Montana – SARC
      ii. North central Montana off-station winter wheat cultivar performance evaluations – NARC
      iii. Off-station winter wheat cultivar evaluations for the Western Golden Triangle area of Montana – WTARC
      iv. Winter cereal forage cultivar evaluations for the Western Golden Triangle area of Montana – WTARC
      v. Off-Station winter wheat variety performance trials in Central Montana – CARC
      vi. Evaluation of Clearfield Winter Wheat Experimental Lines–NWARC
   
   b. Hard Red & White Spring Wheat Trials
      i. Off-station spring wheat variety performance trials in south central Montana – SARC
      ii. North central Montana off-station spring wheat cultivar performance evaluations – NARC
      iii. Off-station spring wheat cultivar evaluations for the Western Golden Triangle area of Montana – WTARC
      iv. Off-station spring wheat variety performance trials in Central Montana – CARC
      v. Western Regional Hard Spring Wheat Nursery – NWARC
      vi. Spring wheat off-station nursery – NWARC
      vii. Spring wheat seeding rate study – NWARC
      viii. Evaluation of spring wheat varieties under dryland conditions at four off-station sites – EARC
   
   c. Soft White Wheat Trials
      i. Western regional soft spring wheat nursery – NWARC
   
   d. Durum Trials (none this year funded by this project)
i. North central Montana off-station spring durum cultivar performance evaluations – NARC.
ii. Durum cultivar evaluations for the Western Golden Triangle area of Montana – WTARC
iii. Evaluation of durum varieties under dryland conditions at four off-station sites – EARC

e. Spring Barley Trials
i. Off-station spring barley variety performance trials in south central Montana – SARC
ii. Off-station spring barley cultivar evaluations for the Western Golden Triangle area of Montana – WTARC
iii. Spring barley off-station variety performance trials in Central Montana – CARC
iv. Evaluation of Hull-less Barley Varieties – EARC

III. Alternative Crop Management (none this year)
IV. Crop Nutrient Management (none this year)
V. Disease Management (none this year)
VI. Insect Management (none this year)
VII. Weed Management (none this year)
VIII. Other studies (none this year)

PROCEDURES:

All projects are replicated either three or four times in randomized designs appropriate to each location. All reported grain yields and protein are corrected to a uniform moisture level as reported in the results table for each project. Grain moisture and test weight are typically measured using Dickey-John moisture meters. Grain protein is determined using either Perten or Foss NIR technology.

APPLICATION AND RESULTS:

Results are available to the Montana crop producer as well as to the scientific community. All results from these investigations will be available in CD format by request and can be found on the web at the Southern Agricultural Research Center website (http://www.sarc.montana.edu/) as well as at the Montana Wheat and Barley Committee website (http://wbc.agr.mt.gov/).

CURRENT or PENDING BUDGETARY SUPPORT:

All projects included herein are partially supported by MAES funding to include scientist salaries. Projects included herein are not supported by other grants.

POTENTIAL FOR ENHANCED EXTRAMURAL FUNDING:
Extramural support for research on variety evaluations is difficult to obtain. By funding this project MWBC helps us build long-term evaluations over multiple environments. The resultant data sets and documented trends can then be used to justify more elaborate grant proposals that can gain attraction from other funding sources.

**INCREASED COMPETITIVENESS DUE TO THIS FUNDING:**

Much of the research associated with this project is conducted off-station on cooperating producer's farms. Evaluating crop performance in diverse environments provides data to help producers make management decisions in cropping systems, variety selection, crop nutrition, and crop pest management as well as in general agronomics.

**NUMBER OF YEARS MWBC HAS FUNDED THIS PROJECT:**

This Joint Research Center project has been funded by MWBC for 46 years (1972-2017) starting with a total award of $14,000 in 1972.

**OVERALL BUDGET:**

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<tr>
<th>Category</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Salary</td>
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<td>Benefits</td>
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<td>Supplies/Expendables</td>
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<td>Travel</td>
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<td>Contracted Services</td>
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<td>Repair/Maintenance</td>
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<tr>
<td><strong>Grand Total</strong></td>
<td><strong>$210,000</strong></td>
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**Budget justification.** This budget is a cumulative summary of six research centers including Eastern, Northern, Western Triangle, Northwestern, Central, and Southern Agricultural Research Center. Expenses are estimated for the period Jan 1, 2018 through Dec 31, 2018. The majority of this budget, $175,200 goes to personnel including summer help, classified, and professional for salaries and benefits. Approximately $18,000 is included for supplies and expendables to cover the costs of fertilizer, herbicides, bags, etc. Another $7,700 is included for repair and maintenance of equipment. Travel amounts to $5,600. The remainder is for contracted services for sample analysis. Individual station budgets can be obtained from OSP upon request.