

International Programs in Agriculture



IPIA

Annual Highlights
2006-2007

Message from the Director

International Programs in Agriculture (IPIA) in the Purdue University College of Agriculture is responsible for the international aspects of the three university mission areas: learning, discovery, and engagement, and we lead in all three areas. Over 25 percent of our students study abroad at some time during their undergraduate program. They are learning to understand a multicultural world. Purdue Agriculture faculty collaborate in research with colleagues in over 50 countries. But it is in international engagement that Purdue Agriculture stands out among its peer institutions.

In the 2006-2007 year, with the help of the Bill & Melinda Gates Foundation and partners in Africa, Purdue Agriculture launched a ten-country effort to disseminate non-chemical grain storage technology in West and Central Africa. In collaboration with the U.S. Agency for International Development (USAID) and non-governmental organizations (NGOs), Purdue Agriculture is helping to rebuild the educational capacity of agricultural universities in Afghanistan. For the last three years, Purdue Agriculture faculty led groups of Indiana agribusiness people and students to Costa Rica to study the potential market for Indiana

products in Latin America. In partnership with the Monterey Institute of Technology and the Mexican Consulate in Indianapolis, the four Latino Learning Centers in Indiana are helping thousands of new immigrants broaden their education.

Purdue Agriculture goes beyond learning about the world and doing research to being involved in making the world a better place. International engagement is key to helping students understand their role as responsible citizens. It is a crucial part of the feedback mechanism that brings new ideas and issues from the users of research products (i.e., technology and organizational innovations) back to those doing the research. It is essential to the Purdue University Cooperative Extension Service's (CES) goal of helping Hoosiers thrive in a rapidly globalizing economy.

Annual Highlights is a summary of our activities for the 2006-2007 fiscal year. If you need more information about any Purdue Agriculture international activity, please contact us, or contact the department in which the activity originated.

Jess Lowenberg-DeBoer, Director

News from IPIA

Fiscal year 2007 has been an eventful year at IPIA. Jess Lowenberg-DeBoer took over as full-time director on October 1, 2006. In February, 2007, the first veterinary medicine student went to Kenya as part of the Research to Support Linking Livestock Markets to Wildlife Conservation project, financed primarily with \$330,000 from the Globe Foundation. In April, 2007, Purdue signed a \$7 million contract with the U.S. Agency for International Development (USAID) to help rebuild the capacity of Afghan universities to serve agricultural and veterinary medicine students. In June, IPIA started an \$11.4 million project with the Bill & Melinda Gates Foundation to extend non-chemical cowpea storage methods in ten countries in West and

Central Africa. Thanks to the hard work of Linda Vallade and the study aboard staff, Purdue Agriculture exceeded its strategic goal of having 25 percent of undergraduate students involved in study abroad.

IPIA is particularly involved in multidisciplinary international activities. Most of the international efforts with a single discipline focus are managed from departments and are described in the News from Departments sections. Examples of multidisciplinary international activities during the 2006-2007 year include:

- The Purdue Improved Cowpea Storage project is led by Joan Fulton, AGECE. It involves faculty members from Entomology (ENTM), Agricultural

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Economics (AGEC), Food Science (FS), and Youth Development & Agricultural Education (YDAE) in disseminating non-chemical cowpea storage technology in Burkina Faso, Niger, Nigeria, Benin, Togo, Mali, Senegal, Cameroon, Ghana, and Tchad. Faculty members involved are: Larry Murdock and Barry Pittendreigh (ENTM), Lisa Mauer (FS), Natalie Carrol (YDAE), and Jess Lowenberg-DeBoer (IPIA and AGECE). The technology to be disseminated is storage in airtight containers (most often heavy duty plastic bags) developed by Murdock and colleagues from Cameroon about 20 years ago. The project is supported by a grant from the Bill & Melinda Gates Foundation.

- The Advancing Afghan Agriculture Alliance (A-4) is led by Kevin McNamara (IPIA and AGECE). The goal of A-4 is to help rebuild the capacity of the agricultural universities in Afghanistan after 30 years of war. A-4 is working closely with the University of Kabul, Balkh University in Mazar-e-Sharif, Herat University, and Nangahar University in Jalalabad. Jerry Peters, YDAE, Ken Foster, AGECE, and Jess Lowenberg-DeBoer, IPIA, have been to Afghanistan to provide short-term technical assistance. Faculty members in Agronomy (AGRY) and Botany & Plant Pathology (BTNY) hosted two visiting scholars from Kabul University in the fall of 2006. Twenty-four staff members from Afghan universities are in Bangalore, India, working on M.S. degrees. Curriculum development workshops have been organized for both the faculties of agriculture and veterinary medicine at Kabul University.
- Scott Lake, Animal Science (ANSC), Maria Marshall, AGECE, and Ken Foster, AGECE, are supervising students under the Research to Support Linking Livestock Markets to Wildlife Conservation project supported by the Globe Foundation. This project works with pastoralist communities in northern Kenya to improve livestock management, develop alternative income generating enterprises, and take advantage of the opportunities in eco-tourism. Partners in this effort are Egerton University, Lewa Conservancy, Ol Pejeta Conservancy, and the Northern Rangelands Trust, which is a consortium of Masai and Samburu communities. Marshall and Lake visited Lewa, Ol Pejeta, the Il Ngwesi group ranch, and surrounding communities in June, 2007, to prepare for M.S. thesis research by their students in 2007 and in 2008. Egerton University students involved in the project will be doing their M.S. thesis research in the same period.
- With the help of the Globe Foundation, a team of seven faculty and staff members from Purdue Agriculture and the Purdue School of Veterinary Medicine visited Kenya to explore the potential of work with HIV/AIDS affected farmers. The faculty members were: Steve Weller, Horticulture and Landscape Architecture (HORT); Shawn Donkin, ANSC; Scott Lake, ANSC; Maria Marshall, AGECE; Eran Raizman, Vet Med.; Steve Hawkins, assistant director of Purdue Farms; and Jess Lowenberg-DeBoer, IPIA. They spent most of their time in Kenya in the Eldoret area. They visited clinical and outreach facilities run by the

Academic Model for Prevention and Treatment of HIV/AIDS (AMPATH) which is a partnership of the medical schools of Indiana University and Moi University. They had discussions with colleagues in the Moi University faculty of agriculture and the Kenya Agricultural Research Institute (KARI). They developed a plan to collaborate with AMPATH, Moi University, and KARI to assist HIV/AIDS affected farm families to generate income enterprises.

As is always the case, there was some coming and going at IPIA in 2006-2007, including:

Jess Lowenberg-DeBoer, Purdue agricultural economics, became the new associate dean and director of IPIA on October 1, 2006. Lowenberg-DeBoer had served as interim IPIA director since September, 2004.

Kashchandra Raghothama (Ragu), Purdue horticulture, became the new associate director of IPIA in February, 2007. This is a half-time position. He will focus on developing programs in Asia and the Middle East.

Kevin McNamara, Purdue agricultural economics, became the assistant director of IPIA, focusing 100 percent of his time on programs in Afghanistan. He is director of the A-4 effort to rebuild capacity at Afghan universities.

Jon Dillow, International Academic Programs specialist, went to the University of Minnesota to pursue a Ph.D. in educational administration.

Kara Hartman joined the IPIA study abroad staff as International Academic Programs specialist. Hartman graduated from Purdue with a B.S. in agricultural economics. As an undergraduate, she studied for a semester in Ireland.

Lee Stanish started an M.S. program in YDAE. This fall he had served as the international Extension specialist since May, 2006. His graduate assistantship will focus on YDAE international efforts, particularly the exchange programs with Japan. He will continue to have office space in IPIA.

Kira Everhart-Valentin joined IPIA as the new Extension international program coordinator. This is a position that is 50 percent CES and 50 percent IPIA. She recently completed a M.S. in political science at Kansas State University.

Katy Ibrahim, long-time administrator for the USAID Collaborative Research Support Programs (CRSPs) at Purdue moved to become the administrative assistant for the Purdue Improved Cowpea Storage Project (PICS), which is managed out of IPIA.

Since its founding in 1962, IPIA has been an exciting place to work. New donors are becoming interested in international agricultural development (i.e., Bill & Melinda Gates Foundation). New areas of the world are opening for Purdue engagement (i.e., Afghanistan). Strategies are being developed for study abroad, international research, and international Extension. IPIA will continue to be an exciting place to work in 2007-2008.

Study Abroad

In 2006-2007, 242 agriculture students participated in an academic overseas experience, a record number. Students traveled to all parts of the world and studied on every continent except Antarctica. Currently 25 percent of Purdue Agriculture undergraduates have participated in a study abroad program prior to graduation — the highest percentage of all colleges or schools at Purdue.

Twenty-five scholarships and grants totaling over \$12,000 were awarded through IPIA to agriculture students who participated in a long-term program (eight weeks or longer) in 2006-2007.

In 2006, IPIA began to implement the International Science and Education (ISE) grant received from the U.S. Department of Agriculture. IPIA administered a questionnaire to all incoming freshmen to determine their international background, their goals for study abroad while at Purdue, and their reasons why they may not achieve their goals. Over 60 percent indicated they planned to participate in a study abroad program during their academic career, and over 14 percent indicated that the availability of study abroad opportunities influenced their decision to attend Purdue.

