The Meristem

Department of Botany and Plant Pathology
2002 Annual Newsletter

Welcome

Meristem Welcome

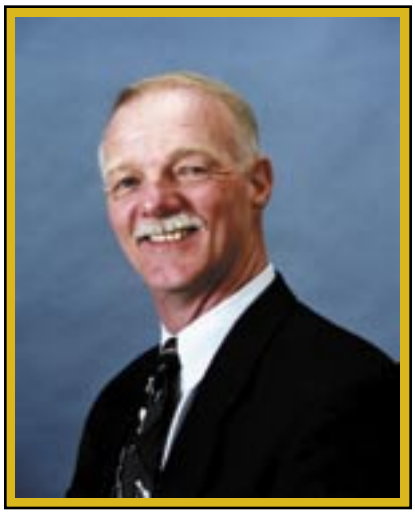
Welcome to the 2002 Year-in-Review of the Department of Botany and Plant Pathology. Every year I think we can't get any busier and every year I am pleasantly surprised that we do. 2002 certainly was no exception. Much of our time this past year was devoted to recruiting and hiring four new faculty in the department. Dr. Guri Johal, assistant professor of plant pathology, Dr. Tesfaye Mengiste, assistant professor of plant pathology, Dr. Zhixiang Chen, associate professor of plant pathology, and Dr. William Johnson, assistant professor of weed science all joined us during 2002. With outstanding faculty come outstanding students and outstanding discoveries. We are extremely pleased to have each of them join our faculty. You can learn more about each from their brief biographical sketches inside.

I am sorry to say that Dr. Markus Scholler, Curator of the Arthur and Krebiel Herbaria left in December and returned to Germany to be with his family. In the 3 years Markus was here, he helped restore the herbaria to their former excellence and increase the number of loans many fold. We wish Markus and his family all the best. We also were sorry to lose Dr. Peggy Sellers, Director of the Plant & Pest Diagnostic Laboratory this past year. Peggy accepted a new position as State Coordinator of the Master Gardener Program. Gail Ruhl, senior diagnostician and longtime P&PDL employee, accepted the position of Interim Director.

2002 saw an increased awareness and concern nationwide for the safety and security of our country's food supply and agricultural system. The Department of Botany and Plant Pathology received two national grants to help develop a regional and national plant disease and pest laboratory network and to increase the knowledge base of exotic plant pathogens. We currently are in the middle of both of these projects and will wrap them up later in 2003.

Our research and educational programs continue to grow in national and international prominence and our faculty and students continue to excel at all levels. External grants in the department reached another all time record high in 2002, eclipsing last year's record. And it looks like 2003 is on track to outdo 2002. Several of our faculty received distinction by being named editors or to editorial boards of scientific journals. Additionally, Dr. Ron Coolbaugh was named Director of the university's MARC/AIM program, the highly successful minority recruitment summer research program.

Our graduate students continue to distinguish themselves, as well. Our recruiting weekend last spring was highly successful and I am pleased to say that most of our top recruits joined the department in the fall. Several of our more senior students received notable honors this year. Joe Flaherty, a Ph.D. student with Dr. Charles Woloshuk, received the prestigious Indiana Seed Industry Graduate Fellowship Study Award; Carrie Lapaire, a M.S. student with Dr. Larry Dunkle and Phil Harmon, a Ph.D. student with Dr. Rick Latin, were honored with the



department's Outstanding Graduate Student Award for 2002. And Ms. Iris Perez Almeida, a Ph.D. student with Dr. Nick Carpita, was the department's Outstanding Teaching Assistant. Several of our graduate students received professional society travel grants to scientific meetings and Ian Thompson, a Ph.D. student with Dr. Don Huber, was an invited symposium speaker at an international conference in Greece.

As I write this 2003 is well underway and it looks like we will be just as busy this year as in the past. We hope to recruit another new faculty member and this year's graduate student recruiting weekend was outstanding. We are beginning to see significant increases in our undergraduate programs and the quality of all of our students is outstanding. I welcome your comments and invite you to stop in for a visit if you venture back into

Department Information
Excellence through Diversity

Ray D. Martyn, Department Head
Department of Botany and Plant Pathology
Purdue University
915 W. State Street
West Lafayette, IN 47907-2054
Phone: 765-494-4615
FAX: 765-494-0363

http://www.btny.purdue.edu/

The Meristem Editor
Ms. Pam Mow
Administrative Assistant
Phone: 765-494-4615

<mowp@purdue.edu>

What's Inside

Table of Contents

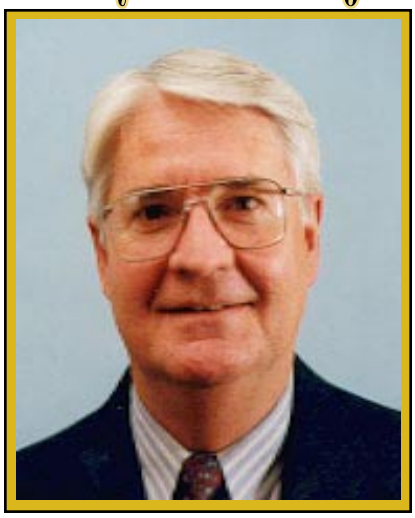
Department of Botany and Plant Pathology Mission & Vision Statements
Adopted, May 2001

Mission Statement - *To pursue knowledge and develop new concepts in plant and pathogen biology and to minimize the impact of disease and weeds on plant productivity and to provide the highest quality education programs.*

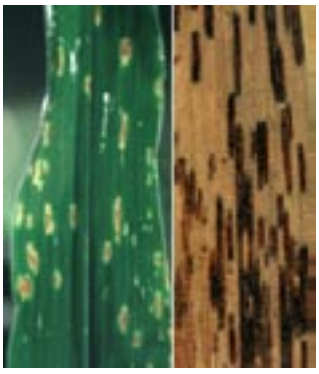
Vision Statement - *A committment to defining new directions of science and discovery through quality research, educational and outreach programs enabling students and staff to become leaders in their disciplines.*

Dr. Larry Dunkle, Adjunct Professor of Plant Pathology

Faculty Spotlight



Larry Dunkle is a Research Plant Pathologist with the USDA-Agricultural Research Service and Adjunct Professor in the Department of Botany and Plant Pathology. He has served as the Research Leader of the USDA-ARS Crop Production and Pest Control Research Unit for the past seven years. Dr. Dunkle received a B.S. in biological sciences from the University of Northern Colorado and the M.S. and Ph.D. degrees in botany from the University of Wisconsin. He was a National Institutes of Health post-doctoral Fellow and then an Assistant Professor in the Department of Plant Pathology at the University of Nebraska before joining the USDA-ARS and the Department of Botany and Plant Pathology at Purdue in 1978. He has served the American Phytopathological Society (APS) and Mycological Society of America (MSA) as a member and chair of numerous committees and as Associate Editor of *Phytopathology* and *Mycologia*. He was elected Fellow of APS in 1996.

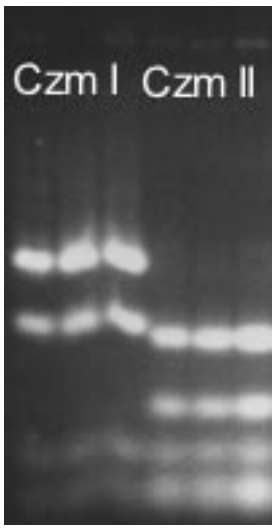


Symptoms of gray leaf spot of corn in early summer (L) and fall (R).

For the majority of his research career, Dr. Dunkle studied the structure and biochemical activity of host-selective toxins, phytotoxic secondary metabolites produced by fungal pathogens to determine their role in diseases of corn and sorghum. His recent research has concentrated on gray leaf spot of corn caused by the fungus, *Cercospora zeae-maydis*. During the past two decades with increases in conservation tillage practices and widespread planting of susceptible hybrids, gray leaf spot has become the most common and economically threatening foliar disease of corn in the United States, Africa, and South America.

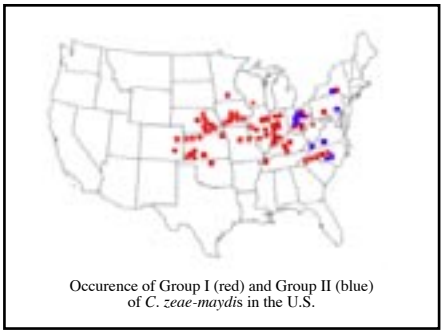
Conidiophores and conidia of *Cercospora zeae-maydis*.

In studies to determine the basis for regional variation in the severity of gray leaf spot symptoms among corn hybrids, Dr. Dunkle and Dr. Juan Wang, a post-doctoral associate in his lab, discovered the existence of two groups of the pathogen based on DNA profiles and nucleotide sequence of the internal transcribed spacer (ITS) region of ribosomal RNA genes. Because these two groups were taxonomically indistinguishable, they were considered to be sibling species. Further analyses of molecular characteristics, in collaboration with Dr. Morris Levy (Department of Biology) and Dr. Steve Goodwin (USDA-ARS, Department of Botany and Plant Pathology), demonstrated that the two groups are clearly distinct species.



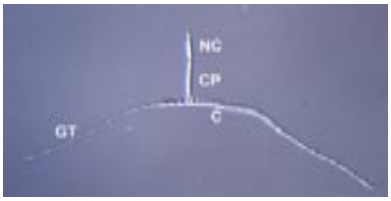
Restriction digests of the ITS region distinguish isolates of Group I and Group II of *C. zeae-maydis*.

Dunkle and ARS Lab Technician, Mark McClenning, developed a PCR-based method that facilitated the rapid identification of the two sibling species and determination of their global distribution. Application of the method to isolates from diseased corn leaf samples collected in the USA, Africa, and South America, established that, as predicted from earlier analyses, both groups of the pathogen are present in the U.S. The most common group, designated Group I, is distributed throughout the corn-growing regions, whereas Group II is localized in the eastern third of the country, east of Indiana. Similarly, both groups were found in South America, but only isolates of Group II were found in Africa. Although such genetic variability in the pathogen population is often a serious concern for disease management strategies based on genetic resistance, further work by Dr. Dunkle and colleagues indicated that corn hybrids did not differ in their response to either of the sibling species and that screening for resistance would not be confounded by local populations of the pathogen.



Occurence of Group I (red) and Group II (blue) of *C. zeae-maydis* in the U.S.

Gray leaf spot is initiated by conidia (asexual spores), which often originate from leaf debris remaining on the soil surface from the previous year's crop. Therefore, the process of sporulation is very important to the initiation and progression of the disease cycle. While studying factors that influence sporulation by *Cercospora zeae-maydis*, a graduate student in Dunkle's lab, Carrie Lapaire, described the process of microcycle conidiation, in which germinating spores produce new spores directly without an intervening phase of vegetative growth.



Microcyle conidiation of *C. zeae-maydis* on a water droplet.

She found that conidia of the gray leaf spot fungus could attach to trichomes on the surface of corn leaves and, in high humidity, generate up to four times the original

(Continued on page 30)

Dr. Zhixiang Chen, Associate Professor of Plant Pathology

Dr. Chen's research focuses on the regulatory mechanisms of plant defense responses to microbial pathogens. Transcriptional regulation of gene expression is a central part of plant defense responses and elucidating the complex regulatory mechanisms for the differential expression of plant genes holds the key to our understanding of the molecular basis of plant disease resistance. One of the major projects in Dr. Chen's laboratory is focused on a family of plant transcription factors containing the novel WRKY zinc-finger DNA-binding motifs. WRKY transcription factors are found only in plants and are encoded by a large gene family with more than 70 members in *Arabidopsis*. Studies over the past several years in Dr. Chen's laboratory have provided critical lines of both direct and indirect evidence for important roles of plant WRKY proteins in plant defense responses. First, expression analysis of the WRKY gene family reveals that a majority of WRKY genes in *Arabidopsis* are rapidly induced after pathogen infection or treatment with the plant defense signal molecule salicylic acid (SA). Second, plant WRKY proteins recognize the TTGACC/T (W-box) sequences that are present in the promoters of a large number of plant genes associated with defense responses and disease resistance. These genes encode antimicrobial proteins such as PR proteins and regulatory factors such as transcription factors and receptor-like protein kinases. The W boxes in the promoters of these genes are specifically recognized by WRKY proteins and are essential for their inducible expression during plant defense responses. In addition, plant WRKY proteins play a critical role in the inducible expression of the *NPR1* gene that encodes a positive regulator of plant systemic acquired resistance. Third, gain-of-function and/or loss-of-function mutants have been isolated for some members of the WRKY gene family from *Arabidopsis* and some of these mutants have altered phenotypes in disease resistance and defense gene expression. Building upon this substantial amount of knowledge, tools and other resources, the current research on the project in Dr. Chen's laboratory focuses on determination of the full regulatory potential of the gene family through search for the functions of all identified WRKY genes from two model plants, *Arabidopsis* and rice, using combined genetic, molecular and genomic approaches. Efforts are also been taken to understand the mode of action of individual WRKY proteins and the signaling pathways leading to the rapid induction of WRKY genes during the activation of plant defense responses.

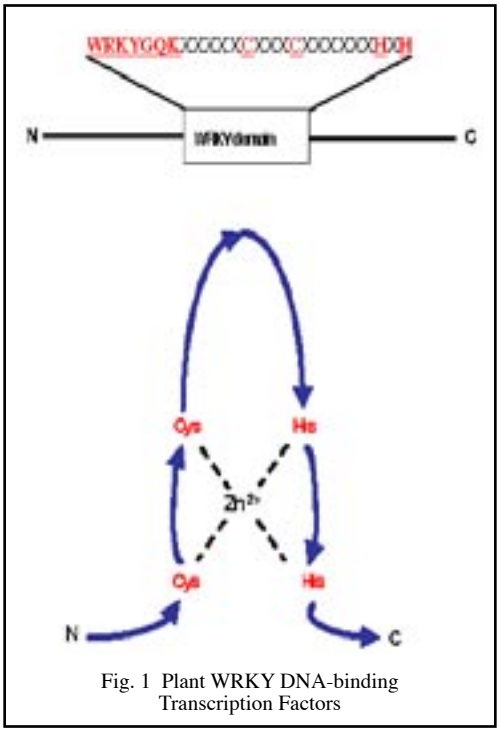


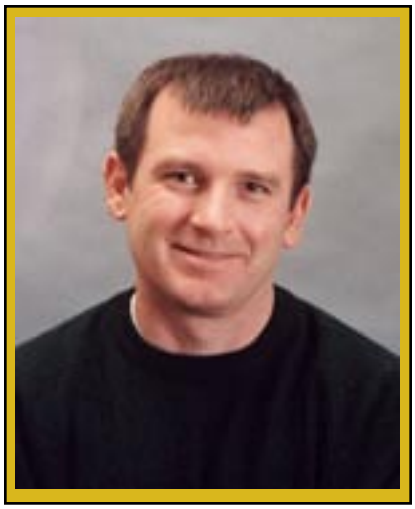
Fig. 1 Plant WRKY DNA-binding Transcription Factors

Another major project in Dr. Chen's laboratory concerns posttranscriptional gene silencing (PTGS) and antiviral defense in plants. PTGS (also known as RNA interference, (RNAi) is a double-stranded (ds) RNA-mediated, nucleotide sequence-specific process of RNA degradation found in a variety of eukaryotic organisms including plants, fungi and animals. A remarkable feature of RNAi in plants is its ability to spread systemically throughout the whole organisms initiated locally. One biological function of PTGS is in the defense against viral pathogens in plants. Consistent with the role of PTGS in antiviral defense, several reported studies show that virus can act as both activators and targets of RNA silencing. The research on PTGS and antiviral defense in Dr. Chen's group is focused on a group of novel RNA-dependent RNA polymerases (RdRPs) that synthesize small complementary RNA (cRNA) using cellular or viral RNA as templates. Some members of RdRPs are required for dsRNA-mediated gene silencing. Recently, Dr. Chen's group has identified a new tobacco RdRP (NtRdRP1) that is induced by virus infection and SA treatment. Transgenic tobacco antisense plants deficient in the NtRdRP1 activity have been obtained and found to be more susceptible to both tobacco mosaic virus and potato virus X. A similar RdRP has also been identified in *Arabidopsis* and a knockout mutant for the gene is also more susceptible to virus infection. Dr. Chen and his colleagues are currently studying the roles of these inducible RdRPs in other aspects of RNA silencing, particularly in the generation and amplification of the systemic mobile silencing signal in plant PTGS. Research is also being conducted to determine the molecular and biochemical mechanisms by which the inducible RdRPs confer plant resistance to viral pathogens.

