Iowa State University selects new College of Agriculture dean

Wendy Wintersteen was named dean of Iowa State’s College of Agriculture, and director of the Iowa Agriculture and Home Economics Experiment Station in January.

“Dr. Wintersteen has been an exceptional faculty member and administrator in our College of Agriculture, and she will make an outstanding dean,” said Iowa State University President Gregory Geoffroy. “She is very knowledgeable about agriculture, and she has excellent relationships with people throughout the agricultural community. We’re extremely pleased that she has accepted this very important position for Iowa State University and for agriculture nationally.”

Wintersteen succeeds Catherine Woteki, who left ISU last July to become global director of scientific affairs for Mars Inc., McLean, Va.

Prior to becoming interim dean, Wintersteen was senior associate dean of the college and associate director of the experiment station from 2000 to 2005. In other ISU positions (1979 to 2000), Wintersteen was entomology professor; director of extension for agriculture and natural resources; coordinator of pesticide management and pesticide applicator training programs; and extension associate in the entomology department and two extension area offices. As a faculty member, Wintersteen coordinated the activities of the Pest Management and Environment Program, which seeks to reduce the health and environmental risks of pesticide applications. Her extension research interests focused on the development and assessment of pest management strategies including the environmental economic injury level and measuring IPM adoption levels. From 1989 to 1990, Wintersteen also was acting national pesticide education program leader for the USDA-Extension Service in Washington, D.C.

Wintersteen has received numerous awards including the Early Achievement in Extension Award from the Iowa State University Foundation (1993), Outstanding Extension/Regulatory Display, Entomological Society of America (1994), USDA and EPA Certificate of Appreciation for outstanding service and dedication in establishing the national program for the certification and training of pesticide applicators (1999) and Honorary Member, Iowa Independent Crop Consultants Association (2000).
BIGMAP STAFF

Scott Hurd

Last year Scott Hurd came to the College of Veterinary Medicine to work on animal biosafety issues. He is associated with the Department of Production Animal Medicine and the Institute for Food Safety and Security. He is also Director of World Health Organization Collaborating Center for Risk Analysis and Hazard Surveillance and Intervention in Food Animals.

Scott has a Ph.D. from Michigan State University in Epidemiology and Economics and a D.V.M. from Iowa State University.

Over more than 20 years Scott has lead several initiatives applying analytical epidemiology, systems modeling, and risk assessment to important problems in food animal production. He has served as:

- Analytical epidemiologist and risk analyst at Hurd-Health Consulting and Iowa State University,
- Leader in swine Preharvest Salmonella research at the USDA, ARS. National Animal Disease Center,
- Head of the USDA National Animal Health Monitoring System Design and Analysis group for the first 3 national surveys,
- Scott’s current research is to do quantitative research on the public health impacts of various on-farm management practices in food animals, such as salmonella control and antibiotic use. His field research activities focus on epidemiology and ecology of foodborne pathogens, especially Salmonella and Campylobacter, for swine and turkeys and their environment. He has identified important preharvest control points that will reduce the prevalence of pathogens in the food chain. He has extensive experience in systems and risk assessment modeling.

In 1990 he was an analyst on the first US risk assessment for mad cow (Bovine Spongiform Encephalopathy). He has also conducted quantitative risk assessments for classical swine fever and tuberculosis in Michigan white-tailed deer, avian influenza, Salmonella enteritidis in shell eggs, and xenotransplantation from swine. Most recently, he published a quantitative analysis of the public health risk from using macrolide antibiotics in food animals and an analysis of the public health benefits from antibiotic use in poultry.

Scott is also involved in teaching a new course in risk assessment with Jeff Wolf. This course provides a means to educate students in the tools that can be used for the science-based assessment of risk.

Adelaida Harries

Adelaida Harries has been working at the Seed Science Center/BIGMAP since August, 2002. Her appointment is as Assistant Scientist with a primary focus on process management applied to biosafety, developing biosafety procedures manuals for genetically modified organisms, including environmental release, food/feed safety and commercial release.

Adelaida has also developed Procedures Manuals for Seed Import/Export and for Phytosanitary Accreditation for Seed Export, which has been adopted in five countries of the Asia Pacific Region under a USDA Funded project. Similarly, in an ASTA-Funded project she developed Procedures Manuals for Seed Certification Accreditation and Phytosanitary Accreditation in Spanish for the five Andean Pact countries.

