

March 5, 2012

Honorable XX
Office Building
Washington, D.C.

Dear Senator or Representative X:



The National Barley Improvement Committee (NBIC) represents the entire US barley community - growers, researchers, malting, brewing, and cereal food end-users (Appendix B).

Barley production, and the manufacture and sale of value-added barley products (malt, beer, food, livestock, fish & biofuels) have a significant impact on the US economy (Appendix A).

* \$760 Million/Year Crop Value *56% Used in Beer *38% Feed *3% Food *3% Seed

>Critical and primary raw material for beer (**NO BARLEY = NO BEER**)

- * \$224 Billion/year brewing industry business activity
- * 1.8 Million jobs
- * \$34 Billion business and personal taxes
- * \$11 Billion consumption taxes

Federal investment in barley research is needed to keep barley a viable option for US growers and to maintain and enhance value-added job generating enterprises in the US.

> **Barley is primarily a public sector non-GM crop**, with most barley research and development at state universities and USDA-ARS facilities

> **Little interest by biotechnology seed companies** in barley research & variety development

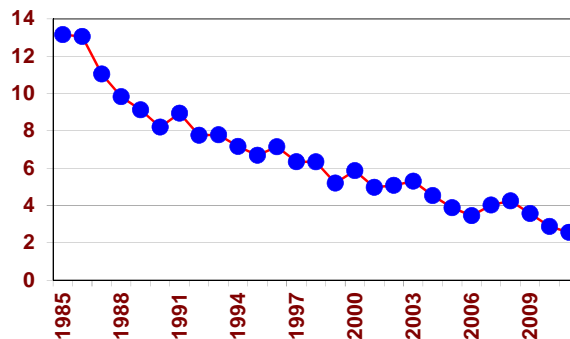
- * Low acreage = limited seed sale potential

> **Barley is facing stiff competition from corn, soybeans, canola, and other crops** that are receiving substantial private sector investment, including GM variety development

> **Malting and brewing industry barley end-users provide some research support**

- * Unlike seed companies, there is limited incentive to invest in variety development
- * In competitive worldwide economy, they can purchase quality barley at best price, from Canada, Europe, or other countries
- * Thus US growers, the economy, and government revenue are the losers without adequate federal and state support of barley research that keeps barley a viable US crop

US Barley Acreage
Millions of Acres



We are requesting the assistance and support of your office to increase or at least maintain funding at FY2012 levels for the USDA Agricultural Research Service (ARS) and National Institute of Food and Agriculture (NIFA) in the FY2013 budget.

Funding agricultural research is a justified federal expenditure and needed to maintain and enhance the agricultural economy and job creation.

- * Crop production and agricultural based industries are a strong component of economy
- * Generates new employment, grower income, and federal, state, & local tax revenue
- * Crop and value added product exports (\$42 B in 2011) reduce unfavorable trade balance
- * Helps maintain US dominance in agricultural world markets
- * Vital federal role in funding research that is not being conducted in private sector
- * Payoff of 20 to 60 percent from government investment in agricultural research

The NBIC recognizes the need to address the federal deficit, and agricultural research funding has been reduced as part of that effort the past two fiscal years. Further cuts will cause additional harm to US agricultural research infrastructure and its ability to generate innovations necessary for the agricultural economy to remain viable, competitive, and expand job creation.

FY2011 Agriculture Appropriations Bill

	<u>Funding</u>	<u>Change from FY2010</u>	
USDA-ARS	\$1.133 Billion	(\$ 47 Million) (4.0%)	Salaries & Expenses
USDA-NIFA	\$1.219 Billion	(\$132 Million) (9.8%)	Discretionary

Earmarks Eliminated for All Federal Agencies - Impact on Barley (\$1.3 Million)

(\$290,000)	ARS Cereal Disease Laboratory, St. Paul – Ug99 Wheat & Barley Research
(\$547,000)	NIFA Barley for Rural Development Special Research Grant
(\$471,000)	NIFA US Barley Genome Project Special Research Grant

