National Cereal Germplasm Phenotyping

Program Area Code – A3121
Letter of Intent Deadline – May 7, 2010 (5:00 p.m., ET); see Part IV, A (page **Error! Bookmark not defined.**) for instructions
Application Deadline – July 16, 2010 (5:00 p.m., ET)
Proposed Budget Requests –

- Coordinated Agricultural Project (CAP) Grants must not exceed $5,000,000 per year ($25 million total, including indirect costs) for project periods of up to 5 years. Program anticipates making up to 2 awards in FY 2010.
- Conference and Food and Agricultural Science Enhancement (FASE) Grants must adhere to the guidelines outlined beginning in Part II, D. 4 and 5.
- Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Type – Integrated Projects
Requested Grant Type – CAP, Conference, and FASE Grants
Program Area Contact – Dr. Ed Kaleikau (202-401-1931 or ekaleikau@nifa.usda.gov)

A research and education CAP Grant will be awarded that provides new knowledge and tools for conventional breeders to use the nation's cereal germplasm efficiently and to design new varieties adapted to changing climates. CAP applications are expected to demonstrate coherent and complementary activities with the ultimate goal of being a National strategy or solution that is implemented for U.S. cereal crops. Applications are expected to take advantage of innovative high throughput advances in genomics and to translate basic discoveries and knowledge to practical applications. Comprehensive approaches are expected to include cultivar development, selection theory, applied quantitative genetics, breeding for improved adaptation to biotic and abiotic stresses (*e.g.*, climate change adaptation, multiple resistance and tolerance to insect and disease problems), improved response to lower input and organic systems, and participatory breeding through classical/conventional and other appropriate approaches. This team may contain expertise in genomics, genetics, breeding, genetic resources, bioinformatics, plant biology, curriculum development, extension, outreach, program evaluation, economics, sociology, and human sciences, as appropriate. Expertise from principal stakeholders and partnerships with end user groups (*e.g.*, industry, processors, and growers) is integral. The application should outline the potential of the CAP team, its structure, coordination and plan of implementation. In FY 2010, projects must focus on public cereal crop production systems (*e.g.*, corn, barley, wheat, rice, and oats)

Program Area Priority – Applicants must address the following:

- Phenotype the collections of the USDA National Plant Germplasm System (NPGS) and advanced germplasm in public breeding programs to advance knowledge of traits conferring host-plant resistance to temperature extremes, drought (water-use efficiency), pests, diseases or invasive species through classical/conventional breeding and other appropriate approaches. To ensure coordination, research applicants must confer with the crop-specific curators in the USDA NPGS (www.ars-grin.gov/npgs/index.html) and public plant breeding programs to ensure that 1) relevant germplasm is available for distribution and use; 2) standardized methods for high-throughput phenotyping under field conditions are feasible or will need to be developed as part of the proposal; and 3) phenotype data generated will be entered and curated in the Germplasm Resource Information Network database (GRIN) and other public databases for breeders to use. The project must also aim to 1) fill knowledge gaps and as appropriate to adopt innovative technologies (*e.g.*, marker assisted selection, genome-wide selection) to significantly reduce the breeding cycle time and cost of phenotypic evaluations and deployment of beneficial QTLs in breeding programs for U.S. crop production and health; and 2) develop education programs to train the next generation of contemporary plant breeders in both laboratory molecular methods and field-based breeding practice to include genomics, quantitative genetics and conventional breeding to strengthen U.S. plant breeding capacity. Collaborations are encouraged between university, government and industry laboratories that provide opportunities to develop a new cohort of agricultural scientists able to undertake and translate basic discoveries into application.

Other Program Area Requirements:

- All applications must adhere to the requirements beginning in Part IV (page **Error! Bookmark not defined.**).
- Applications must include research and education functions of the agricultural knowledge system. Each function should be represented by one or more objectives within the application.
- Applications from and collaborations with Minority Serving Institutions are strongly encouraged.
- Priority will be given to applications that can reduce the breeding cycle time and most quickly develop new plant lines, varieties, or cultivars adapted to anticipated future conditions.
- Applicants are encouraged to confer with the Crop Curators and Crop Germplasm Committees (CGCs) in the USDA NPGS regarding the desirability of depositing genetic stocks and experimental plant populations generated into the NPGS genebanks. Crop curators and the researchers need to define mutual responsibilities for quality assurance, replenishing depleting stock, and the projected duration for the NPGS's commitment to curate these materials.
- Beginning in 2007, CGIAR International Agricultural Research Centers (*e.g.*, CIMMYT, IRRI, CIAT, CIP, ICRISAT, ICARDA) and some national genebanks began distributing germplasm of certain crops accompanied by the FAO International Treaty's Standard Material Transfer Agreement (SMTA). Researchers are encouraged to confer with their host institution regarding how such materials should be handled. For further information, see the International Treaty's web site at www.planttreaty.org/smta_en.htm.
- Applications must include a budgeted plan for the release of research results to the public in a timely manner. All sequence and expression data must be released to public repositories (*e.g.*, Genbank under the Bermuda standards; GEO under MIAME compliance). All phenotype and map data must be deposited into an appropriate public database (e.g., major databases of the research community) in a rapid timeframe after quality control tests. Arrangements must be documented in the application.
- Applicants are encouraged to develop national and international collaborations with research groups already working on the species of interest to minimize duplication of effort and maximize cost effectiveness. U.S. collaboration with international partners is encouraged; however, applications must be submitted by eligible U.S. institutions.
- Applicants must justify the potential impact of the proposed research and demonstrate that they can apply the most recent technologies. If tools and resources are developed (e.g., biological materials, germplasm, software), an applicant must budget for and demonstrate an adequate and efficient storage and distribution of the tools and resources once they are available.