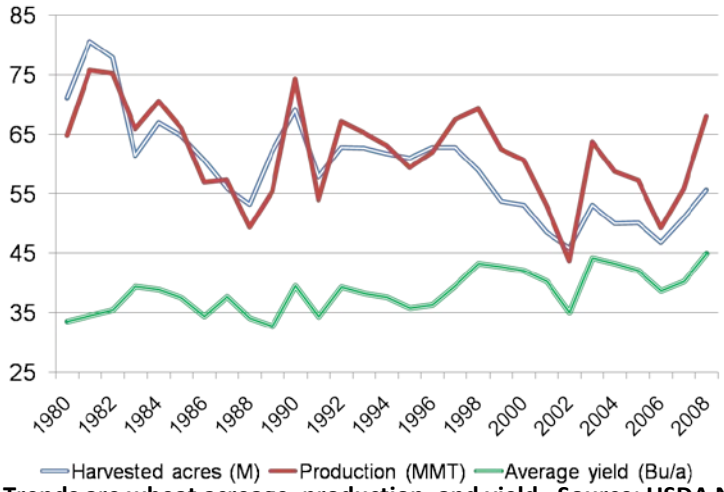
FY2010 – Research Priorities of the
National Wheat Improvement Committee
and
National Association of Wheat Growers

Wheat is fundamental to food security and economy of the US with a farm-gate value of over $14 billion. Wheat production, food security, and low food prices cannot be taken for granted. ***In 2007-08, US and world wheat stocks fell to historic year-end lows*** due to declining acreage and unusual weather-related crop stress. Production rebounded in 2008, but US acreage and production are forecast to decline again in 2009. ***The fundamental weaknesses underlying the long-term decline in wheat production have yet to be addressed.***



Trends are wheat acreage, production, and yield. Source: USDA NASS

USDA-Economic Research Service concluded that ***wheat 'has lost its competitive edge*** relative to other US crops, particularly soybeans and corn'. Wheat acreage is nearly 1/3 less than in 1980 as production has shifted to maize and soybeans. Increased demand for biofuels accounts for only some of this shift. Wheat productivity and economic returns have not kept pace with other major crops. When compared with corn or soybean, ***wheat production is more vulnerable*** to evolving disease and insect pressures. Breeders are approaching ***the limits of the wheat gene pool;*** essentially running out of new genes that can resist pests and tolerate stress. Due to lack of market acceptance of genetically modified (GM) wheat, wheat growers do not have access to many valuable new traits for insect and disease resistance, drought tolerance, herbicide tolerance or nutritional quality. Growers are replacing wheat on millions of acres with crops of higher net returns and more consistent yields.

Wheat producers worldwide are facing ***new threats from increasingly virulent diseases and insects. New African stem rust races are poised*** to move into critical wheat producing areas of India and Pakistan. These races have defeated nearly all major resistance genes, leaving huge production areas, at great risk to catastrophic yield losses. This wind-blown pathogen could hitchhike on travelers clothing and enter the US at any time. Other diseases, such as Fusarium head blight (scab), leaf and stripe rust, and insects such as Hessian fly continue to evolve in terms of virulence and adaptation while ***resources and funding for research to combat these threats continue to decline.***

US wheat yields must increase by 20% in the next 10 years if we are to stabilize production, acreage, and meet the growing demand for wheat products - a rate that is comparable to that of the Green Revolution during the 1960's. This goal is attainable, but it will require a renewed investment of public and private funds to develop, apply, and deploy new technologies. Investments must support basic and applied research, integrate laboratory and field-based sciences, and effectively deliver new technologies and scientific advances to the wheat industry and family farm.

