

Document of Collaboration

These documents include

1. The description and budgeted plan for the release of research results
2. Letters of support and Commitment from
 - a. Industry
 - b. Growers
 - c. Colleagues

Description and budgeted plan for the release of research results (e.g., data, germplasm, cultivars, genetic resources) that is compliant with the terms and conditions that govern USDA NIFA funded projects in the areas of plant breeding, genetics and genomics

We anticipate that this project will generate phenotype and genotype data of long-term utility. Therefore, we have arranged that all data will be deposited with the T3 database administered by Dr. Jean-Luc Jannink. Please see letter of support to this effect. No additional resources are required from this project: formatting and uploading of data is covered by the salaries requested. Likewise, we anticipate that this project will generate germplasm of long-term utility – particularly the doubled haploid training population and doubled haploids derived from specific cycles of genomic selection. These genetic stocks will be deposited with the National Small Grains Collection administered by Dr. Harold Bockleman. Please see letter of support to this effect. No additional resources are required for this activity. We anticipate that this research will lead to the development of germplasm with potential for variety release. Variety releases follow a defined process at Oregon State University, including review by a Cereal Variety Release Advisory Committee and a University Variety Release Committee. Variety releases are approved by the Director of the Agricultural Experiment Station. In the event of PVP, we will follow the procedures described in Article 9 of the NIFA NATIONAL INSTITUTE OF FOOD AND AGRICULTURE; U.S. DEPARTMENT OF AGRICULTURE RESEARCH TERMS AND CONDITIONS; AGENCY-SPECIFIC TERMS AND CONDITIONS MAY 2012.



January 24, 2013

Patrick Hayes, Barley Project
253 Crop Science Bldg
Oregon State University
Corvallis, OR 97331 USA

Dear Dr. Hayes:

The Idaho Barley Commission is very pleased to offer its full support to the USDA-AFRI grant proposal entitled *Bringing Food Barley to the Table*.

As you are aware the Idaho Barley Commission has provided funding support for food barley variety development research at the USDA ARS Small Grains Germplasm Research Facility in Aberdeen, ID, for the past 15 years and winter food barley variety development at Oregon State University for the past five years. We are very committed to the development and expansion of this exciting new class of barley production and utilization, particularly in the face of rising health concerns from obesity, diabetes and other chronic diseases that can be managed through better diets.

The Idaho Barley Commission will meet later this winter to set budgets for FY 2014 research projects and will be evaluating a cost-share contribution to support research that is being proposed under this USDA AFRI grant. In particular, we are very interested in (1) development of winter food barley cultivars as Idaho has demonstrated its strong interest in expanding winter barley production opportunities in both food and malting; (2) testing experimental lines developed by your Double Haploid Genomic Selection program at Idaho locations to evaluate agronomic adaptation to our local growing conditions; and (3) furthering our understanding of end-use traits in a multitude of food applications.

We look forward to this opportunity to strengthen our partnership with our leading barley research institutions in our region, including the USDA ARS Small Grains Germplasm Research Facility and Oregon State University, and with the food manufacturing industry to help achieve your objectives in bringing food barley to the American table. I will keep you apprised of our research funding decisions in the coming weeks.

Sincerely,

Kelly L. Olson

Kelly L. Olson
Administrator
821 W. State Street
Boise, ID 83702
208-334-2090 www.barley.idaho.gov



Minnesota Barley

2601 Wheat Drive • Red Lake Falls, MN 56750 • Phone: 218/253-4311 • FAX: 218/253-4320

February 5, 2013

Patrick Hayes, Barley Project
253 Crop Science Building
Oregon State University
Corvallis, Oregon 97331 USA

Dear Mr. Hayes:

The Minnesota Barley Research & Promotion Council is in full support of the USDA-AFRI grant proposal entitled Bring Food Barley to the Table.

The Minnesota Barley Council has been a promoter of food barley development for the past 25 years. We were instrumental in obtaining the heart healthy designation for barley and have assisted in the varietal development of high beta glucan barley at the University of Minnesota. We currently support and assist in the development of winter food barley varieties at the University of Minnesota. We look forward to publicizing these efforts to our growers and assisting in on-farm trials.

