

United States Senate Committee on
Agriculture, Nutrition and Forestry

Farm Bill Field Hearing
East Lansing, MI
Saturday, April 9, 2011

Testimony by:
J. Ian Gray, Vice President
for Research and Graduate Studies
Michigan State University

Chairwoman Stabenow, Senator Roberts, I welcome the opportunity this morning to make a few remarks about the critical role that USDA-funded research plays in the long-term sustainability of the agriculture system in the United States. I am currently the Vice President for Research and Graduate Studies at Michigan State University and formerly had the privilege of leading the Michigan Agricultural Experiment Station from 1997 to 2004. Therefore, I understand the need for a strong commitment from our nation's universities, particularly our land grant institutions, to serve the research and developmental interests of our agricultural industries.

Permit me to divide my comments into three discrete, but related, topics. These are:

- CREATE-21 and its future impact on agricultural research
- MSU's research programs in support of Michigan agricultural and natural resources
- The need for a balanced research portfolio within the National Institute of Food and Agriculture and in those universities which obtain research support from the USDA

CREATE-21 – and I would like to express our deep appreciation to you, Chairwoman Stabenow, for your strong commitment to, and support of, this initiative. U.S. agriculture faces many serious challenges that can only be solved through enhanced scientific research, extension and teaching – and that requires the projected resources as outlined in the original CREATE-21 proposal. USDA funding for food, agriculture, and natural resources research is almost static and has grown at an average annual rate of just 1.85 percent over the last four decades. CREATE-21 called for increasing competitive funding to just over \$2 billion per year over a seven year period, with fundamental (basic) research constituting 55 percent of the total and integrated programs the remaining 45 percent. These respective numbers represent a paradigm shift within the USDA research programs, and would catalyze a significant change in how university research programs, not simply those within agricultural experiment stations, can develop the science that will undergird the security of USA agriculture in the future.

I ask you for your continued support of CREATE-21 and it is most important that it be fully implemented and funded.

Michigan agriculture contributes over \$70 billion annually to the State's economy, making it the second largest industry. Michigan produces over 200 commodities on a commercial basis, making the State second only to California in agricultural diversity. Michigan State University

relies heavily on USDA funding, state funding such as Project GREEN, and commodity funding, to address the myriad of challenges facing Michigan agriculture and to take advantage of new opportunities such as organic agriculture in Michigan. USDA funding comprised 15% of the total competitive federal funding that MSU received last year.

I would like to acknowledge the importance of the Specialty Crop Research Initiative that was established by the National Institute of Food and Agriculture to solve critical industry issues through research and extension activities. Chairwoman Stabenow, I would also like to recognize your strong advocacy of this Initiative as it pertains directly to the needs of our specialty crops in Michigan. Priority projects under this Initiative are multi-state, multi-institutional, or trans-disciplinary; and include explicit mechanisms to communicate results to producers and the public. As an example, MSU received \$14.4 million to lead a team of scientists from 11 U.S. institutions and six international partners to improve the quality of fruit in the globally important Rosaceae family. The Specialty Crop Research Initiative must be stabilized and continue to grow – and with the loss of special projects (earmarks), our researchers and the industry they serve need access to these competitive funds.

Furthermore, there is also a need for flexibility in research funding to allow researchers the opportunity to compete for funds to address crisis situations such as threats from exotic pests. For example, early this year, the Michigan Department of Agriculture confirmed the presence of the brown marmorated stink bug in Michigan. BMSM can be a serious pest of a variety of fruits, vegetables, field crops and ornamental plants. Control of this pest and others such as the spotted wing drosophila is necessary to secure the viability of our plant industries in Michigan.

Finally, I would like to make a few remarks about the need for the USDA to commit strongly to promoting and funding basic research.