Research Priorities of NWIC and NAWG:

Breeding, genetics, and genomics research to increase productivity

1) Breeding, variety development, deployment

1) Field-based breeding, evaluation, screening, infrastructure (regional / state)

2) Long-term germplasm development; national, international exchange

3) Implement molecular markers and genomics tools

2) Application of genomics to wheat improvement

1) Expand molecular mapping of economically important traits

2) Increased number of molecular markers to saturate the wheat genome

3) Develop a physical map and sequence of the hexaploid wheat genome

4) Improve ease of use and interoperability of wheat-related databases

5) Exploit functional genomics to understand gene expression and gene networks

3) Research, development, and commercialization of 'GM' wheat

1) Gene discovery, sequencing, construct development

2) Transformation, assessment, regulatory approval

3) Licensing, deployment, and commercial acceptance

4) Expand the wheat gene pool

1) Transfer novel genes from landraces, exotic, and related species

2) Apply chromosome and molecular engineering, molecular marker technologies

Reducing threats and constraints to production

5) Emerging and increasingly virulent diseases

1) ***Cereal rust diseases (stem, leaf and stripe rust);*** Foliar and head diseases (including Fusarium; Septoria; mildew; tan spot; and bunts); Root diseases (including crown rot; strawbreaker; take-all; Pythium; and Rhizoctonia)

2) Pathology, race monitoring, germplasm assessment, host-plant interactions

3) Gene discovery, enhancement, application of molecular markers

6) Increasingly virulent and damaging insect pests

1) ***Hessian fly; greenbug and other aphid species;*** *wheat stem sawfly;* midges; etc.

2) Screen germplasm, identify and deploy durable resistance genes

3) Monitor changes in biotypes, virulence; host-plant resistance mechanisms

7) Environmental stress and response to climate change

1) ***Increase tolerance to drought, heat,*** *cold, frost*, soil salinity and acidity

2) Identify and deploy novel genes for tolerance; apply marker technology

3) Understand and manipulate genetic and physiologic mechanisms for abiotic stress tolerance during growth and development

Improving processing, products, and nutritional qualities

8) Enhance market demand, value through improved quality, processing and products.

1) Expand testing, support for rapid variety development

2) Develop and implement rapid measures for end-use quality assessment

3) Enhance value through biochemical modification, enhanced nutrition

9) Biofuel production

1) Modify straw biochemical composition to increase cellulosic ethanol production and improve gasification efficiency

Font indicates: ***Immediate needs;*** *High priority needs;* Priority needs

NAWG / NWIC Priorities for Fiscal Year 2010

Executive Summary

Wheat is fundamental to food security and economy of the US, with farm-gate value of over $14 billion. Wheat products are the foundation of the US milling and baking industry, supporting millions of jobs and generating additional billions in end-product value and business activity. Wheat and wheat flour are basic ingredients of the US food industry, the most advanced, efficient, and safest in the entire world. Wheat exports are valued at approximately $3.75 billion per year and are an important offset to the US trade deficit.

Wheat production, food security, and low food prices cannot be taken for granted. ***In 2007-08, US wheat stocks fell to an historic 60 year low;*** a consequence of declining acreage and unusual weather-related crop stress. ***World stocks fell to a 30-year low.*** Erratic weather patterns, long-term drought, early-season frosts, and harvest rains reduced production in major wheat regions, including those in Australia, Ukraine, Russia, Canada, and Argentina. ***Prices of flour and wheat-based foodstuffs rose to unprecedented highs.*** Food was again in the headlines, as many countries struggled to meet demand and feed their poor.