Sincerely,

Marvin Zutz
Executive Director

OWC



OREGON WHEAT COMMISSION

February 6, 2013

Dr. Patrick Hayes
253 Crop Science Building
Oregon State University
Corvallis, OR 97331

Dear Dr. Hayes,

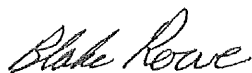
The Oregon Wheat Commission would like to express our strong support for the USDA-AFRI grant titled *Bringing Food Barley to the Table: Rapid Response Breeding for Human Health and Nutrition*.

The Oregon Wheat Commission has a long history of representing approximately 4,000 Barley and Wheat Producers and Land Owners across the state. In 2012, barley was produced on 53,000 acres for a total production of 3.8 million bushels with a value to our State of over \$11 million. The growers of this State have long supported the Barley Variety Development Program at Oregon State University.

The Commission is very excited about the development of food barley varieties both for their potential consumer health benefits and the benefits these new varieties could offer to our growers and our economy. The majority of the grain production in Oregon is a low rainfall summer-fallow based system. In recent years barley has decreased in acreage because it has not been competitive with wheat. We are hopeful that varieties developed through this program and others like it will accelerate the development of these new varieties and provide growers with an additional option for managing risk and crop rotation when making their production decisions.

The Oregon Wheat Commission will be considering their research funding for the 2013-2014 fiscal year in the coming months. Those deliberations will include a contribution to the efforts proposed in this grant. Please feel free to contact me if I can be of further assistance at (503) 467-2161.

Sincerely,



Blake Rowe, CEO
Oregon Wheat Commission



2702 W. Sunset Boulevard, Suite A • Spokane, WA 99224-1112
509.456.2481 • fax: 509.456.2812 • e-mail: wga@wagrains.com

February 4, 2013

Patrick Hayes, Barley Project
253 Crop Science Bldg
Oregon State University
Corvallis, OR 97331 USA

Dear Dr. Hayes:

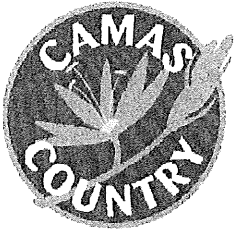
I am pleased to write in support of the "Bringing Barley to the Table: Rapid Response Breeding for Human Health and Nutrition" USDA AFRI grant. The Washington Grain Commission is a strong supporter of barley research, and specifically, Dr. Kevin Murphy, at Washington State University.

The work that is being developed through this grant is of great interest to the growers in Washington State. The targeting of low temperature tolerance and facultative growth habit in order to provide maximum flexibility, adaptability, and productivity in an era of climate change and shifting agronomic practices will be utilized by many growers. We feel that this type of research will stimulate additional acreage of barley in our state as well.

We look forward to the opportunity to work with you on this grant and we will be following the progress closely. Should you need our assistance or have any questions, please feel free to contact me.

Sincerely,

Mary Palmer Sullivan
Vice President
509-456-2481



February 12, 2013

Camas Country Mill, LLC fully supports the goals, objectives and methods described in the USDA-AFRI grant proposal entitled *Bringing Food Barley to the Table*.

Camas Country Mill is committed to local grain production and milling, and currently grows and processes barley and other cereal crops in the Southern Willamette Valley. Our company has an established and beneficial relationship with regional plant breeding programs, including barley variety development research at Oregon State University under the direction of Dr. Hayes and Ross. Camas Country Mill has grown and contracted with other Oregon farmers to grow food barley varieties coming from Oregon State University, and our company has a long-term interest in the development and cultivation of improved food varieties.

The expansion of food barley research supports Camas Country Mill's commitment to providing the best in whole grain nutrition; characterizing food quality attributes and developing new food barley varieties will aid our company in promoting barley as a nutritionally significant and unique whole grain.

This project will advance our knowledge of the prospects for further commercializing food barley, and will bring crop diversity to our agricultural systems and product diversity to our customers. Camas Country Mill looks forward to this opportunity to strengthen our partnership with leading barley research institutions.

Sincerely,

Tom Hunton
Camas Country Mill, LLC
P.O. Box 130
Alvadore, OR 97409



Dr. Patrick Hayes
Barley Project
253 Crop Sci. Bldg
3050 Campus Way
Oregon State University
Corvallis, OR 97331 USA

February 8, 2013

Dear Dr. Hayes;

ConAgra Mills is very pleased to offer its full support to the USDA-AFRI grant proposal entitled *Bringing Food Barley to the Table*.

Our company has a long-term interest in the benefits whole grains can bring to human health and nutrition. Of the cereal grains, barley stands to make unique contributions. Barley grain beta glucan is certainly important, but barley can also bring other essential attributes to the table.