Dr. Chen's research program has been supported by grants from National Science Foundation and the United States Department of Agriculture. Since his arrival in August, Dr. Chen has been setting up his new lab and continuing research projects at Purdue University. In addition, he is helping develop a new laboratory course entitled, Molecular Approaches in Plant Pathology, that will be debuted in the spring semester of 2003.

Fig. 2 Virus-induced silencing of the *Arabidopsis* phytoene desaturase gene and suppression of photoprotective carotenoid production that leads to photobleaching symptom.

Dr. Kevin Gibson, Assistant Professor of Weed Science



Kevin Gibson is an Assistant Professor of Weed Science with research and teaching responsibilities. Dr. Gibson received his bachelor's degree in Biology from Indiana University and an M.S. in Biology from San Diego State University. He completed his doctorate in Plant Ecology in 1998 at the University of California at Davis and conducted post-doctoral work at UC-Davis until he joined our faculty in 2001. His research program is currently funded by grants from the United State Department of Agriculture.

One of the major trends in weed management in the United States since World War II has been a tremendous increase in the use of and reliance on herbicides for weed control. This approach has been highly successful and improvements in weed control have contributed to higher yields and reduced labor costs in agriculture and other managed systems. More recently, however, concerns about human and ecosystem health, problems with herbicide resistance, shifts in the species composition of weed communities toward more problematic species and the expense and difficulty of bringing new herbicides to market call into question our continued near-exclusive reliance on herbicides. Alternative management systems that are both profitable and sustainable need to be developed. These weed management systems will require not only the optimal use of existing herbicides but new non-chemical approaches to weed management. Integrated weed management (IWM) has been proposed as such an approach. The principal tenet of IWM is that, by presenting weeds with a more complex pattern of management practices, weed populations can be decreased, resistance to management tactics delayed and herbicide inputs reduced. The complexity of integrated weed management systems requires that work be conducted from a whole-systems perspective. However most research conducted on weed management occurs at organizational levels below that of whole-systems and so is often of limited value to farmers and resource managers interested in adopting new approaches to weed management. Dr. Gibson's research focuses on the interaction between weed ecology and management systems within agricultural and natural ecosystems.

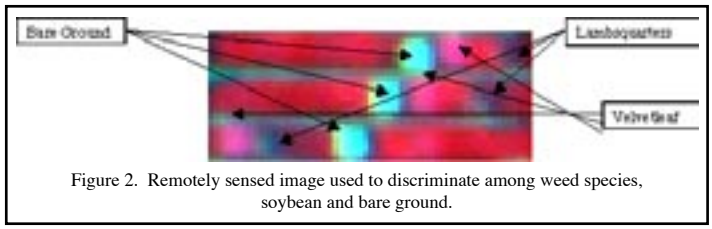


Figure 2. Remotely sensed image used to discriminate among weed species, soybean and bare ground.

Dr. Gibson has ongoing collaborative projects in three main areas: 1) site-specific weed management, 2) integrated weed management systems in vegetable crops and 3) ecology of *Alliaria petiolata* (garlic mustard).

Site-specific weed management. The distribution and abundance of weeds within a field tend to be very patchy. However, herbicides are typically applied over the entire field. Thus many areas of the field containing no weeds are unnecessarily sprayed. Accurate mapping of weed species within a field could allow growers to restrict spraying to areas infested with weeds. This would improve weed control and reduce herbicide inputs. Traditionally weed maps have been constructed through intense field scouting. The goal of site-specific weed management is to integrate remote sensing for detecting weed infestations, knowledge-based systems for recommending site-specific herbicide applications and herbicide applicators into an on-the-go weed control package. A major hurdle in developing this technology is the difficulty of discriminating among weed species using remote sensing technologies.

Figure 1. System integrating weed detection system, sub-meter global positioning and image capturing abilities of CCD cameras.

Rich Dirks, a research associate and Ph.D student in Dr. Gibson's lab, is developing a tractor-based system that integrates a weed detection system, sub-meter global positioning, and the image capturing abilities of CCD cameras to create high accuracy maps of weeds in large production fields. When operational, this system will allow the rapid collection of data on weed species distribution over much larger acreage than possible in previous studies. Weed maps constructed with this technology will be used to relate the distribution of weed species at the Agronomy Research Center near West Lafayette, IN to field location, soil nutrient properties, drainage characteristics and crop yields. This component of Rich's work will allow us to better understand the relationships between weed species distribution and environmental and management factors. In addition to Rich's work, Dr. Gibson has conducted research on the potential use of hyper and multispectral remote sensors for the detection of weed species in soybean. In a recent experiment, Dr. Gibson was able to distinguish among four weed species growing with and without soybean with greater than 90% accuracy.

Vegetable Crops. Most herbicides currently registered for use in vegetables are more than twenty years old and may soon become unavailable for use due to re-registration restrictions or because the manufacturer removes them from the marketplace. Registrations for new herbicides to be used in vegetables lag behind other crops while economic and environmental concerns have increased the need for researchers and farmers to develop effective non-chemical alternatives for weed management. The adoption of integrated weed management systems by farmers is therefore essential to the continued sustainability of vegetable crop production in the North Central region and the entire U.S. One obstacle to the adoption of integrated weed management systems is that relatively little quantitative information is available to help farmers evaluate the consequences of continuing with or modifying their current weed management systems. David Hillger, a doctoral student, will use on-farm sampling and detailed farmer surveys to 1) quantify

(Continued on page 30)

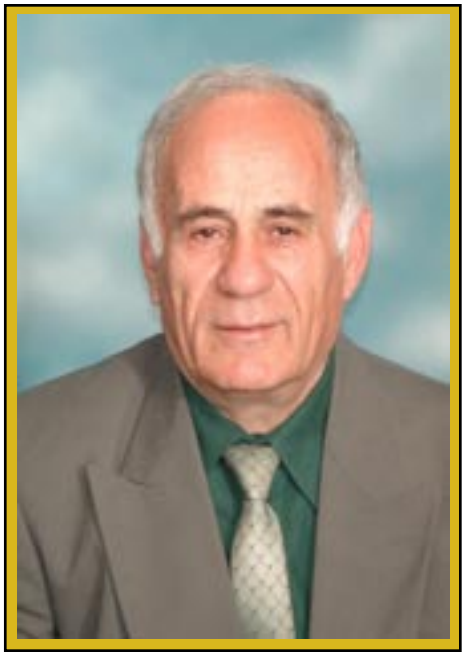
Dr. Naim Iraki, Distinguished Ag Alumni

Dr. Naim Iraki, Director of the UNESCO BETCEN Laboratory and Associate Professor at Bethlehem University was nominated by the Department of Botany and Plant Pathology to receive the 2002 Distinguished Agricultural Alumni Award. Dr. Iraki was one of nine recipients selected by the School of Agriculture in April 2002.

Dr. Iraki received his Ph.D. in Plant Biology in 1987 under the direction of Dr. Nick Carpita and in collaboration with Dr's. Ray Bressan and Mike Hasegawa from the Department of Horticulture and Landscape Architecture. Immediately upon receiving his Ph.D., Dr. Iraki returned to Bethlehem University and began teaching courses in botany and microbiology. He hasn't slowed down since. In 1995, the Biotechnology Action Council of UNESCO was established for the Palestinian Territory and Arab countries in Bethlehem, one of five Biotechnology Educational and Training Centers (BETCEN) world-wide, and Dr. Iraki was named its first and only Director. In that position, he has been instrumental in elevating the education and training activities in plant molecular biology and agricultural biotechnology in the West Bank. Dr. Iraki has brought together large numbers of young scientists from the Palestinian Authority and other Arab countries with scientists in Israel. His projects in molecular biology are aimed heavily at real agricultural problems in the area and one of economic significance. His outreach to the United States for involvement in his center includes the University of Wisconsin and his alma mater, Purdue University.

His contribution to the peace process in the Middle East has had an impact well beyond the educational aspects of the center. Professors Aharonowitz and Barash, from Tel Aviv University, put it best "…We strongly believe that the system of direct contact and interaction between Israeli and Palestinian academicians established by Dr. Iraki is a very important initiative towards establishing a new grasp of the Israeli-Arab relations which undoubtedly will contribute to enhancement of the peace process and stability in our area." These direct contact and interactions with Israel have placed Dr. Iraki in considerable personal peril, particularly during the present dangerous political situation.

While at Purdue, Dr. Iraki learned to appreciate the importance of applying scientific knowledge and discoveries to promote the nation's economic and social prosperity. He also learned that empathy, mutual respect, and peaceful coexistence among groups of different cultures, races, and colors are achievable. Through these interactions he recognized that science could be an ideal starting point for constructive communications between individuals of different ethnic origins



2002 D.A.A. Award

Department of Botany and Plant Pathology Distinguished Agricultural Alumni Recepients

1992 Paul Sun, Ph.D. 1961

1993 Leland House, B.S. 1951, M.S. 1953, Ph.D. 1956

1993 Sue A. Tolin, B.S. 1960

1994 Larry N. Vanderhoef, Ph.D. 1969

1997 Gabriel Cadena-Gómez, Ph.D. 1968

2001 Henry L. Shands, M.S. 1961, Ph.D. 1963

2002 Naim Iraki, Ph.D. 1987

Department of Botany and Plant Pathology Honorary Doctorate Recepients

1971 Peter R. Jennings

1977 Oliver E. Nelson, Jr.

1981 George B. Cummins

1993 John B. Bancroft

1995 Joe L. Key

1996 Paul Sun

1997 Nobutaka Takahashi

1999 Mangina V. Rao

2000 Larry N. Vanderhoef

Faculty and Staff Awards and Promotions

The Indiana Horticultural Society honored **Dr. Paul Pecknold** this past year with their Distinguished Service Award. The award recognizes those individuals who have made outstanding, continuing contributions to the society and fruit industry of Indiana. Dr. Pecknold was specifically cited for his leadership role over the past ten years in the publication of regional tree fruit spray guides for Indiana and surrounding states.

Dr. Ray Martyn, professor and department head, was elected Councilor of North Central Division of the American Phytopathological Society. His term is for 3 years and will represent the North Central Division on the APS Council.

Dr. Nick Carpita was appointed to the American Society of Plant Biology's Executive Committee in November of 2002. His term is for 3 years, 2002-2005.

Dr. Charles Woloshuk has been appointed as an associate editor for *Mycologia* . His term will run until 2005. In addition, he also will be serving on the editorial board of the *Journal of Food Protection.*

Dr. Jody Banks was appointed co-editor of *The Plant Cell.* She will serve as co-editor for five years beginning in 2003.

Dr. Bill Johnson, one of our newest faculty members, was appointed associate editor of the new electronic journal *Crop Management.* In addition, he was awarded the Certificate of Merit from the American Society of Agronomy in 2002 for his publication titled "Practical Weed Science for the Field Scout."

Dr. Charles Woloshuk was promoted to full professor effective July 2002. Dr. Woloshuk has a outstanding research program that focuses on the genetics, biochemistry, and physiology of mycotoxin biosynthesis.

Dr. Robert Pruitt was granted tenure effective July 2002. Dr. Pruitt has a well established and successful research program with its primary focus on the molecular and genetic regulation of growth and development of plants; fertilization and epidermal cell interactions.

Seven faculty and staff honored for years of service in 2002.

The Department of Botany and Plant Pathology is pleased to recognize seven faculty and staff members for their years of service and dedication to the department and to Purdue University. They are as follows:

Cindy Myers
Webmaster and Program Assistant
Purdue Pesticide Programs
10 years

Lona Jean Strickland
USDA Secretary
10 years

Fred Whitford
Director
Purdue Pesticide Programs
10 years

Wad Crochet
USDA Lab Technician
Soybean Research
20 years

J. Robert Mitchell
Department IT Manager
25 years

Ralph Nicholson
Professor of Plant Pathology
30 years

Scott Abney
USDA Professor of Plant Pathology
35 years

Our congratulations and thanks go out to all of these individuals for their many years of contributions and commitment to the department.

2002 Summer Research Program in Agriculture

The School of Agriculture hosted eight students during the summer of 2002 with Dr. Ron Coolbaugh as the director.

"All of the students had a great time and learned a lot," says Ron Coolbaugh. Erika Barlow, from Notre Dame, worked in Dr. Jin-Rong Xu's lab on fungi. Her parting words were that Dr. Xu is a Fun Gi! Ralph Nicholson and Peter Dunn (Entomology) co-hosted Stacie Roundtree from Bowie State University. She worked on extracts from insect larvae that inhibit fungal growth. Two of the eight participants returned to begin graduate school at Purdue in the fall of 2002.

The SRP in Ag will have a new coordinator in 2003. Dr. Nicole Gale was hired as the Coordinator of Multicultural Programs in Agriculture in October of 2002.

Left to right are Lilly Hassan, Southern University; Dr. Ron Coolbaugh, director of the SRP; Mikki Knowles, Fort Valley State University; Stacie Roundtree, Bowie State University;Vanessa Alan, University of Mississippi; Erika Barlow, Notre Dame University; Laura Jefferson, Florida A & M University; Stacie Hamilton, Alabama A & M University, Dr. DaleWhittaker, Assoc. Dean and Director of Academic Programs; Stacey Winfield, Program Assistant; and Yerai Oliveras, University of Puerto Rico.

Dr. Ron Coolbaugh, MARC/AIM Program Director

In December 2002, Dr. Ron Coolbaugh, Professor of Plant Biology and former department head, was appointed to succeed Dr. Vic Rodwell, Professor of Biochemistry, as the Director of MARC/AIM (Purdue Minority Access to Research Careers/Access to Internal Minorities) Summer Research Program here at Purdue. Dr. Rodwell founded this program and served as the director for the past 23 years. This program has had considerable success in its goal of encouraging undergraduate students, who are members of under-represented minority groups, pursue the Ph.D. degree.

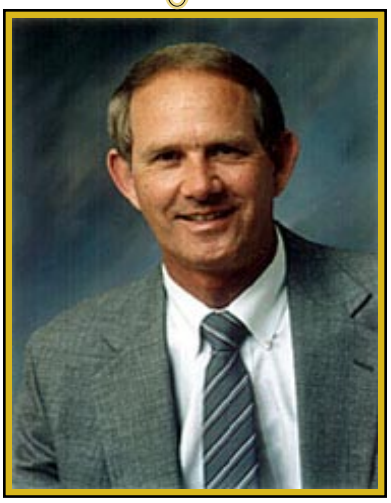
The history of this program goes back more than two decades. The program was established in 1980 to offer undergraduate students from the federal MARC Program at minority institutions an opportunity to participate in research at Purdue. In 1982, the AIM program began to offer the same research experience to minority students enrolled at Purdue.