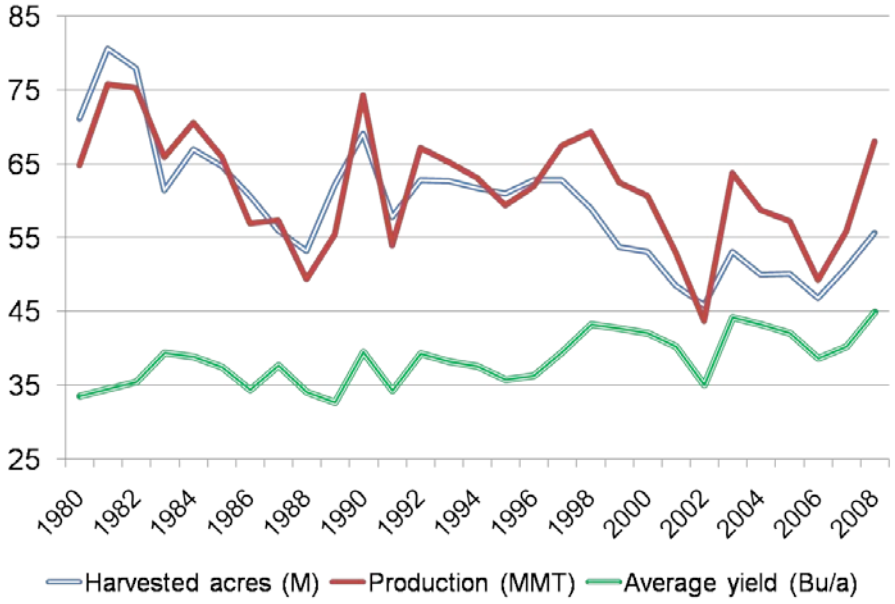


Figure: Trends in wheat acreage, production, and yield. Source: USDA NASS

US and world production rebounded in 2008, but US acreage and production is forecast to decline again in 2009. ***Fundamental weaknesses underlying the long-term decline in wheat production have yet to be addressed***. USDA-Economic Research Service has concluded that ***wheat 'has lost its competitive edge relative to other crops'***. Wheat acreage is nearly 1/3 less than in 1980 as production has shifted to maize and soybeans. Increased demand for biofuels accounts for only some of this shift. Increases in wheat productivity and economic returns per acre have not kept pace with other major crops. As compared with corn or soybean, wheat production is more

vulnerable to evolving disease and insect pressures. Breeders are approaching ***the limits of the wheat gene pool;*** essentially running out of new genes that can resist pests and tolerate stress. Due to lack of market acceptance of genetically modified (GM) wheat, wheat growers do not have access to many valuable GM traits for insect and disease resistance, drought tolerance, herbicide tolerance, or nutritional quality. Growers are replacing wheat on millions of acres with crops of higher net returns and more consistent yields.

Wheat producers worldwide are facing ***new threats from increasingly virulent diseases and insects. New African stem rust races are poised*** to move into critical wheat producing areas of India and Pakistan. These races have defeated nearly all major resistance genes, leaving huge production areas at great risk to catastrophic yield losses. ***Over 75% of the US wheat acreage is planted to varieties that are highly susceptible to this disease.*** We must identify new sources of durable resistance, incorporate these into new wheat varieties, and replace nearly all currently grown varieties. Other diseases, such as Fusarium head blight (scab), leaf and stripe rust, and insects such as Hessian fly and Russian wheat aphid, continue to evolve in terms of virulence and adaptation while ***resources and funding for research to combat these threats continue to decline.***

Public investments in agricultural research through USDA-ARS and USDA- CSREES have been in long-term decline, ***jeopardizing core programs and our long-term capacity for wheat improvement.*** US commitment and funding for international agricultural research through USAID, critical for world food security, is poised for unprecedented cuts in FY09. Private investments in wheat research have lagged far behind corn and soybean, as biotechnology companies are reluctant to invest without market acceptance or value-capture opportunities for GM wheat.

US wheat yields must increase by 20% in the next 10 years if we are to stabilize production and meet growing demand for wheat products; a rate that is comparable to that of the Green Revolution during the 1960's. We must address critical vulnerabilities to emerging and increasingly virulent strains of diseases and insects. We must increase tolerance to drought, heat, and frosts to address environmental instabilities and respond to climate change. This goal is attainable, but it will require a renewed investment of public and private funds to develop, apply, and deploy new technologies. Investments must support basic and applied research, integrate laboratory and field-based sciences, and effectively deliver new technologies and scientific advances to the wheat industry and family farm.