She was the President of the National Seed Institute INASE, Ministry of Agriculture of Argentina, with overall responsibility for seed certification, plant breeder’s right, seed testing, variety evaluation and registration, molecular markers laboratory and release of genetically modified organisms. She also was a member of the Argentine National Biosafety Commission (CONABIA), responsible for developing the national policy and regulations related to genetically modified organisms and their impact on Argentina trade.

Her outstanding leadership internationally led her to be selected as Chair of the Organization for Economic Cooperation and Development (OECD) Schemes for Varietal Certification of Seed Moving in International Trade, Vice-chair of the International Union for the Protection of New Varieties of Plants (UPOV), member of the Executive Committee of the International Seed Testing Association (ISTA) and Chair of the Seed Committee of the Latin American Integration Association (ALADI).

Adelaida has been a consultant to Food Agriculture Organization (FAO), Danish International Development Agency (DANIDA), European Union (CEE), U.S. Department of Agriculture (USDA), among others.

In 2001 she received a distinguished service award for her contributions to the development of the seed industry in the Latin American Region, from the Latin American Seed Trade Federation (FELAS).

Lulu Rodriguez

Lulu Rodriguez is associate professor and director of graduate education in the Greenlee School of Journalism and Communication at Iowa State University. She specializes in the communication of science and technology and in extension/outreach efforts to improve such communication. Her research projects include investigations of consumer opinions about complex and controversial agricultural technologies, and evaluations of media messages about and public perceptions of biotechnology. She received her master’s degree in communication from Cornell University and earned her doctorate in mass communication from the University of Wisconsin-Madison. Contact information: 214 Hamilton Hall, Iowa State University; 515-294-0484; lulurod@iastate.edu.
Seed Science Center Staff

Alan Gaul

The Seed Science Center welcomes Alan Gaul back to the Center. He has recently been taken a position conducting training and research on seed conditioning.

Alan comes from a dairy farm in Northeastern Iowa. He has a BS in Agricultural Engineering from Iowa State University. During college he worked in the Agricultural Engineering (now the Agricultural and Biosystems Engineering Department) grain handling lab where his work involved extensive testing of grain moisture meters and other grain quality measurements.

He also worked at the Seed Science Center during college and was heavily involved in both research and extension programs for seed conditioning, including the first several years of “hands on” seed workshops provided by ISU. He has been a frequent guest speaker at various ISU workshops and conferences since leaving the Seed Science Center in 1983.

Since then he has worked for seed equipment companies. First he was Chief Engineer for Seed & Grain Systems, Inc., a turnkey seed plant contractor involved with the design, fabrication, and erection of seed conditioning facilities throughout the Midwest and many foreign countries. He was responsible for design and technical support related to virtually all aspects of plant design, including conceptual design, equipment selection, structural and equipment layouts, dust handling systems, and process control specifications. He was instrumental in the development of various devices for use in the industry, including seed drying, material handling, and process control systems. The position also included extensive experience during start-up and personnel training at many of the facilities. He also served as VP for Operations Management during later years, with responsibilities related to project management and coordination of daily company operations, June 1983 through November 1999.

Until recently he served as Chief Engineer for AEC Enterprises, Inc., an Iowa corporation operating the manufacturing facilities formerly owned by Seed & Grain Systems. The operation provides steel fabrication and design services for the seed industry, manufacturing the majority of the product line previously supplied by Seed & Grain. The company is part of AEC Group, which also supplies industrial control panels and process control systems for the seed industry.

Allan has a lot of experience fitting the design of plants and equipment to changing seed industry needs. We are looking forward to having Alan here at the Seed Science Center and expect that you in the seed industry will want to talk with him about conditioning issues.

PCR Staff

Wayne Shyy

Returning to Iowa State University has been a literal homecoming for Wayne Shyy. A recent graduate of Princeton University, his initial fascination and eventual development in the sciences had their roots here in Ames, Iowa.

As early as a high school student, Shyy was exposed to the onset of the biotech revolution in the late 1990’s while working with Dr. Kan Wang of the Agronomy Department. Through extensive hands-on training, Shyy was a quick and eager student at the Plant Transformation Facility. His main duties were DNA extraction, purification, and polymerase chain reaction (PCR) experimentation. With great leadership, responsibility, and independence, Shyy fostered a growing interest in biotechnology research and development.