Another component of the grant is to send faculty and advisors to existing partner institutions and universities to become more familiar with their programs and better able to promote them to their students. Michael Dana, HORT, visited the University of Copenhagen, Denmark, the Swedish University of Agricultural Sciences, Alnarp, Sweden, Hannover University, Germany, and In-Holland School, Delft, The Netherlands. Alan Grant, ANSC, Allen Talbert and Pamala Morris, YDAE, and Allan Goecker, Academic Programs in Agriculture, visited Zamorano, Honduras as part of Zamorano Days.

In June 2006, Linda Vallade, Program Leader for Agriculture Study Abroad, attended the European League of Life Sciences/North American (ELLSNA) meeting in Copenhagen, Denmark, where she gave a presentation on “Making short-term programs work,” and in July, she served on a panel in Traverse City, Michigan, to discuss “Internationalizing the Campus” at the National Association of State Universities and Land Grant Colleges (NASULGC) Government Affairs Conference.

Extension

Purdue International Extension has continued to expand its work with the Indiana Latino Community. During November, three staff members traveled to Mexico for a one-week nationwide seminar held by the Mexican Department of Education pertaining to adult immigrant education issues. Additionally, nine Purdue staff members and other Indiana community government officials and leaders traveled to Mexico in February for ten days to study its culture and education systems.

Each semester, International Extension brings in an international agriculture specialist from a country that could be linked with Indiana for trade. This effort is funded by an International Science and Education (ISE) grant. In the fall of 2006, a one-day seminar focused on Costa Rica, with Costa Rican specialists Elicier Vargas and Henry Quesada focusing on hardwoods trade. Czeslaw Nowak of the Agricultural University of Krakow, Poland, presented a seminar in the spring of 2007. Nowak discussed what transitioning eastern European agriculture looks like, and its potential for trade.

During April, three Purdue Extension educators teamed with a University of Illinois Extension team to present technical agriculture trainings in the Ukraine. The 11-day trip included working with local farmers and agricultural colleges to access and improve agriculture, rural development, and Extension in the Ukraine.

Mike Dana and Rosie Lerner, HORT, took 18 Master Gardener's to

England in May as a part of an international horticulture continuing education program.

In June, International Extension and YDAE led a ten-day summer travel course to Costa Rica. The trip was a comprehensive group of ten people. These included Indiana high school agriculture educators, Purdue faculty, Extension staff, and Extension graduate students. The program was coordinated with help from Tamara Benjamin and CATIE University. The program is made possible by a USDA grant that has the participants focus on market access for specific Indiana agribusinesses.

In June 2007, Northeast Indiana (Extension Area 11) hosted 12 Polish 4-H members and eight Polish adult leaders and government officials. The program allowed for the incoming participants to study Indiana agriculture, 4-H and Extension, and U.S. culture during the two-week program where each Polish participant stayed with an Indiana host family.

Twenty Japanese youth, ages 15-18, arrived in Indiana in July for a four-week stay as part the Purdue/Meiji Gakuin Summer 4-H International Program. This 4-H based International Exchange Program is to provide a “glimpse” into the everyday life of American families while developing lasting friendships and cultural bridges for Indiana youth. Each Japanese participant stayed with an Indiana host family during the exchange.

CRSP Highlights

AQUACULTURE CRSP

Purdue University participated in the Aquaculture CRSP (ACRSP) under the leadership of Kwamena Quagrainie, AGEC. Under the ACRSP 12th Work Plan, the program in Tanzania trained 25 existing fish farmers. He held a training program from June 18-22, 2007, at the Institute of Continuing Education Conference Hall of the Sokoine University of Agriculture, Morogoro, Tanzania, where they focused on general pond construction, pond management, pond fertilization, fish food production in ponds, hatchery management, artificial catfish reproduction, control of fish predators and fish diseases, and fish farming record keeping. They utilized techniques such as illustrations, open discussions, sharing of experiences, and questions and answers. There were some practical hands-on sessions that involved catfish artificial breeding, catfish and tilapia sex identification, and fertilizing ponds using poultry manure. Farmers had laboratory experience examining microorganisms from pond water under microscopes. The medium of instruction was in Kiswahili, because all farmers understood and were able to communicate very well in Kiswahili (the national language). Trainees also visited the ponds and hatchery site at Kingolwila Fish Center.

They conducted outreach activities in Ghana through sponsorship of educational field visits by students of the Department of Fisheries and Watershed Management of the Kwame Nkrumah University of Science and Technology, Kumasi, to established commercial aquaculture farms. The visit took students to different commercial fish farms that used different culture technologies, (i.e., pond culture, cage culture, and integrated aquaculture). Students visited an aquaculture research center and a fish feed mill. Through these field excursions, students established personal contacts with private, commercial fish farm managers and fisheries researchers, and businesses; these excursions provided a link for Fisheries and Watershed Management to send students for internships and on-the-job training. Already, a number of students are undertaking internships at the Water Research Institute as a result of the visit. At this location, the students are being exposed to hatchery production techniques in production of Tilapia fingerlings. The outreach has stimulated the interest of students in commercial aquaculture as alternative agricultural enterprise. They produced flyers and brochures for outreach activities in the Lake Bosumtwi District, and other potential fish growing regions in Ghana. The publications contain information on various aspects of fish farming and will be distributed as handouts to the general public – especially targeting persons with demonstrated interest in fish farming as a business or those with the potential for fish farming.

BEAN/COWPEA CRSP

At Purdue, the Bean/Cowpea CRSP involves faculty and students in ENTM, HORT, FS, and AGEC. Barry Pittendrigh and Larry Murdock, ENTM, are focusing on developing resistance management

strategies in West Africa for the genetically modified cowpea being developed by an international consortium including Purdue University, the African Agricultural Technology Foundation (AATF), Rockefeller Foundation, the Commonwealth Scientific and Industrial Research Organization (CSIRO), the International Institute for Tropical Agriculture (IITA), and the Purdue-based Network for the Genetic Improvement of Cowpea for Africa (NGICA). NGICA took leadership in the current initiative to develop a transgenic cowpea. The initial focus of the international partners is to develop cowpea varieties resistant to the pod borer (*Maruca vitrata*). Research by Matt Jenks and his student, Eugene Parsons, HORT, focuses on developing a more efficient genetic transformation method for cowpea. Work by Pittendrigh, Murdock, and collaborators at the Institut de l'Environnement et de Recherches Agricoles (INERA) in Burkina Faso, (Mme Clementine Dabire), Institut National de Recherches Agronomiques du Niger (INRAN) (Dr. Ibrahim Baoua), and the Institute for Agricultural Research (IAR) in Nigeria (Ishiykv), includes tracking the migration patterns of *Maruca*. Current evidence suggests that the insect is not present in the main cowpea-growing zone throughout the year in West Africa, but re-infests the crop every rainy season from more humid areas near the coast. The resistance management plan, especially the plan for refuges, depends on the pattern of re-infestation.

Bean-corn tortillas are the focus of efforts in the Department of Food Science as part of the Bean/Cowpea CRSP project. Kirby Hayes and Suzanne Nielsen collaborate with Ana Bonilla at the University of Costa Rica on this CRSP project which is focused on value-added bean-based products for the United States and Central America. The current graduate student working at Purdue on the project, Maria Castro from Costa Rica, recently conducted sensory evaluation studies on the bean-corn tortillas at the University of Costa Rica. The student who worked previously on the project, Cynthia Machado, presented an invited talk on her work in February, 2007, at a meeting of bean growers/distributors in Cancun, Mexico. The topic of bean-corn tortillas is of particular interest in the United States and Latin America because of the increasing cost of corn.

In West and Central Africa, Joan Fulton and Jess Lowenberg-DeBoer, AGEC, focused on research to assist entrepreneurs who sell cowpea-based street foods. The most common cowpea-based street food is a fritter, call "kossai" in Hausa and "akara" in some languages used in coastal areas. Most of the entrepreneurs selling cowpea-based foods in West Africa are women. In many cases, the profits from selling cowpea-based foods are the main source of income for the family. One of the key problems faced by entrepreneurs is the labor required for traditional cowpea wet milling methods. Food scientists have developed lower labor processing methods that start with a coarse cowpea flour, but entrepreneurs have been concerned that fritters produced with the new methods would be rejected by their clients. Fulton and Lowenberg-DeBoer worked with colleagues from the National Institute for Agricultural

Research of Niger (INRAN), Bayero University of Kano (BUK), Nigeria, and Abubakar Tafawa Balewa University (ATBU) of Bauchi, Nigeria, to determine which cowpea fritter characteristics consumers value most, what factors limit profitability of cowpea food enterprises, and how the vendors and their clients evaluate fritters made with cowpea flour. Fulton, Lowenberg-DeBoer, and colleagues worked on finalizing studies of consumer preferences for cowpea grain.