We recognize that federal resources are limited and Congress must make difficult decisions for the coming fiscal year. However, ***federal investments in wheat research are fundamental to economic viability and stability of the US food industry***. An infusion of new funds is critical to meet long-term threats to production and sustain US producers and the agriculture based economy in today's competitive world market. US commitments to international agricultural research also must be increased if we are to meet the growing world demand for wheat grain, and achieve food security in the most vulnerable and unstable countries.

Summary of Funding Priorities

Detailed descriptions of each initiative follow on subsequent pages

Project	Description	Total
Cereal Rust Disease Initiative	Coordinated project involving multiple institutions and locations; the US part of a global effort	$5,000,000
USDA-ARS Regional Small Grains Molecular Genotyping Laboratories	Improve wheat productivity, pest resistance, and quality through application of molecular marker technologies - Fargo, ND [northern region] .....($200,000) - Manhattan, KS [central/southern region] ($200,000) - Pullman, WA [western region] .....($400,000) - Raleigh, NC [eastern region] .....($400,000)	$1,200,000
Enhancing Wheat Quality, Competitiveness, Security, and Sustainability	Develop and apply rapid functionality tests for variety development, marketing, and improve wheat product and processing quality - Hard Red Winter Wheat Quality Laboratory, Manhattan, KS.....($650,000) - Engineering Research Unit, Manhattan, KS .....($650,000) - Soft Red Winter Wheat Quality Laboratory, Wooster, OH.....($650,000) - Western Wheat Quality Laboratory, Pullman, WA .....($650,000) - Hard Red Spring and Durum Wheat Quality Lab, Fargo, ND.....($650,000)	$3,250,000
Enhancing Wheat Insect Pest Research	Coordinated project involving multiple institutions and locations	$1,200,000
Building restoration – ARS insect research	Restore greenhouse used for Hessian fly research in Manhattan, KS destroyed by tornado	$600,000
Small Grains Germplasm Enhancement	Aberdeen, ID – identify and manage valuable genes in the national germplasm collection; introduce and distribute international germplasm stocks	$750,000

USDA-Agricultural Research Service

USDA-ARS has been crippled by a long-term decline in budgets for salaries and expenses due to mandatory, but unfunded, salary increases and lack of inflation offsets. For example, the USDA-ARS budget declined by 0.7% from FY07 to FY08, with no provision for salary increases. This reduced discretionary funds for conducting research by as much as 20 to 25% in many Research Units. Research capacity, staffing, and facilities all have suffered, undermining the ability of ARS to meet its mission. ***We implore Congress to provide adequate funding to ARS to meet pay costs and address critical national agricultural research needs.***

USDA-ARS Priority Budget Requests

Cereal Rust Disease Initiative: $5,000,000

Highly virulent and aggressive new races of stem, leaf, and stripe rust threaten the entire US production of wheat, barley, and oats. New races of stem rust have appeared in Africa which can defeat nearly all resistance genes now deployed in the US. If these races were to be introduced and become established in the US, wheat production losses of over 1.4 billion bushels per year, worth approximately $10 billion at the farm gate, are possible. ***A nationally coordinated Cereal Rust Disease Initiative is needed through an increase in annual funding of $5 million to support cooperative USDA-ARS and Land-Grant university cereal research efforts in 29 states where personnel, expertise, and facilities are already established.*** The Administration, Senate and House each have recognized the critical need to take action in past budget proposals. However, increases in cereal rust research funding for ARS were eliminated in final stages of appropriation for FY07 and FY08. For FY09, the Senate Agricultural Appropriations bill again recommends an increase in $1 million for cereal rust research. These funds would be an important step, but remain critically inadequate to fund an aggressive, coordinated national response to the rust threat. The appropriations fail to provide sufficient funds to support collaborative ARS research with key partners and programs at the Land-Grant Universities.