At Princeton, Shyy was fortunate to be accepted into the prestigious White House Scholar internship with Merck Pharmaceuticals, Inc at their West Point, Pennsylvania site. Here, his passion for science first linked with the potentials of private industry. Working specifically in protein design and synthesis in early drug detection and their effects upon the human blood-brain-barrier, Shyy was exposed to bio-pharmaceutical policy and intellectual property in private industry applications.

In his time away from Ames, Shyy remained in close contact with Iowa State University. He was involved with field crop research and studied the relationship between that research and the ongoing debate on genetically modified organisms (GMOs), specifically about plant-made pharmaceuticals (PMPs). He came to understand the dire need for a non-biased approach to understanding and regulating GMO crops worldwide, but with specific focus on the socio-economic impact here in the Midwest.

It would come as no surprise then, when Shyy decided to work at the Seed Science Center here at Iowa State University upon graduating.

After arriving at the Seed Science Center, Shyy quickly fell in step with the supportive faculty and staff, aiding in the development of protocols for the detection of GMOs in seed and grain. This derived directly from his past experiences, including DNA extraction and PCR testing of seed. Flexibility and an eagerness to understand new technological applications drove novel protocol development, organizing sample workload and thorough validation of various established protocols with relation to projected seed testing trends and goals.

The future implications of seed technology have guaranteed great opportunities here at the Seed Science Center and Seed Testing Laboratory. Shyy looks forward to the development of real-time PCR technologies in the areas of event-specific detection in GM seed and the finalization of a new Iso-electric Focusing (IEF) laboratory and services. With each step in technological innovation, there are innumerable aftershocks as the seed industry tries to keep up with responsible detection and regulation during this exciting time. The Seed Testing Laboratory’s DNA services are continually expanding, offering services to truly benefit the industry now and in the coming years.
Saharah Moon Chapotin
Post-Doctoral Research Associate

Saharah Moon Chapotin is a post-doctoral research associate with BIGMAP. She is based in Washington, DC, where her activities are focused on regulatory issues surrounding genetically modified agricultural products. She is comparing different plant breeding methods, including conventional breeding, mutation breeding and genetic engineering, to assess the potential for unexpected phenotypes and the process by which they are detected and eliminated. Prior to joining BIGMAP, Saharah Moon was a science policy fellow at the National Academies. She received a Ph.D in plant physiology from Harvard University and a B.S. in biology from Stanford University.

Gema Grau
Graduate Student

I am originally from Zaragoza, a city of 600,000 inhabitants in a dry region of Northeast Spain. Even though nobody in my family has an agricultural background, I grew interested in crops and food production. I obtained a bachelor’s degree in Agronomy from Universitat de Lleida and in my last year of studies I came to Iowa State University on an internship. Initially, I worked in the Entomology Department and later on in the Agronomy Department, where I met Dr. Susana Goggi, who is my major professor today. Currently, I am working on my master’s degree in Crop Physiology and Production, expecting to graduate in the spring of 2006. My research focuses on the use of essential oils from aromatic plants as an alternative seed treatment in soybean. I have tested different oils against three common soybean seed pathogens in vitro. I am currently working on determining their minimum inhibitory concentration, checking for any potential phytotoxic effect over the germination of the seed and starting to test their efficacy in vivo. I really enjoy the opportunity of studying at the Seed Science Center, learning more about seed physiology, pathology and testing, and also about international market and regulations of seeds while improving my English skills and meeting interesting people of all around the world.

Nathan LeVan
Graduate Student

Home: A row crop farm near Stacyville, Iowa

Background: Bachelor’s degree from Iowa State University in Agronomy and Seed Science in 2004

Current: I am currently working on my Masters in Crop Production and Physiology with a specialization in Seed Science (expected graduation in spring/summer 2006). Dr. Russ Mullen and Dr. Susana Goggi are my major professors.

Research: I am studying imbibitional injury in soybeans. This project has three main aspects:

- analyzing seed composition and trying to determine if protein and oil levels affect the incidence of imbibitional injury;
- testing seed grown under soybean cyst nematode infestation to see if the nematodes reduce seed quality; and
- observing various varieties in multiple maturity groups in the field and in the lab in an attempt to standardize a rule for germination testing low moisture soybean seed lots.

Teaching: I am currently a teaching assistant in the Agronomy department’s crop science teaching group. I am involved with two introductory undergraduate lab courses, Agron 114, Principles of Agronomy, and this spring Agron 212, Grain and Forage Crop Management.