In Eastern and Southern Africa, Fulton and Lowenberg-DeBoer collaborated with researchers from Sokoine University of Agriculture (SUA), Morogoro, Tanzania; Bunda College, Malawi; the Mozambican Institute for Agricultural Research (IIAM); the International Center for Wheat and Maize Research (CIMMYT); the International Center for Tropical Agriculture (CIAT); and IITA. They and their students collected data on consumer preferences for common beans in Tanzania, Mozambique, and Malawi, the potential for farmers in Mozambique to increase bean production to meet demand in South Africa, the risk management strategies of small holder farmers in Malawi and Mozambique, and on the constraints to regional trade in beans and other grain legumes in Eastern and Southern Africa.

IPM CRSP

Steve Weller and Guatemala collaborators wrapped up research and technology transfer activities in Guatemala, providing growers and technicians key production and integrated crop management (ICM) technologies through workshops, train-the-trainer demonstrations and manuals, such as the manuals *Pre-Inspection Manual for Snow and Sugar-pod Peas* and the *IPM Manual for Mediterranean Fruit Fly Management in Guava and Star Fruit*. Over 1,000 people attended various workshops and are expected to pass the technology to fellow growers and technicians. To institutionalize the IPM research in Guatemala, they wrote the *IPM Didactic Guide*; and once approved, it will be incorporated into the primary and secondary school curriculums. Honduras collaborators continued IPM research on non-traditional agriculture export (NTAE) production strategies and production protocols to develop integrated approaches for managing pests while reducing chemical use. The “vine collapse” problem in melon production was of most interest. They focused on the biological control of soil-borne diseases, effect of cover crops, use of fungicidal sprays, and feasibility of mycorrhizae inoculation of plants in the absence of fertilizers to minimize the problem.

Weller is involved in the New IPM CRSP project — IPM for Fragile Ecosystems: Perennials in Latin America and the Caribbean. The overall project has activities in Honduras and Ecuador. Purdue's involvement is primarily in Honduras working with the Honduran Agricultural Research Foundation (FHIA) and Zamorano College. Year two research emphasized identification of key pest complexes; soil solarization use in managing soil borne pests; evaluation of predatory mites for pest management in Chinese eggplant, strawberries, and papaya; cultural practices useful in managing

white grub larva in vegetables and strawberries; thrip management in onion; and use of biological pesticides for managing soil-borne pests.

Two Zamorano undergraduate students participated in an internship in IPM on the Purdue campus from January until April, 2007. The students were Paola Meneses and Rodrigo Mack. They attended the Indiana Horticulture Congress in January, as well as a course in organic production. They conducted research in weed management in vegetable crops with organic herbicides. Paola wrote a research paper on organic production methods and Rodrigo wrote a paper on hydroponic production. The internship program will be continued in 2008 with two additional undergraduate students from Honduras.

In January and February 2007, a team conducted a baseline socio-economic survey in Honduras. The socio-economic data came from 151 households from three micro-regions in the Comayagua Valley and on hillsides bordering the valley. Both male and female householders were interviewed. These three regions encompass a broad range of IPM-targeted vegetables for both export and domestic markets. The regions encompass differing agro-ecologies, transition phases from subsistence crops and coffee to commercial vegetable production and ethnicities, and IPM technology transfer methods. These distinct agro-ecological regions are linked both through watersheds and the flow of labor from the hillsides to the valley's export horticulture operations.

FHIA and Zamorano continued to focus on the development of pest management programs and bulletins to decrease the use of pesticides in order to better meet export standards and promote safer production of produce for local consumption.

Ricky Foster, ENTM, continued his ninth year of participation in the IPM CRSP project in Mali and expanded activities into Burkina Faso, Niger, Benin, Togo, Ghana, and Senegal. He is a collaborator in the IPM CRSP West African Consortium of IPM Excellence. The primary focus of his work the past several years has been the management of the whitefly vectored virus complex that has devastated the tomato industry in West Africa. Cooperators in each country are conducting variety trials, using tomato germplasm from the University of California, Heinz, various American and European seed producers, and AVRDC — The World Vegetable Center. The Gemini viruses responsible for the diseases have been characterized as genetically unique from previous identified viruses. The goal of the project is to help farmers to manage the disease by a combination of implementing a virus host-free period, use of resistant varieties, time of planting, and limited use of insecticides for control of the vectors. In addition to IPM CRSP funds, the West Africa research is supported by USAID Agricultural Biotechnology Support Program II (ABSPII). Foster also serves as an adjunct professor at the University of Bamako in Mali, and is the major professor for Moussa Nossourou. Moussa is scheduled to complete his Ph.D. degree in entomology in January, 2007.

PEANUT CRSP

The previous work with peanuts, and more recent findings with almonds, document that nuts can be incorporated into the diet without promoting weight gain. CRSP specialists have turned their attention to identifying the mechanisms. One likely candidate is that oral processing generates a satiety signal that suppresses subsequent energy intake. This may stem from the nut's sensory properties. For example, the physical property necessitates mastication, which generates a satiety cue. The taste and smell may also contribute satiety cues through learned associations between the nut's sensory properties and post-ingestive feedback. A third alternative is the efficiency of mastication that determines the release of lipid contained in the nut cells, and this liberated fat is an effective stimulus for the release of satiety hormones in the gut (i.e., cholecystokinin). The current project is exploring how the sensory properties of peanuts influence masticatory function and satiety.

In addition, the project will determine whether roasted and/or salted peanuts elicit the same blood lipid responses as raw peanuts. The latter have been shown to reduce cholesterol and triglycerides. This was part of the basis for an FDA approved qualified health claim for nuts. Given the wider popularity and availability of roasted and salted peanuts, it is vital to verify that this same benefit holds since consumers may eat these forms assuming they are just as healthy. This project is being conducted in the United States, Brazil, and Ghana.

INTSORMIL (International Sorghum and Millet)

John Sanders, AGECC, combines an Extension or development program with his INTSORMIL research program, Development of the Input and Product Markets in West Africa for Sorghum and Millet. The Marketing-Processing program received its second year of funding from the regional office of USAID in Accra to put new technologies onto sorghum and millet farms. Simultaneously, this program improves market ties between farmers' groups and facilitates the growth of the food and feed processors who are buying this millet and sorghum. In the summer of 2006, 467 ha of cropland was put into these new technologies which benefitted 535 farmers in Senegal, Mali, and Niger. To do this, a broad network of collaborators for both the research and Extension aspects was created.

Farmers in Maradi and Gobi, Niger, achieved yields of 2.5 to 3.5 tons/ha of sorghum, following the recommendations. These yields should be compared with average farmer yields of 800 kg to one ton/ha in the region. In Mali, yield gains were more modest at 1.2 to 1.5 t/ha as compared with 600 to 800 kg/ha on farmers' fields in the region. The Malian sorghum breeder has agreed that these sorghum cultivars are too tall and is introducing shorter season cultivars for the farmers' groups in 2007. In Mali, in contrast with sorghum, millet yields were outstanding at 1.5 t/ha.

By getting higher prices for farmers from reducing the effects of price collapses and obtaining a price premium, the farmers can afford to pay for higher input levels for improved seeds and for the inorganic fertilizer. Improved soil fertility is the first prerequisite for getting yields up as Sahelian soils not only have low initial nutrient levels, but farmers have also been nutrient mining for some time with their low-input strategies.

Through the Marketing-Processing Program, a series of studies on the millet (food processing in Mali and Senegal) and sorghum processors (poultry producers in Senegal and Burkina Faso), on tannin in sorghum in the region, and a review of the income effects on farmers from new technology introduction and from the marketing strategies were initiated.

The INTSORMIL research program of John Sanders produced three journal articles reporting research results and a chapter in an American Society of Agronomy monograph on dryland agriculture in 2006. This chapter presents the empirical support and justification for the technology introduction and marketing strategies presently being pursued in the extension project above.

Finally, the overall INTSORMIL program operated out of the University of Nebraska finished its five-year grant in 2007. Sanders' program submitted and received a new grant for the next four and one third years to continue research activities in the new Sorghum, Millet, and Other Grains grant. Funding will also be received from the Mali USAID Mission to expand the Extension-development activities there over the next four years.

Bruce Hamaker, FS, was awarded a new project in the USAID-funded Sorghum, Millet and Other Grains (also known as INTSORMIL) CRSP titled "Product and Market Development for Sorghum and Pearl Millet in West Africa". This project focuses on West African sorghum and millet processed products to enhance markets for local farmers to sell their surplus grain. He additionally has a co-coordination role for the INTSORMIL West Africa Regional Program consisting of the countries of Senegal, Mali, Burkina Faso, Niger and Nigeria; as well as a USAID Mali Mission project with John Sanders, AG EC, and Principal Investigator from Kansas State University on sorghum and millet market systems.

Hamaker also actively collaborates with faculty at Kasetsart University, Bangkok, Thailand and Jiangnan University, Wuxi, China; and has recently traveled to both universities.

SANREM CRSP

Jerry Shively, AGECC, continues to serve as the chairperson of the SANREM CRSP Technical Committee. Shively's research focuses on several aspects of natural resource management in low-income settings. His research includes work in Vietnam, where he collaborates with colleagues from Nong Lam University. During the past year, he has also supervised research on hybrid adoption in the Philippines and pest management among smallholder cocoa producers in Indonesia.