USDA-ARS Regional Small Grains Molecular Genotyping Labs: $1,200,000

The National Barley, Oat, and Wheat Improvement Committees and National Association of Wheat Growers express their appreciation to Congress for providing funding to establish four Regional Small Grains Molecular Genotyping Laboratories in Fargo, ND; Manhattan, KS; Raleigh, NC; and Pullman, WA. The USDA-ARS Regional Molecular Genotyping Laboratories have become a critical resource to apply genomics information and DNA molecular marker technologies in the improvement and breeding of wheat, barley and oats. The four labs are now at-capacity, while demand for research and services grow rapidly to address biotic and abiotic threats to cereal production. ***We are requesting additional funds for these laboratories to provide critical genomics and molecular marker information to small grains research***

programs in 36 states. Wheat growers will benefit from more rapid development of varieties with enhanced stress tolerance, disease resistance, and superior end-use quality.

	FY2010 Request
Fargo, ND (Northern Plains)	$200,000
Manhattan, KS (Central)	$200,000
Pullman, WA (West)	$400,000
Raleigh, NC (East)	$400,000

Enhancing Wheat Quality, Competitiveness, Security, Sustainability: $3,250,000

World wheat production is increasingly vulnerable and the global demand for wheat food products is growing at a faster rate than production. Researchers must rapidly develop, apply, and deploy new technologies to improve productivity, disease and insect resistance, quality, and sustainability of our wheat production systems. The world wheat market is increasingly sophisticated, demanding of quality, value, higher levels of productivity, and food safety, and is being driven by privatization, consolidation and mechanization. Quality assessment remains among the most costly, time-consuming and critical components of wheat research and variety development. Market applicable functionality tests are essential to document processing value and end-product quality for marketing of US wheat. Four USDA-ARS regional wheat quality laboratories are largely responsible for sustaining the processing and product qualities of US wheat which are critical to our domestic and export markets. These programs have suffered from long-term decline in funding and staffing which has critically reduced their research capacity. ***An infusion of $3.25 million ($650,000 per Research Unit) is needed for these laboratories to maintain programs, address new research priorities, and support cooperative Land-Grant research and breeding efforts in 21 states where personnel, expertise, and facilities are already established.***

	FY2010 Request
Hard Red Winter Wheat Quality Laboratory, Manhattan, KS	$650,000
Engineering Research Unit, Manhattan, KS	$650,000
Soft Red Winter Wheat Quality Laboratory, Wooster, OH	$650,000
Western Wheat Quality Laboratory, Pullman, WA	$650,000
Hard Red Spring and Durum Wheat Quality Lab, Fargo, ND	$650,000

Enhancing Wheat Insect Pest Research: $1,200,000
plus one-time allocation for building restoration: $600,000

Damage from insect pests has been steadily increasing in many wheat-growing areas. Up to 70% of fields in the southern Plains, and 40% of fields in the northern Plains have some level of Hessian fly infestation each year. Only 2 of 22 known wheat resistance genes are still effective due to increasing virulence of the insect. Since its first appearance in the U.S. in 1986, the Russian wheat aphid has caused over $1.5 billion in losses to the wheat industry. Eight increasingly virulent biotypes have been identified to-date. The Wheat stem sawfly is a major pest of the northern plains, responsible for

yield losses of approximately $25 million each year in Montana alone. New genetic sources of resistance, rapid, effective screening methods, and novel biocontrol agents are needed to achieve durable resistance to these pests. ***An increase in annual funding of $1,200,000 is requested for a multidisciplinary and nationally coordinated research program to reduce production losses to wheat insect pests.*** A one-time allocation of $600,000 also is requested to restore the Hessian fly greenhouse facility at Manhattan, KS that was critically damaged by a tornado.

Small Grains Germplasm Enhancement - Aberdeen, Idaho: $750,000

Funding is requested to establish a research geneticist position with the USDA-ARS National Small Grains Collection (NSGC) that will support wheat and oat germplasm enhancement and the introduction and distribution of international nurseries. A portion of the funds are to support cooperative exchange, enhancement, and evaluation efforts by university researchers under Specific Cooperative Agreements with USDA-ARS. Germplasm enhancement is long-term, national responsibility of ARS and important contribution to crop improvement. This new research initiative within the NSGC will speed the transfer of novel genes for a diversity of traits from landrace and wild accessions into cultivars in producer's fields. This program request corresponds with previous Administrative Initiatives on Crop and Animal Protection and Agricultural Genomics, Germplasm, and Collections.