Basic research is the underpinning for new practical applications in agriculture that improve productivity, safety and nutrition, as well as economic value. In a recent NRC report entitled **The New Biology for the 21st Century: Ensuring the United States Leads the Coming Biology Revolution¹**, it was concluded “that integrating knowledge from many disciplines will

¹ *A New Biology for the 21st Century: Ensuring the United States Leads the Coming Biology Revolution*. National Research Council of the National Academics, The National Academics Press, Washington, D.C., 2009

permit deeper understanding of biological systems which will both lead to biology-based solutions to societal problems and also feed back to enrich the individual scientific disciplines that contribute new insights.” These societal needs were identified as sustainable food production, protection of the environment, renewable energy and improvement in human health.

We have been promoting this integrated approach to research at MSU for some time, and I would like to provide a few brief examples from the work of MSU scientists as to how basic or disciplinary research, when linked to application, is benefitting U.S. agriculture.

Genomics and improved potato breeding A collaboration between one of our potato breeders and a computational genomics expert shows how translational science works best. These investigators were awarded a Specialty Crop Research Initiative grant and have used the funds to develop a program to discover useful genetic tools in potato and related crop plants. Efforts to use the basic knowledge gained in the project to improve potato disease resistance are already under development. Michigan’s potato production ranks about eighth in the nation and we strive to give our potato growers better quality varieties.

Cold tolerance Basic studies on the mechanisms of cold tolerance in the laboratory model plant, *Arabidopsis*, led to the discovery of the key genetic pathways which plants use to adapt to cold and drought conditions. This knowledge is being used to develop more cold tolerant canola, and has been demonstrated as a means to allow eucalyptus to be grown as an energy crop in areas (southern states) where it previously wasn’t possible.

RosBREED project MSU leads an 11 institution project (\$14.4M SCRI funded) to understand the function of, and apply, DNA sequences from related specialty crops in the same family, apples, peaches, cherries and strawberries, to improve plant breeding.

Oil engineering Fundamental studies of how plants synthesize lipids has led to the genetic tools which can be used increase oil seed production yield and allow the oil composition to be tailored specifically for improved nutritional content, or applications in biofuels production.

Swine production. Market pig sales add nearly \$15 billion to the US economy and pork exports have increased 37% since 2006, however, pork quality defects cost the industry over \$227 million and negatively impact export market demand. MSU researchers responded to this

problem by applying genetic technologies to identify DNA marker and gene expression variants associated with economically important production and pork quality traits.

An example from outside MSU

RNAi, basically this is a powerful technology that allows selected genes to be silenced. RNAi now has tremendous applications in agriculture and medicine (including novel approaches to cancer therapy), but it was accidentally discovered by US and Dutch scientists trying to breed particular colors in petunia flowers. Even with carefully planned objectives and applications, we can't always predict where basic science discoveries will lead.

I would be remiss if I did not acknowledge the concerns of our basic plant scientists at MSU about current government funding programs with decreasing room for research on fundamental biological processes in crop or model plants. It is their hope that the USDA will have an elevated role to play as part of the federal research landscape, including support of basic plant biology. To quote two of my colleagues, "the research community must continually educate policy makers about the importance of all aspects of plant biology, from eureka moments to the farm gate."² They have provided written testimony for greater support of the basic plant research programs.

I would like to conclude by quoting from Dr. Roger Beachy's lecture to the American Association for the Advancement of Science in June 2010³ – "I am deeply cognizant of the awesome responsibility USDA has to ensure the capacity of our colleges and universities to continue to do meaningful and productive research – with state budgets in freefall, now is not the time to pull back our support." I would submit that in addition to the continued growth of the NIFA research program, research institutions must commit to more integrated research approaches (basic and applied) to address the long-term sustainability of U.S. agriculture and the nutritional health of our citizens.

Thank you for your attention.

² Buell, C. Robin, and Last, Robert L., Twenty-First Century Plant Biology: Impact of the Arabidopsis Genome on Plant Biology and Agriculture. *Plant Physiology* 154:498, 2010

³ Beachy, Roger N., Agricultural Research: Changing of the Guard, Guarding the Change. Inaugural AAAS Charles Valentine Riley memorial Lecture, June 15, 2010, American Association for the Advancement of Science