News from Departments in the College of Agriculture



Agricultural Economics

William Masters focused on opportunities for smallholder farmers to raise their incomes through new production technology and market opportunities. A new grant for 2007-2010 will fund three Ph.D. scholarships for work on agricultural trade policy, through the USDA National Needs program. He received another grant for 2007-2008 from the International Food Policy Research Institute (IFPRI), to continue his work on new incentives for faster deployment of innovations as detailed at www.agecon.purdue.edu/ prizes. For 2007-2010, Masters and his colleague Gerald Shively are co-editors of *Agricultural Economics*, the journal of the International Association of Agricultural Economics. His new undergraduate textbook, *Economics of Agricultural Development: World Food Systems and Resource Use (2006)*, written jointly with George Norton and Jeffrey Alwang at Virginia Tech, is being adopted around the country. He has been active in the World Bank project on Distortions to Agricultural Incentives, whose work will be forthcoming in 2007-2008. In the past year, Masters was particularly pleased to have published his first paper in a top political science journal, thus demonstrating that agricultural economics has relevance for all of social science. The paper, entitled "The Role of Leadership in Democratic Deliberations: Results from a Field Experiment in Sao Tome and Principe", uses randomized assignments of political leaders to discussion groups as a way of testing basic theories about the outcome of political debate. The paper was co-authored with political scientists Macartan Humphreys and Martin Sandbu, and published in *World Politics*.

Thomas Hertel and Terrie Walmsley are the Executive Director and Director respectively of the Center for Global Trade Analysis (GTAP), the university-based home for GTAP, a global network of researchers and policy makers conducting quantitative analysis of international policy issues. The aim of the project is to improve the quality of global economy-wide analysis through education and develop analytical databases, economic models, and innovative methodologies. These efforts are supported by funds from 24 international and national organizations. This year the center produced the first pre-release of version 7 of the GTAP Data Base covering 101 regions and 57 commodities. As part of the center's goal to increase usage of the GTAP Data Base in Africa, the Center, in collaboration with the World Bank, the European Commission and the U.N. Economic Commission for Africa, is also developing a special Africa-focused database. This year also marked the 10th Anniversary of the Conference for Global Economic Analysis organized annually by the Center. In the past, the conference has been co-hosted with organizations from around the world including the United Nations Economic Commission for Africa

(UNECA), Ethiopia; Federal Agricultural Research Centre (FAL), Germany; and the World Bank, USA. This year the conference returned to Purdue and was attended by 214 people from 42 countries.

Brigitte Waldorf presented her work in Toronto, Canada, at the North American Meetings of the Regional Science Association International (RSAI), in November 2006, on the migration behavior of the highly educated population. In July 2007, she presented a paper, co-authored with Susan Chen and Eda Unal, at the first World Congress of the Spatial Econometrics Association (SEA) in Cambridge, England. The paper analyzed the impact of health care accessibility on infant mortality, elderly mortality, and health behaviors.

Wally Tyner taught a Benefit Cost Analysis course in Morocco to 19 members from the Ministry of Agriculture. During the same mission, he worked on agricultural policy issues regarding water use in agriculture, wheat policy, and policies regarding sugar. He also traveled to Sweden in January to present a paper on United States and French biofuels policies and alternative policies for the future.

Raymond Florax's expertise in spatial econometrics took him to France and The Netherlands where he made several presentations on spatial econometrics and statistics, among other things for the Dutch Association for Operations Research, and the French Association for the Development of Research in Economics and Statistics (ADRES). He supervised a graduate student from Portugal, and one from the Netherlands, who each received a 2006 Ph.D. from Vrije Universiteit in Amsterdam.

Phil Abbott returned from sabbatical leave at the University of Copenhagen, Denmark, where he was working with the Development Economics Research Group in the Department of Economics. He has continued to collaborate with colleagues there, and in developing countries, on research examining agricultural trade and economic development, with applications in Vietnam, Mozambique, and Morocco. In Morocco, he constructed a model of spatial and temporal wheat price variability that is being used by DPAE (Direction de la Programmation et des Affaires Economiques) in the Ministry of Agriculture and Rural Development to inform ongoing policy debate. In Mozambique, he examined cashew export taxes and export subsidies, and their impact both on in-country processing and farm income for the Ministry of Planning. In Vietnam, he is examining the impacts of past bilateral trade agreements with the European Union, Association of Southeast Asian Nations (ASEAN) and the United States and drew implications for the World Trade Organization (WTO) accession as part of an ongoing Danish International Development Agency (DANIDA) collaboration with the Central Institute for Economic

Agricultural Economics continued

Management. Methodological work on the implications of trade policy for development is in progress, and Vietnam is serving as a case study. New efforts have started in West Africa on agricultural policy distortions in Cote d'Ivoire for the World Bank, and on cotton trade from Mali, Burkina Faso, Benin, and Senegal for USAID. Abbott has traveled to Denmark, France, Vietnam, Mali, and Burkina Faso in connection with this research.

Maria Marshall is part of a multidisciplinary team of inter- and intra- university faculty and Extension specialists involved in a program titled Agricultural Exports and Rural Incomes (AERI). The mission of this program is to increase rural incomes in southern (upper) Egypt. These efforts are supported by funds from USAID. In 2006, Marshall developed and delivered several two-week workshops in Cairo, Minia, and Luxor on developing business plans and managing a small business. Workshop participants are members of various Egyptian agencies, university faculty, Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance (ACDI-VOCA), and Cooperative for Assistance and Relief Everywhere (CARE) specialists, and small horticultural and livestock producers. ACDI-VOCA and CARE specialists will in turn deliver the workshop and give technical assistance to small producers throughout southern Egypt who have formed horticultural and livestock cooperatives. University faculty will make workshop lectures part of their agribusiness classes.

The Center for Food and Agricultural Business (CAB) is developing a project for research and agribusiness management development in collaboration with Filipe Ravara (Purdue AGEC Ph.D., 1995) of Caixa Geral de Depósitos, the state-owned financial institution of Portugal. The project 'Strategic AgriMarketing... a Program for Food and Agribusiness Managers of Portugal' would provide Portuguese marketers with new ways of analyzing marketing problems, and place a significant emphasis on strategy and decision-making tools that are critical to marketing success. The project would begin with the research and development of three advanced case studies, intended for publication in both United States and Portuguese academic and trade publications. The training phase of the project would focus on the advanced case studies, and also include other content such as current market research, modeling, and integrated approaches. The audience for the project would include food and agribusiness managers from the certified food production regions of Portugal.

CAB, along with IPIA, seeks to maintain and strengthen the center's relationship with the USDA/FAS Cochran Fellowship Agency. Several international programming projects have been developed for Cochran over the past ten years, with on-going discussions for additional possible programming.

CAB provided an orientation and overview program, "Food and Agricultural Products to China... a program developed for Yuan Import Company," for one of China's successful importers of

commodity minerals. The importer seeks to expand the firm's understanding of the U.S. food system and to increase the firm's imports to add U.S. food and agricultural products. The purpose of the program was to acquaint the importer with the U.S. agricultural system, and to focus on value-added agricultural products produced in Indiana. The center coordinated activities with the Indiana State Department of Agriculture (ISDA) and Purdue's Extension New Ventures Team, and hosted principals of the Chinese firm at meetings with ISDA representatives and on-site discussions with representatives of food and agribusiness firms in Indiana.

CAB worked closely with IPIA's International Youth and Extension Specialist to host Czeslaw Nowak of the Agricultural University of Poland for a one-week visit to Purdue and the local area. The center's role was to assist in the promotion of Nowak's seminar on international trade; to provide a background of historical activities between the center and the Polish university in order to suggest relevant meetings for the schedule; to arrange a farm visit to a large, specialized commodity grain operation; and to facilitate social events whereby Nowak could expand and deepen his relationships with faculty members and professional staff of the center in order to discuss possibilities for future collaboration.

The Purdue University - Indiana University MS-MBA in Food and Agribusiness Management includes a significant international perspective, found throughout the coursework and most significantly in the international residency session. During May, 19 students and four faculty instructors and professional staff traveled to The Netherlands for the international residency session. Hosted by the University of Wageningen, the residency includes formal classroom instruction by both Purdue and Wageningen faculty members and field visits organized as day trips to sites around Holland. Several food and agribusiness firms provided facilities tours and management discussions for students, including: DMV International, an innovative food, nutrition, and pharma products company; Lamb Weston, second largest producer of frozen potato products in the European market; FloraHolland, a flower auction representing 5,000 Dutch growers and 3,000 international growers from Netherlands, Europe, Africa, Israel, South America, and Asia; Provimi, a leading provider of animal nutrition products; KeyGene, a life sciences research company focusing on molecular genetics and biotechnology for the plant breeding industry; Royal Horticultural Company Lemkes, a specialized service provider to European retail chains and one of five largest plant exporters in Netherlands; and the Rotterdam Harbor Fruit Terminal, with the largest cold storage area in the world.

Agricultural and Biological Engineering

Rabi Mohtar was invited by USDA to be part of the U.S. delegation to India as part of the Agricultural Knowledge Initiative (AKI) U.S.-India research initiative, September 20 to 22, 2007. Mohtar was also asked by USDA-FAS to lead the Water Quality team during the meeting and to be part of the write-up committee for the

workshop outcomes. During the workshop, Mohtar met with his India counterparts on the recently USDA funded proposal partnering with several Indian institutions to develop a graduate degree program in international water resources.