The MARC/AIM program is now in its twenty-fourth year and has had more than 750 participants collaborate with more than 375 Purdue faculty mentors on research endeavors. This program has hosted approximately 30 minority students in laboratory, field, and library research projects every year since its beginning. Each student participant is mentored by a faculty member and other research staff associated with the project. At the end of the eight-week program the students attend a three-day conference where they share their experience with about 500 other students who had participated in similar programs at other institutions in the Midwest. The participants then share presentations of their research results before they leave campus, and many present their findings at regional or national conferences.

Fifty six MARC/AIM alumni have gone on to earn Ph.D degrees (29 from Purdue University), and more than fifty have earned doctorates in the health professions. More than a hundred others have earned M.S. degrees, and many are currently in graduate education programs. Among the 65 corporate employers of former MARC/AIM students are Abbot Labs, Allstate, AT&T Bell Labs, Borg Warner, Bristol-Myers Squibb, Cessna Aircraft, Dupont, Eli Lilly, Ford, GE, Honeywell, McDonnell-Douglass, Pfizer, Rockwell International, SIA, and Zeneca Agricultural Products.

The Graduate School, the Office of the Provost, and the Schools of Agriculture, Engineering, Liberal Arts, Pharmacy, and Science continue to fund the MARC/AIM program.

Dr. Coolbaugh will be working closely with Dr. Rodwell to ensure a smooth



transition for another successful program in the summer of 2003. Dr. Coolbaugh has served as a research mentor for MARC/AIM students and has directed the Summer Reseearch Opportunity program in Agriculture for several years. The MARC/AIM program is expected to continue to flourish under the leadership of Dr. Coolbaugh.

2002 MARC/AIM, SRP, and NIH Summer Research Program Participants

New Botany and Plant Pathology Faculty

Dr. Guri Johal joined our department as an assistant professor in July, 2002. Guri was born in Punjab, India and completed his B.S. degree in biology and his M.S. degree in genetics from Punjab Agricultural University. He completed his Ph.D. at Simon Fraser University in Burnaby, B.C., Canada, where he worked on the physiological and biochemical aspects of disease resistance in beans under the supervision of Dr. Jim Rahe. He then was a postdoctoral fellow with Dr. Steve Briggs from 1988 to 1992, first at the Cold Spring Harbor Laboratory, NY, and later at Pioneer Hi-Bred International, Inc. During his appointment with Steve Briggs, Guri cloned the maize Hm1 gene – the first disease resistance gene cloned from plants. From 1993 to 1998, he was an assistant professor of maize genetics in the Department of Agronomy at the University of Missouri-Columbia. During this time, he explored the phenomenon of disease lesion mimicry and other aspects of maize genetics and pathology. He was a Senior Research Scientist in the Disease Resistance group at Pioneer Hi-Bred International Inc. from 1999-2001 where his responsibilities included overseeing a number of projects with relevance to maize diseases, transposon tagging of agriculturally important genes, and functional genomics.

The major focus of Dr. Johal's research effort at Purdue will be in the area of maize molecular pathology and functional genomics. He will also teach a graduate class in host-parasite interactions. He is joined by his wife, Lynn, and their three daughters, Jasmine, Priya, and Nicole.

Dr. Zhixiang Chen is an Associate Professor of Plant Pathology with research and teaching interests in molecular plant-pathogen interactions. After completing his undergraduate studies at Zhejiang Agricultural University in China, Dr. Chen came to the United States in 1984 to pursue graduate school. He obtained his M.S. degree in plant genetics and breeding at Cornell University and Ph.D. in biochemistry and molecular biology at University of Nebraska-Lincoln. He worked as a postdoctoral fellow at the Waksman Institute of Rutgers University before joining the faculty of the Department of Microbiology, Molecular Biology and Biochemistry at the University of Idaho in 1995. Dr. Chen joined the Department of Botany and Plant Pathology in 2002 as an Associate Professor of Plant Pathology. He is also an Associate Editor of *Molecular Plant-Microbe Interactions*.

For more on Dr. Chen's research, see page 5 where his research is featured as one of our faculty spotlight articles. Dr. Chen's wife, Baofang Fan, is a research technician at Purdue. They have two sons, John and Jeffrey.

Dr. Tesfaye Mengiste joined the faculty of the Department of Botany and Plant Pathology at Purdue University in October of 2002. For the past two years, Dr. Mengiste has held a postdoctoral fellow position with Syngenta Biotechnology, Inc. in North Carolina. There, his focus was on the functional genomics of plant defense responses to *Botrytis cinerea*. At Purdue, Dr. Mengiste's research focus will include the functional genomics of plant defense responses to necrotrophic fungi as well as the molecular components of host defense signaling in response to necrotrophic pathogens. The interaction and cross-talk between signal transduction pathways in response to biotic and abiotic stresses will also be a research focus.

After earning his B.S. in Plant Science from Alemaya University of Agriculture in Ethiopia, Dr. Mengiste joined the Ethiopian Institute of Agricultural Research where he was involved in the breeding and cytogenetics program of the Ethiopian staple tef (*Eragrostis tef*) for 3 years. In 1991, Dr. Mengiste returned to Ethiopia after earning a Masters degree in Plant Biotechnology from Wye College (University of London) in England. He worked as a research scientist in the Field Crops Research Division until 1995 when he left for Switzerland to work on his Ph.D. In 1999, Dr. Mengiste earned his doctorate in Plant Molecular Biology from the Friedrich-Miescher Institute and came to the United States to work for Syngenta Biotechnology.

Dr. William Johnson joined the faculty of the Department of Botany and Plant Pathology in October 2002 as an Assistant Professor of Weed Science. After receiving his M.S. and Ph.D. in agronomy from the University of Arkansas in 1989 and 1994, respectively. Dr. Johnson was an Assistant Professor of Agronomy at the University of Missouri, Columbia in the Plant Sciences Unit. Dr. Johnson worked on developing economically and environmentally sound weed management systems for the major agronomic crops of Missouri. He conducted applied research addressing current and potential weed management challenges facing crop producers. He also advised graduate students and worked closely with life sciences companies, agribusiness organizations, state agencies, and commodity groups.

Dr. Johnson's research here at Purdue will focus on the evaluation of the interactions between winter annual weeds and other plant pests, understanding the relationship between early season weed interference, corn yield and competition for nitrogen, and the identification and management of herbicide-resistant and economically important weeds. Dr. Johnson will develop weed management systems that are economically and environmentally sound, integrate cultural practice with judicious herbicide use, improve efficiency of production, and minimize selection pressure for herbicide-resistant weeds. His goal is to promote grower acceptance of these weed management systems through education efforts targeting growers, crop consultants, input suppliers, industry representatives and extension educators in Indiana and surrounding states.

Dr. Johnson and wife, Susan, are the parents of one son, Jacob, and newborn daughter, Heather. They are enjoying fixing up their home here in Lafayette, Indiana and many other outdoor activities.

Grants Awarded in 2002

T. S. Abney, Southern Illinois University, $9,800, March 1, 2002 through February 28, 2003, "Indiana-SDS Variety Testing."

T. S. Abney, University of Georgia/IFAFS, $120,000, September 15, 2001 through September 30, 2004, "*Phytophthora sojae,* Pathogen Germplasm ."

T. S. Abney, University of Illinois, $10,925, March 1, 2002 through February 28, 2003, "Indiana White Mold of Soybeans."

T. S. Abney, University of Wisconsin-Madison, $11,812, March 1, 2002 through February 28, 2003, "Indiana *Phytophthora sojae* Losses."

T. S. Abney, Indiana Soybean Board, $30,000, May 1, 2002 through April 30, 2003, "Phytophthora Root Rot: 2002. Identify Role of New and Predominant Races of Soybean Phytophthora."

T. S. Abney, Indiana Soybean Board, $30,000, May 1, 2002 through April 30, 2003, "Sudden Death Syndrome: 2002 – Root Infection/Foliar Responses of Soybean Varieties (Including Roundup Ready and Cyst-X Soybeans)."

J. A. Banks, National Science Foundation, $36,479, August 1, 2002 through July 31, 2003, "Collaborative Research: The Green Plant Bac R Library Project: Public Resources for Studying Evolution, Physiology and Development."

J. A. Banks, National Science Foundation, $155,000, September 1, 2002 through August 31, 2003, "The Genetic and Molecular Basis of Sex Determination in *Ceratopteris*."

T. T. Bauman, Industry, $163,220, January 2002 through December 2002, "Weed Management Research."

T. T. Bauman, USDA, $14,674, January 2002 through December 2002, "Weed Management Research."

T. T. Bauman, and **G. R. Nice**, University of Nebraska, $36,000, September 15, 2001 through September 14, 2004, "Weedsoft Development for Use in Indiana."

T. T. Bauman, and **G. R. Nice**, University of Nebraska, $17,000, April 1, 2000 through September 14, 2002, "Weedsoft 2001/02."

N. C. Carpita, Trask Trust Fund, $18,000, December 1, 2002 through May 31, 2003, "Characterization of a Chemically Inducible Promoter System from *Aspergillus niger* for Use in Crop Plants."

N. C. Carpita, U.S. Department of Energy, $104,000, August 15, 2002 through August 14, 2003, "Mechanism of Bio-synthesis of Cereal Mixed-Linkage ß-Glucans."

N. C. Carpita, B. L. Reuhs, C. J. Staiger, and W. E. Vermerris, National Science Foundation, $1,612,953, September 1, 2002 through August 31, 2007, "Identification and Characterization of Cell Wall Mutants in Maize and Arabidopsis Using Novel Spectroscopes."

Z. Chen, USDA, NRI, $595,909, August 1, 2002 through July 31, 2004, "Functional Genomics of the WRKY Gene Family from Rice."

R. C. Coolbaugh, USDA, CSREES, $6,000, August 15, 2002 through August 14, 2003, "Student Support for International Symposium on Cytochrome P450 Biodiversity."

R. J. O'Neil and **K. Gibson**, USDA, NRI, $90,495, April 1, 2002 through March 31, 2005, "Determination of the Suitability of *Rhamnus* and Related Species as Primary Hosts of the Soybean *Aphis glycines*."

K. Gibson and S. Weller, USDA IPM NC-Region, $107,000, April 2002 through May 2005, "Weed Management in Vegetable Crops."

K. Gibson, and S. C. Weller, University of Nebraska, $93,375, July 1, 2002 through June 30, 2005, "Weed Community Shifts and Management Options in the Conversion to Organic Production Systems."

S. Hallett, Purdue University Agriculture Research Programs, $15,000, August 1, 2002 through July 31, 2003, "The Integration of Bioherbicides and Chemical Herbicides for the Control of Waterhemp."

D. Huber, Phosyn, $14,000, January 2002 through December 2002, "Research on Micronutrient Uptake and Interactions with Disease."

W. Johnson, Industry, $10,000, November 1, 2002 through December 31, 2003, "Integrated Weed Management Research."

R. Latin, Industry, $25,000, May 2002 through April 2003, "Evaluation of Fungicides for Control of Turfgrass Diseases."

R. Latin, Midwest Regional Turfgrass Foundation, $10,000, May 2002 through April 2003, "Epidemiology and Management of Turfgrass Diseases."

R. D. Martyn, Honduras Ministry of Agriculture, $5,818, October 1, 2002 through September 30, 2003, "Identification, Distribution, and Epidemiology of Plant Virus Pathogens that Threaten Pepper/Tomato Production in Honduras and Guatemala."

C. Y. Oseto, P. M. Hirst, and **P. C. Pecknold**, USDA, APHIS, $8,100, October 1, 2001, through September 30, 2002, "Plant Pest Survey – Plum Pox Survey, Indiana."

P. Pecknold, B. Chaney, H. Holt, and R. Blaedow, Rainbow Treecare, $3,500, May 2002 through May 2004, "Fungistatic Properties Associated with the Tree Growth Regulator *Paclobutrazol*."

R. E. Foster, P. M. Hirst, **P. C. Pecknold**, and S. C. Weller, USDA, CSREES, $88,790, April 1, 2002 through March 31, 2005, "Organic Production Systems for Applies in the Midwest."

C. Y. Oseto**, K. K. Rane**, and P. R. Sellers, USDA, APHIS, $60,440, October 1, 2001 through September 30, 2002, "Plant Pest Survey."

G. Shaner, National Wheat and Barley Scab Initiative, $88,000, May 1, 2002 through April 30, 2003, "Epidemiology and Management of Fusarium Head Blight of Wheat by Chemical and Genetic Means."

M. A. Webb and **K. Preekamol**, Purdue Electron Microscopy Consortium, $18,000, June 2002 through May 2003, "Localization of Putative Crystal Chamber Proteins in Grape Root."

A. Westphal, USDA, NRI, $120,000, September 1, 2002 through August 31, 2004, "Soil Suppressiveness Against *Heterodera glycines* by Fungi and Bacteria Closely Associated with Nematode Cysts."

A. Westphal, Indiana Soybean Board, $17,150, May 1, 2002 through April 30, 2003, "SDS in Response to Different Moisture Regimes and Infestation Levels of Fungal Pathogens."

A. Westphal, United Soybean Board, $28,125, April 1, 2002 through March 31, 2003, "Biotechnology Approaches to the Control of SDS."

(Continued on page 31)

Publications in 2002

Pryer, K. , H. Schnedier, E. Zimmer and **J. Banks**. 2002. Deciding among green plants for whole genome studies. *Trends in Plant Science*. 7:550-554.

Vanzin, G., M. Madson, **N.C. Carpita**, K. Keegstra, N. Raikhel, W.-D. Reiter. 2002. The *mur2* mutant of *Arabidopsis thaliana* lacks fucosylated xyloglucan because of a lesion in fucosyltransferase AtFUT1. *Proc. Natl. Acad. Sci. USA.* 99:3340-3345.

Carpita, N. C., and M.C. McCann. 2002. The functions of cell wall polysaccharides in composition and architecture revealed through mutations. *Plant Soil* 247:71-80.

Urbanowicz, B., C. Rayon, and **N. C. Carpita**. 2002. Biochemical mechanisms of synthesis of (1→3), (1→4)-β-D-glucans: Cellulose synthase with an added twist? *Plant Biopolymer Science: Food and Non-Food Applications* (D. Renard and P. Lefer, eds.), Royal Society London, Cambridge, U.K.

Shim, W.-B., and **L. D. Dunkle**. 2002. Identification of genes expressed during cercosporin synthesis in *Cercospora zeae-maydis*. *Physiological and Molecular Plant Pathology* 61:237-248.

Wolpert. T.J., **L. D. Dunkle**, and L.M. Ciuffetti. 2002. Host-selective toxins and avirulence determinants: What's in a name? *Annual Review of Phytopathology* 40:251-285.

Egel, D. S. 2002. Evaluation of fungicides for the control of gummy stem blight on watermelon, 2001. *Fungicide and Nematacide Tests*. 57:V127.

Harikirshnan, R. , **D. S. Egel**, C. C. Gunter and **R. D. Martyn**. 2002. Evaluation of fungicide application method and plastic mulch on severity of mature watermelon vine decline, 2002. F*ungicide and Nematacide Tests*. 57:V135.

Gibson, K. D. , A. J. Fischer, T. C. Foin and J. E. Hill. 2002. Implications of delayed *Echinochloa* germination and duration of competition for integrated weed management in water-seeded rice. *Weed Research*. 42: 351-358.

Kema, G. H. J., **S. B. Goodwin,** S. Hamza, E. C. P. Verstappen, **J. R. Cavaletto, J. R.**, T. A. J. van der Lee, M. Hagenaar-de Weerdt, P. J. M. Bonants, and C. Waalwijk. 2002. A combined AFLP and RAPD genetic linkage map of *Mycosphaerella graminicola*, the *Septoria tritici* leaf blotch pathogen of wheat. *Genetics* 161:1497-1505.

Goodwin, S. B. 2002. The barley scald pathogen *Rhynchosporium secalis* is closely related to the discomycetes *Tapesia* and *Pyrenopeziza*. *Mycological Research* 106: 645-654.

