C-FAR Semi-Annual Meeting

The Illinois Council on Food and Agricultural Research (C-FAR) held its 2004 Semi-Annual Meeting at the Northfield Inn, Suites & Conference Center, in Springfield on August 24. Highlights of the meeting included reports from board officers and committee chairs, special remarks by C-FAR’s four partner-university leaders, and presentations by C-FAR–funded researchers during meetings of the working groups. About 130 members from diverse food, agricultural, and related interests across Illinois attended the meeting. “I continue to applaud our membership for the dedication they visibly demonstrate,” said Alan Puzey, C-FAR chairman. “They not only attend meetings such as this, but throughout the year, they demonstrate through their actions why food and agricultural research is so important to Illinois.”

During the general meeting of the membership, members agreed by consensus to revise the C-FAR bylaws to extend the terms of service of working group chairs and vice chairs. Working group chairs and vice chairs will now serve two-year terms, extended from the current one-year terms, with a two-term limit. The terms of service for research committee members were also extended to two-year terms with a two-term limit. These changes were made to provide greater consistency for the working groups and the research committee. Updated C-FAR bylaws can be found on the C-FAR website at www.ilcfar.org/organ/By-Laws.html.

The C-FAR mission statement was revised to a shorter, more concise description of the mission of the association. The new C-FAR mission statement is

“To advance profitable, consumer-sensitive, environmentally sound food, agricultural and related systems by securing funding for relevant research and outreach and fostering public participation in program guidance.”

“Our membership recognized the need for an updated mission statement to more concisely describe the mission of C-FAR and to better represent our broad-based membership,” said Kraig Wagenecht, C-FAR executive administrator.

Members heard a recap of the State of Illinois FY05 budget development process and the reinstatement of a $3.5 million C-FAR appropriation from Legislative Committee Chair Jack Erisman and Herman.
Greetings

DIFFICULT TIMES CAN BE BENEFICIAL

The State of Illinois’ budget development process for FY05 was long and protracted for everyone involved. Extremely difficult decisions had to be made at all levels of the legislative process. Although no one desires such a tight budget environment, the problem was real, and it had to be addressed with the most careful consideration.

Now, with an FY05 budget in place and our state, and its people, making every effort to continue moving Illinois forward, there is an opportunity to reflect. One clear reflection I have is that, although those were indeed difficult times, they provided an opportunity for the realization of beneficial outcomes.

I’d like to point out some of the beneficial outcomes that resulted for C-FAR, and ultimately for the citizens of Illinois. These benefits are of course in addition to the reinstatement of a C-FAR appropriation.

The difficult times provided C-FAR with the opportunity to respond to a myriad of well-founded and thoughtful questions from elected and appointed officials from throughout the state. These inquiries ran the entire gamut. But we are in the business of ultimately guiding research that results in a better Illinois, and, to that end, let me focus on the beneficial outcomes for our research programs that resulted from the most recent legislative session.

The difficult times allowed us to probe deeper and more exhaustively into what publicly-funded state investments in food and agricultural research mean to Illinois. While the list of such successful outcomes is extensive, let me cite one such example, the development of soybean disease-resistance technology. This technology, which has been patented, is expected to substantially reduce soybean yield losses associated with soybean cyst nematode and soybean death syndrome. Projections indicate that over the next ten years this technology will improve growers’ annual income by $156 million.

Or, consider the fact that C-FAR funding was solely responsible for the development of a comprehensive web-based information tool that assists consumers in making informed food choices, enhancing Illinois citizens’ nutrition and eating habits. This website receives over one million hits per month!

The difficult times also allowed us to gather the most recent information on how researchers are utilizing the State of Illinois C-FAR investment to leverage those funds at ratios we never dreamed possible at the onset of our organization. Again, although the list of leveraging examples is long, let me point to one instance where a $90,000 State of Illinois investment garnered a $1.35 million grant from the National Institutes of Health for an initiative on the post-antibiotic era of food production.

An initiative regarding watershed management and planning received $718,000 from the U.S. Department of Agriculture and U.S. Environmental Protection Agency because C-FAR, thanks to the State of Illinois appropriation, was able to leverage the initial investment of $21,000.

Let me note that the majority of these leveraged funds are coming into Illinois to stimulate our economy and create jobs—and ultimately to make our business sectors robust and our environment one that protects our natural resources.