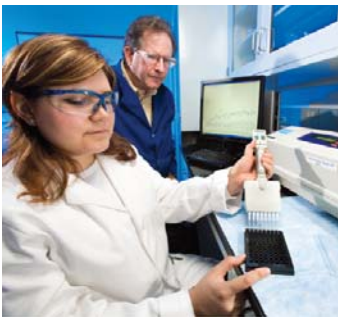
- > Elimination of ARS programs scored as earmarks. Flat budgets with increased facility and research costs for staff remaining, resulted in reduced research capacity and effectiveness
- > Elimination of NIFA Special Research Grants and other programs scored as earmarks resulted in substantial loss of funding to state universities, many of which also received state funding cutbacks

FY2012 Agriculture Appropriations Bill

	<u>Funding</u>	<u>Change from FY2011</u>	<u>Change from FY2010</u>
USDA-ARS	\$1.095 Billion	(\$38 Million) (3.4%)	(\$ 85 Million) (7.2%)
USDA-NIFA	\$1.207 Billion	(\$12 Million) (0.9%)	(\$144 Million) (10.6%)

Closes 9 ARS research laboratories and one major program

- > **Cost of closing ARS locations and programs = savings to be realized in first year**
- > Congress did not provide closing costs
- > **Closing costs taken out of overall ARS budget**
 - * Across board cut to all ARS locations and programs
 - * Utilization of funds budgeted for vacant positions (previously used by HQ for short term, high priority or emergency needs, until positions filled)
- > Net effect is further reduction in ARS capacity to conduct research and meet its mission



The NBIC supports the FY2013 Administration request of \$2.7 million for ARS pay costs.

- > ARS budget for salary and expenses has declined over past two fiscal years
- > Majority of funds at locations are obligated to increasing fixed facility and salary costs.
- > If pay costs are not provided, significant reductions occur in discretionary funds available to conduct research

The NBIC supports increased funding for Hatch Act & Smith-Lever Formula Funds.

- > Provides critical support to applied scientists, including crop breeders, and extension personnel at state universities
- > Practical research and programs of critical importance to farmers, end-users, and consumers
- > Such work is not funded by existing competitive grant programs which focus on basic research

NBIC supports increased funding for the Agricultural and Food Research Initiative (AFRI) but not through redirection of funds from the ARS budget or other NIFA discretionary funding.

- > Competitive plant science grant program that provides valuable supplemental support to barley and other agricultural scientists
- > Supported very productive and recently ended **Barley Coordinated Agricultural Project**
- > A new AFRI grant of \$25 million over 5 years was awarded a year ago by NIFA for the **Triticeae (Barley & Wheat) Coordinated Agricultural Project or T-CAP.**
 - * Applying latest genomic technology to barley and wheat variety development
 - * 55 university and ARS researchers & educators from 21 states

NBIC supports reauthorization in next Farm Bill funding for research regarding diseases of wheat and barley caused by *Fusarium graminearum* to the US Wheat & Barley Scab Initiative, a consortium of land-grant colleges and universities (Food, Conservation, and Energy Act of 2008 - Public Law 110-246, Title VII, Section 7307). **FY2012 Funding = \$5 Million**

Thank you for your consideration.

Sincerely,

Juliet Marshall
Chair

Brian Lacey
Vice Chair

Mike Davis
Executive Secretary
mpdavis.amba@sbcglobal.net

USDA AGRICULTURAL RESEARCH SERVICE (ARS)

The Agricultural Research Service (ARS), the USDA in-house scientific research agency, conducts research of high national priority to develop and make available solutions that address agricultural challenges, including those faced by barley. The ARS funds projects that directly and indirectly benefit barley.

Highlights and examples of important barley research programs include, but are not limited, to the following.

CROP BREEDING & PROTECTION

Emerging diseases threaten the US barley crop and its value added agricultural industries. The ARS is working to address critical threats posed by the Ug99 race (also know as race TTKSK) of stem rust, *Fusarium* head blight (FHB or scab), and many other diseases.