Guest, C. A. , D. G. Schulze, **I. A. Thompson** and **D. M. Huber**. 2002. Correlating manganese XANES spectra with extractable soil manganese. *Soil Sci. Soc. Amer. J.* 66:1172-1181.

Huber, D. M. , M. E. Hugh-Jones, M. K. Rust, S. R. Sheffield, D. Simberloff and C.R. Taylor. 2002. Invasive Pest Species: Impacts on Agricultural Production, Natural Resources, and the Environment. *Council for Agricultural Science and Technology, Ames, IA*. Issue Paper No. 20.

Gray, J. , D. Janick-Buckner, B. Buckner, P. S. Close and **G. S. Johal.** 2002. Light-dependent death of maize lls1 cells is mediated by mature chloroplasts. *Plant Physiology* 130:1894-1907.

Hans, S. R. and **W. G. Johnson**. 2002. Influence of shattercane (*Sorghum bicolor*) interference on corn (*Zea mays*) yield and nitrogen accumulation. *Weed Technology.* 16:787-791.

Hellwig, K. B. , **W. G. Johnson** and P. C. Scharf. 2002. Grass weed interference and nitrogen accumulation in no-tillage corn (*Zea mays L.*). *Weed Science.* 50:757-762.

Beyers, J. T. , R. J. Smeda and **W. G. Johnson**. 2002. Weed management programs in glufosinate-resistant soybean (*Glycine max*). *Weed Technology.* 16:267-273.

Li, J. , **W. G. Johnson** and R. J. Smeda. 2002. Interactions between glyphosate and imazethapyr on four annual weeds. *Journal of Crop Protection.* 21:1087-1092.

Johnson, W. G., R. J. Smeda, S. Hans, and K. Hellwig. 2002. Weed Management Systems for Environmentally Sensitive Areas. *Univ. of Missouri Coop. Ext. Manual* IPM1018. 13 pp.

Johnson, W. G., et al. (21 co-authors). 2002. U.S. Soybean Diagnostic Guide Color Guide (CD Rom). Sponsored by United Soybean Board.

Glomski, L. M. , K. V. Wood, **R. L. Nicholson** and **C. A. Lembi**. 2002. The search for exudates from Eurasian watermilfoil and hydrilla. *J. Aquatic Plant Management.* 40:17-22.

Martyn, R. D. 2002. Monosporascus root rot and vine decline of melons. *The Plant Health Instructor.* DOI:10-1094/PHI-1-2002-0612-01.

Chopra,S., **A. Gevens**, C. Svabek, K. V. Wood, T. Peterson, and **R. L. Nicholson**. 2002. Excision of the candystripe 1 transposon from a hyper-mutable Y1-cs allel shows that the sorghum Y1 gene controls the biosynthesis of deoxynthocyadin phytoalexins and phlobaphene pigments. *Physiological and Molecular Plant Pathology*. 60:321-330.

Pecknold, P. C., R. E. Foster, P. Hirst and S. C. Weller. 2002. Indiana Commercial Tree Fruit Spray Guide 2002. ID-168.

Bordelon, B. C. , **P. C. Pecknold**, R. E. Foster and S. C. Weller. 2002. Indiana Commercial Small Fruit & Grape Spray Guide. ID-169.

Abbasi, M., Gh. A. Hedjaroude, H. Gjaerum, and **M. Scholler**. 2002. *Puccinia ariorum sp. nov*. and other noteworthy graminicolous rust fungi (*Uredinales*) from Iran. *Mycotaxon*. 81:435-444.

Schmidt, A. and **M. Scholler**. 2002. Studies in *Erysiphales anamorphs* (II): *Colutea arborescens*, a new host for *Erysiphe palczewskii*. *Feddes Repertorium* 113:107-111.

Wood, A. R. and **M. Scholler**. 2002. *Puccinia abrupta var. partheniicola* on *Parthenium hysterophorus* in Southern Africa. *Plant Disease* 86:327.

Zhou, W. , F. L. Kolb, G. Bai, **G. Shaner** and L. L. Domier. 2002. Genetic analysis of scab resistance QTL in wheat with microsatellite and AFLP markers. *Genome.* 45:719-727.

Day, K. M. , W. P. Lorton, **G. C. Buechley** and **G. E. Shaner**. 2002. Performance of public and private small grains in Indiana, 2002. *Indiana Agricultural Research Programs Purdue University.* Station Bulletin No. B 814.

Shaner, G. and **G. Buechley**. 2002. Control of wheat diseases in Indiana with foliar fungicides, 2001. *Fungicide and Nematicide Tests.* 57:CF04.

(Continued on page 31)

Research Highlighted at NC IPM Conference

For more than 30 years, the USDA-CREEES (U. S. Department of Agriculture Cooperative State Research, Education, and Extension) and Land-Grant universities have partnered to develop, evaluate and share new methods to manage the pests that inflict economic loss on our crops and invade our living spaces. New integrated pest management (IPM) strategies provide economically viable alternatives, including chemical and non-chemical control methods, to effectively manage insects, plant diseases, and weeds while reducing risk to human and environmental health. The CSREES-Land Grant University IPM partnership is implemented by an experienced network of research and extension staff located in all 50 states and six territories. Each year this network directly influences urban and agricultural pest management decisions by transferring research-based knowledge through demonstrations, clinics, workshops, scouting programs, consultations, and a wide variety of printed and electronic media.

At the recent North Central Regional IPM Conference held in Indianapolis, Indiana, a number of programs supported by the NC IPM Grants Program for 1998-2000 were recognized. There were ten states representing the North Central region with a great diversity of projects. Two of the projects highlighted were from past and present faculty members of the Department of Botany and Plant Pathology.

Dr. Keith Perry, a former Associate Professor of Virology in our department, was awarded $75,000 for the project titled "Assessing and Managing Soil-borne Virus Disease in Wheat Production." Dr. Perry began this project in 1998. The goal was to enhance productivity in wheat in the North Central region through an assessment of virus tolerance or resistance in germplasm currently used in North Central region breeding programs. Research was conducted at three locations: Indiana, Illinois, and Kansas. All cultivars showed some level of infection at each of the different sites and seasons. There were no obvious differences in cultivar tolerances from state to state, although an assessment of tolerance was hampered by plot-to-plot variability. Of particular interest in this study was the identification of cultivars with high levels of tolerance. What remains unclear is whether the observed low levels of infection were true cultivar phenotypes, or whether there was genetic heterogeneity in the germplasm. Genetic heterogeneity would suggest that some progeny could be recovered from single heads (or seeds) that would be completely resistant to infection in the field. Alternatively, tolerance could be due to a reduction in the frequency of successful viral transmission and infection events.

In October 2000, Dr. Keith Perry accepted a position at Cornell University were he is continuing his research.

Dr. Case Medlin, **Dr. Kevin Gibson**, and graduate student, **Loree Johnston's** research project titled "Reducing Herbicide Input and Increasing Economic Output with Site-Specific Weed Management" also was highlighted in the NC IPM publication.

In June 2000, Dr. Medlin was awarded $65,000 from the NC IPM program. Dr. Medlin and his student, Loree Johnston, were in the beginning stages of the project when he accepted a position at Oklahoma State University. So newly hired professor, Dr. Kevin Gibson, joined the project here at Purdue to help guide the research, while collaborating with Dr. Medlin in Oklahoma.

Growers in the United States rely heavily on herbicides to control weeds. The availability and use of herbicides have contributed to higher crop yields and made possible a reduction in labor. However, the continued reliance on herbicides poses several challenges to the future of agriculture. Environmental and human health concerns, shrinking profit margins for growers, and an increasing number of herbicide-resistant weed species are only a few of the reasons driving the need for better herbicide application programs.

Site-specific weed management has been used to reduce herbicde use and associated costs and risks. Site-specific production systems are used to optimize crop production by varying inputs and practices across fields in response to infield variability. Variable rate technology (VRT) devices are currently being used in other production practices for real-time, automated, differential application of management inputs.

The missing key for variable rate applicaiton of herbicides is the ability to differentiate among weed species. However, integrating VRT with remotely sensed images and the algorithms for differentiating among weed species may allow for the development of a real-time, site-specific herbicide applicator. Therefore, a goal was to take the initial steps toward developing the algorithms for species differentiation.

Location, environmental conditions, crop and weed developmental stage at the time of data collection, and the analytical procedure used impacted the outcome of species differentiation trials. Classification accuracies did not improve a great deal with high-quality, hyperspectral, ground-based imagery equipment. Incorporating this technology into this research resulted in correct classification of 89% of the weed-infested or weed-free areas. With further research to refine these and other algrorithms, a real-time VRT herbicide application for in-season use will become a reality. The potential cost savings are estimated to be 20-80% of the current herbicide costs for any given field.

The purpose of the NC IPM publication, which highlighted these two projects, is to provide insight in to the successes that have been achieved by researchers and extension specialists who strive to provide answers to questions posed by their clientele.

Any questions regarding these research projects should be directed to the individuals involved. Listed below is their current contact information:

Dr. Keith Perry
Department of Plant Pathology
Cornell University
210 Bradfield Hall
Ithaca, NY 14853
klp3@cornell.edu

Dr. Case Medlin
Oklahoma State University
Departmetn of Plant & Soil Sciences
279 Agricultural Hall
Stillwater, OK 74078-6028
crm@mail.pss.okstate.edu

Dr. Kevin Gibson
Purdue University
Department of Botany and Plant Pathology
915 W. State Street
West Lafayette, IN 47907-2054
kgibson@purdue.edu

Educational Outreach

Educational Outreach

The Department of Botany and Plant Pathology is committed to outreach and engagement of the community in promoting a healthy, sustainable, and secure food system at the local, state, and national level.

This past year the Department participated in a number of educational outreach events, including the 2002 Indiana State Fair, Purdue's SpringFest, Ag School sponsored Project Future, 4-H sponsored Plant Science Workshop and Career Exploration Day, the Regional Science and Engineering Fair and the Hoosier Association of Science Teacher's Convention in Indianapolis.

The **Hoosier Association of Science Teachers, Inc. (HASTI) Convention** is held every February in Indianapolis. Approximately 2,500 Indiana 6th-12th grade science teachers, administrators and student teachers attend this two-day convention. The Office of Academic Programs within the School of Agriculture coordinates a display at the HASTI annual convention and as a department within the School of Agriculture, we are invited to participate in this outreach opportunity. We demonstrate various computer programs that have application within high school classrooms, and distribute discs with photographic slide sets, interactive CD's and of course, recruitment literature! With the use of microscopes and LCD panels we present lab demonstrations that teachers can incorporate into their biology curriculum. **Gail Ruhl** presented lab exercises on watermolds and powdery mildews (now posted in the K-12 educational site on APS net) and several years ago **Dr. Jody Banks** and her graduate student, **Barb Hass**, presented the ever popular "Sex In A Dish" experiment with fern gametophytes (now distributed by Carolina Biological). **Gail Ruhl** also provided materials and a program on how to incorporate fungi and simple concepts of plant pathology into elementary classrooms, including a classroom exercise entitled "Grow a Fungus Garden".

This past summer, The Department of Botany and Plant Pathology was showcased at the **2002 Indiana State Fair** in an exhibit titled "Plants and Microbes in Action." The exhibit was designed and coordinated by **Gail Ruhl**, as the chair of the Departmental Educational Outreach Committee and housed in the "OUR LAND PAVILLION". Our display (compliments of our excellent Ag School exhibit, design and production crew, Jon Bricker, Dave Breshnahan and Rob Snorek) consisted of a Frank Lloyd Wright style house-front (30 ft wide by 14 ft tall) with an alcove entrance and exit that opened into a 20 x 30 ft landscaped backyard complete with two ponds (one real pond with flowing stream and one large mural backdrop). A pictorial panel display designed by **Dr. Carole Lembi** included information and management of aquatic plants and algal bloom problems in reservoirs. Another informational/pictorial display designed by **Gail Ruhl** outlined infectious and noninfectious disease problems on ornamental plants and the importance of accurate identification for correct "prescription" of management strategies. An audio/visual computer touch screen presentation produced by **Gail Ruhl** was used to illustrate the origin, relevance and science of plant pathology.

The landscape design and procurement of plants for the backyard exhibit was provided by Brian Wildeman, a senior undergraduate student in Landscape Architecture. Dana Neary, Special Events Coordinator for the School of Ag, was instrumental in the planning process, set-up and maintenance of the plants for the duration of the Fair. The exhibit heightened the awareness of thousands of Indiana citizens on the importance of agricultural stewardship. Awareness of the Department's undergraduate programs and the Plant & Pest Diagnostic Laboratory was also increased through the distribution of thousands of take-home informational cards.

The annual **Lafayette Regional Science and Engineering Fair** is held each year at Purdue University. The Department of Botany and Plant Pathology awards a 1st and 2nd place award in the area of plant science.

In 2002, the 1st place was awarded to ***Ms. Stephanie Cheng*** of West Lafayette High School for her project titled "The effects of different amounts of a 10-30-15 fertilizer on the number of fronds of duckweed for 14 days," and 2nd place was awarded to ***Ms. Margaret Hass*** of Jefferson High School for her project titled "Sorghum phytoalexins: A means of detoxification." A special thanks to our 2002 judges, graduate students **Carrie Lapaire, Lauren Brownback** and **Dr. Andreas Westphal**.

Again in 2003, the department participated in the 51st Regional Science and Engineering Fair. This year's judges were **Dr. Susan Lolle**, and graduate student **Ian Thompson**, and **Ryan Lee**. The judges awarded 1st place honors to ***Ms. Genia Gabrielou***, a freshman at West Lafayette High School for her project titled "The effect of oxygen on browning in apple." 2nd place was awarded to ***Ms. Rachana Raghothama***, also a freshman at West Lafayette High School for her project titled "The effect of ascorbis acid on banana polyphenol oxidase activity." The 1st place recipients received a certificate, $50, a T-shirt, and mouse pad and the 2nd place recipients received a certificate, $25, a T-shirt, and mouse pad. In 2003, honorable mention was given to ***Mr. John Chen***, a sophomore at West Lafayette High School for his project titled "The effect of damaged leaves on *Arabadopsis* in growth in terms of mass."

Ms.Genia Gabrielou accepting her 1st place award of $50 from Dr. Ray Martyn.

Ms. Rachana Raghothama receiving her 2nd place award of $25 from Dr. Ray Martyn.

Both of these students are invited to showcase their projects at Springfest. Congratualtions to this talented group of science students.

Classroom opportunities to learn about the wonderful world of plant diseases and weed science were provided by **Glenn Nice** and **Gail Ruhl**. Glenn provided a one hour weed science 'hands-on' class for junior high students in a 4-H sponsored **Plant Science Workshop**. Gail presented four one hour classes on "Fun with Fungi" activities for junior high and high school students participating in 4-H sponsored **Career Exploration Day** and **Project Future**, a workshop sponsored by the School of Agriculture. The importance of science classes

(Continued on page 31)

Approximately 25,000 people attended this year's SpringFest, April 13th and 14th, 2002. In 1998, the Purdue University Agriculture Open House (Bug Bowl, Vet School Open House, Hort Show, etc..) was renamed the Purdue SpringFest to encourage campus-wide participation in this weekend of hands-on educational outreach. Our department and the Department of Agronomy share a site in the front of Lilly Hall, entitled "Plants, Soils and Microbes in Action." We present hands-on activities, demonstrations and displays pertaining to the various areas of expertise and interest within our respective departments. The Graduate Student Association also sells food to raise money for travel scholarships.

This is a wonderful outreach opportunity. **Gail Ruhl**, our coordinator, was responsible for planning the activity site and assembling the materials necessary for the site. Volunteers associated with our departmental efforts, include faculty, administrative professionals, clerical staff, graduate and undergraduate students, post docs, technicians, and assorted family members. Our educational and fun-filled activities and demonstrations are 'housed' in front of Lilly Hall as well as inside the front foyer of the building. Colorful computer generated stickers are created for each activity site and given to participants.