This type of information was widely known before the budget crunch of this past spring and summer, but the so-called difficult times provided us the opportunity to hone and sharpen our understanding of this information. We welcomed the opportunity to do so. Yes, difficult times can be beneficial.
C-FAR Day at Western Illinois University

C-FAR is holding its fourth annual C-FAR Day from 9:00 a.m. to 3:00 p.m. on November 16 at Western Illinois University (WIU) in Macomb. C-FAR Day provides a special opportunity for members to engage in discussions directly with researchers about their research activities. “C-FAR Day is an event much anticipated by our membership. It provides a ‘hands-on’ opportunity for stakeholders to see C-FAR–funded research along with the scientist who did the work,” said Nels Kasey, C-FAR research chair.

This year C-FAR members will learn about the variety of C-FAR–funded research taking place at WIU. Research topics to be highlighted include the university’s alternative crop program, food safety initiatives, and organic crop systems research. Attendees will also have the opportunity to visit an alternative crop seed-cleaning laboratory and tour WIU’s Allison Organic Research and Demonstration Farm. “It is truly a privilege to host C-FAR Day at WIU,” said Andrew Baker, WIU Department of Agriculture chair. “It allows us to showcase the uniqueness of our agricultural research and food safety initiatives. We are quite proud of our programs and are excited to have the opportunity to share our knowledge base and engage with the constituents of Illinois.”

Previous C-FAR Days have been held at the University of Illinois at Urbana-Champaign, Southern Illinois University at Carbondale, and Illinois State University.

For more information about C-FAR Day, e-mail cfar@aces.uiuc.edu or call the C-FAR office at 217.244.4232.

C-FAR Semi-Annual Meeting

CONTINUED FROM PAGE 1

Bodewes, C-FAR’s legislative consultant. “The grassroots efforts of our membership to contact their state representative, state senator, and the governor’s office regarding the importance of the C-FAR appropriation were instrumental in securing funding for FY05,” said Erisman. “We continue to look forward to working with the State of Illinois in support of a vibrant food, agricultural, and related research program.”

University leaders at C-FAR’s four partner universities—Dr. Robert Easter (University of Illinois at Urbana-Champaign), Dr. Gary Minish (Southern Illinois University at Carbondale), Dr. Patrick O’Rourke (Illinois State University), and Dr. Andrew Baker (Western Illinois University)—provided updates on C-FAR research programs at their respective universities. Drs. Minish and O’Rourke were welcomed by the membership as they assumed their new leadership roles at their respective universities this past summer.

During the afternoon, the five C-FAR working groups each met to visit with a C-FAR–funded researcher whose project fell within their research focus area, and to review their research focus areas.

Dr. Vijay Singh, assistant professor of agricultural and biological engineering at the University of Illinois at Urbana-Champaign, shared his research on the effect of milling parameters on fiber and its removal from the distiller’s dried grains with solubles (DDGS) in a dry-grind ethanol plant, with members of the Expanding Agricultural Markets working group.

Dr. Phillip Eberle, associate professor of agribusiness economics at Southern Illinois University at Carbondale, presented his work on assessing needs for a viable Illinois dairy industry, to members of the Rural Economic Development working group.

Dr. Suzanne Broussard, visiting assistant professor of animal sciences at the University of Illinois at Urbana-Champaign, discussed her collaborative research with Dr. Keith Kelley on the post-antibiotic era of food production, with members of the Agricultural Production Systems working group.

Dr. Andrzej Bartke, professor of internal medicine at Southern Illinois University School of Medicine, and Dr. Todd Winters, associate professor of animal science, food, and nutrition at Southern Illinois University at Carbondale, shared their research on the impact of soy components on quality of life during aging, with members of the Human Nutrition and Food Safety working group.

Dr. Richard Cooke, associate professor of agricultural and biological engineering at the University of Illinois at Urbana-Champaign, reviewed his research on modifying drainage systems to improve water quality, with members of the Natural Resources working group.

“Connecting our members with researchers has always been a priority,” said Nels Kasey, C-FAR research chair. “We are pleased to have initiated this new format and will do everything we can to expand these opportunities. It is beneficial, not only for our members, but also the researchers.”

Following discussions with these researchers, the working groups reviewed their research focus areas to determine whether research objectives or subobjectives needed revisions. The Expanding Agricultural Markets working group revised their research focus area objective and subobjectives to reflect the need for the development of marketing expertise to enhance the food and agriculture industry’s profitability. The Rural Economic Development, Agricultural Production Systems, and Natural Resources working groups updated their research focus area objectives and subobjectives to provide added clarity for researchers. No changes were made to the Human Nutrition and Food Safety working group’s research focus area. To view the updated C-FAR research focus areas, visit the C-FAR website at www.ilcfar.org/research/focus.html.