Ug99 Stem Rust is a new race spreading in Africa and the Middle East and it is only a matter of time before it reaches the US. Most wheat and barley varieties in the US and the world are susceptible to this devastating disease, which could cause substantial crop and economic losses, threatening worldwide food security. NBIC thanks Congress for appropriating increased funding of \$3 million (FY09 & FY10) for rust research. This funding, which is being utilized at various ARS research locations and state universities, is critical to the effort to address the vulnerability of the US barley and wheat crops to Ug99 stem rust. ARS helps support a critical nursery screening for barley and wheat for Ug99 resistance in Kenya. Increased funding is needed for Ug99 research. Any further reductions in current funding would slow down this effort, preventing ARS from fully implementing its Ug99 action plan



<http://www.ars.usda.gov/ug99/> and would leave wheat and barley crops at risk.

A key ARS location for Ug99 research is the **Cereal Disease Laboratory, St. Paul, MN**. **In FY11, Congress eliminated \$290,000 in needed funding for Ug99 research at this location because it was scored as an earmark** (*this funding was approved by Congress in FY06*).

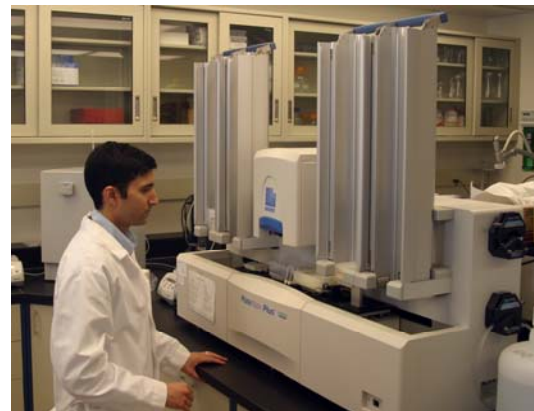
Fusarium head blight (scab) is a fungal disease that impacts wheat and barley. Scab can cause significant yield losses and quality reductions, including the production of fungal toxins (mycotoxins) in infected grain. These toxins may render the grain unsuitable for both human and animal consumption. The ARS is working on scab at many of its research locations and is funding the U.S. Wheat and Barley Scab Initiative (USWBSI) <http://scabusa.org/home> which provides \$5 million a year in grants to ARS and university scientists in 22 states (AR, GA, IL, IN, IA, KS, KY, LA, MD, MI, MN, MO, NE, NC, ND, NJ, NY, OH, SD, TX, VA, WI) to develop effective control measures that minimize the threat of scab. Progress has been made, but the



problem is not solved. Reductions in funding will hinder that momentum and be economically detrimental to wheat and barley producers, end-users and consumers. The decline in barley acreage to historic lows is due in part to the impact of this disease, and can only be reversed if control measures, including resistant varieties, are developed.

[ARS breeding, genomic, and supporting research](#) is of critical importance in the development of improved barley varieties that are more tolerant to drought, heat, cold, diseases, insect pests, and have expanded uses with improved quality.

NBIC expresses its appreciation to Congress for providing funding to establish *four Regional Small Grains Molecular Genotyping Laboratories*, in **Fargo, ND; Manhattan, KS; Pullman, WA;** and **Raleigh, NC**. The laboratories are facilitating the application of state of the art genomic and molecular DNA marker technology to small grains improvement, serving wheat, barley and oat breeding programs in up to 36 states. Due to their success in serving the small grains research community, workloads have increased dramatically. If funding is cut, they cannot effectively meet the growing need for their collaborative research and genotyping services, including their critical support work for the NIFA Triticeae CAP (T-CAP). **Other barley research at these locations**, including work on fungal pathogens, viruses, and biotechnology at **Fargo, ND**, and root and stripe rust diseases at **Pullman, WA**, are also important components of the national barley variety improvement effort.