Mohtar was asked by the Sheikhha Moza of Qatar (Her Highness's office) to be on the executive committee of the science Qatar Initiative. He met with Qatar Foundation officials September 16-19, 2007, in Doha on building linkages with Middle Eastern research institutions. At the meeting, Mohtar presented his vision of building interdisciplinary research structures and strategic plan for the research initiative. Mohtar and Bernie Engel attended the first Arab Expatriate scientists meeting April, 2007. Mohtar was one of six international scientists to be invited by Qatar Foundation to plan for the April meeting. He was instrumental in the first project by the foundation to be coordinated by Purdue on information systems.

Distance-learning courses produced jointly by Grain Elevator and Processing Society (GEAPS) and Purdue University may soon be available in Spanish. An agreement signed at Purdue last month grants permission to APOSGRAN (the Argentinean Post-Harvest Grain Association) to translate the courses for its members and others in Latin America. APOSGRAN, a close ally of GEAPS, is a post-harvest grain association based in Argentina.

Dirk Maier, leader of GEAPS' Distance Education Program Oversight Committee, participated in the signing ceremony in Argentina. APOSGRAN member, Ricardo Bartosik, a post-harvest grain researcher with INTA (Instituto Nacional de Tecnología Agropecuaria) in Argentina, will head the project. INTA is Argentina's equivalent of our USDA-ARS with research stations across the country.

So far, the GEAPS-Purdue collaboration has offered two distance-learning courses, "Facilities Planning and Design I," and, "Quality Grain Management." "Facilities Planning and Design II" is likely to be offered this winter, and planning for other courses is underway. APOSGRAN has indicated that its first Spanish-language course would be "Facilities Planning and Design I."

In the distance-learning program, lecture material comes on CDs, and the course instruction and interaction occur online. No travel is required. Registration fees are held to a minimum, and GEAPS members receive a substantial discount.

Larry Theller recently returned from an interesting trip to China, where he used GIS and GPS to investigate agricultural lands between the Great Wall and the Inner Mongolian Border.

Rabi Mohtar recently visited the University of Agricultural Sciences in Bangalore, which included discussions with their vice chancellor, deans, directors, and department heads. Rabi along with several other professors discussed specific areas of their interest: water, sustainability, and environmental issues, biotechnology/molecular biology, biofuels including ethanol/biodiesel, sandwich

graduate programs; value added endeavors; and economic development. In the realm of biofuels, the state of Karnataka is investing significantly in each of three districts to enhance production of two species of oil bearing shrubs/trees (Jatropha, a new world species, and Pongamia).

Agronomy

As part of the study abroad program in IPIA, Cale Bigelow and Christine Wilson (AGEC) led a spring-break program to Ireland. This group consisted of 34 students from across the college of Agriculture. During the one-week program, the group toured various animal and crop production operations, as well as support services, and also toured many of the historical sites and enjoyed the St. Patrick's Day parade in Dublin.

Craig Beyrouy represented Purdue at the Global Consortium of Higher Education & Research (GCHERA) meetings in Costa Rica, March 5-8, 2007. While at those meetings, he visited EARTH University and initiated discussions with their president, Jose Zaglul, and the Dean of the College of Agriculture at the American Institute of Beirut, Nahla Hwalla, about opportunities for collaborations among the institutions.

Laura Bowling hosted a visit to Purdue for Ashad Khan, Director of the Global Climate Impacts Study Center in Islamabad, Pakistan, in February, 2006. Bowling continues to be involved in two joint research projects as part of the Northern Eurasia Earth Science partnership Initiative (NEESPI) with active collaboration with Russian scientists, in particular Alexander Oltchev (Institute of Evolution and Ecology Problems of Russian Academy of Sciences), and Nina Speransky (State Hydrological Institute).

Melba Crawford was appointed to the international advisory committee for Belgian/South Africa hyperspectral satellite mission. She was also invited to Universidad Tecnica Federico Santa Maria in Santiato, Chile, for a collaborative research meeting. And, she developed a joint proposal on remote sensing of natural resources in Chile. She developed a collaborative research initiative in remote sensing of coastal environments with K.U. Leuven. As a result, Ph.D. students traveled to Purdue to work during January, 2007. In addition, Crawford presented an invited talk on Remote Sensing of Urban Systems at the Institute of Electrical & Electronic Engineers (IEEE) Urban Conference in Paris, France, April 11-13.

Gebisa Ejeta was on sabbatical with Rockefeller Foundation in Nairobi in late 2006 and early 2007. He organized a symposium entitled "Integrating New Technologies for Striga Control: Towards Ending the Witch-hunt", held in Addis Ababa, Ethiopia on November 5-11, 2006, for over 75 participants from 20 countries. The Symposium brought together key leaders for a symposium to deal with the development of the new, integrated, knowledge-based control strategies, including those new successes deployed in the field, as well as those with promising strategies currently under development. These experts discussed how these strategies

Agronomy continued

may be integrated with each other to develop more durable and sustainable methods that will be useful for decades to come. This was supported by USAID through a grant to INTSORMIL and EIAR (Ethiopian Institute of Agricultural Research).

George Van Scoyoc, Janet Beckerman, and John Graveel hosted two visitors from Kabul University in Afghanistan. Van Scoyoc, Beckerman, and Graveel worked with Zikrullah Safi and Ghulam Rasul Faizi to help these individuals refresh their professional skills and expose them to modern teaching methods and technologies. Safi and Faizi worked closely with the Purdue faculty mentors in the classroom to observe and participate in teaching activities at Purdue and also on the development of an appropriate/parallel course for Kabul's curriculum. During their stay, the Afghan faculty studied teaching effectiveness, how to develop and revise courses, critical success factors in course design, and multidisciplinary approaches to agriculture education. They became familiar with school outreach programs. Interacting with Van Scoyoc, Beckerman, and Graveel allowed the Afghan visitors to participate in a full range of professional activities providing them with information to improve their discipline area knowledge and strengthen their curriculum/course development and teaching skills.

Scott Jackson was elected chair of the International Soybean Genome Consortium (organized in Japan last April) that includes China, Japan, Brazil, Korea and the United States. He gave a talk at the International Rice Functional Genomics Symposium in France, and gave a talk at the International Legume Genomics and Genetics Conference in Australia.

Jianxin Ma and John Graveel established a letter of cooperation with the Chinese Academy of Agricultural Sciences on the use of soybean germplasm.

John Graveel gave a talk at the International Conference on Heterosis, Polyploidy and Epigenetics in May, in China. Graveel also gave a talk at the International Center for Tropical Agriculture (CIAT) in Cali, Colombia, and wrote a successful grant with collaborators there. He gave a talk on soybean and phaseolus genetics at CIFN-UNAM (Internal Council of the Nitrogen Fixation Research Center – National Autonomous University of Mexico) in Cuernavaca, Mexico, in January.

Yiwei Jiang gave a talk at the 2nd International Society for Horticultural Science (ISHS) Conference on Turfgrass Science & Management for Sport Fields, in Beijing, China, June 2007.

Eileen Kladvik participant and presented paper at the International Soil Tillage Research Organization (ISTRO) triennial conference, August 27-September 1, 2006, Kiel, Germany.

Jianxin Ma gave a talk titled "Utilization of transposon-based genomics tools for crop improvement" at the Chinese Academy of Agricultural Sciences, Beijing, May 23, 2007. Jianxin also initiated

the "Transposable Elements Workshop" to be held annually at the International Plant & Animal Genome Conference, 2007.

Dev Niyogi traveled to Goa, India, to meet with the project investigators for the Asian Initiative Grant and gave an invited talk at the Mesoscale Processes conference at the Indian Institute of Technology in Delhi, in September. Niyogi and Ph.D. student, Souleymane Fall, traveled to Senegal during the summer to interact with meteorologists to successfully complete a climate atlas for the country.

Hsin-I Chang (EAS graduate student with Dev Niyogi) traveled to Dehli, India, in September to collect observed data from the Indian Institute of Technology and the Indiana Meteorological Department. These were initial input data necessary for the model simulation of the rain event over Mumbai. This was joint research with Mohanty at the Indiana Institute of Technology.

Phillip Owens visited Istvan University, Hungary, in September with William McFee to establish cooperation in soil studies.

Jeff Volenec initiated a joint research project with Carlos Canguano, a forage researcher from the Argentinean national research organization, INTA, and his graduate student Leandro Ventroni. The goal of this research is to understand how alfalfa fall dormancy interacts with harvest frequency in determining forage yield and plant persistence, and how this might differ between the Midwest United States and Argentina. They are analyzing Taproots in order to determine the physiological basis for differences in alfalfa performance.

A joint research project has been initiated with Danny Donaghy and Richard Rawnsley, and Keith Pembleton, a Ph.D. student from the University of Tasmania. Their research focuses on the impact of environmental stress on alfalfa growth and development and taproot reserve levels. They'll identify management strategies to minimize the negative consequences of drought, and mismanagement on alfalfa performance in order to improve forage production for an expanding dairy industry in Tasmania and Australia.

Cliff Weil, co-organizer of the 1st European Molecular Biology Organization (EMBO) Workshop on Plant DNA Repair and Recombination, traveled to Giens, France, and presented both a talk and a poster.