Thought provoking titles were chosen for each activity site. "Spores galore", coordinated by **Dr. Greg Shaner** and **Dr. Andreas West**phal gave participants a chance to use microscopes for a closer look at the microorganisms that cause plant disease. "Colorful fungi" presented by **Dr. Charles Woloshuk** taught about the beneficial and deleterious aspects of fungi through fungal art. At "Botanical Beauty and Shopping Cart Science," **John Cavaletto** demonstrated how to grow a pineapple plant and with compound microscopes showed people the plant cells that makes a pear crunchy. "Who Wants to be a Plant Doctor?", coordinated by **Gail Ruhl,** quizzed participants on their knowledge of plant diseases and provided a chance for people to ask questions pertaining to plant problems. Face painting, provided by **Jo Anne Fisher** and numerous graduate students and the children's activity table, coordinated by **Gail Ruhl,** were two of the most popular youth activities.

Our department also featured a display on Plant Biotechnology, coordinated by **Glenn Nice**, Identification of Common Weeds, coordinated by **Loree Johnston**, Herbaria tours and mushroom literature, coordinated by **Markus Scholler** and free helium balloons decorated with our departmental logo - coordinated by **Gail Ruhl**. The graduate students also sold beer-steamed brats and hotdogs for the hungry crowd!!

The Year in Pictures

The Year in Pictures

2002 Departmental Seminar Series

The department has a very active seminar program. Approximately five to seven speakers from around the country are invited each semester (fall and spring). In addition, several on-campus speakers and several graduate students round out the 15-week semester. External speakers are selected through a nomination process to the departmental seminar committee after nomination from the faculty and the graduate students. The seminar committee reviews all suggestions, and recommends a slate of speakers for both the fall and spring semesters. Graduate students have the honor to invite a specific person designated as "the students choice" speaker. Below is the list of seminar and quests for 2002.

Dr. Carole Lembi, Botany & Plant Pathology Department, Purdue University. "Of tastes and toxins: Cyanobacteria in Indiana and Brazil."

Dr. Chris Staiger, Biological Sciences Department, Purdue University. "Profilin: A great allergen, but can it shut off pollen tub growth during the self-incompatibility response?"

Dr. David Salt, Horticulture & Landscape Architecture, Purdue University. "Nickel hyperaccumulation in plants."

Dr. Rick Howard, DuPont Crop Genetics, Wilmington, DE. "Trends in imaging fungal pathogens and plant-host interactions."

Dr. Terry Niblack, Department of Crop Sciences, University of Illinois. "Soybean cyst nematode: The race is off."

Dr. Robert Holm, Executive Director, IR-4 Project, Technology Centre of New Jersey, Rutgers University. "Challenges and opportunities for the IR-4 minor crop agriculture program in a new century."

Dr. Angus Murphy, Horticulture & Landscape Architecture, Purdue University. "Asymmetric localization of auxin efflux carriers involves an actin-dependent vesicular cycling system."

Dr. Nevin Young, Department of Plant Pathology, University of Minnesota. "Integrated view of legume genomes."

Dr. Matt Liebman, Department of Agronomy, Iowa State University. "Linking soil, crop, and weed management: Ecological mechanisms and farming practices."

Dr. Patrick Tranel, Department of Crop Sciences, University of Illinois. "Mechanisms and evolution of herbicide resistance in weeds."

Mr. Dave Hillger, Botany and Plant Pathology Department, Purdue University. "Economic comparison of herbicide resistant corn technologies." (M.S. Research Seminar)

Ms. Carrie Lapaire, Botany & Plant Pathology Department, Purdue University. "Microcycle conidiation in the fungus *Cercospora zeae-maydis*, the causal agent of gray leaf spot of maize." (M.S. Research Seminar)

Mr. Joerg Boellmann, Botany & Plant Pathology Department, Purdue University. "The ground-ivy rust *Puccinia Glechomatis* in North America: Its life cycle and epidemiology." (M.S. Research Seminar)

Dr. Charles Michler, Director, Hardwood Tree Improvement and Regeneration Center, Purdue University. "Fine hardwood genomics and population genetics."

Dr. Andrew Staehelin, Department of Molecular, Cellular, and Development Biology, University of Colorado. "Cellular structuromics-reconstructing cells at 7nm resolution."

Dr. Claude de Pamphilis, Department of Biology and Life Sciences Consortium, Penn State University. "The Floral Genome Project: Origin, conservation, and divergence of the floral developmental program in flowering plants."

Dr. Anita Dille, Department of Agronomy, Kansas State University. "Applying ecological principles to improve weed management."

Dr. Markus Scholler, Botany and Plant Pathology, Purdue University. "Using herbaria formerly and today: An overview with examples from the Purdue University Herbaria."

Dr. Marc Orbach, Department of Plant Pathology, University of Arizona. "Dissecting the disease cycle of *Coccidiodes immitis*, The Valley Fever Fungus."

Dr. Thomas Baum, Department of Plant Pathology, Iowa State University. "Parasitism genes of the soybean cyst nematode."

Ms. Loree Johnston, Botany and Plant Pathology Department, Purdue University. "Using remote sensing techniques to detect weed infestations with and without soybeans." (M.S. Research Seminar)

Mr. Darrin Dodds, Botany & Plant Pathology Department, Purdue University. "Management and implications of annual ryegrass cover crops." (M.S. Research Seminar)

Mr. Wesley Everman, Botany & Plant Pathology Department, Purdue University. "The effect of pre- and post-herbicides on the spectral reflectance of corn." (M.S. Research Seminar)

Mr. Mauricio Antunes, Botany and Plant Pathology Department, Purdue University. "Chemically inducible promoters: Prospects for their use in agriculture." (Ph.D. Research Seminar)

The Department of Botany and Plant Pathology has initiated a new program to recruit high quality undergraduate students for a summer research internship program.

This program is designed for the serious undergraduate student interested in graduate school and who wishes to capture the excitement of research in the plant sciences. The department offers a limited number of internships in plant biology, plant pathology, and weed science. Students gain experience in conducting research by working with faculty, post-doctoral scholars, and graduate students. Special programs are offered related to laboratory safety, graduate education, and career opportunities.

The internship runs for eight-weeks on the West Lafayette campus. Each student is provided round trip transportation to West Lafayette, and is housed in University dormitories. In addition to transporation and housing, students will receive a stipend for the eight weeks.

To be eligible, students must be U.S. citizens or permanent residents and have completed two years of college level study in one of the life sciences by June of the year of application with a minimum grade point average of 3.0. Interns must be available for eight consecutive weeks. The application deadline is March 15th, with notification being given to all applicants by April 15th.

We are extremely excited that four students will be participating in the SRP in 2003. Check out our homepage <**www.btny.purdue.edu**> throughout the summer to see photos and learn more about these students and their projects.

Currently twelve of our faculty are participating in the summer research program.

Jody Banks
How Sperm Find the Egg

Nick Carpita
Characterization of Plant Cell Wall Mutants Using Infrared Microspectroscopy

Ron Coolbaugh
Production of Plant Hormones in Fungi

Steve Hallett
Biological Control of Weeds

Sue Loesch-Fries
Analysis of Virus-Host Interactions in Arabidopsis

Gurmukh Johal
Genetics and Genomics of Maize Stress Responses

Bob Pruitt and Susan Lolle
Cloning Genes Regulating Organ Fusion in Arabidopsis

Zhixiang Chen
Mechanisms of Plant Gene Expression

Mary Alice Webb
How Do Proteins Affect Crystallization of Calcium Oxalate in Plants?

Andreas Westphal
Mycorrhizal Association of Watermelon Roots

Charles Woloshuk
Molecular Biology of Aspergillus glaucus

Jin-Rong Xu
Genomics of Magnaporthe grisea, the Fungus That Causes Rice Blast Disease.

Undergraduate News

Sarah Kessans receiving her 2002 Botany and Plant Pathology Sophomore Scholarship check from department head, Dr. Ray Martyn.

Sarah Knapke receiving her 2002 Botany and Plant Pathology Junior Scholarship check from department head, Dr. Ray Martyn.

David Doll, 2002 Botany and Plant Pathology Junior Scholarship Award Recipient.

Dr. Ray Martyn presenting senior Matt Eckerle with his 2002 Botany and Plant Pathology Senior Scholarship check.

The past year was a year of growth in our undergraduate options. Along with graduating seven of our 15 students during the past two years, we saw many changes to our undergraduate options. The department introduced the new "Environmental Plant Studies" option, renamed the old plant science option to "Plant Biology" and reevaluated the "Crop Protection" option. New posters and brochures were designed and printed for all three options and a massive mailing was sent out to science teachers throughout the midwest to introduce and familiarize everyone with the changes in our programs.

We are seeing the growth now due to our efforts. In 2001 and 2002 we welcomed ten new students. As of now we have six new students admitted for the fall 2003 semester. This will put our undergraduate enrollment at 21 students. We will continue our efforts to recruit and retain quality students into our undergraduate options.

The new academic year always gives the department an opportunity to recognize and reward our current students for their outstanding academic achievements and leadership qualities. Academic advisors, **Dr. Carole Lembi** and **Dr. Ron Coolbaugh** nominate students for departmental scholarships which are awarded at the beginning of the fall semester.

In fall 2002 four students were selected to receive departmental awards. **Sarah Kessans** received the $1000 Botany and Plant Pathology Sophomore Scholarship. Sarah is an outstanding student in our plant biology option who has been involved in many activites since coming to Purdue. As an outcome of her winning a science fair competition at the national level, she has traveled to Israel several times to conduct research. She is also a member of the Purdue Crew Team. During this time she has maintained a GPA of 3.3 She is also the recipient of the four year Mauri Williamson Excellence in Agriculture Scholarship.

Sarah Knapke and **David Doll**, both juniors in our plant biology option, received the $1000 Botany and Plant Pathology Junior Scholarship. Sarah transfered from pre-pharmacy and has maintained a GPA of 3.39 and is involved in a number of activities related to plant science. She is a member of the Honor Societies of Phi Sigma Pi and Phi Eta Sigma. She also is active in the Botany Club, Shreve Club and her local church and has served as the floor senator for the Shreve dormitory.

David has maintained a GPA of 3.44 while also being involved in many activities. During the school year and the summer, David worked for Dr. Paul Pecknold in the Botany and Plant Pathology department. He has been very active in preparing and driving the Grand Prix racer for Tarkington Hall the past two years. In the fall of 2002, David was in the study abroad program in New Zealand.

This year's Botany and Plant Pathology Senior Scholarship of $1000 was awarded to **Matt Eckerle**. Matt is a truly outstanding student who is earning a dual major from the Department of Botany and Plant Pathology and the Department of Ag and Biological Engineering and plans to graduate with honors in spring 2003. He has a GPA of 3.86 and is involved in many activities such as the Botany Club, Purdue Cycling Team, Purdue Ski Club and last year served as a resident assistant in his dorm, just to name a few. Matt has done research on molecular biology of fungi in Dr. Ron Coolbaugh's laboratory, a summer internship on bioinformatics at Dow AgroSciences, a second internship at Dow in computer programming, and is has initiated a research project in his second major in Ag and Biological Engineering. Matt also did a study abroad in New Zealand in the Spring of 2000. He is quite an amazing young man with a bright future ahead.

These are just a few examples of the calibur of students in our undergraduate options in the Department of Botany and Plant Pathology. It is our goal to continue to attract more individuals like those recognized above. Our sincere congratulations go out to these four talented and hard working students.

Meet our newest alumni!!

May 2002

David Smith
Bachelor of Science
Major: Crop Protection
Dave is continuing his studies here in the Botany and Plant Pathology Department under the direction of Dr. Steve Hallett and is working on a M.S. in weed science.

Travis Bainbridge
Master of Science
Major Professor: Dr. Sue Loesch-Fries
Thesis Title: "Recombinant Relicase Proteins of Alfalfa Mosaic Virus as Tools for Studying Viral Replication"
Travis is furthering his studies while working in Ireland.

Kelly Goedde
Master of Science
Major Professor: Dr. Tom Bauman
Thesis Title: "Applying Computer Technology in Weed Science Extension Education"
Kelly is currently working for CSX Railroad in Jacksonville, FL as a consultant.

August 2002

Joerg Boellmann
Master of Science
Major Professors: Dr. Greg Shaner & Dr. Markus Scholler
Thesis Title: "The Ground-Ivy Rust *Puccinia glechornatis* in North America Life Cycle and Epidemiology"
Joerg is currently working in the J.C. Arthur and Kreibel Herbaria.

Carrie Lapaire
Master of Science
Thesis Title: "Microcycle Conidiation in *Cercospora zeae-maydis*"
Carrie is currently a research technician here in the Department of Botany and Plant Pathology in the lab of Dr. Larry Dunkle

December 2002

Darrin Dodds
Master of Science
Major Professor: Dr. Tom Bauman
Thesis Title: "Management of Annual Ryegrass (*Lolium mutiflorum* Lam.) Cover Crops in No-till Corn (*Zea mays*) and Soybean (*Glycine max*)."
Darrin is continuing his studies towards a Ph.D. at Mississippi State University.

Wesley Everman
Master of Science
Major Professor: Dr. Tom Bauman
Thesis Title: "The Application of Remote Sensing for Detection of Plant Reflectance Response to Herbicide Stress in Corn Cropping Systems."
Wes is continuing his studies towards a Ph.D. at North Carolina State University.

David Hillger
Master of Science
Major Professor: Dr. Tom Bauman
Thesis Title: "Comparison of Herbicide Resistant corn (*Zea mays*) Technologies"
Dave is continuing his studies towards a Ph.D. under the direction of Dr. Kevin Gibson here in the Department of Botany and Plant Pathology.

Loree Johnston, Dave Hillger, Wes Everman, and Darrin Dodds after December 2002 Commencement Ceremonies. All four received M.S. degrees in Weed Science. Congratulations!!

Loree Johnston
Master of Science
Major Professor: Dr. Kevin Gibson
Thesis Title: "Weed Species Determination Using Remote Sensing"
Loree recently accepted a position with Agriliance as an Agronomy Production Specialist in Fond du Lac, Wisconsin.

Ana Saballos Espinal
Master of Science
Major Professor: Dr. Sue Loesch-Fries
Thesis Title: "Studies of Antimicrobial Properties of Fusion Protein CP-ESF12: *In Vitro* Activity and Effect in Fungal Disease Development"
Ana is currently a lab technician in the Department of Biological Sciences here at Purdue University. She also gave birth to a son, Alexander in December.

Graduate Student Recruiting Weekend

In March 2002, the department hosted five outstanding graduate student recruits for a weekend of science and entertainment. The five students spent Friday meeting with faculty and graduate students discussing the various research programs in the department. Friday evening our special visitors had dinner with several current students and got a taste of the local night life. The next day was filled with touring campus and the community, checking out living accomodations, etc. Saturday evening, everyone got together for a social at the home of Ray and Carol Martyn. By Sunday, if was time to head back home. We are pleased to say that three of those five students joined our department in the fall of 2002 as new graduate students:

Ms. Holly Ruess from The Rochester Institute of Technology

Ms. Valerie Kinney from Purdue University

Mr. Cameron Cooley from Middle Tennessee State University.

Visiting student, Cameron Cooley with Dr. Ray Martyn at the Saturday night recruiting reception.

Graduate students enjoyed a relaxing evening at the recruiting reception after a full day with the visitors.