USDA National Institute for Food and Agriculture (formerly CSREES)

The transition from CSREES to the National Institute for Food and Agriculture (NIFA) in 2009 presents an important opportunity to review and renew national goals, strategies, priorities, and funding for agricultural research. In general, we support the guiding principles being used to implement the new Institute and encourage a high level of openness, transparency and accountability in developing priorities and funding programs. Our immediate concern is funding for NIFA implementation and for the Agriculture and Food Research Initiative (AFRI) competitive grants program. Funding of $190 million for the entire FY2009 AFRI program is simply inadequate. ***We encourage Congress to double the budget for the NIFA Agriculture and Food Research Initiative (AFRI) for FY10 to $380 million.*** Major investments in basic research and infrastructure are needed at the national, regional, and state levels if we are to meet US demands for sustainable production of food, feed, biofuels, and fiber.

We encourage the Secretary to form and manage the National Institute for Food and Agriculture under the following principles:

1. NIFA should be implemented to maximize research funding and minimize expenditures on administration. The statute stipulates that no more than 4% of the appropriated funds may be retained by the Secretary for administrative costs. We have been concerned that the six new NIFA Program Directors would increased administrative costs and simply add another bureaucratic layer between the agencies and the Under Secretary.

We encourage USDA to make only those structural changes that improve efficiency and program delivery.

2. Duplicative or conflicting reporting relationships should be avoided. According to the notice, the Secretary has determined that the NIFA Director will report to the Undersecretary for Research Education and Economics. We believe this is most appropriate and will avoid conflicts in reporting among agencies. Support for NIFA must not come at the expense of the Agricultural Research Service. These agencies have complementary, but very different roles and responsibilities. Both must be adequately funded to sustain US agricultural growth and productivity.
3. We encourage the Secretary to cap allowed charges for institutional overhead in NIFA granting programs at no more than 20%. Our immediate goal must be to increase the stature, capacity, and support for agricultural researchers within the USDA and the scientific community. Institutional overhead charges are now commonly 50% or more, consuming a large proportion of these valuable and limited funds. A reasonable cap on overhead is needed to increase the proportion of funds that go to conducting research, while still providing some basic institutional support.
4. The critical importance of capacity building cannot be overlooked in funding of competitive grants. Many important research needs are, by nature, long term and do not readily fit into competitive grant programs. These must be addressed with multi-year grants or ongoing investments. Furthermore, without capacity investments in facilities, equipment, and people, the pool of talent competing for grants will dwindle. ARS has lost many 'permanent' research positions as operating funds have been lost to unfunded salary increases and inflation. State universities are also under severe funding pressure, which will make grants even more important in funding core programs.
5. We are pleased that the Agriculture and Food Research Initiative (AFRI) includes provisions for long-term grants and refers specifically to critical activities like plant breeding and germplasm enhancement, which require long-term research and funding commitments. Support for breeding is critical in crops like wheat where public sector programs play a large role in development of new cultivars. NIFA must develop effective guidelines for periodic review and managing of longer-term grants to ensure projects are productive and do not waiver from their approved missions. We encourage funding collaborative projects with regional focus, particularly with regard to breeding, that can more effectively addresses local threats and production constraints.
6. The notice says the NIFA Director is responsible for determining the appropriate balance between applied and basic research, but we note the statute appears to provide no discretionary flexibility: it requires 60% of available funds to be invested in fundamental research and 40% in applied research. We encourage funding of applied and multidisciplinary research to ensure that scientific advances are translated throughout agricultural industries and have impact on-farm. We would appreciate clarification regarding the priorities and process to determine funding allocations among the six general program areas. We encourage the Director to invest in program areas that address critical, economically important near-term industry needs, while also providing vision, foundation, and funding to address the long-term needs of US agriculture. As such, we suggest that the Plant Health, Production, and Plant Products Division should be a high priority for agency funding.
7. The Institute must carefully balance funding and priorities to address near, medium, and long-term research needs. Priorities must be placed on research that will lead to increased production and production efficiency; reduced vulnerability to diseases, insects, and environmental stress from climate change; improved processing quality,