Weil and Christopher West, Wanda Waterworth, and Susan Armstrong (University of Leeds, and University of Manchester, UK) are examining signaling responses to DNA damage in plants, with Tom Gerats (Radboud University, Netherlands) on control of plant transposon activity, and with Avi Levy (Weizmann Institute, Israel) on genetic control of meiotic recombination.

Tony Vyn hosted Jongho Seo, a crop physiologist from the National Institute of Crop Science in Suwon, Republic of Korea, from August 2006 to February 2007 for his sabbatical research leave on soybean production and ecology. Vyn participant and presented a paper at the International Soil tillage Research Organization (ISTRO)

triennial conference, August 27-September 1, 2006, Kiel, Germany. He presented a talk entitled “Soil sequestration and gas emissions of carbon after three decades of tillage systems for corn and soybean production in Indiana” at the International Soil Tillage Research Organization Conference, Kiel, Germany, in August, 2006. He presented a poster from one of his graduate students (Chris Boomsma) at the same conference. Vyn presented an invited talk entitled “Advances in Cropping Systems from the Corn Belt” in January to over 400 farmers and crop consultants attending the Southwest Agricultural Conference held annually in Ridgeway, Ontario, Canada. Vyn hosted Anita Gal, soil scientist from Szent Istvan University, Godollo, Hungary, for a three-month research fellowship on gaseous carbon and nitrogen emissions from soil in long-term tillage systems.

Faculty from agronomy hosted a four-member delegation, including the Dean of Agriculture, Deputy Dean of International Programs, and two professors, from the Szent Istvan University in Godollo, Hungary, for one week in March, 2007.

Animal Sciences

Chris Bidwell took sabbatical leave to Brisbane, Australia, from September 2006 to May 2007. He was awarded the J.M. Rendel Fellowship from CSIRO – Livestock Industries. Bidwell attended the 30th International Conference on Animal Genetics in Porto Seguro, Brazil.

Todd Applegate presented a talk entitled “The small intestine of the bird: balance between barrier and functionality”, in Herzogenburg, Austria. Applegate hosted several from the U.S. China Feed Industry Association and National Renderers Association, Inc., in June. He presented a talk entitled “Protein and amino acid nutrition in poultry: impacts on performance and the environment” at the Meat Quality and Feed Efficiency Conference, Dunboyne, Ireland. He presented a talk entitled “Nutrients, nutritional state, and small intestinal microbiota” at the National Taiwan University, Taipei, and a talk entitled “Impact of small intestinal development on growth” at the Tunghai University, Taichung, Taiwan.

Layi Adeola gave an invited talk in Edmonton, Alberta, Canada. He presented a talk at the World Waterfowl Conference, in Guangzhou, China. He attended the 9th International Symposium on Digestive Physiology in Pigs, in Vejle, Denmark. Adeola participated in a research-planning meeting and attended a British Society of Animal Science meeting in York, England. He gave an invited Departmental Seminar at Obafemi Awolowo University, Ile-Ife, Nigeria, and was an invited speaker at the Spanish Foundation for the Development of Animal Nutrition Conference, in Madrid.

William Muir presented “Multilevel Selection in Breeding Programs, a Win-Win-Win Solution for the Animal, Producers and Society” at the Behavior and Welfare seminar series in Guelph, Canada. In addition, Muir taught a short course at Scandinavian

Institute in Statistical Genetics, University of Aarhus, July 24-28, 2006. The title of the course was Principles of Quantitative Genetics Instructors. He presented “Genome Wide Marker Assisted Selection (GMAS) a Breakthrough in Application of Genomics to Animal Breeding” at the Genesis Faraday Workshop in Coventry, England. He presented a seminar entitled, “Industry-wide and genome-wide assessment of commercial poultry biodiversity” at the Roslin Institute.

Heng-wei Cheng, Dave Gerrard, and Alan Grant visited the School of Animal Science and Technology, Zhejiang University, China, in May 2007. During the visit, the bilateral collaboration in education and research was discussed. Eight Chinese undergraduate students participated in the 2007 Summer Intern Program for Chinese Students. Of the nine Chinese students who were in the program in 2006, seven of them have been accepted as graduate students by different universities, including Purdue, and two have been hired as researchers by the two top Chinese institutes.

Brian Richert and Allan Schinckel met with 17 Chinese swine industry leaders to talk about swine nutrition, use of distillers grains in swine diets, and impact of genetics and ractopamine on compositional growth and dietary requirements.

Schinckel traveled to Columbia to give a series of talks on swine growth modeling — selection for increased lean growth, and the use of Ractopamine. Schinckel and Terry Stewart met with two Russian government officials to discuss Swine Testing & Genetic Evaluation System (STAGES) and use of Blup in pigs and starting a regional swine improvement program.

Mark Russell spoke at the Agrarian State University of Moldova and in Cluj-Napoca at the University of Agricultural Science & Veterinary Medicine. These talks were focused on international Extension systems and the land grant university example. Russell accompanied a YDAE group to Ecuador as a service-learning Maymester serving international communities course. Russell also gave a talk at the Leeds Metropolitan University, England, and a talk at the University College in Dublin, Ireland, as well as a talk at the University of Wales in Aberystwyth.

Edmond Pajor presented a talk entitled “Farm Animal Welfare Education and Research at Purdue University” at the French National Institute for Agricultural Research, Clermont Ferrand, France, and a talk entitled “Swine Welfare Research at Purdue” at Rennes, France. Pajor is collaborating with the World Organization for Animal Health (OIE) located in Paris, to develop a Web-based animal welfare resource directory. The directory will identify international experts, areas of specializations, and the availability of education materials or opportunities. Pajor presented a talk entitled “Animal Welfare: The Purdue: USDA Program” at the University of Krakow, Poland.

Susan Eicher hosted a Fulbright Ph.D. Scholar from U.C. Dublin, Ireland, in her laboratory from October 2006 until July 31, 2007. The scholar has been working on a dairy lameness project.

Biochemistry

Clint Chapple was an invited speaker at the 18th International Conference on Arabidopsis Research, Beijing China, June, 2007. The title of his presentation was “Looking beyond Arabidopsis and angiosperms for biomass crop improvement genes”.

W. Andy Tao was invited to present his studies on proteomics to research institutes in both China and Taiwan in May 2007. At Shanghai Institute of Materia Medica, Chinese Academy of Sciences, he spoke on “Targeted Proteomics Using Soluble Nanopolymers for Drug Discovery”. At Yang-Ming University and the Institute of Chemistry, Academia Sinica in Taipei (ROC) he delivered seminars entitled “Soluble Nanopolymers for Targeted Proteomics”.

In September 2006, David Krogmann presented a short version of his course “How to write a scientific paper in English” to graduate students at Okayama University in Okayama, Japan. This is an abbreviated version of a course that Krogmann has taught for 20 years in Mexico. He received a commendation from the Mexican Biochemistry Society for teaching the course over the last 20 years. In addition, he conducted experiments on the structure of cyanobacterial phycobilisomes with his long-time collaborator, D. Carlos Gomez Lojero, of the Department of Biochemistry at the Center for Advanced Studies, National Polytechnic University.

Henry Weiner was a co-author on three papers with Dr. A. Daiber from the Department of Cardiology, Johannes Gutenberg University, Mainz, Germany. The studies examined the biochemical details of nitrate tolerance in rats. Human nitrate tolerance is associated with long-term clinical use of nitroglycerin for heart disease. The papers were published in the *Journal of Biological Chemistry*, *British Journal of Pharmacology and Arteriosclerosis*, *Thrombosis, and Vascular Biology*. Weiner presented a seminar entitled “A lifetime with human liver aldehyde dehydrogenase: What we have and have not learned from the structure” at the Biochemistry Department in the Medical Faculty of the University of Ljubljana, in Ljubljana, Slovenia. During his visit, he selected a site for the 2008 Meeting on Enzymology and Molecular Biology of Carbonyl Metabolism in Kranjska Gora.

In November of 2006, Sandra Rossie visited two sites in Russia to develop collaborative interactions for the biophysical analysis of human protein phosphatase 5, an important molecule in pathways connected to cancer and neurological disease. In Novosibirsk, she spoke at the Institute of Chemical Biology and Fundamental Medicine, Siberian Branch of the Russian Academy of Sciences and then prepared protein samples for analysis. Collaborators at the Institute of Chemical Kinetics and Combustion performed preliminary experiments on these samples. Additional expertise and advice was sought from scientists during a visit of Kazan State University and the Zavoisky Kazan Physical-Technical Institute of the Kazan Scientific Center, Russian Academy of Sciences. Further interactions are expected in the future.

Botany and Plant Pathology

Bill Johnson gave an invited symposium presentation titled “Biology and Multiple Resistance of Horseweed in the Eastern Corn-Belt U.S.” in April, 2007, at the Rothamsted Resistance Symposium, in Harpenden, UK. Entomologists and plant pathologists from across the world attended this conference to share information on resistance to synthetic pesticides in insects, diseases, and weeds. Johnson gave an invited presentation titled “Control of various weed species with BAS800”, in June, 2006, in Ridgeway, Ontario, Canada.