Graduate Student Organization

Kathryn Wilkinson, President

Please allow me to introduce the 2002 -2003 Graduate Student Organization (GSO) officers: **Katie Wilkinson**, President; **Phil Harmon**, Vice President; and **Lauren Schellenberger**; Treasurer. On behalf of this year's officers I would like to thank last year's officers, especially **Carrie Lapaire**, for an outstanding job. We all congratulate Carrie on her recent graduation and wish her the best of luck in her future endeavors.

The Botany and Plant Pathology GSO has been very busy over the past year. Our group has grown significantly and the excitement of new students has added new life to our organization.

Last summer the GSO participated in many scientific and social activities. The 2002 Collegiate Weed Science Contest was held on July 18th in Fowler, Indiana. Five graduate students and one undergraduate in our department participated. The graduate team of Darrin Dodds, Wesley Everman, David Hillger, and Loree Johnston came very close to a 3rd place finish among a dozen Midwest colleges and universities and David Hillger received 1st place overall. Dave Smith was 2nd among the undergraduates and Ryan Lee participated as an individual graduate student.

Loree Johnston, Darrin Dodds and Dave Hillger figuring sprayer calibrations during the 2002 North Central Weed Contest in Fowler, Indiana.

Our Purdue Weed Science Team in the field identifying different types of weeds at the North Central Weed Science Contest in July, 2002.

The annual meeting of the American Phytopathological Society was held last summer in Milwaukee, Wisconsin. Several of our graduate students attended and presented posters and gave oral paper presentations of their research.

Phil Harmon, Amanda Gevens, Carrie Lapaire, Ian Thompson, and Joerg Boellman at the Annual APS Meetings in Milwaukee, Wisconsin.

The second annual GSO canoe trip was held in July. This year we opted for the longer, 15 mile, trip on Sugar Creek. We only had a few go overboard and everyone had a great time so we will be planning it again this summer.

The GSO webpage has been a success thanks to the efforts of Philip Harmon and the rest of the website development committee (Carrie Lapaire, Brian Foss, and Maurico Antunes). Our website has had 2832 hits since January 2002. Thirty-six students currently have links from the main site to curriculum vitaes, biographical information, and personal interests. The webpage also contains links to graduate student events and fundraisers along with other useful links. The webpage can be found at http://www.btny.purdue.edu/GSO/ and a link to it also can be found on the main Botany and Plant Pathology webpage.

This fall a mentoring program was established within the GSO to help new students adjust to graduate student life in our department. Each incoming student has the opportunity to be paired with a student who already "knows the ropes." This program gives each of our new students a more experienced person to answer questions and find help for problems. The program is still being implemented, but so far it seems to be working very well.

On November 15, 2002 the grad students participated in the departmental poster session. Many grad students, post docs, and undergraduates presented their current research on posters for the rest of the department to review. I think we all learned a little more about what the people around us are doing. That evening the department's Outstanding Graduate Students of the Year were also announced. We would like to congratulate Ph.D. student Philip Harmon and M.S. student Carrie Lapaire. I think the grad students all agreed they were very deserving!
Our most entertaining (if not important) addition to the graduate student curriculum this year has been the "graduate student seminar series" held at a local establishment every Friday afternoon around 5:00 pm. Topics have ranged from "The most noble uses of microorganisms (especially yeast)" to "Why we love barley".

Lauren Schellenberger volunteering at the face painting dislay at SpringFest 2002.

Carrie Lapaire at the grill cooking the brats and hot dogs for the hungry crowds at SpringFest 2002.

We have many social events, community service projects, and fundraisers planned for the remainder of this year. Our most important fundraiser will be SpringFest. We will again be selling bratwursts and hot dogs, so don't forget to attend and bring your appetite. We will also be hosting prospective students for this year's graduate student recruitment weekend.

This year has been really great so far with much more to come. Thanks again to the department for all the support and don't forget to check out our webpage.

2002 Outstanding Graduate Student Awards

The Departments 2002 Outstanding Graduate Student Awards were presented at the Annual Post-Doc/Graduate Student Poster Session held in November 2002.

This year's recipient of the M.S. award was Ms. Carrie Lapaire. Carrie received her M.S. degree in August 2002. Her research involved studies of sporulation in the fungal pathogen, *Cercospora zeae-maydis*, which causes gray leaf spot of maize. She discovered the process of conidiation directly from original conidia without an intervening phase of vegetative growth. A manuscript summarizing her work was recently published in *Phytopathology*. In addition, her research was highlighted on the journal cover.

Carrie came to Purdue in the summer of 2000, where she worked in the Plant and Pest Diagnostic Lab. Through her experiences in the P&PDL, she was the senior author of 12 extension publications/bulletins. During her first academic semester she served as a teaching assistant, while rotating through three research laboratories. She began her M.S. research in January 2001 in the laboratory of Dr. Larry Dunkle, along with being a teaching assistant for a second semester. During this time she made sufficient progress on her project and was able to submit an abstract and present her results in a poster at the national American Phytopathological Society (APS) meeting in Salt Lake City. She received the prestigious APS Foundation Malcolm Shurtleff Travel Award to support her travel to the meeting. She became involved at the APS Foundation booth and attended meetings of various APS committees. She is a member of the APS Mycology Committee and the Mycological Society of America. Departmentally, Carrie served as Vice-President and then as President of the Botany and Plant Pathology Graduate Student Organization. She served also as the School of Agriculture graduate student representative on the Travel Grant Review Committee. For her performance in the classroom, her service to the department and the university, her contributions to the graduate student community, her professional involvement and accomplishments, Carrie Lapaire was very deserving of the Outstanding Graduate Student Award for a M.S. student.

Dr. Ray Martyn presenting Ms. Carrie Lapaire with the 2002 Botany and Plant Pathology Outstanding M.S. Student Award.

Dr. Ray Martyn presenting Mr. Phil Harmon with the 2002 Botany and Plant Pathology Outstanding Ph.D. Student Award.

The 2002 award for outstanding Ph.D. student was presented to Mr. Phil Harmon. Phil has been a member of the Botany and Plant Pathology family for several years. He completed his B.S. in plant science from our department in May 1999. He began working with Dr. Rick Latin immediately after graduation. Phil has undertaken an ambitious research project on a new disease of turfgrass. The results of his research filled gaps in our knowledge regarding the over-winter survival of the pathogen. The expected benefits of his work include a reduction in the amount of fungicide targeted at gray leaf spot suppression and improved disease control due to appropriate timing of fungicide applications. Because of the nature of his research, Phil was invited to participate in a symposium on gray leaf spot biology and management at the annual meetings of the American Phytopathological Society (APS) in 2001. He also presented a paper at the 2002 APS meeting. During the course of his research on gray leaf spot epidemiology, he developed a semi-selective medium to facilitate isolation of the pathogen from diseased tissue. Also, he is completing work on PCR-based detection of *Pyricularia grisea* from perennial ryegrass tissue. The outcome of this work will be a rapid accurate method for detecting of the presence of the pathogen, thereby aiding disease management decisions. Phil has an impressive ability to solve problems. He has the ability to define a problem, break it down into manageable parts, and find the appropriate solution, one step at a time. Other graduate students, faculty and staff seek his advice and benefit from his know-how. He co-authored a paper with Dr. Dan Egel at SWPAC dealing with sprayer configurations for applying fungicides for melon disease control. He has lectured classes, at the request of the instructors, on various topics in plant disease management and principles of disease diagnosis and he is sought out by diagnosticians for his expertise and skill in identifying turfgrass diseases. Phil is also a leader with the graduate student group. He is serving his second term as Vice-President of the Graduate Student Organization. He created and maintains the graduate student website and he serves on the departmental graduate student recruitment committee.

Because of his excellence in research, his efforts and initiative in educational activities, and his leadership, Phil Harmon was the choice for this year's outstanding Ph.D. graduate student.

Graduate Student Travel Awards

APS Travel Awards

The APS Foundation presented 24 students nationwide with travel awards. These awards provided $400 to attend the 2002 APS Annual Meeting in Milwaukee, Wisconsin. Graduate Student, **Lauren Schellenberger**, received the Joseph P. Fulton Award. Dr. Fulton is a Professor Emeritus of the Department of Plant Pathology at the University of Arkansas, Fayetteville. His research included disease control studies with strawberries and vegetables, and he taught courses in plant pathology, plant virology, and fruit and vegetable pathology. Lauren presented a poster entitled "Survey of Isolates of *Sclerotinia homoecarpa* in Indiana for Sensitivity to Three Fungicides."

Photo of NC:APS Travel Grant Recipients at the 2002 APS Meetings in Milwaukee, WI

Carrie Lapaire and **Phil Harmon** each received a travel grant of $150 from NC APS to attend the 2002 APS Annual Meetings in Milwaukee, WI. This event hosted concurrent divisional and national meetings where both made presentations. Carrie's poster was titled "Microcycle conidiation in *Cercospora zeae-maydis,*" and Phil's paper was titled "Influence of primary inoculum of epidemics of gray leaf spot on perennial ryegrass."

Loree Johnston, M.S. student under the direction of Dr. Kevin Gibson, received two travel grants from Purdue University's Graduate Student Association in 2002. The first award was for $200 for Loree to attend the Weed Science Society of American Annual Meeting in Reno, Nevada in February 2002. She presented her poster titled "Detecting weed infestations in soybeans using remote sensing technologies." Her second award for $300 was for her to attend the North Central Weed Science Society Annual Meeting in St. Louis, Missouri in December 2002. At this meeting, she presented the poster titled "Using multispec to identify weed infestations in soybeans."

2002 Departmental Travel Awards

Thirteen M.S and Ph.D. students were awarded departmental travel grants in 2002. Each calendar year students can apply for one departmental travel grant in the amount of $250, to attend a regional or national meeting and present results of their research in either poster or oral communication format. Listed below are the students who were awarded a travel grant, and the meeting and location of the presentation:

Darrin Dodds, Weed Society of America, Reno, NV, February 10-13, 2002. "Micronutrient uptake by isogenic roundup ready corn and normal corn."

David Hillger, Weed Society of America, Reno, NV, February 10-13, 2002. "Economic comparison of herbicide resistant corn technologies."

Loree Johnston, Weed Society of America, Reno, NV, February 10-13, 2002. "Detecting weed infestations in soybeans using remote sensing technologies."

Loree Johnston at the North Central Weed Science Society Annual Meeting in St. Louis in December 2002.

Joerg Boellmann, Mycological Society of America, Corvallis, OR, June 23-27, 2002. "The life cycle of *Puccinia glechomatis*, microcylic rust on *Glechoma hederacea*."

Burt Bluhm, American Phytopathological Society, Milwaukee, WI, July 27-31, 2002. "PCR-detection of fumonisin and trichothecene-producing *Fusarium* species."

Carrie Lapaire, American Phytopathological Society, Milwaukee, WI, July 27-31, 2002. "Microcycle conidiation in *Cercospora zeae-maydis*."

Lauren Schellenberger, American Phytopathological Society, Milwaukee, WI, July 27-31, 2002. "Survey of isolates of *Sclerotinia homoeocarpa* in Indiana for sensitivity to three fungicides."

Yangseon Kim, American Phytopathological Society, Milwaukee, WI, July 27-31, 2002. "Isolation and characterization of the second catalytic subunit of cAMP-dependent protein kinase in *Magnaporthe grisea*."

Lei Li, American Phytopathological Society, Milwaukee, WI, July 27-31, 2002. "Trapping for in planta expressed genes in *Magnaporthe grisea*."

Phil Harmon, American Phytopathological Society, Milwaukee, WI, July 27-31, 2002. "Influence of primary inoculum of epidemics of gray leaf spot on perennial ryegrass."

Joe Flaherty, American Phytopathological Society, Milwaukee, WI, July 27-31, 2002. "Generation of regulatory mutants of fumonisin biosynthesis in *Fusarium verticilliodes*."

Iris Perez Almeida, American Society of Plant Biologists, Denver, CO, August 3-8, 2002. "Characterization of the cell-wall ß-galactosidase gene family of arabidopsis"

Mauricio Antunes, American Society of Plant Biologists, Denver, CO, August 3-8, 2002. "Fibronectin-binding protein as a potential signal of osmotic stress."

2002 Outstanding Teaching Assistant

Each year the Committee on the Education of Teaching Assistants and the Office of the Provost invite all departments on campus to nominate outstanding teaching assistants for this award to celebrate graduate student teaching.

The Department of Botany and Plant Pathology was proud to honor **Iris Perez Almeida** for her contributions as a teaching assistant in BTNY 210, Introduction to Plant Science for 2 semesters while working towards her Ph.D. in the laboratory of Dr. Nick Carpita.

All fifty-seven university honorees received an engraved plaque in recognition of their excellence in teaching at the recognition dinner on April 2, 2002 in the North Ballroom of the Purdue Memorial Union.

David Hillger in the field identifying the different types of weeds and herbicide at the North Central Weed Science Contest.

Weed Science Team Provides Strong Competition in 2002

Congratulations goes out to our Purdue Weed Science team, which consisted of **Darrin Dodds, David Hillger, David Smith, Loree Johnston, Ryan Lee**, and **Wesley Everman**, for providing strong competition in the North Central Weed Science Contest on July 18, 2002. This event was held at the Dow AgroScience Research Station in Fowler, Indiana. Ninety agricultural students from 13 universities throughout the Midwest competed in this all-day event where they were tested on their ability to calibrate a sprayer, identify different types of weeds and herbicides, and solve problems presented in farmer/consultant role-playing situations. The 18 competing teams were given 90 minutes to complete each task.

David Hillger distinguished himself when he received the first place "overall graduate student award" in the contest. **David Smith** placed second in the undergraduate division.

Joseph Flaherty Wins Indiana Seed Industry Graduate Fellowship Study Award

In 2002, **Joseph Flaherty**, a Ph.D. student under the direction of Dr. Charles Woloshuk, was awarded the Graduate Fellowship Study Award from the Indiana Seed Industry. This $2000 cash award is made available from donations by the Ag Alumni Seed Improvement Association, Indiana Crop Improvement Association, Indiana Seed Trade Association and Public Varieties of Indiana. The goal of the award is to support a graduate student whose program of study is relevant to the seed industry. Factors considered in qualifying a recipient include: scholastic excellence, demonstrated academic interest in plant science with empahsis in an area relevant to the seed industry, work or cooperative educational experience, extracurricular activity, career interest, character and leadership.

Congratulations Joe!

Joe Flaherty receiving the 2002 Indiana Seed Industry Graduate Fellowship Study Award from Associate Dean, Randy Woodson.

2002 Bouyouces Conference

Ian Thompson, Ph.D. student attends 2002 Bouyouces Conference

Research in manganese oxidation in plant pathogenic fungi afforded Ian Thompson the unique opportunity to attend the 2002 Bouyouces Conference at the Sani Resort in Kassandra, Greece. This conference, named to honor soil scientist Dr. George Bouyouces, occurs every two years. The subject matter of the conference changes from year to year. This year's conference was entitled "Molecular Level Processes Controlling Availability of Chemical Species to Plants in Microbes." Attendance of the conference is by invitation only and every one of the twenty-five or so attendees gives a 45-minute presentation of their research.

Ian received the $1000 Francis and Evelyn Clark Soil Biology Scholarship from the Soil Science Society of America to offset some of the travel expenses.

An international assemblage of physical chemists, soil chemists, xenobiotic chemists, plant physiologists, microbiologists, and a plant pathologist attended the conference. The talks ranged from solution chemistry dynamics, trace element speciation, copper resistance in bacteria from copper mine tailings, factors and the prediction of factors effecting the availability of elements to plants, and tools to assess rhizosphere characteristics with high spatial resolution.

In total, ten days were spent in Greece. Ian took the time to explore Athens and the ruins at the center of the city, traverse the western coast of Greece twice to pay homage to Mount Olympus, swim in the Aegean Sea, enjoy the beautiful Sani Resort, and engage in many traditional afternoon siestas. While at the Bouyouces Conference, Ian received an invitation to submit a symposium abstract to the 7th International Conference on the Biogeochemistry of Trace Elements, to be held in Uppsala, Sweden.