By characterizing food quality attributes and developing improved food varieties, this project will advance the state of our knowledge and the prospects for commercializing barley foods. This will bring diversity to agricultural systems and offer consumers an expanded menu of healthy whole-grain choices.

As a demonstration of our commitment to this research, our company will perform the following in-kind analyses/services to be suggested by Dr. Ross and ourselves.

Sincerely,

Glen Weaver
Director, RQI
ConAgra Mills



.....
GENERAL MILLS

General Mills, Inc. confirms the value to the food industry of the USDA-AFRI grant proposal entitled *Bringing Food Barley to the Table*.

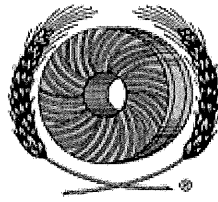
Our company has a long-term interest in the benefits whole grains can bring to human health and nutrition. Of the cereal grains, barley stands to make unique contributions. Barley grain beta-glucan is important, but barley can also bring other essential attributes to the table.

By characterizing food quality attributes and developing improved food varieties, this project will advance the state of our knowledge and the prospects for commercializing barley foods. This will bring diversity to agricultural systems and offer consumers an expanded menu of healthy whole-grain choices.

General Mills, Inc. looks forward to this opportunity to strengthen our partnership with our leading barley research institutions throughout the US, including Oregon State University, the USDA ARS at Aberdeen, Idaho, the University of Minnesota, and Washington State University.

Sincerely,

Laura M. Hansen, Ph.D.
Sr. Technology Manager- General Mills, Inc.
Grain-Fiber Ingredient Technology Program
330 University Ave. SE
Minneapolis, MN 55414
Laura.Hansen@genmills.com



GRAIN MILLERS

February 7, 2013

To: USDA-AFRI

Grain Millers, Inc. is very pleased to offer its support to the USDA-AFRI grant proposal entitled *Bringing Food Barley to the Table*.

Grain Millers, Inc. currently contracts and purchases barley and other small crops from growers throughout North America for the production of barley flakes, flours, etc. sold to the food industry as functional ingredients. Grain Millers, is the largest oat and small grain industrial processor in North America with manufacturing facilities in the US and Canada and markets its grain-based ingredients to food companies throughout the United States, Canada, Mexico and exports to Central and South America as well as Asia-Pacific.

Grain Millers is constantly looking to establish working relationship with the small grain breeding programs and is constantly evaluating food uses with Oregon State University (Pat Hayes, in particular).

Nutritionally unique barley varieties, i.e. high beta-glucan, diverse and rich phytochemical content together with certain morphological characteristics, i.e. ease of dehulling or pearling, are of significant interest to our food ingredient program. Clearly, by characterizing food quality attributes and developing improved food varieties, this project will advance the state of our knowledge and the prospects to further commercialize barley into healthy food systems.

The fact that Grain Millers, Inc. has complete Cereal R&D and QC laboratories at its Eugene, OR facilities, it is willing to offer analytical and pilot plant support services in support of this particular OSU initiative.

Cordially,

Roberto Serrano
Vice-President, Technical Services & Innovation
Grain Millers, Inc.
315 Madison St.
Eugene, OR





February 8, 2013

Hummingbird Wholesale is very pleased to offer its full support to the USDA-AFRI grant proposal entitled Bringing Food Barley to the Table.

We are a distributor of Organic beans, grains, flours and seeds. We deliver weekly to customers from San Francisco to Seattle. Our customers are unusually discerning when it comes to the nutritional quality of the foodstuffs they purchase. We currently carry two types of hulless barley grain and one type of barley flour. Tamalpais (a white hulless variety now popular for its tenderness and ability to cook quickly) and Karma (a black hulless Tibetan heirloom recently propagated in the Willamette Valley) were recently introduced to our customer base through our newsletters and price lists. This has resulted in sales to large food distributors in California as well as our weekly customers.

As the Farm Liaison for Hummingbird Wholesale, I have had many inquiries as to what kind of barley research can be conducted at OSU. One recent query from a grain distributor in Montana involved the possibility of crossing the agronomic traits of Karma barley (very tall and easy to grow Organically with a yield of 3,000 lb. /acre) with the nutritional and superior flavor of the short growing black barleys which typically grow to just ten inches in height and yield only 800 lb. /acre. This in itself would be a boon to both Willamette Valley farmers and the consumer. Being able to offer both the consumer more affordable black barley and the farmer a variety which yields well would bode well for all involved.