The *National Small Grains Germplasm Research Facility, Aberdeen, ID*, is the home of the National Small Grains Collection. The barley research at this location focuses on genetic improvement for malt, food and livestock feed uses, and on increasing production efficiency in rainbow trout through the use of barley-based feeds. The program includes genetics and breeding research; maintaining, evaluating, and distributing germplasm stocks to researchers throughout the world; research to improve breeding efficiency and to identify valuable new targets for germplasm enhancement; and research on trout genetics, physiology, and nutrition. This is a key location for the national barley research effort, including addressing emerging diseases. The photo at right shows Dr. Mike Bonman research leader (L), and **Eric Jackson (R), barley/oat geneticist**. Dr. Jackson left ARS in January and as a result of the ARS FY12 funding situation, his high priority position remains unfilled. **NBIC strongly supports filling this position.** Another vacated scientist position assigned to the trout-grains project is also vacant and frozen.



Better barley for America's malting and brewing industries, and more nutritious, health-promoting barley and oats are the goals of scientists at the *Cereal Crops Research Unit, Madison, WI*. Researchers are unlocking the mysteries of germination (a key step in malting),



where barley grains become storehouses of enzymes to break down starch and protein that support fermentation to produce beer. They are identifying and studying antioxidant chemicals in barley and oats that may play a role in protecting humans from degenerative diseases such as heart disease and certain cancers. The researchers also collaborate with barley and oat researchers at public institutions to aid in breeding improved varieties of these grains by analyzing the quality of

breeding selections and other experimental samples, and developing improved methods of analyses. This function is of critical importance to maintaining the viability of barley and oat programs throughout the US. As the single national location for quality evaluation, it is much more cost effective than having quality labs established throughout the US. *Dr. Mark Schmitt, CCRU Research Chemist, recently developed a method that utilizes 100-fold reduced quantities of barley for malt analysis, important for experimental lines for which only limited grain is available. Simpler analytical protocols at this small scale were also developed and shown to be valid. This increased sample throughput and decreased turn-around time between breeder submission of lines and return of analytical data, provides more timely data to stakeholders. An important molecular geneticist position is currently vacant at the CCRU. NBIC strongly supports filling this key position.*

The *Wheat, Peanut and Other Field Crops Research Unit, Stillwater, OK* is the primary ARS unit developing pest management technologies for aphid pests of barley and wheat, which cause direct damage to crops and/or transmit viral diseases. Researchers at this unit develop cereal crop germplasm with resistance against insects by using genetic techniques and help define biological and cultural control methods, life histories, genetics, biochemical interactions, and economic importance of insect pests.



BIOENERGY



The *National Center for Agricultural Utilization Research, Peoria, IL*, is at the forefront in research directed at converting cereal crop residues to ethanol, and has initiated research on the utilization of barley straw as a fuel. When grains, such as corn, barley, and wheat are harvested, about one-half of the biomass is left in the field. While some of this crop residue is needed to replenish the soil for the next crop, the remainder can be removed and used to produce biofuels. There is enough straw to produce as much ethanol as we now produce from grains.

The **Sustainable Biofuels and Co-Products (SBCP) Research Unit** at the **Eastern Regional Research Center (ERRC), Wyndmoor, PA**, is conducting research to help achieve sustainable biofuels production from barley. Highlights of recent barley research outputs include pyrolysis technology to convert barley hulls, straw, and mycotoxin (DON) contaminated dried distillers grains with solubles (DDGS) into green diesel and Bio-char. Bio-Char can be used to increase organic carbon and fertility in poor soils. A new fermentation process was developed in collaboration with Virginia Tech, that reduces DON in barley DDGS so it can be used for animal feed.