Ian Thompson is a Ph.D. student with Dr. Don Huber. His dissertation research involves "Manganese Oxidation in the Take-All Pathogen *Gaeumannomyces graminis*." Ian joined the department in 1997 as a M.S. student. After completing his M.S. in 1999 with Dr. Huber, he stayed on to pursue his Ph.D. He is expected to graduate in August of 2003.

The Parthenon in Athens was undergoing a massive facelift for the 2004 Olympics. None of the scaffolding is visible from this angle.

This is a fraction of the wonderful Sani Resort. Attending International Conferences can be pretty rough sometimes!

"Killer Dart" champions, Ian Thompson and Eda Nar with their prizes.

4th Annual "TEXAS BARBEQUE"

Sunday, September 29th was the day for the annual "Texas Barbeque" hosted by Ray and Carol Martyn. Each year they invite all of the post-docs and graduate students for an afternoon of food, drink, air hockey, and of course, the traditional "Killer Dart Championship". Along with an afternoon of fun and relaxation, it is a great way for the new post-docs and students to get more acquainted with each other in a social setting.

The "Killer Dart Championship" took place without serious injury. Ian Thompson and Eda Nar were the victors, earning $50 in texbook credit as their prize. A good time was had by all.

Dave Hillger and Stephen Jordan checking for a bullseye.

Ian Thompson throwing the winning dart!

After the games, it's time to eat!

Annual Social/Poster Session a Great Success!














The 3rd Annual Post Doc/Graduate Student Social and Poster Session was held on November 15, 2002 at the University Inn in West Lafayette, Indiana. This yearly event features the on-going research of our graduate students, post-docs, and professors. During the three-hour session, more than 100 faculty, staff, students, and administrators viewed and discussed the wide diversity of research. There were 35 posters presented by departmental post-docs and graduate students. The evening also provided the venue for announcing our 2002 outstanding graduate student award recipients. The 2002 M.S. award was presented to Ms. Carrie Lapaire and the 2002 Ph.D. award went to Mr. Phil Harmon. (*See article on page 23*).


Plant and Pest Diagnostic Laboratory

Programs

Due to State budget deficits, On September 1, 2002, the Plant and Pest Diagnostic Lab (P&PDL) was downsized by the transfer of it's full-time director, Dr. Peggy Sellers. Dr. Sellers assumed a new position as Master Gardener State Coordinator in the Department of Horticulture and Landscape Architecture. Gail Ruhl assumed the Interim Director position of the laboratory while continuing her responsibilities as Senior Plant Disease Diagnostician.

The staff of the Plant and Pest Diagnostic Lab, along with other cooperating Extension specialists in the departments of Botany and Plant Pathology, Entomology, Horticulture and Landscape Architecture, and Forestry diagnosed 1793 physical samples and 262 digital images during 2002. The majority of samples were received during the months of June, July, and August. Same day service was provided for 12% of the samples received and 37% of the samples were completed in three days or less. A total of 78% of the samples received during 2002 were diagnosed within five working days.

The most common commodities submitted to the P&PDL were woody ornamentals (37%), followed by flowers (19%), and agronomic crops (10%). The remaining 34% of samples were distributed among various other commodity groups including turf, vegetables, fruit, and problems from homes/buildings. Noninfectious disorders (41%), infectious diseases (31%) and arthropod-related problems (19%) were the most common primary diagnoses in 2002.

The P&PDL was represented by its staff at a number of State Extension activities including, but not limited to, the Indiana Horticulture Congress, the Indiana Flower and Patio Show, and the Indiana State Fair. P&PDL staff members also participated in a variety of Purdue University sponsored events and educational programs such as Garden Day, SpringFest, Master Gardener Training, Turf and Ornamental Workshops, Pesticide Applicator Training, Plant Science Workshop, 4-H Round-Up, Career Exploration, and Certified Crop Advisor Training.

A pilot project on digital diagnostics, funded by Purdue's 21st Century Extension Initiative, was completed in 2002. This project provided a selected group of educators with the necessary tools (digital camera, microscopes, and training materials) to enhance their ability to provide fast, accurate diagnosis to their clientele via submission of quality digital images to the Plant and Pest Diagnostic Lab. A standard web-based method of submitting digital samples to the P&PDL was tested by selected educators during this pilot project. During 2002, county educators submitted 262 digital samples via the web-based system.

A similar standard web-based method of submitting digital samples to the P&PDL will be available to all educators as well as the general public in 2003. Digital samples submitted to the Plant and Pest Diagnostic Lab will be assessed the same $11 (in-state) and $22 (out-of-state) charge as physical samples. There will be no additional charge for any follow-up physical samples that might be requested by diagnosticians who require more detail for an accurate identification or diagnosis of the problem than is provided by the digital images submitted. Out-of-state digital images will be accepted only from neighboring states to Indiana -- Kentucky, Illinois, Michigan, and Ohio.

The Dr. Dan Yirgou Scholarship Fund

Mr. Mezgebou Amlak recently sent an update on the Dr. Dan Yirgou Scholarship Fund which was established in April of 2001in memory of the late Dr. Dagnatchew Yirgou. Mr. Amlak, a former classmate, colleague, and lifelong friend, wrote a biography of the life of Dr. Yirgou and published it here in the United States with part of the proceeds going to the scholarship fund.

At the opening of 2003 the fund had a corpus of $6,010. The objective is to achieve the requirement is $20,000 to allow beneficiaries of the fund to start arriving at Purdue to pursue studies and research in the argricultural science field.

Contributions can be made through Purdue University. If you are interested in making a donation to this scholarship fund, please send your donations to:

Mr. Linda S. Young
Purdue University
Development Office
610 Purdue Mall
Hovde Hall, Room 130
West Lafayette, IN 47907
1-800-677-8780
Please make checks payable to Purdue University and indicate that it is for the Yirgou Scholarship Fund.

Southwest Purdue Agricultural Center

The staff at the Southwest Purdue Agricultural Center (SWPAC) kept busy in 2002 conducting field, greenhouse and laboratory research, presenting extension talks, meeting with growers, and teaching. Below are a few of the highlights of the past year.

In September, SWPAC staff were busy getting ready for a visit by Purdue University President Dr. Martin Jischke on September 18. President Jischke toured the center and learned about our extension, research and teaching efforts. While in the area, President Jischke also toured Vincennes University and met with area agricultural leaders. In the evening a Purdue University Ag Alumni dinner was hosted in order for Dr. Jischke to meet some of the local alumni.

Dr. Vic Lechtenberg, Dean of the School of Agriculture, confers with Purdue President, Dr. Martin Jischke and area grower and President of Indiana Farm Bureau, Don Villwock while visiting SWPAC in September 2002.

Kallie Shuckman was hired as a research assistant in June 2002. A native of Knox County, Kallie received an associate degree from Vincennes University and a B.S. degree in Agriculture from Western Kentucky University. Her duties include processing soybean cyst nematode samples, acting as crew boss of summer workers and helping to maintain and conduct field, greenhouse and laboratory greenhouse research for Drs. Dan Egel, Chris Gunter, and Frankie Lam.

The Staff at the SWPAC
(from L to R) Front Row: Brenda Nowaskie, Secretary and Kallie Shuckman, Research Technician Back Row: Dr. Harikrishan Ramasubramaniam, Post-Doc Associate; Dr. Frankie Lam, Entomologist; Dr. Dan Egel, Plant Pathologist; and Dr. Chris Gunter, Horticulturalist.

SWPAC staff have received several research grants. Dr. Daniel S. Egel is part of a team of cucurbit pathologists researching alternative fungicides and spray intervals for managing gummy stem blight and Alternaria leaf blight of muskmelon. This grant is a part of the USDA Sponsored Crops At Risk Program. Managing yellow shoulder of tomato, another USDA grant, has occupied much of Dr. Chris Gunter's time during the last year. Dr. Frankie Lam continues his research to find management solutions to seed corn maggots affecting muskmelon.

2002 also was the final year of a grant from the Indiana Commissioner of Agriculture, and Purdue University School of Agriculture to combat mature watermelon vine decline (MWVD). The final report was submitted to the commissioner's office in November 2002. Included in the grant is a set of grower recommendations for management of MWVD.

Although the grant work has been completed, much remains to be done. Drs. Egel, Westphal and Martyn are actively at work on MWVD. The entire staff of SWPAC is also hard at work on this new disease. Our thanks to Dr. Harikrishnan Ramasubramaniam, a post-doctoral research associate for the work he has done over the two years of the grant.

Sagamore of the Wabash Award to Nancy Bauman

The Department of Botany and Plant Pathology extends our congratulations to Nancy Sahnd Bauman, wife of Dr. Tom Bauman, Professor of Weed Science in our department for receiving the Sagamore of the Wabash Award. The award is highest honor that the Governor of Indiana bestows. It is a personal tribute usually given to those who have rendered a distinguished service to the state. Among these who have received Sagamores have been astronauts, presidents, ambassadors, artists, musicians, politicians, and everyday citizens who have contributed greatly to our Hoosier heritage.

Mrs. Bauman, a retired science teacher, guidance counselor, and former director of the guidance department at Tecumseh Middle School in Lafayette, Indiana, worked with many students and families outside of school. She visited many families in crisis in an attempt to make a difference. "I collect children, in the grocery, on the street, at the library, and just strike up a conversation and see where it goes from there," Nancy says.

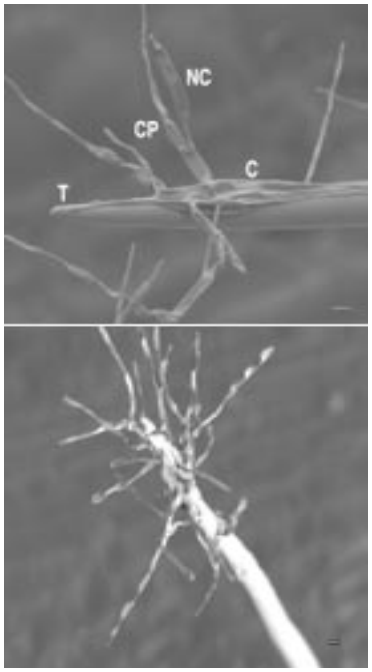
Two Former Graduate Students Accept Faculty Positions

In November 2002, Dr. Chi-Kuang Wen accepted a position as an assistant professor at the Shanghai Institute of Plant Physiology. Dr. Wen received his Ph.D. from our deparment in December of 1997 under the direction of Dr. Jody Banks. After receiving his Ph.D., Dr. Wen accepted a post-doc position at the University of Maryland where he continued his research until he accepted the assistant professor position in China.

Won-Bo Shim received his Ph.D. from our department in December of 2000 under the direction of Dr. Charles Woloshuk. Immediately following graduation, Dr. Shim began working at a post-doc in the laboratory of Dr. Larry Dunkle here at Purdue Univeristy. In December of 2002 Dr. Shim was offered an assistant professor position in the Department of Plant Pathology and Microbiology at Texas A&M University. He will be working on diseases of field crops, primarily of corn and sorghum. His research program will emphasize understanding the biology of fungal pathogens, molecular mechanisms of host-pathogen interactions, and fungal secondary metabolism (particularly mycotoxins).

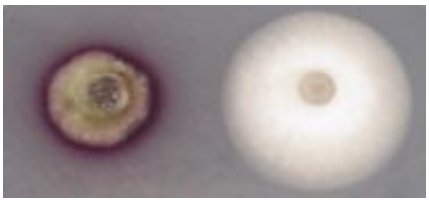
(Continued from page 4 - Dunkle)

original number of spores within 48 hours. Because the microcycle conidiation also was found to occur on trichomes of other crop plants (soybeans) and common weeds (foxtail and johnsongrass), the process may have epidemiological consequences by maintaining or increasing the inoculum potential during periods when conditions are unfavorable for infection.



Microcycle conidiation of *C. zeae-maydis* on corn trichomes.

Many species of Cercospora produce cercosporin, a red-pigmented secondary metabolite that is thought to be a determinant of virulence in these pathogens because of its phytotoxic activity against a diverse array of plants. Genetic engineering approaches incorporating resistance to cercosporin have been proposed as a means to control plant diseases caused by Cercospora species. Despite the importance of cercosporin in the host-pathogen interaction, little is known about the biosynthetic pathway or the factors that regulate cercosporin production by the fungus. Together with Dr. Won-Bo Shim, a USDA-ARS post-doctoral Research Associate, Dunkle is applying molecular approaches to identify genes that are required for cercosporin biosynthesis toward the ultimate goal of determining its role in pathogenesis. They prepared a cDNA subtraction library to identify genes that are specifically expressed during cercosporin synthesis, including a number of genes encoding enzymes in secondary metabolism and signal transduction pathways. One gene, designated *CZK3*, was identified as a MAP kinase kinase kinase, a component of a signal transduction pathway that responds to nutrient deficiency and other stresses. Mutants generated by targeted disruption of the *CZK3* gene were abolished in cercosporin production and conidiation and elicited only small chlorotic spots when inoculated onto corn leaves.



Cercospora zeae-maydis wild type (L) and a mutant with a disrupted *CZK3* gene (R).

Complementation of the disrupted mutant with the wild-type *CZK3* gene restored wild-type levels of growth and conidiation as well as the ability to produce cercosporin. The results suggest that cercosporin is a virulence factor in *C. zeae-maydis* during pathogenesis of corn, but the *CZK3* gene performs multiple functions in regulating secondary metabolism and fungal development that may indirectly influence the ability of the pathogen to damage the corn plant aside from its impact on cercosporin synthesis. Consequently, Dunkle is characterizing genes encoding enzymes that participate directly in the biosynthetic pathway to more accurately assess the importance of cercosporin in gray leaf spot development. It is anticipated that the results of this research will contribute to the development of innovative strategies for controlling diseases caused by this important fungal pathogen.

(Continued from page 6 - Gibson)

relationships between weed management systems and weed communities, 2) address the implications of alternative vegetable production systems for weed management, 3) identify problem species associated with various management practices and 4) encourage the adoption of IPM strategies by providing farmers with the information necessary for such changes. In addition to contributing to these IPM project goals, this project will also identify areas of component IPM research needed to help develop truly integrated systems that reduce pest problems in vegetable crop production and result in environmentally and economically sustainable systems.

Garlic mustard. Forests of the eastern United States are undergoing a massive invasion of exotic plant species calling into question the continued integrity of these ecosystems. *Alliaria petiolata*, garlic mustard, is a naturalized European biennial invader of forest communities throughout much of the eastern United States. *A. petiolata* displaces native forest species and may alter forest successional trajectories. Although work has been conducted on the biology and ecology of this species, the invasion of forests by *A. petiolata* has not been studied within the context of community and ecosystem level phenomena. In particular, the effect of forest fragmentation on biotic and abiotic processes that affect the susceptibility of forests to *A. petiolata* invasion has not been examined. Dr. Gibson had initiated research that will contribute to the development of a conceptual model of how ecosystem and community properties

Figure 3. A strand of garlic mustard. Note the prairie trillium, a native spring ephemeral, at the center of the photo.

influence the establishment and persistence of *A. petiolata* in deciduous forests. The relative importance of resource availability and distribution, natural enemies, plant competition, and forest spatial patterns (edge effects) are being investigated in field and laboratory experiments. The potential of *A. petiolata* to alter successional trajectories of forests is also being examined. We believe that this research will help to generate a knowledge base necessary to develop ecologically based long-term management strategies that reduce the susceptibility of eastern deciduous forests to *A. petiolata* invasion and contribute to emerging theories on the nature of plant invasions.