The next meeting of the membership will be the 2005 Annual Meeting, to be held on February 15 in Springfield.

C-FAR Connection Fall 2004
Researchers at the University of Illinois at Urbana-Champaign (UIUC) are leading the world in swine transgenic research to enhance sow milk production and piglet health. With industry pressure for earlier weaning and larger litter sizes, sows with greater high-quality milk producing ability would be able to yield larger, healthier offspring and reduce the number of runts too small to enter into production. Matthew Wheeler, professor of animal sciences and bioengineering, provides leadership for the project, and he is joined by professors Sharon Donovan and Walter Hurley and a team of researchers in this cutting-edge research initiative. Funded through the UIUC C-FAR Sentinel Program, this research is the first transgenic livestock project directed solely at advancing agriculture. “This is one of the first research projects that has successfully employed transgenic technology to improve an economically important livestock species,” said Wheeler.

In intensive pig production systems, piglets achieve only about half their potential growth-rate during lactation because of low volume and solids content of sow milk. Low piglet weaning weight affects overall pig performance through the nursery, grower, and finishing stages and affects general piglet health. Decreases in weaning weight also affect subsequent reproductive performance of females, including a prolonged weaning-to-first-estrus interval and lower ovulation rate and subsequent litter size.

Current swine management systems attempt to maximize the number of piglets born per litter and the piglet survival rate. In order to sustain larger litter sizes and keep piglets alive and healthy, maximum milk production must be obtained. The gains that have been made in decreasing newborn mortality, combined with the increased litter sizes from sows selected for high genetic merit, make milk production and composition two of the most important limiting factors in piglet survivability and growth.

Researchers have theorized that lactose (milk sugar) production regulates milk volume. Although studied for...
Preliminary results indicated milk in first and second parity sows normally found in sow milk. The effects of increased $\alpha$-lactalbumin levels on milk production, milk composition, and piglet health.

Transgenic animals are animals that contain a gene or engineered gene that they would not have obtained through normal breeding or mating practices. The genes are transferred into the animals by injecting the gene of interest into a developing embryo. In a small percentage of the embryos, the injected gene inserts into the DNA of the animal and becomes part of the animal’s genome. This allows the gene to behave like any other of the animal’s genes, and the gene is passed on to the offspring in a normal fashion.

Transgenic swine that produce higher levels of insulin-like growth factor I (IGF-I) in their milk are also being developed to examine its effects on the growth, health, and development of the piglets. IGF-I is a bioactive protein found in the milk of mammals and at significantly higher levels in colostrum than in later-stage milk. When IGF-I is given to piglets in milk replacer, it results in greater intestinal growth and maturation.

To date, two lines of transgenic pigs containing the bovine $\alpha$-lactalbumin gene have been produced. One of the lines is currently being studied, while the second line is being propagated to allow further investigation. The first line of pigs is producing 50 percent more total $\alpha$-lactalbumin than is normally found in sow milk. The effects of this increase on sow milk production and on piglet growth is being examined in first and second parity sows. Preliminary results indicated milk production by transgenic gilts was greater than that of control sows. The growth rate of piglets nursing transgenic sows was compared to those nursing control sows. At weaning, piglets suckling transgenic sows weighed about 1 pound more than piglets suckling the control sows. Some very preliminary data indicate that piglets suckling homozygous transgenic females were more than 1 pound heavier than control piglets.

Three transgenic boars containing a gene construct that will allow production of higher IGF-I levels in milk have been produced. They are being mated to produce transgenic sows that will allow researchers to study the effects of this gene on piglet growth and health. Preliminary results indicate that Colostral IGF-I content of transgenic sows ranged from 6 to 14 times greater than that of nontransgenic milk. Further, milk IGF-I was maintained at higher levels until day 20 postpartum, approximately six-fold greater than the milk IGF-I content of nontransgenic sows. Future studies will investigate the effect of higher IGF-I levels on piglet growth and intestinal health.