Activities: I was highly involved in the Agronomy Undergraduate Student Club serving as treasurer in 2002, and president in 2003 and was also a member of the Agronomy Department Social committee in 2003. I served as a representative on the College of Agriculture’s Dean, Catherine Wotecki’s student panel, and as a member of the Computational Advisory Committee. In my free time I play in the City of Ames softball leagues, and enjoy going fishing as much as I can.

Comments: I truly believe that the opportunities that you are given as a student here at the Seed Science Center, and within the Agronomy Department, here at Iowa State are quite extraordinary. Having the chance to attend BIGMAP events, acquire professional skills and contacts at national ASA and ASTA meetings, and to have a great staff that is highly approachable are all attributes that create an experience that would be very hard to equal at another university.
Payne Appointed Vice Provost for Extension

Jack Payne became Iowa State University’s Vice Provost for Extension on January 15, 2006. At Iowa State, Payne’s responsibilities will include overseeing Cooperative Extension programs in agriculture and natural resources, communities and economic development, families, and 4-H youth development, as well as administering University Extension programs in business and industry and continuing education and communication services.

Payne’s appointment is of special interest to the Seed Technology and Business Online Master’s Degree programs because of the responsibility that he has been given for organizing distance education at ISU.

Prior to assuming the Vice Provost position at Iowa State, Payne served as Vice President for University Extension at Utah State University, Logan, and was also the Director of the Utah Cooperative Extension Service and Dean of Continuing Education Services at Utah State. Before joining Utah State, Payne served as the first CEO and President of the American National Fish and Wildlife Museum and held several positions with Ducks Unlimited.

Payne received his B.S. in Biology from Temple University, Philadelphia; his M.S. in Fisheries Science, and his Ph.D. in Wildlife Science, both from Utah State University, Logan.

HARMONIZATION OF SEED POLICIES AND PHYTOSANITARY REGULATIONS IN THE ANDEAN COMMUNITY OF NATIONS

Adelaida Harries, Bimap Process Management

The Andean Community (CAN) is a sub-regional organization, with international legal status, composed of Bolivia, Colombia, Ecuador, Peru and Venezuela. The key objectives of the Andean Community (CAN) are: to promote the balanced and harmonious development of the member countries under equitable conditions, to boost their growth through integration and economic and social cooperation, to enhance participation in the regional integration process with a view to the progressive formation of a Latin American common market, and to strive for a steady improvement in the standard of living of their inhabitants.

In 2003, an American Seed Trade Association funded a project for the harmonization of seed policies and phytosanitary regulations in the Andean Community of Nations to enhance the seed trade in the region. The Seed Science Center coordinated this project.

All five countries of the CAN, Bolivia, Colombia, Ecuador, Peru and Venezuela, participated in a series of six (6) workshops conducted in the region through their national plant protection offices, seed departments and seed industry. Based on phytosanitary scientific information and the tools of process management, consensus was attained for regional harmonization of seed policies and phytosanitary regulations for the selected seed crops: cotton, rice, field beans, corn, sorghum, soybean, and potato.

The project finalized in September 2005 with the following accomplishments:

- Elimination of unnecessary quarantine pests from national lists: The initial list of 379 quarantine pathogens for the selected crops was reduced to 112.

- Development and approval of common quality seed certification standards for seed and field for the seven selected crops.

- Development and submission of an Andean Community Seed Law to the CAN Secretariat, as an amendment of the outdated CAN Decision #193 of 1981. The proposed amendment is a modern law that regulates the seed production, variety release and seed certification. The law will serve as an umbrella for the Andean Countries.

- Development of the phytosanitary accreditation manuals for seed export for each country that describe in detail the procedures to be followed in the accreditation system for seed export. The only exception was Peru, which participated as an observer in this phase. The phytosanitary accreditation is the official recognition by the National Plant Protection Office that accredits organizations to carry out their own phytosanitary field inspections and/or seed health testing. Accredited entities are any public or private organization or individual that meets the requirements established in the accreditation system.

- Development of seed certification accreditation manuals for the five countries. The manuals allow the accreditation of seed companies to carry out their own seed certification.

- Development and submission of a proposed “CAN Decision” on phytosanitary accreditation and seed certification accreditation. This will serve as a general framework for approval by the countries through the Andean Community Secretariat.

- Development of three models of quality manuals based on process management to be utilized in the training of the individuals in the private seed sector. The manuals developed were: Quality Manual for Seed Company, Quality Manual for Seed Testing Laboratory and Quality Manual for a Seed Certification Entity.