In addition to his research responsibilities, Dr. Gibson developed and taught a new course on Plant Ecology. Dr. Gibson also taught the Introductory Weed Science course in Fall 2002 and a graduate level course on Weed Ecology. Dr. Gibson is currently developing a course in Tropical Agriculture to be taught in Costa Rica.

(Grants continued from page 11)

A. Westphal, Purdue University Agriculture Research Program, $30,000, July 1, 2003 through June 30, 2005, "Ecological Components of Mature Watermelon Vine Decline in Indiana"

R. F. Turco, M. Bischoff, C. T. Jafvert, A. E. Konopka, L. S. Lee, B. K. Miller, L. F. Nies, P. C. Rao, and **F. Whitford**, Environmental Protection Agency, $500,000, November 15, 2002 through November 14, 2003, "Contaminant Remediation Optimization Program."

C. P. Woloshuk, and M. Cousin, USDA-ARS, $159,949, June 2002 through April 2004, "Development of Immunocapture Real-Time PCR to Detect Fusarium Species in Grains and Food."

C. P. Woloshuk, Purdue Research Foundation Research Grant, $13,070, January 2002 through December 2003, "Isolation and Characterization of Regulatory Genes Involved in Fumonisin Biosynthesis."

C. P. Woloshuk, USDA-ARS Cooperative Research, $24,375, September 2002 through September 2003, "Characterization of the Infection and Aflatoxin Biosynthesis in Maize Kernels by *A. flavus"*

C. P. Woloshuk, Monsanto Corporation, $1,000, August 2002 through December 2002, "Evaluation of Ear Rots in Bt Trials."

J. R. Xu, US Wheat and Barley Initiative, $40,750, May 1, 2002 through April 30, 2003, "Use of Gene Expression Analysis to Study Pathogenicity in *Gibberella zeae"*

B. Birren, C. Kistler, F. Trail, and **J. R. Xu**, National Science Foundation, $1,900,000, September 1, 2002 through August 31, 2004, "Genomics of the Pathogenic Fungus *Fusarium graminearum* (*Gibberella zeae*)."

J. R. Xu, North Carolina State University, $9,050, May 15, 2002 through August 30, 2002, "Whole Genome Analysis of Pathogen Host Recognition and Subsequent Responses."

J. R. Xu, Agricultural Research Service, $39,731, September 3, 2002 through August 25, 2003, "Use of Gene Expression Analysis to Study Pathogenicity in *Gibberella zeae*."

(Publications continued from page 12)

Shaner, G. and **G. Buechley**. 2002. Control of wheat diseases in Indiana with foliar fungicides, 2001. *Fungicide and Nematicide Tests.* 57:CF04.

Shaner, G. and **G. Buechley**. 2002. Effect of seed treatment on stand establishment and yield of soybeans in Indiana, 2001. *Fungicide and Nematicide Tests.* 57:ST17.

Shaner, G., **G. Buechley** and G. Johnson. 2002. Control of seed corn diseases in Indiana with foliar fungicides, 2001. *Fungicide and Nematicide Tests* 57:FC07.

Westphal, A., G. T. Brown and S. Schneider. 2002. Evidence for biological nature of the grape replant problem in California. *Plant and Soil.* 242:197-203.

Pyrowolakis, A., **A. Westphal**, R. A. Sikora and J. O. Becker. 2002. Identification of root-knot nematode suppressive soils. *Applied Soil Ecology.* 19:51-56.

Bluhm, B. H., **J. E. Flaherty**, M. A. Cousin and **C. P. Woloshuk**. 2002. A multiplex polymerase chain reaction (PCR) assay for the differential detection of trichothecene- and fumonisin-producing species of *Fusarium* in cornmeal. *Journal of Food Protection.* 65:1955-1961.

Xue, C. , **G. Park**, W. Choi, L. Zheng and R. A. Dean and **J. R. Xu**. 2002. Two novel fungal virulence genes specifically expressed in appressoria of the rice blast fungus. *The Plant Cell.* 14:2107-2119.

Xu, J. R. and **C. Xue**. 2002. Time for a blast: genomics of *Magnaporthe grisea*. *Molecular Plant Pathology.* 3:173-176.

Park, G. , **C. Xue**, L. Zheng, S. Lam and **J.R. Xu**. 2002. MST12 regulates infectious growth but not appressorium formation in the rice blast fungus *Magnaporthe grisea*. *Molecular Plant-Microbe Interactions.* 15:183-192.

Hou, Z. , **C. Xue**, T. Katan, Y. Peng and H. C. Kistler. and **J. R. Xu**. 2002. A MAP kinase gene (MGV1) for hyphal growth and plant infection in *Fusarium graminearum*. *Molecular Plant-Microbe Interactions.* 15:1119-1127.

Zhang, Y. , R. Lamm, C. Pillonel, S. Lam and **J. R. Xu**. 2002. Osmoregulation and fungicide resistance: the *Neurospora crassa os-2* gene encodes a HOG1 MAP kinase homologue. *Applied and Environmental Microbiology.* 68:532-538.

(Educational Outreach continued from page 14)

is emphasized and we discuss undergraduate studies and career opportunities in the areas of botany, plant pathology and weed science.

Dr. Jody Banks gave two science demonstrations to 6th graders at Happy Hollow Elementary in Lafayette, Indiana titled "Dinosaur plants" and "Let's clone a gene."

Down in Vincennes, Indiana, SWPAC Director, **Dr. Dan Egel** participated in several educational outreach activities. Dan gave a Youth Leadership Knox County-Agricultural Awareness Lecture to 20 students in March 2002 and was also a judge at the Tri-State Regional Science and Engineering Fair.

Welcome back to a long-time friend

The department welcomed back Ms. Pam Mow as the Administrative Assistant to the Department Head. Pam was a member of the department for 10 years serving in several capacities, including the administrative assistant to the head. After a brief off-campus venture, she returned to the department in November 2002, assuming the position vacated by Cat Pace.

Goodbyes

Tom Richards, USDA Research Associate, Retires after 31+ years (1969 - 2002)

Tom Richards became an integral part of the Soybean Pathology Project, under the direction of Dr. Scott Abney, as an undergraduate in 1967, and continued to work full-time with the project after completing his B.S in 1969.

Tom provided valuable contributions to the Soybean Project and influenced the research of numerous graduate students that worked on soybean disease problems. His presence and interaction was invaluable, and he contributed both technically and spiritually, especially in difficult times, to reach important goals. Most students (Ken Roy, Debbie Logan, Mike Ensminger, Arlene Turmail, Ronda Conner, Dave Cherlin, John Balles, Beth North, Brent Sipes, Ralph vonQualen, Dan Ploper, Becky Sanders, Mike Vail, Greg Holland, Antonio Ivancovich, Jay Young, Matt Booker, Jose Melgar, Tiffany Strait, Mark Kinsey, Alex Cochran, & Brian Foss) who worked in the soybean lab share the same feelings.

Countless hours were spent in the soybean plots at the Agronomy Farm, planting, inoculating pathogens, evaluating, and harvesting. For example, Tom introduced many graduate students to the concept of "planting with a tractor-mounted planter." Even after many hours of sitting in the planter under a bright sun, Tom never lost his smile.

After retiring, Tom and his wife, Kathy, moved from Brookston, Indiana to Fort Wayne, Indiana to be closer to their parents. Our best wishes go out to Tom and his family for a successful future.

This lunch in August 1996 is an example of the continuum of friendship and collaboration that Tom experienced as part of the soybean project.

Scott Abney and Tom Richards on a short visit to the soybean plots talking about soybean pathology.

The Department Says Goodbye to Key Personnel

After three years as Curator of the Arthur and Krebiel Herbaria, Dr. Markus Scholler return to Germany in December, 2002 to be with his family. In the time Dr. Scholler was here at Purdue, he helped restore the herbaria to their former excellence and increase the number of loans. The department wishes Markus and his family all the best.

We also were sorry to lose Dr. Peggy Sellers, Director of the Plant and Pest Diagnostic Laboratory this past year. Dr. Sellers accepted a new position as the State Coordinator of the Master Gardener Program. We wish Peggy much success in her new position.

Cathrine Pace, Administrative Assistant to Dr. Ray Martyn, also made a big move in 2002. Cat decided to pack up her belongings and moved to Arizona to start a new life while she was still young and adventurous. Best wishes to Cat on her new adventure.

Dr. Ray Martyn hugs Cathrine Pace while deparment personnel join in at a reception in her honor on her last day with the department.

Markus Scholler receives the coveted "Botany Mug" from Dr. Ray Martyn at a farewell reception in December.

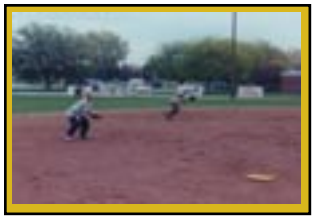
Peggy Sellers and Dr. Ray Martyn share a laugh as he presents her with the traditional "Botany Mug."

3rd Annual Botany and Plant Pathology Fall Picnic

The 3rd Annual Botany and Plant Pathology Fall Picnic was held Saturday, October 26, 2002 at Murdock Park in Lafayette. We had a good crowd on hand and, even though the temperatures were chilly, it didn't stop everyone from having a good time. Many participated in the graduate student vs. faculty/staff softball game. The winner wasn't decided until the last inning of play, when the graduate students came from behind to win 17-15. So the trophy was turned over to them by the faculty/staff team.

There were several first time players. Graduate student, Chaoyang Xue, and post-doc, Xinhua Zhao, made their first ever plate appearances. There also were several outstanding defensive players noted: Lauren Schellenberger's overall solid play at first base and Darrin Dodd's diving and sliding catch in shallow left field that thwarted the faculty/staff momentum late in the game. We also need to mention the defensive play of the faculty/staff team who know how to tag out an opposing player. Just ask Joerg Boellmann, who collided and went high into the air, landed flat on his back and was tagged out while catching his breathe.

Practice up and we will see you next year!!



Annual Chili Cook-Off and Holiday Party

Each year, after the fall semester is finished, we look forward to the "Annual Chili Cook-Off and Holiday Party." This year eight cooks made their special pot of chili for the competition. The crowd of close to 90 sampled the chili and many holiday favorites.

After everyone was finished with lunch, Dr. Ray Martyn thanked everyone for a great year and the contributions everyone made to the success of the department. Then the awaited annoucement of the 2002 Chili Cook-Off Winner was presented to Ryan Bonnell. Ryan received the 1st place certificate and a bag of Purdue goodies. 2nd place was awarded to Don Huber and 3rd place went to Bob Mitchell. It appeared that everyone had a nice time. We look forward to next year's festivities.

Guri Johal seriously sampling all of the different chili's before voting for his favorite.

The crowd waiting with anticipation for the naming of the chili cook-off winner.

Everyone anxiously awaiting there turn for the samples of chili .

Our 2002 Winners (L to R): 3rd place, Bob Mitchell, 2nd place, Don Huber, and 1st place, Ryan Bonnell.

Our Giving Heart Angel Tree each year is generously donated by Dr. Ralph Green.

Crystal Reinken and Amy Deitrich wrapping the Angel Tree Gifts.

2002 Giving Hearts Angel Tree Project

Once again in 2002 our holiday tree was decorated with Giving Heart Angels. Angel Tree coordinators, Crystal Reinken, Pam Mow and Amy Deitrich, went to the Boiler Volunteer Network and picked up 12 angels to sponsor. Each child asked only for a few items, but with the generous response we received from everyone in the department, we were able to get extras for each child. This year the volunteer network also asked for coat donations and we received eight coats. On Thursday, December 12th, Crystal, Amy, Pam, and graduate student, Margaret Olek, loaded up two carts with gifts and walked over to Stewart Center to drop off our contributions. We had a great time doing this and we always look forward to participating in this holiday event. Thanks to everyone for their participation.

Margaret Olek, Amy Deitrich, Pam Mow, and Crystal Reinken with all the Angel Tree Gift donations.

Amy Deitrich, Margaret Olek, and Crystal Reinken at the Boiler Volunteer Network dropping off our gifts.

Alumni News - From Around The Land

Robert Holm (B.S.'62, M.S. '64, Ph.D. '69/Major Professor, Joe Key): I greatly enjoyed my visit to the department on February 20, 2002 to give a seminar, meet with the graduate students, and teach the weed science class.

Andrew Larson (B.S. '98/Academic Advisor, Mary Alice Webb): Our first child was born on July 21, 2002, Avery Matthew Larson. I'm in my 5th year as a biology teacher, and I'm currently teaching my first botany course!

Itimar Souza (Ph.D. '81/Major Professor, James Williams, Jr.): Post-doc on allelopathy in Santa Cruz, CA in 1990 and Vermilion, SD in 1991. Courses taught at LAV: undergrad - weed biology and weed control, graduate - weed management, herbicide action, herbicide in soil, and special topics in weed science.

George Cummins (Ph.D. '35/Major Professor, Max Forney): Very little news, I have been in an assisted adult home nearly one year as a result of some falls and two breaks to the right leg. Celebrate my 95th birthday September 29, 2002. General health is good.

Sam Phillips (M.S. '98/Major Professor, Tom Bauman): Hola a todos mis queridos amigos, Well, I've been in one place for three years now and all of you who know me realize that this is a long time for me. So guess what, I'm moving again. And this time it's a big move. I have accepted a position of agriculture extension specialist with the Peace Corps and I will be moving to Bolivia to begin training on January 26, 2003. I am very excited about the opportunity to assist small subsistance farmers in Bolivia with improving their lives and the lives of their families. In addition, this will give me the opportunity to use and improve the Spanish language skills that I have been working hard to develop the past two years. I expect to have occasional internet access in Bolivia and I will do my best to stay in touch with all of you. My yahoo account is: slphil65@yahoo.com. I will send updates as I get more information. Feliz navidad y prospero año nuevo, Sam. (I have had contact with Sam and he welcomes emails).

Thank You For Your Support!

I would like to thank, once again, all of the individuals who invested in the department in 2002 in support of our efforts to provide the highest quality education experience to our students. Tomorrow's discoveries will be made by today's students and once again, your donations have made the difference. We continue to use your donations primarily to provide undergraduate scholarships and travel grants for our graduate students. In 2002, $4,500 in scholarships was awarded to four outstanding undergraduate students and another $3,250 to 13 graduate students in the form of travel grants to scientific conferences. These dollars often are supplemented with scholarships and travel grants from within the university and from professional societies. For example, Lauren Schellenberger, a M.S. student with Dr. Rick Latin received the Joseph P. Fulton Travel Grant awarded from The American Phytopathological Society, Carrie Lapaire and Phil Harmon, each received travel grants from the North Central Division of The American Phytopathological Society, and Loree Johnson, a M.S. student with Dr. Gibson, received travel grants from both The Weed Science Society of America and Purdue University's Graduate Student Association. In addition, our department Graduate Student Organization provides supplemental travel grants. All of these combined provided our students the opportunity to participate in their respective professional societies on an annual basis.

We also have used some of your money to offset some of the travel expenses associated with our graduate student recruiting weekend and our annual graduate student and post-doctorate poster session reception. Both of these events have been very successful in helping attract and retain the best students and post-docs. and, with your help, we hope to continue them in the future.

And lastly, we continue to support the local high school's Science Fairs, and provide a 1st and 2nd place senior division award for projects in the general category of plant sciences at the Greater Lafayette Regional Science Fair. You can read more about all of these students and awards inside. We are very proud of all of our students and I thank you for your support of our shared values and our goal of achieving academic preeminence.

Ray D. Martyn

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New Address

In August of 2002, Purdue University implemented new addresses for all departments campus-wide. Here is ours:

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It features our faculty and their research programs, our weekly newsletter, "The Root of the Matter," courses, undergraduate and graduate programs, Extension, research, special interest area, and resource quicklinks, and also links you to the Purdue University Home Page and the School of Agriculture Home Page.

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