nutrition, and food safety; and new technologies for long-term crop improvement as identified under the Plant Health, Production, and Plant Products section of the statute. Economic impact must be an important consideration in determining research priorities and selecting research proposals.

8. We encourage broad solicitation and use of industry input to establish priorities and assist in evaluation and selection of research proposals. Grower and private sector input will help focus efforts and encourage high levels of performance and accountability.

The NWIC and NAWG have long been supportive of basic, competitive plant science grant programs through agencies such as USDA-NIFA and the National Science Foundation, which provides valuable supplemental support to some wheat and crop scientists. ***However, increased funding for these important federal granting agencies, must not come at the expense of core directed programs*** that are critical to maintain integrity of US agricultural research. Competitive grants for agricultural research ***must be balanced*** with adequate support for long-term USDA-Agricultural Research Service and State Agricultural Experiment Station directed-research programs that are committed and responsive to the immediate needs of the US agricultural economy.

NAWG and NWIC do not support proposals that would reduce, redirect, or continuously 're-compete' the Hatch multi-state awards or redirect McIntire-Stennis formula funds to competitively awarded multi-state grants. These funds provide critical base support to land-grant university agricultural research programs. The move to competitively funded grants would effectively cripple the long-term commitment of University programs to improving agricultural productivity of growers at the state and local level. Many core agricultural research programs, such as breeding, pathology, entomology, end-use quality, and crop management, ***require long-term financial and scientific investments and stable funding commitments.*** Research activities such as these which are critical to our agricultural economy and food supply cannot be effectively managed or supported through national or multi-state, short-term grant-funding mechanisms.

USDA-NIFA Special Research Grants

USDA Special Grants provide an important alternative funding mechanism for high priority agricultural research efforts. These grants facilitate rapid, coordinated response to regional and national threats to agriculture and deployment of new technologies. ***We encourage Congress to use Special Grants judiciously*** to address critical short-term needs to control invasive species, reduce threats from emerging diseases and insects, improve food quality and safety, and promote sustainable cropping systems.
We encourage reinstatement of the following Special Grants of importance to the wheat industry, with ***restoration of funding to the FY06 level:***

	FY08	**/**	**FY06**
Aegilops Cylindrica (Jointed Goatgrass), ID, WA	$263	/	$355
Expanded Wheat Pasture, OK	$240	/	$323
Russian Wheat Aphid, CO	$230	/	$306
STEEP III – Water Quality in Northwest	$476	/	$640
Wheat Genetics Research, KS	$258	/	$344

US State Department, Agency for International Development International Agricultural Research through the CGIAR

We are grateful to Congress for the 2008 Supplemental Appropriations Act for Development Assistance to address the international food crisis. This funding was instrumental in alleviating devastating cuts proposed in USAID funding for the Consultative Group on International Agricultural Research (CGIAR) in FY08 that would have had a critical, long-term impact on world food production. Our appreciation also is extended to Administrators of USAID and OMB. It was only through a combination of 'bridge' funds from the Supplemental Appropriations Act, year-end funding commitments from USAID central and regional offices, and OMB emergency famine funds for seed multiplication that core CGIAR programs could be maintained and implemented through FY08.

While we are thankful for the funding which 'rescued' CGIAR in FY08, ***we are deeply concerned that the Administration's FY09 budget proposal for USAID, as it did in FY08, seeks no funding commitments for CGIAR.*** There is inadequate funding and flexibility in the proposed USAID-EGAT (Bureau of Economic Growth, Agriculture, and Trade) budget to provide core base funding for the CGIAR. We are again extremely concerned over the financial vulnerability and future of the CGIAR and the International Ag Research Centers.