All the public and private sector country representatives agreed on the way forward on the implementation of the agreements to enhance seed trade in the region and with other trading partners.
THIRD ANNUAL BIGMAP SYMPOSIUM CONVENED IN AMES

Jeff Wolt, BIGMAP Plant Risk Assessment

The Third Annual BIGMAP Symposium was held in Ames on April 18, 2006. The annual symposium addresses issues relating to the safety and acceptance of plant and animal biotechnology, as part of BIGMAP’s mission to increase public understanding of the risks and benefits of biotechnology applications in agriculture. This year’s theme was: Understanding and Communicating Issues in Agricultural Biotechnology.

The morning session was organized by the Greenlee School of Journalism and Communication at ISU, and addressed Communication of Agricultural Biotechnology Risks and Benefits. Michael Bugeja, Director of the Greenlee School set the stage for the session with a presentation describing the role of journalists in deliberations on issues of broad public importance. Dr. Thomas Hoban, Professor of Sociology, Anthropology and Food Science at North Carolina State University overviewed results of nearly 15 years tracking of public attitudes concerning biotechnology with the United States. In comparing trends in public opinion in the US with those in Europe, Hoban pointed to an apparent closing of the gap in attitudes, but with Europeans still showing greater skepticism toward agricultural biotechnology. Trends over time show a distinctly greater approval by the public of plant biotechnology in comparison to animal biotechnology. Hoban pointed to the weight of moral versus scientific arguments as underpinning this difference. Paul Elias, biotechnology reporter for Associated Press, provided a working journalist’s perspective of how science and controversy balance in the reporting of biotechnology. The morning session closed with a dialog session moderated by Dr. Eric Abbott of the Greenlee School.

The afternoon session focused on Science and Policy Issues in Agricultural Biotechnology and provided perspectives on the state of science and regulation. There has been much interest on the part of product developers as to whether obtaining GRAS (Generally Recognized as Safe) status for selected products can overcome obstacles regarding field production of non-food products, including some pharmaceuticals and industrial compounds produced by agricultural biotechnology. This was addressed by Dr. Mary Ditto of the FDA Office of Food Additive Safety Division of Biotechnology & GRAS Notice Review. She presented an overview regarding early food safety evaluation of new non-pesticidal proteins and described GRAS for biotechnology products. Gregory Jaffe, Director of the Biotechnology Project for the Center for Science in the Public Interest, provided a perspective of consumers with regard to the pace and nature of biotechnology products brought to the marketplace in the United States. He focused on the length of the process for regulatory review and questioned whether customers are getting the kind of products they want. Plant-made subunit vaccines for animal health represent the first type of plant-based pharmaceutical to gain approvals (for contained production and use in animals) in the United States. Dr. Guy Cardineau of the Arizona Biodesign Institute and Arizona State University College of Law described the rationale and state of the science for use of plants as production platforms for pharmaceutically active substances. The session was concluded with Dr. Bob Peterson of the Department of Land Resources and Environmental Sciences at Montana State University describing his research assessing and communicating comparative risks associated with biotechnology. Panel discussion for this session was moderated by Dr. David Heron, Assistant Director of the Policy Coordination Division of USDA-APHIS Biotechnology Regulatory Services.

Further information and presentations from this and prior BIGMAP Symposia can be accessed at the BIGMAP website, www.bigmap.iastate.edu. Begin planning now to attend the 4th Annual Symposium in spring 2007.
State Department Outreach Activities on Agricultural Biotechnology

By Paul Christensen, Editor

On October 11 Jack Bobo, Deputy Chief of the State Department Bureau of Economic and Business Affairs, presented a summary of the Bureau's activities in a seminar at the Seed Science Center.

The Bureau is responsible for trade issues related to biotechnology and food aid and development issues related to biotechnology. The Bureau coordinates among several US government agencies that are involved with these biotech issues.

Jack reviewed the places where ag biotech is being used around the world using data from the International Service for the Acquisition of Agri-Biotech Applications (ISAAA). He also summarized the approval status of the first biotech traits around the globe.

The Bureau does not have programs in Europe, but he pointed out that there is a little biotech production in both France and Germany, now that the EU approval process is working again. In West Africa there is some interest in biotechnology now, especially in the countries that rely on cotton exports, but the leaders of those countries are reluctant to take the political risk associated with biotechnology.