On August 2, 2006, Stephen Goodwin chaired a session and presented a talk on his research findings at the 1st International Symposium on Cercospora Leaf Spot on Sugar Beet, in Québec, Canada. Goodwin presented a talk on cercosporin production in *Cercospora* and related asexual stages of *Mycosphaerella* that was co-authored by Larry Dunkle. Goodwin presented a poster on genomic sequencing efforts for comparative analyses of fungi in the genus *Mycosphaerella* at the 8th International Mycological Congress, in Cairns, Australia, on August 21-25, 2006. On August 28, 2006, he presented a poster at the International Triticeae Mapping Initiative workshop, in Victor Harbor, Australia, on changes in gene expression in non-host resistance responses of barley following inoculation with the wheat pathogen *Mycosphaerella graminicola*. On September 1, 2006, he presented a seminar on his research findings at the South Australian Research and Development Institute (SARDI), in Adelaide, Australia. The title of his seminar was, “The *Mycosphaerella* genomics project and its application towards understanding resistance responses in cereal crops”. In addition, Goodwin served as a member of the scientific advisory board for the European project, BioExploit, on October 18-19, 2006. Board members listened to and commented on progress reports for the project, which has a goal to significantly reduce pesticide use in agriculture.

Teresa Koller joined Goodwin’s lab on May 21, 2006, as a visiting scholar from Zürich, Switzerland. Teresa is a student at the Swiss Federal Institute of Technology, and will be working for six months to analyze genes from wheat that are involved in defense responses to the fungal pathogen *Mycosphaerella graminicola*.

Janna Beckerman, as part of the USAID Afghanistan Faculty Exchange Program, mentored for Ghulam Rasul Faizi, faculty member of the University of Kabul, Afghanistan. She worked closely with him, meeting weekly to monitor progress, to develop 12 PowerPoint presentations, and a laboratory handbook to use in Afghanistan to teach student introductory plant pathology. Beckerman included Faizi on a seminar to Lexington, Kentucky, to meet with regional fruit growers, and arranged a second trip for him and another Afghan scholar to be accompanied by Glenn Nice for an extended crops tour in Texas. This mentoring project was funded and overseen by Kevin McNamara (Agricultural Economics), with mentoring done in collaboration with George Van Scoyoc.

Don Huber presented an invited seminar on “Managing Nutrition for Disease control” at the Federal Agricultural Research Centre (FAL), Brunswieg, Germany; a seminar at Rothamstead, England on “Take-all, the disease and its control”; a workshop at Phosyn Company in Poklington (York), England on “Managing nutrition for disease control” and “Strategies to off-set glyphosate immobilization of Mn”; a symposium presentation in Piracicaba, Brazil, on “Strategies to reduce glyphosate induced immobilization of Mn and its impact on disease”; and a seminar at the Russian Institute of Phytopathology (VNIIF) on “Nutrient-disease interactions for sustainable crop production.”

Entomology

In early March, Dean Randy Woodson, and Steve Yaninek joined Cliff Sadof on a trip to Costa Rica. The purpose of the trip was to learn more about a project Sadof started to reduce the number of insect pests being imported into the United States on exotic ornamental plants. The visit was hosted by Tamara Benjamin who is project Co-PI and a Purdue colleague from the FNR with a joint appointment at the project host institution - CATIE (Centro Agronómico Tropical de Investigación y Enseñanza). They visited project facilities at CATIE, as well as an organic farm, and a selection of ornamental producers and packing houses in the main ornamental production zones of the country. Six local graduate students are involved in the program. Sadof's project is an integral part of a Caribbean Safeguard Initiative that will help build trade capacity in the region.

Sadof was on sabbatical in Costa Rica between January and June, 2006.

Barry Pittendrigh assumed leadership of the USAID Bean/Cowpea CRSP (Collaborative Research Support Project).

Bob O'Neil continues his collaboration with Japanese and Chinese scientists on the North Central Soybean Research Program project: “Biological control of soybean aphid”. In June and July of 2006, he traveled to the University of Utsunomiya, Japan, and the Chinese Academy of Sciences, Beijing, China, to survey and collect natural enemies of the soybean aphid and review collaborative research on non-target impacts of soybean aphid natural enemies. In Japan, he attended a research meeting at the University of Utsunomiya to review research protocols and findings to-date. They visited Purdue and the University of Illinois in fall, 2006. In China, they conducted field collections of aphid natural enemies near Xiuyan in Liaoning province, and Haerbin, Heilongjiang. In Beijing, they surveyed the campus of Beijing University, where a diversity of (aphid) host plant species was planted. Overall, a total of five cultures of soybean aphid natural enemies from Liaoning and Heilongjiang were initiated from 2006 collections in China. Non-0traget studies will be repeated in 2007 in both countries.

Gary Bennett and Changlu Wang initiated a fire ant and urban entomology collaboration in China.

Chris Oseto delivered the Agroecology Maymester course in Costa Rica.

Jeff Stuart attended the XXXIII Congreso de Entomologia in Manizales Colombia, July, giving the keynote speech. He spent the following week at Cenicafe in Colombia interacting with scientists and presenting a seminar.

Stuart and Steve Yaninek took a group of graduate students to Mexico over the break between fall and spring semester to visit the winter Monarch butterfly sanctuaries in the state of Michoacan. This was a pilot visit to prepare for new study abroad course entomology intends to offer during the break between fall and spring semesters next academic year with a grant from International Programs.

Venu Margam, graduate research assistant of Barry Pittendrigh, in conjunction with a Biosafety and Biodiversity grant from IITA/USAID, traveled to Nigeria and Niger to assess the distribution and abundance of alternative host plants for *Maruca vitrata*, the legume pod borer. A paper describing the availability of alternative host plants of *M. vitrata* in the region is in preparation. Margam observed and documented that insecticide use on cowpeas in northern Nigeria and southern Niger is far more intense than expected, and seems to be on the increase. This probably excessive insecticide use is an additional reason to explore the use of Bt cowpea for *Maruca* control in West Africa. Margam's report is available at the Network for the Genetic Improvement of Cowpea for Africa (NGICA) Web site: <http://www.entm.purdue.edu/ngica/ejournal/pub01.html> as part of the new NGICA e-journal.

Network for the Genetic Improvement of Cowpea for Africa, co-founded by Larry Murdock and others in 2001, was instrumental in facilitating the availability of two new genes that could be used for cowpea improvement through genetic engineering. The ABO gene may offer drought tolerance while the SOS and LOS-5 genes may confer salt tolerance. The intellectual property for the genes outside of China resides in companies formed by Ray Bressan. Cowpea germplasm incorporating the ABO and SOS genes has already been developed. For more details, see the NGICA Web site: http://www.entm.purdue.edu/ngica/reports/llmrabABO_jeh.pdf<.>

Steve Weller, George Van Scoyoc, and Al York recently completed a Maymester Study Abroad course in Southern France and Italy. The objective of the program was to explore the agriculture of the areas and to compare organic and conventional methods. In addition to time spent in rural areas and on farms, they spent a night in the Pyrenees Mountains. Eighteen students from six departments, including four from entomology, comprised the group.

The department hosted the following visiting scientists: Zhifeng Wu and Xiuhao Yang from China, with Gary Bennett; Qiu Xing-hui from China with Barry Pittendrigh; Kehinde Popoola from Nigeria with Jeff Stuart; and Julia Prado from Costa Rica with Cliff Sadof.

Food Science

Six Ph.D. students from Thailand universities have worked over the past year in laboratories of six faculty members within the Department of Food Science (BeMiller, Bhunia, Butzke, Ferruzzi, Hamaker, Hayes). These Thai students are doing part of the research at Purdue for their Ph.D. degrees. Ferruzzi and Bhunia traveled to Thailand during the past year for the final defenses of the students they helped supervise, to serve as external examiners and advisory committee members. While in Thailand, Bhunia gave an invited seminar on “*Listeria monocytogenes* – pathogenesis and novel biosensor-based detection methods” in Department of Biotechnology at Mahidol University, Bangkok, Thailand, on June 7, 2007. Bhunia was a keynote speaker for II Brazilian Congress on Milk Quality and delivered a seminar on “Prevention and Control of *Listeria monocytogenes* in Dairy Industry”. The meeting was held in Goiania, GO, Brazil, October 23-25, 2006. Bhunia taught a mini course for two days to the attendees of II Brazilian Congress on Milk Quality: (i) General characteristics of *Listeria monocytogenes*, and (ii) Nanotechnology/Biosensor-based methods for detection of *Listeria monocytogenes*, October 26 and 27, 2006.

Bhunia was an invited speaker to give a talk on “Bacterial pathogen detection using a novel light scattering technology” in “Rapid Methods Europe 2007” held in Noordwijkerhout, The Netherlands, January 29-30, 2007.

Christian Butzke and his colleagues, Mario Ferruzzi from FS and Bruce Bordelon from HORT, conducted a scouting trip to Italy in October, 2006, in preparation for the 2007 Maymester “Food, Wine and Culture of Italy”. The Purdue team visited with fellow scientists at the Catholic University of Piacenza and the University of Naples, and toured vineyards and wineries, as well as factories of Parmesan cheese, olive oil, balsamic vinegar, and prosciutto/salami along the way from Milano to Napoli.