Wheeler and his team anticipate the following potential impacts of this research on the swine industry:

- A 10% increase in sow milk production would result in an additional $2 to $5 net profit per litter weaned (based on an average litter size of 8 piglets).
- Increased weaning weight will improve the weaning transition and shorten the number of days to market or puberty. Potentially, an additional $5 net profit per animal may be realized.
- Increasing the amount of IGF-I in sow milk will improve the intestinal health of piglets, which may improve the weaning transition and decrease the susceptibility to intestinal diseases.

“Developing new technologies is crucial in assisting pork producers in Illinois and the United States to remain competitive in an ever-increasing global marketplace,” said Jim Kaitschuk, executive director of the Illinois Pork Producers Association. “Dr. Wheeler’s research has the potential to help improve pork producers’ profitability.”

Collaborations have been established with research groups in both Germany and Brazil. In addition 15 patents have been generated, and a startup company, Vitea, has licensed microfluidic technology and is marketing a commercial product for use in embryo production.

“State of Illinois funding, via C-FAR, has been instrumental in providing the seed monies to get these projects started and provide the preliminary data required for federal funding. The vision of C-FAR has brought about many innovations that would otherwise have not been possible,” said Wheeler.

Wheeler is currently working with U.S. Food and Drug Administration (FDA) officials to develop guidelines for approving commercial use of transgenic swine. Although researchers are not concerned about any safety issues, the approval process is expected to require larger field trials, as well as risk assessment studies.

Welcome

A special welcome to the Sod Growers Association of Mid-America, which joined C-FAR as an Organizational Member this summer. We also welcome Environmentally Correct Concepts as a new Affiliate Member. We are grateful for these organizations’ commitment to Illinois food, agricultural, and related research programs, and we look forward to their engagement in C-FAR.
Scab-Resistant Apple Varieties Being Developed Through Genomics Research

Apple production is an important segment of Illinois agriculture. The Illinois Agricultural Statistics Service estimates that 60 million pounds of apples are produced each year, with a value of almost $30 million. About 80% of the apples are consumed fresh, with the remainder being processed into cider, sauce, pies, and apple butter.

Apple production requires intensive agricultural practices, including the application of pesticides to control fungal and bacterial diseases, insects, mites, and weeds. Labor and chemical costs associated with growing healthy apples are significant. Currently, producers must use chemical sprays up to 15 times per season to protect their orchards.

One of the most serious diseases of apple and ornamental crabapple is apple scab, caused by the fungus Venturia inaequalis. Apple scab causes defoliation and weakening of the tree, as well as scabby and often severely deformed fruit.

Schuyler Korban, professor of molecular genetics at the University of Illinois at Urbana-Champaign (UIUC), is leading research to develop apple varieties that are resistant to apple scab. Using leading-edge genetic engineering, Korban and his research team have identified the gene responsible for resistance to apple scab found in a crabapple line, and they have cloned the gene for transfer into select apple varieties. Using map-based cloning, Korban’s team is the first in the United States to identify the gene and construct a library of the apple genome. “Traditional breeding programs have produced disease-resistant apple varieties, but none has been able to maintain the quality traits of the original lines,” said Korban. “By transferring the cloned disease-resistance gene into popular apple varieties, we anticipate that producers will be able to reduce chemical spray usage while consumers continue to enjoy their preferred apple varieties...some of which have been in existence for over 100 years.”

On average, 30% of the cost of apple production can be attributed to labor and chemical spray costs. By growing apple varieties resistant to apple scab, Illinois producers are expected to be able to reduce these costs by approximately 15%, which could save producers hundreds of thousands of dollars each year. In addition, a reduction in the use of chemical sprays would enhance efforts to protect the environment and alleviate consumer concerns about the use of chemical sprays in the apple industry. In the changing marketplace, consumers are increasingly demanding agricultural products that are safe, healthful, and of premium quality.

“As an apple grower, I’m very concerned about the environment and the cost of apple production. Growers I know use pesticides with great care, especially since we live and work where we farm,” said Randy Graham, co-owner of Curtis Orchard in Champaign, and member of the Illinois State Horticultural Society. “C-FAR research is critical for Illinois apple producers because applicable research must be carried out in the region where it will be used. Different regions vary greatly with respect to growing conditions and disease.”

To date, the scab-resistant gene has been transferred into Gala and McIntosh apple varieties. These genetically enhanced plants are currently being analyzed for various traits.

Funded through C-FAR’s External Competitive Grants Program and UIUC’s Internal Program, this is the first reported research on the cloning and characterization of a disease-resistance gene from a fruit crop—and from woody perennial plants as a whole. “C-FAR funding was critical for us being able to move forward with this research to identify and clone the apple scab-resistance gene,” said Korban. “We are leading the world in this innovative research that has the potential to significantly increase profits to growers and expand the Illinois and U.S. apple industries.”