The major objectives of the Bureau are to promote science-based regulatory systems, to maintain the flow of trade while maintaining the health and security of products involved with biotechnology, and to reduce hunger and poverty and increase incomes in the developing world. Their outreach activities include Codex Alimentarius, the biosafety protocol of the Convention on Biodiversity, the Organization for Economic Cooperation and Development (OECD), the FAO and other UN organizations, and some other forums where decisions related to biotechnology are taken.

These outreach activities involve: speaker programs, international visitor programs, voluntary visitor programs, workshops and conferences, editorials and other media opportunities, dialogues with policy makers, journalists and consumers. The budget of the bureau is only about $500,000, but it involves a lot of people with the issue.

Jack said that when questioned about the validity of using science-based analysis of the risks associated with biotechnology he normally refers to the work done by the National Academy of Science, the EU regulatory agencies, and the World Health Organization positions. He also refers to the position of the FAO, in their State of Food and Agriculture 2003-2004. Consensus among these organizations, helps ease concerns with science-based approaches.

He noted that the technical issues that come up in the discussion of biotechnology have shifted over the last 10 years: health concerns have shifted to concerns with biodiversity. There is fundamental objection to the involvement of multi-national corporations that may find different forms of expression over time. Discussions of the relationship between business, democracy and human rights tend to overshadow discussions of trade and biotechnology.

Foundation Seed in Mozambique

Paul Christensen, Seed Science Center Distance Education Coordinator

USAID has financed a Project for the International Crops Research Center for Semi-Arid Tropics, ICRISAT, in which the ISU Seed Science Center has a role as a sub-contractor. The project is called Developing Sustainable Seed Systems to Support Commercialization of Small-Scale Agriculture in Sub-Saharan Africa.

Many farmers in Africa grow crops mainly as a subsistence activity and are therefore beyond the reach of the market economy. Extension of commercial activity in seed into this market can be facilitated by actions which simplify and reduce the risk of involvement for both commercial seedsmen and farmers. Making the products of public research more available is one approach. Creating organizations for the production and sale of foundation seed of these varieties is a second means. And training staff of both public and private organizations in the production of foundations seed is a third.

The ISU Seed Science Center is involved with helping ICRISAT plan economically sustainable foundation seed organizations. The program is especially directed at creating channels by with new varieties based on work done by the International Agricultural Research Centers of the Consultative Group for International Agriculture can be more effectively delivered to farmers across Africa.

In August I visited Mozambique and traveled in the three major seed production regions of the country. I worked with Celso Ruface of ICRISAT Mozambique to create a detailed business plan for a new organization that can work with the Institute for Agricultural Investigation and private seed companies to create sustainable business based on the sale of foundation varieties developed by the institute. Celso and I visited many government and private organizations involved with seed in Mozambique to develop a clear understanding of the constraints involved.

The plan involved estimates of the demand for foundation seed and the costs required to produce and sell it. It also made recommendations on the institutional framework within which the foundation seed company could operate including its relationship to the Institute and the potential customers.

Technical proposals like the foundation seed business plant suppose changes in seed regulation that will make seed commerce work efficiently. That is one of the reasons that the Seed Science Center’s International Program spends so much time working on harmonization of seed regulation to make it more effective.
2005 Biopharmaceutical Corn Field Trial Summary

By Brian Meyer, College of Agriculture Communications

Overview

In 2005, Iowa State University conducted a field trial of genetically engineered corn at the Iowa Army Ammunition Plant near Middletown in southeast Iowa. The corn was engineered to produce a protein with potentially significant implications for human and animal health. The field trial was part of Iowa State’s continuing efforts to evaluate the production of plants engineered to produce pharmaceuticals and industrial products.

Research Focus

The field trial was led by principal investigator Kan Wang, Associate Professor in the Department of Agronomy and Director of the Center for Plant Transformation in the Plant Sciences Institute. Dr. Wang engineered the corn to produce LT-B, a protein subunit produced by some strains of E. coli. Research has shown the ability of the protein to stimulate protective immune antibodies. The ISU research is evaluating the ability of the corn-based pharmaceutical to protect animals from diarrhea caused by bacterial infections. The research ultimately may benefit people in developing nations for whom bacterial diarrhea can prove fatal; people suffering from traveler’s diarrhea; and livestock producers working to ensure healthy herds. Dr. Wang’s project has received $200,000 from the USDA and several Iowa State University units.