Butzke was invited to speak to groups of South African winemakers and grape growers on the impact of global warming on winemaking practices. He presented seminars in the Stellenbosch and Worcester winegrowing districts in November, 2007. Butzke led an expedition of Purdue and UC Davis faculty and industry consultants on a vineyard tour of Northeastern China in December of 2006 that included visits to China Agricultural University in Beijing and commercial wineries around the area.

Lisa Mauer participated in a USAID-Serbian Enterprise Development Program for the purpose of educating food industry personnel about the types and functions of commonly used food additives, with an emphasis on fruit and vegetable processing. During the two-week period she was there, she visited and toured ten food companies located throughout Serbia. She met with faculty from the two universities in Serbia that offer food science programs. Mauer discussed curricula and the Institute of Food Technologists accreditation program.

Forestry and Natural Resources

Guofan Shao visited several provinces of China between June 3 and July 1, 2007, to conduct research on selecting suitable sites for development vineeries in China. The project was funded by VIA Technologies. Shao was invited to attend a panel meeting for evaluating key proposals in forestry and ecology at China's Natural Science Foundation, July, 2006.

Eva Haviarova visited the Technical University Zvolen, Slovak Republic, in the frame of NFS Twinning program, conducting research in the area of the use of fast-grown wood species and their suitability for product development for the furniture industry. The title of this project is “Material science and new furniture product development: evaluation of new material resources and their viability for development of specialized engineered furniture with higher customer value.”

Faculty members and students from both institutions were engaged in this project. They developed extensive cooperation between Wood Research Laboratory at Purdue University, and Department of Wood Science, Department of Furniture Design, Department of Chemistry at Technical University, and arranged exchange visits. Technical University is one of the well-recognized research and teaching European institutions with a rich history in the area of Wood Products, Forestry, Machinery, and Ecology. There is a possibility of student exchange and study abroad programs.

Rick Meilan, Doug Jacobs, and John Dunning traveled to the far northern part of Sweden with nine Purdue students to study climate change in the Arctic. The course was part of the FNR's summer course in International Natural Resource Studies, co-taught with North Carolina State and the Swedish University of Agricultural Sciences. The students worked in international teams to research specific topics that are related to the course's main theme. This year, they examined the impact of climate change on the natural ecology and the human systems of the Swedish boreal and Arctic systems. All of the students and faculty came out of the course with a greater appreciation of the changes already occurring in the Arctic, and the complexity of combating climate change successfully.

In August 2006, Rita Mckenzie and Harvey Holt, with a colleague from Clemson University, went to the UK to set up a study abroad curriculum. This program was announced during the fall of last year, but was not sufficiently subscribed. The course can be seen at the following Web site: <http://www.agriculture.purdue.edu/fnr/html/ugrad/UrbFor/fnrstudyabroad.htm><.>

Doug Jacobs attended a symposium on mineral nutrition of higher plants in Pamplona, Spain. He met with colleagues from various universities to develop a research proposal on mineral nutrition of holm oak seedlings, which was funded by the Spanish Department

of Education and Science. Jacobs met with industry cooperators at Foresta Capital to develop a research project for a graduate student, who is currently conducting her project in the company's black walnut plantations near Talayuela, Spain. Jacobs co-instructed the FNR 460 course, an international exchange course in collaboration with the Swedish Agricultural University and North Carolina State University. The course was conducted in northern Sweden adjacent to Abisko National Park, with the theme of studying the environmental impacts of climate change.

Horticulture and Landscape Architecture

Matthew Jenks and Avtar Handa helped develop, and have continued to participate in, a USAID Instructional Capacity Building Team in Egypt. The initiative has included on-site evaluation and needs assessment of curriculum and instructional methods used by horticulture programs at five universities in Egypt. Workshops, interviews, and training programs for university faculty and administrators have emphasized contemporary approaches in curriculum development, as well as new strategies for enhancing the effectiveness of teaching and learning.

Michael Dana assumed departmental leadership of the HORTECUS Program (HORTiculture in EC and US). This consortium of seven horticulture departments from universities in the United States and European Union facilitates student and faculty exchange programs and international course development. Participant institutions include TEI (Crete), Hogeschool Delft (Netherlands), KVL (Denmark), and the University of Hannover (Germany), as well as three U.S. universities (Alabama A&M University, Oklahoma State University, and Purdue University). In addition to their cultural diversity, the cooperating educational institutions' geographical locations provide a unique palette of horticultural industries, and thus experiential opportunities, for exchange students and faculty to interact.

Kim Wilson participated with Mark Russell and Pam Morris in the development and offering of a Maymester Study Abroad course (YDAE 491) focused on serving international communities. This service-learning course was designed to address specific community needs in Tumbabiro, Ecuador. Students and faculty met with the mayor of the village, engaged local leaders in a dialog to assess community needs, and developed a collaborative project and implementation strategy. Students gained direct personal experience regarding how service can help to improve community health and education and make a difference in the lives of people.

K.G. Raghothama continues to play an active role in the Multinational Agricultural Research and Development program, which focuses on strengthening research and educational collaborations among Jordan, Israel, Palestine, and the United States. He was an invited speaker at the symposium, in Amman, Jordan; Bethlehem University and Hebron University, Palestine; and the Agricultural Research Organization and Galilee Research Center, Israel.

An ongoing project funded by the McKnight Foundation on "New approaches for improving phosphorus acquisition and aluminum tolerance of plants in marginal soils" is led by Raghothama, Cliff Johnston, and Daryl Schulze of Agronomy, with collaborators in Brazil, China, and Africa.

Raghothama, David Salt, Avtar Handa, and Kathryn Orvis continued their education, research, and outreach efforts under a USAID-AIO funded project in Bangalore, India. Joined by Peter Goldsbrough and Marshall Martin, the group seeks to enhance institutional capacities in India with the goal of improving nutritional quality of food through biotechnological approaches. Improving the health of women and children is a critical objective of this initiative. Many members of this team attended a 2006 international symposium organized in Bangalore, India, as a part of the project.

Angus Murphy was selected as the 2006 Underwood Fellow, sponsored by the Biotechnology and Biological Sciences Research Council, United Kingdom. Angus, Wendy Peer, and Ian Moore conducted collaborative research in the Department of Plant Sciences, University of Oxford to elucidate regulators of the trafficking of auxin transport proteins. They were accompanied by Anindita Banerjee and Boosaree Titapiwatanakun, graduate students of the Murphy lab, as well as by Andrew Markey, an undergraduate student.

Steve Weller coordinated with Al York of entomology and George Van Scoyoc of agronomy on a Maymester course entitled, "Comparison of Organic and Conventional Farming in France and Italy." This course emphasized agricultural production practices in Europe, in field and horticulture crops. Students learned through interaction with producers and exposure to European regulations for organic and conventional crop and animal production.

Natalia Dudareva and Steve Weller received a grant from Purdue University International Programs for their proposal "Strategic Recruitment Program for Outstanding International Graduate Students from Eastern Europe." They developed a recruitment mechanism to attract and sustain long-term relationships between Purdue University and six universities and research institutes in Russia, Czech Republic, and Hungary. Their program fosters scientific collaborations and exchange between faculty and undergraduate students that will promote increased matriculation of qualified graduate students. Their initiative includes a program by which talented undergraduates can visit Purdue University for summer internships prior to their graduation and before their decision about graduate school.

Youth Development and Agricultural Education

B. Allen Talbert and Mark Balschweid led 12 students on an international study abroad undergraduate teacher preparation course in agricultural education in Jamaica. The Maymester

Youth Development and Agricultural Education continued course was headquartered at the College of Agriculture, Science, and Education in Port Antonio, Jamaica.

Jerry Peters and colleagues from the University of Minnesota and Indiana University, in partnership with the National Youth Sports Corporation and The Indiana Center for Cultural Exchange, conducted a seven-day workshop hosted by the Algerian Ministry of Youth and Sports and the Algerian Basketball Federation. The workshop focused on the learning of fundamental basketball skills, and timeout segments on leadership and diversity.

Mary Pilat presented at the “Fourth International Conference on New Directions in the Humanities” University of Carthage, Tunis, Tunisia, July 3-6, 2006.

Penghui Dou was a visiting professor from March 1, 2006 to February 28, 2007. During his time in the department, Dou focused his efforts on learning more about non-formal and informal youth based educational programming. He was particularly interested in the 4-H and FFA programs. Upon his return to China, Dou has started exploring the potential for the development

of youth-based programming similar to the 4-H and FFA program conducted in the United States. His dream is that someday there will be a “FFC”.

“Serving International Communities”, a service learning Mayme-ster course, is designed to focus on projects related to agriculture majors. Under the leadership of Pamala Morris and other College of Agriculture faculty, students designed a project to address a specific community need and gained insight about how service can help improve health and education, assist in community development and alleviate suffering. The course helps build competent intercultural communication skills and build cross-cultural adaptation skills.

Representing YDAE’s Agricultural Communication Program, Mark Tucker and Natalie Federer traveled to England in October, 2006, to plan a student study-abroad course that is tentatively scheduled for May, 2008. The three-week course, titled “Science Communi-cation: Focusing on English Food and Agriculture,” will be open to students in the College of Agriculture. While in England, Tucker and Federer met with communication professionals and media contacts in support of the new course.

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