Korban has leveraged the C-FAR dollars to obtain over five times this initial investment in a $1.65 million grant from the National Science Foundation (NSF) to carry out related apple genomics research. Expert genomics researchers from the UIUC, Cornell University, Purdue University, and Washington University in St. Louis are collaborating on the NSF grant.

Funds are being sought to continue the development of scab-resistant apple varieties. Additional research studies are needed on transferring the gene into other apple varieties, comparing management systems of the new apple lines with contemporary apple production practices, and consumer studies. New transgenic apple lines will also need FDA approval.

“While the full impact of this research may not be felt for several years, the potential benefits are expected to be tremendous for U.S. apple producers, for consumers, and for the protection of our environmental systems,” said Korban.

Schuyler Korban, professor of molecular genetics and biotechnology at the University of Illinois at Urbana-Champaign, leads a genetic engineering initiative to develop scab-resistant apple varieties.
New Leadership for SIUC and ISU Agriculture Programs

On August 1, Gary L. Minish, former department head and professor of animal and poultry sciences at Virginia Polytechnic Institute and State University (VT), assumed his new role as dean of the College of Agricultural Sciences at Southern Illinois University at Carbondale (SIUC). Minish took over for Robert Arthur, who was serving as interim dean of the college. Raised on his family’s cattle and grain farm in Iowa, Minish is an internationally respected livestock expert. His 35-year career at VT included service as associate dean and director of development and agriculture technology for the university’s College of Agriculture and Life Sciences.

Minish’s vision for the SIUC College of Agricultural Sciences is responsive to the needs of the agricultural industry and consistent with the university’s long-range plan. “I hope to assist the college in strengthening its ties with our commodity groups and industry clientele, increase undergraduate and graduate student enrollment, identify research focus areas that will complement the Southern at 150: Building Excellence Through Commitment initiative, and be on a continuous quest for funds to improve our facilities, equipment, farms, and research and teaching programs,” said Minish.

“C-FAR has provided invaluable support for agricultural research and graduate student training at SIUC. It has also allowed substantial leveraged grant support to be secured from other industry and government agencies. In turn, this has provided our food, agriculture, and natural resource stakeholders with important information and well-educated people to enhance their businesses and industries.”

Also this past summer, the top agriculture leadership post at Illinois State University (ISU) changed hands. On July 1, Patrick D. O’Rourke began serving as chair of the university’s Department of Agriculture. O’Rourke took the reins from Randy Winter, who served as chair of the department for 11 years and continues at ISU as a faculty member.

“There is no doubt in my mind that C-FAR funding played a critically important role for us in recruiting and keeping some of the best new assistant professors in the country over the last few years,” said O’Rourke.

Educated at Purdue University and the University of Illinois at Urbana-Champaign, and having taught agribusiness courses at ISU since 1983, O’Rourke remains committed to keeping the curriculum at ISU updated so graduating students are prepared for the current job market. Through a C-FAR-funded research initiative, O’Rourke developed a web–based agribusiness management simulator called ProStar, which allows students in agribusiness management courses, farm supply managers, and other agribusiness professionals to improve their business–management skills. This research was highlighted in the summer 2004 issue of C-FAR Connection. “The challenge facing us is to make sure that what we do has value, believe in the value of what we do, and be proactive, innovative, and focused on doing what is best for our clientele and for our students’ future lives and careers. Fully embracing the opportunities that exist in the food and agriculture industries is not an option—it is essential. We serve our agriculture department best by making it the best place it can be for its faculty, staff, and students,” said O’Rourke.
calendar
2004–2005

November 10  Board of Directors Meeting
November 16  C-FAR Day at Western Illinois University
January  Board of Directors Meeting
February 15  Annual Meeting (Northfield Inn, Suites & Conference Center, Springfield)
February/March  Board of Directors Meeting
March 7  Agricultural Production Systems Working Group Meeting
March 8  Expanding Agricultural Markets Working Group Meeting
          Rural Economic Development Working Group Meeting
March 9  Human Nutrition and Food Safety Working Group Meeting
          Natural Resources Working Group Meeting
August  Semi-Annual Meeting

Please call the C-FAR office or check the calendar on the
C-FAR website at www.ilcfar.org for further details.