USAID has been a long-term supporter of the international agricultural research centers, such as the International Maize and Wheat Improvement Center (CIMMYT), the International Rice Research Institute (IRRI), the International Center for Agricultural Research in Dry Areas (ICARDA), and the International Food Policy Research Institute (IFPRI), and was a founding member of the CGIAR in 1971. US crop scientists collaborate closely with CGIAR scientists to address chronic and emerging diseases, improve management systems, and reduce the impact of environmental stresses on our major crops. This investment in research has resulted in worldwide deployment of new technologies and improved crop varieties, dramatically increasing food security in the developing world. Funding cuts proposed for FY09 would undermine this nearly 40-year investment and threaten the CGIAR's most important research efforts.

CIMMYT and US researchers are now racing to prevent disaster from a stem rust epidemic developing in south and west Asia. Since identified in Kenya and Uganda in 1999, the Ug99 race of stem rust has spread to Ethiopia, Yemen, Sudan, and Iran, and now threatens critical wheat and barley producing areas of Iraq, Pakistan, India, Syria, and Turkey. In the US, nearly all spring wheat varieties and over 75% of US winter wheat varieties are highly susceptible to this new race of stem rust. We must act quickly, in concert with CIMMYT and ICARDA, to develop and deploy new varieties with resistance to this virulent and rapidly evolving disease.

We implore Congress to provide line-item funding for the CGIAR at $45M in the FY09 and FY10 appropriations for USAID-EGAT, as is proposed in the Lugar-Casey Global Food Security Act now being considered by Congress. This line-

item and increase in funding for the CGIAR is critical to sustain international research efforts, increase agricultural productivity, defend against emerging plant diseases, and reduce poverty in developing countries.

Priorities for Wheat Genomics Research

The NWIC and NAWG ***support the goal of advancing wheat genomics*** to serve as the foundation for basic research and provide the tools for improving food, fuel, and crop yields in a changing environment. We support increased funding of these efforts through collaborative national research grants, such as sponsored by **USDA-NIFA Agriculture and Food Research Initiative** and the **National Science Foundation**.

In 2006, NWIC authorized the formation of a Subcommittee for Wheat Genomics, comprised of 7 elected members, representing University and USDA-ARS researchers, industry and non-profit agencies. The goal of the Subcommittee for Wheat Genomics is to facilitate communication among U.S. researchers, assess national genomics research needs and goals, develop strategies and organize research efforts, facilitate communication with national granting agencies and participation in international initiatives, and advocate for funding of wheat genomics research at the national level.

Guiding principles:

- Wheat is the ideal model species for studying polyploidy genome evolution and trait variation because of the unmatched complement of aneuploid genetics stocks, natural diversity, and wide adaptation.
- Public wheat breeding and research is critical to U.S. agriculture because three quarters of all wheat varieties were developed by public wheat breeders.
- The open exchange and publication of wheat research contributes to the rapid advancement of new scientific knowledge for improvement of wheat and other crops.
- Study of polyploidy genetics and gene expression will provide key information about how genes and alleles interact in a polyploid genome.
- Wheat research has led to novel discoveries in the genetics and biology of vernalization, genetic control of chromosome behavior, and end-product quality.
- Wheat cytogenetics has made major contributions and continues to provide novel genetics stocks and other tools for understanding mechanisms of chromosome pairing and for chromosome manipulation.

Current research priorities were reviewed and voted on at a National Wheat Genomics conference held in December, 2008. These priorities have been communicated to USDA-CSREES National Research Initiative and the National Science Foundation and include.

2) ***Expand molecular mapping of economically important traits***
3) Increase molecular markers to better cover the wheat genome
4) Develop a physical map of hexaploid wheat genome
5) Improved ease of use and interoperability of wheat-related databases
6) Exploit functional genomics to understand gene expression and gene networks