We are also looking forward to the commercial availability of the Streaker variety of hulless barley developed at OSU. Streaker barley flour will, in our opinion become very popular for the making of soft barley pretzels. Its unsurpassed flavor and nutritional qualities will inevitably sell itself.

Not being a company who employs professional barley researchers, we can only imagine the ideas and possibilities that will result from further food barley research.

Our company is committed to the development of barley as a food and has supported food barley variety development research at Oregon State University under the direction of Dr. Hayes and Ross. We are very committed to the development and expansion of winter and hulless food barleys, particularly in the face of rising health concerns from obesity, diabetes and other chronic diseases that can be managed through better diets.

Hummingbird Wholesale looks forward to this opportunity to strengthen our partnership with our leading barley research institutions throughout the US, including Oregon State University, the USDA ARS at Aberdeen, Idaho, the University of Minnesota, and Washington State University.

Thank you.

Sincerely,

James H. Henderson
Farm Liaison
Hummingbird Wholesale
Eugene, Oregon



February 14, 2013

Patrick Hayes, Barley Project
253 Crop Science Bldg
Oregon State University
Corvallis, OR 97331 USA

Dear Dr. Hayes:

As stated in a separate letter the Idaho Barley Commission will provide its full support and backing to the USDA-AFRI grant proposal entitled *Bringing Food Barley to the Table*. Further, we are committed to ensuring Dr. Gongshe Hu, USDA ARS barley breeder at the National Small Grains Germplasm Research Facility, has the necessary resources to participate as a co-PI in this AFRI Project if funded.

We look forward to this opportunity to strengthen our partnership with our leading barley research institutions in our region, including the USDA ARS Small Grains Germplasm Research Facility and Oregon State University, and with the food manufacturing industry to help achieve your objectives in bringing food barley to the American table.

Sincerely,

Kelly L. Olson

Kelly L. Olson
Administrator
821 W. State Street
Boise, ID 83702
208-334-2090 www.barley.idaho.gov

February 15, 2013

Dear Panel members,

With this letter, I want ensure the panel that I am committed to participating in the USDA-AFRI Project "Bringing Barley to the Table" as specified in the proposal.

Development of food barley has been one objective of the breeding program at Aberdeen. I have the appropriate resources to complete the work proposed.

Gongshe Hu

Research Geneticist/Breeder

USDA-ARS

1691 S 2700 W

Aberdeen, Idaho 83210

(208)-397-4162 ext. 241

Gongshe.Hu@ars.usda.gov

February 14, 2013

Professor Pat Hayes
253 Crop Sci. Bldg
3050 Campus Way
Oregon State University
Corvallis, OR 97331

Dear Pat:

I am happy to commit to growing the field trials described in the proposal of Hayes et al. "Bringing barley to the table" at no cost to the AFRI project. Furthermore, I will collaborate on the project by sharing all data, archiving seed samples, and actively seeking funding to cover the costs of analyzing food quality traits from the trials grown at Mt. Vernon. WA.

Our growers have a great interest in this type of work.

Sincerely,



Stephen Jones
Director/ Professor



United States
Department of
Agriculture

Agricultural
Research
Service

1691 S. 2700 W.
Aberdeen, ID 83210
voice 208-397-4162 ext. 112
fax 208-397-4165
Harold.Bockelman@ars.usda.gov

February 4, 2013

Dr. Patrick Hayes
OSU Barley Project
3050 Campus Way
Oregon State University
Corvallis, OR 97331

Dear Patrick:

With this letter I wish to indicate that the National Small Grains Collection (NSGC) agrees to store seeds of parents and DH lines developed as part of the AFRI grant proposal, "Bring barley to the table: addressing the challenges of climate change and human nutrition." NSGC does not plan to regenerate these accessions, but will hold and distribute the seeds during a reasonable life expectancy of approximately 20 years under our medium-term storage conditions.

NSGC is pleased to support the valuable research to be conducted in this project.

Sincerely,

Harold E Bockelman

Harold E. Bockelman
Curator & Supervisory Agronomist



National Small Grains Collection

NSGC Home Page: www.ars.usda.gov/pwa/aberdenn
Germplasm Resources Information Network (GRIN): www.ars-grin.gov/npgs



United States Department of Agriculture

Research, Education, and Economics
Agricultural Research Service

To: Patrick Hayes

Re: Data management and availability from "Bringing barley to the table: addressing the challenges of climate change and human nutrition" through The Triticeae Toolbox (T3).