Management Team

An ISU management team assisted Dr. Wang and her research team in coordinating many aspects necessary to initiate and complete the field trial. Key personnel involved were from the Department of Agronomy, Environmental Health and Safety, Vice Provost for Research Office, College of Agriculture, Plant Sciences Institute, News Service and Biosafety Institute for Genetically Modified Agricultural Products.

Regulatory Approval

The USDA’s Animal and Plant Health Inspection Service (APHIS) has federal oversight for permits to field test genetically modified crops. Iowa State submitted a permit application to APHIS on March 10, 2005. Although the State of Iowa has no laws or regulations concerning field tests of genetically engineered plants, the Iowa Department of Agriculture and Land Stewardship (IDALS) reviews Iowa applications submitted to APHIS. After a series of consultations between IDALS and Iowa State personnel, a set of additional safeguards were identified to help ensure modified plant material would be contained within the test site. These safeguards — which included installation of security cameras, hand-pollination and bagging of plants, and hand-harvesting of the ears — far exceeded APHIS requirements. A federal permit was issued to Dr. Wang on June 10. Throughout the growing season, ISU worked closely with APHIS and IDALS personnel to ensure the trial reached a successful conclusion.

Review of the Growing Season

On June 14, the researchers planted approximately 6,200 seeds in two small plots. The plots totaled less than a quarter of an acre of the 19,000-acre Iowa Army Ammunition Plant and were located 1.2 miles from the nearest commercial corn. The corn was planted more than 35 days after the date of planting in the nearest corn fields to prevent cross-pollination. Eighty-seven percent of the planted seeds germinated. Horan BioProduction of Fort Dodge was contracted to manage the plots. In July, wind monitors were set up to collect data to better understand pollen flow. Preliminary data indicate the site had an average August wind speed of less than 2 meters/second with a maximum gust on one occasion of 11 meters/second (approximately 25 miles per hour). The field trial had no incidents of security breaches during the growing season. At time of pollination, it was estimated the trial would produce about 100 kilograms of seed. Harvest occurred on October 17. The quality and quantity of the crop was much lower than anticipated due to the late planting date and stresses from insect damage, fungal infections and drought conditions in southeast Iowa.

Communications

ISU News Service distributed two news releases in June on the permit application and approval. On the day of planting, reporters from Burlington and Iowa Farmer Today were on hand at the site. In July, News Service profiled Dr. Wang in Inside Iowa State. In June, Dr. Wang presented information on her research at the 11th annual Coalition for National Science Funding Exhibition and Reception on Capitol Hill in Washington, D.C., and also met with several of Iowa’s Congressional delegation. A limited number of stories or comments critical of the research appeared, including in an alternative Des Moines weekly and on a plant pharmaceutical discussion website. Other published reports were neutral or positive.
Next steps

After an assessment of the newly harvested crop, the corn will be fed to animals to study the protein's safety and efficacy in preventing bacterial diarrhea. Researchers also will analyze the most efficient technology to extract and purify plant-based therapeutic proteins. ISU officials will be evaluating options for future field trials, including the possibility of again using the Middletown site.

Assessment

Based on a review of the 2005 process, the ISU management team identified the following issues to be considered prior to future field trials of biopharmaceutical crops:

• Develop ISU standard operating procedures that include recommendations for hand-pollination, appropriate security measures, etc.
• Develop a communication strategy for internal and external audiences, which would include communicating with state officials prior to submission of a permit application
• Support research to develop corn-based systems, such as male-sterile corn varieties, that minimize risk of growing engineered products
• Consider results from ongoing ISU pollen flow studies

Future potential of biopharmaceuticals

Crops grown for biopharmaceutical uses are an example of how Iowa State can apply high-technology to benefit people and animals. Scientific research results will help businesses and farmers make better decisions on promising market opportunities in high-value products. The other important aspect of the research is the opportunity to study how to produce and process genetically engineered plants safely. The highest priority is to safeguard Iowa's nation-leading status in crop agriculture and to maintain public confidence in the quality and safety of the food supply. At the same time, Iowa State is working to ensure that biopharmaceutical crops can be grown in a safe, well-managed and environmentally friendly way, compatible with the best interests of Iowa agriculture.
Etymology of Risk

Paul Christensen, Editor

The history of the word “risk” is less than clear.