The EERC pioneered the development of winter "energy barley" as a feedstock for advanced biofuels for an industry that is now emerging on the East Coast, including the new Osage Bio Energy Plant in Hopewell, VA. Over 500 construction jobs were created, with over \$150 million in procurement, labor, utilities, etc. Due to market and other considerations the plant has not come on line and is up for sale. When operational, the plant would buy \$100 million in barley each year, which will help farmers and the rural economy. Various spin offs and related economic activity would be created, including \$2 million in sales of enzymes to the plant; co-product sale of high protein animal feed for local livestock; capture and sale of carbon dioxide from the plant to local soft drink companies; and the sale of pelletized barley hulls from the plant to make fuel pellets. SBCP and Drexel University conducted analyses that showed winter barley ethanol use as a transportation fuel would result in greater than 50% reduction in greenhouse gas emissions over gasoline. If and when EPA does grant advanced biofuel status to winter barley ethanol, the sale and start up of the plant appears promising.



HUMAN NURITION

ARS centers, including the **Human Nutrition Research Center, Beltsville, MD (BHNRC)**, and **Western Human Nutrition Research Center, Davis, CA**, conduct basic and applied research to identify and understand the health effects of nutrients and other bioactive food components on diverse populations, including children, the elderly, and healthy adults. Obesity prevalence among adults and children in the US has tripled in the last 30 years. The BHNRC is the site for the very productive Barley Foods Health Benefits research project, which documented that whole grain barley and barley-containing products reduce the risk of coronary heart disease by lowering serum cholesterol. The barley project is now aligned with research on obesity prevention at these locations, specifically investigating the role of barley product consumption on satiety, in the prevention and management of obesity, and in the prevention and delay of the onset of diabetes.



USDA National Institute of Food & Agriculture (NIFA)

[Agricultural and Food Research Initiative \(AFRI\)](#) is the nation's premier competitive, peer-reviewed research program for fundamental and applied sciences in agriculture. It is broad in scope with programs ranging from fundamental science to farm management and community issues. AFRI provides valuable supplemental support to barley and other agricultural scientists

An AFRI grant supported the very productive and recently ended **Barley Coordinated Agricultural Project (CAP)**, which provided funding of \$5 million over four years for a community effort of 30 scientists from 19 institutions with expertise ranging from genetics/genomics, breeding, pathology, database management, computer science, food science, malt quality, and statistics. This Barley CAP integrated and utilized state-of-the-art genomic tools and approaches in plant breeding programs, thereby facilitating the development of superior barley cultivars and access to agronomic and economically important genes.



A new AFRI grant of \$25 million over 5 years was awarded a year ago by NIFA for the **Triticeae (Barley & Wheat) Coordinated Agricultural Project or T-CAP**. The T-CAP is composed of 56 scientists from 28 institutions, led by Dr. Jorge Dubcovsky of the University of California at Davis and Dr. Gary Muehlbauer at the University of Minnesota. The goal of the project is to develop methods to produce new varieties that minimize the damage to crops from stresses associated with climate change. It will return significant benefits to farmers by developing tools to adapt varieties planted by growers across the country. The long-term objective is a 10 percent reduction in both nitrogen and water use in barley and wheat production and a reduction of yield losses due to diseases.

The T-CAP builds on the rapidly decreasing costs of genetic sequencing, digital multi-spectral imaging, and data management to accelerate breeding cycles. This will improve publicly-available germplasm. T-CAP will standardize methods for high-throughput field evaluation and integrating genetic and field measurements into public open-source databases (GRIN, GrainGenes, and GRAMENE). All breeding programs will be able to build upon these innovations. T-CAP scientists will systematically characterize wheat and barley lines cataloged in the National Small Grains Collection (NSGC) in addition to commercial varieties. Gene variants present in these collections will be associated with tolerance to biotic and abiotic stresses. Linking high throughput genotyping to high throughput field evaluations will accelerate the introduction of novel genes using non-GMO technology into cereal breeding programs. The new funding and genomic data will provide breeders with deeper access to useful genes present in this valuable collection. T-CAP will also train a new generation of plant breeders in the most advanced breeding technologies helping to address a national shortage of plant scientists.