4 February 2013

Dear Pat,

I am enthusiastic about the research that you are proposing. The integrated approach will be most effective at improving barley for food uses and, indeed, getting it to the table of American consumers. I also believe that The Triticeae Toolbox (T3) can be a useful tool for you, to leverage data from the Triticeae Coordinated Agricultural Project, to manage the large amount of data that you will have, and to make your data available to barley researchers world wide.

T3 provides a relational database that is appropriately structured for plant breeding in the genomics era, with data categories for high-throughput marker data, for a range of traits, and for trial annotations and results. Tools currently exist to flexibly query the database to download data for a number of applications. We are also building analysis capability into T3.

Our curator, Vic Carollo Blake, and our database programmers, Dave Matthews and Clay Birkett will be available to ensure that you are able to upload the data generated by your project as needed.

I look forward to this collaboration and hope that it happens.

Regards,

A handwritten signature in black ink, appearing to read "JL Jannink", with a long horizontal flourish extending to the right.

Jean-Luc Jannink, Objective Leader for T3 in the Triticeae Coordinated Agricultural Project



Robert W. Holley Center for Agriculture and Health
Tower Road
Ithaca, NY 14853-2901

Voice: 607 255 5266 • FAX: 607 255 6683 • E-mail: JeanLuc.Jannink@ars.usda.gov
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UNIVERSITY OF MINNESOTA

University of Minnesota Extension

*Regional Sustainable Development
Partnerships*

*411 Borlaug Hall
1991 Upper Buford Circle
St. Paul, MN 55108
612-625-3148
Fax: 218-726-7566
www.rsdpmn.edu*

February 1, 2013

Dr. Kevin Smith, Professor
Agronomy and Plant Genetics
University of Minnesota
411 Borlaug Hall
1991 Upper Buford Circle
St. Paul, MN 55108

Dear Dr. Smith,

Please accept this letter of support for the project entitled "Bringing Food Barley to the Table." This project will bring needed agronomic and breeding attention to whole grain barley as a human food crop. The U of M Regional Sustainable Development Partnerships are interested in seeing this project move forward in order to diversify cropping systems for producers in our state and region. Last week I attended a meeting of the Farm Breeding Club at the Northern Plains Sustainable Agricultural Society in Aberdeen South Dakota. That group, which includes farmers, agronomist, and plant breeders, discussed the need for hulless barley varieties suited for their organic cropping systems. I understand that organic production is outside the scope of this project, but it points to the interest that this crop is generating among farmers in our regions.

In addition, there is a notable need for whole grains that can be introduced into the local and regional food systems. The Regional Partnerships conduct research and outreach on building healthy, accessible, local food systems and have noted that whole grains are an element that has not been developed in our region. The selection and development of hulless food barley varieties, and their public release, would be a welcome advancement. Should this project be funded, the U of M Regional Partnerships would be interested in working within our food and farming network to help support on farm testing of the barley varieties.

I hope that this project is reviewed favorably and that you are able to realize this important work.

Sincerely,



Kathryn J Draeger, PhD
Statewide Director



An international center for meeting and learning about northern grown crops of the United States

January 30, 2013

Dr. Kevin Smith
Department of Agronomy and Plant Genetics
University of Minnesota – 411 Borlaug Hall
1991 Upper Buford Circle
St. Paul, MN 55108-6026

Dear Dr. Smith:

I am writing to offer my enthusiastic support for the winter food barley project proposal submitted to the USDA/NIFA/AFRI program. Northern Crops Institute (NCI) is currently conducting a food barley promotion project. The acceptance of barley products for its flavor is well established through the sensory study conducted as part of a recent project. Also, there is tremendous interest in the health benefit of barley at a recent food ingredient show where barley was exhibited. Progressive research has been limited because funding is typically focused on more profitable crops such as wheat, corn and soybeans. However, with the promising results from recent product development and strong interest at food shows, activities and research to promote barley as a food ingredient should be encouraged.

Northern Crops Institute is especially interested in collaborating with you to investigate baking characteristics for quality evaluation. In addition, NCI is capable of providing basic grain analyses, including protein, starch, kernel characteristics; as well as chemical analyses such as measuring β -glucan content.