Everyone agrees that risk traces back to Italian, Portuguese and Spanish words meaning “to dare.” The Italian verb is “riscare.” That’s where the trail gets fuzzy. One side suggested that the origin was with the Arabic world that is pronounced “rizq.” Where the “q” stands for a guttural “k” sound. The other side argues for derivation from the Medieval Latin term “risicum or risicum,” and in turn from the Greek word ‘rhiza’ which refers to the ‘hazards of sailing too near to the cliffs: contrary winds, turbulent downdraughts, swirling tides.’

Henry and Renee Kahane found a plausible solution. Henry and Renee were professors of linguistics at the University of Illinois from 1941 to 1971. They had been pushed out of Europe by the war. Their work revolved around showing how linguistic components had moved from language to language around the Mediterranean Sea.

In the 60’s Henry and Renee asserted that the word risk was indeed derived from the word “risicum” but that “risicum” was derived from the Arabic “rizq” through a Byzantine intermediate. The word “rizq” in Arabic has a broad meaning, but the more specific meaning that was transmitted to Europe concerned a military use: “a system in which the soldier was expected to procure his own maintenance from the area where he was stationed.” In this use, the word was applied in sea law and mercenary systems.

“To dare,” the meaning in southern Europe of the renaissance, includes a concept of action with uncertainty, potential benefit, and possible injury or loss. The meaning is like our current use of the phrase “bet the farm.” A soldier living of the land described a situation with elements of uncertainty, benefit and possible loss. The broader meaning of “rizq” in Arabic is future sustenance, daily bread, blessing (from God), or fortune. But in Muslim culture, the future is always contingent on God’s will, and therefore, uncertain for the individual who will live it. In this case the meaning includes elements of uncertainty and benefit, but less emphasis on possible loss than the medieval European meanings.

Our current use of the word “risk” focuses on uncertainty and the possibility of loss, more formally we define risk as the product value of the occurrence of a hazard and the probability of its occurrence. We now use other worlds for the uncertainty of benefits from action. Separation of the concept of the contingency of loss, from the contingency of benefits has advantages in formal analytic thought, but it leaves open the possibility that we might neglect the benefits because they are product of a separate analysis.

Seed Technology and Business Curriculum

By Dr. Paul Christensen, Program Manager of Distance Education, Seed Science Center

Program Description

The Colleges of Agriculture and Business are offering a new global graduate curriculum specifically tailored to the needs of young professionals in the seed industry. The approach will be strongly integrative, emphasizing links between business, scientific and technical subjects. The members of the audience for the master’s degree program are working seed professionals in Iowa, the U.S. and the world. The curriculum will be delivered using distance education technology. The program will prepare young professionals to meet the increasingly complex challenges of management positions in the seed business. There will be options to take the seed business courses for a “Seed Business Management” certificate, or to take science and technology courses for a “Seed Science and Technology” certificate. The certificate options will allow the students to complement their backgrounds and advance professionally. The curriculum will begin 2006 or early 2007. The proposed structure of the curriculum with various courses and their relationships are shown below.

Need and Opportunity

The annual value of planted seed in the world is $55 billion. The annual sales of the global seed business are about $30 billion. The U.S. seed industry has annual sales of $5.7 billion, with over $800 million in exports. The seed business primarily concerns itself with the process of delivering value through genetic improvement of plants, including improvements using modern biotechnology. Improvements in technology, communication and intellectual property protection have created an environment where private sector investment in plant variety improvement continues to grow. With biotechnology the seed share of the total value of agricultural inputs will continue to rise, and resources, including staff, will tend to shift from chemicals toward seed and genetic improvement. The complexity of the decisions to be made in the seed business has increased, and the value of improving decision-making has increased correspondingly both in the developing and the developed countries.

The program will add to ISU’s strategic focus on the practical application of genetics. ISU Seed Science Center is recognized as a global center of excellence in seeds. USDA designated the Seed Science Center to administer the new National Seed Health System (NSHS) in 2003. ISU’s MBA program is new, but its national standing has increased rapidly. The program will build on these strengths.
**Access**

Distance education using internet access will facilitate the involvement of working professionals while they pursue their careers. It will also allow the participation of international students. The program will use CD’s for the delivery of most content to allow access without broadband connections.

**Program Support and Coordination**

The Seed Science Center will administer the program.

**Contacts**

If you want additional information about the M.S. in Seed Technology and Business, contact Paul Christensen, Program Manager, at 515-294-8745 or intlcorn@iastate.edu, or visit our web site at http://www.seeds.iastate.edu/
September 15
Deadline for Priority Registration for the
Seed Technology & Business Master’s Degree Program