Northern Crops Institute has many years of experience working together with university and industry personnel to promote regionally grown crops. This project will benefit us by exploring new traits of food barley and expanding the possibilities of food barley. We are more than happy to provide any help necessary to make this project successful.

For any questions, please do not hesitate to contact me at 701-231-6412 or Natsuki.Fujiwara@ndsu.edu.

Sincerely,

Natsuki Fujiwara
Food Technologist

January 29, 2013

Dr. Kevin Smith

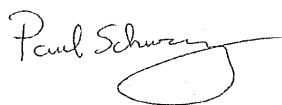
Department of Agronomy and Plant Genetics
University of Minnesota
1991 Upper Buford Circle
411 Borlaug Hall
St. Paul, MN 55108-6026

Dear Kevin,

This letter is in support of your USDA-AFRI grant proposal: Bringing food barley to the table (P. Hayes, A. Cuesta-Marcos, A. Ross, K. Smith, G. Hu, and K. Murphy). The development of food barley lines, as proposed in the grant, will be invaluable to my research on the structure and functionality of various biochemical components in barley. Specifically we are very interested in the molecular weight distribution of beta-glucan/beta-linked oligosaccharides as impacted by genetic variations in beta-glucan deposition. The NDSU Cereal Chemistry group, of which I am part, is also looking at the use of barley as a base in healthy energy drinks. Variation in the content and composition of starch, cell wall polysaccharides and phenolics in barley lines will be very useful.

I feel that your research will lay the groundwork for some very exciting food barley research, and I look forward to working with you in the future.

Sincerely,



Paul Schwarz
Professor
Director, Institute of Barley and Malt Sciences

PLANT SCIENCES

NDSU Dept 7670 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.7971 | Fax 701.231.8474 | www.ag.ndsu.nodak.edu/plantsci

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NDSU is an EO/AA university.



United States Department of Agriculture
Research, Education, and Economics
Agricultural Research Service

Jan 25, 2013

SUBJECT: Collaboration

TO: Patrick Hayes
Professor, Barley Breeding Projects
Oregon State University

FROM: Mitchell L. Wise
Research Chemist
Cereal Crops Research Unit

This letter is to confirm my commitment to participate as a collaborator in the proposed AFRI project for food barley improvement. As a contributing member of this project I will analyze approximately 1500 germplasm lines for tocopherol and tocotrienol (vitamin E) content. This will be accomplished by standard solvent extraction methods followed by ultra-high pressure chromatography (UPLC) using fluorescent detection. My laboratory has extensive experience with and is well equipped for these type analyses. In addition we will provide total lipid analysis using near-infrared transmission (NIT) methods.



Cereal Crops Research Unit
501 Walnut Street, Madison, WI 53726 USA
Voice - (608) 262-3355 FAX - (608) 890-0302
Midwest Area

An Equal Opportunity Employer

Hayes, Patrick

To: wiers002@umn.edu
Subject: RE: AFRI food barley again

From: Jochum Wiersma [mailto:wiers002@umn.edu]
Sent: Wednesday, February 13, 2013 1:13 PM
To: Hayes, Patrick
Subject: RE: AFRI food barley again

Pat,

Yes, I do think that develop the genomic selection tools for facultative and winter food barley is a worthwhile endeavor that demands funding. Not only because the projected outcomes would allow for diversification of the production systems in part of the country that have few other options, food barley will also serve as a model for the effectiveness of genomic selection to address rapidly evolving threats.

Jochum

|



Michael D. Flowers, Dept. of Crop and Soil Science
Oregon State University, 107 Crop Science Building, Corvallis, Oregon 97331-3002
T 541-737-9940 | F 541-737-1589 | Mike.Flowers@oregonstate.edu

February 11, 2013

Dr. Pat Hayes,

I am writing in support of your grant proposal entitled "Bringing Barley Foods to the Table". This grant would support needed research into the development of well adapted food barley varieties for the Pacific Northwest. The addition of food barley varieties in this region would give growers a higher value option compared to the currently available alternatives to the regions wheat based agricultural systems. While the grant proposal does not have an extension component, I fully support the research and will provide assistance as I am able to introduce this new crop to the regions growers, crop consultants, and industry.

Sincerely,

A handwritten signature in black ink, appearing to read "Mike Flowers", followed by a long horizontal line.

Michael Flowers, Ph.D.
Associate Professor and Extension Cereal Specialist