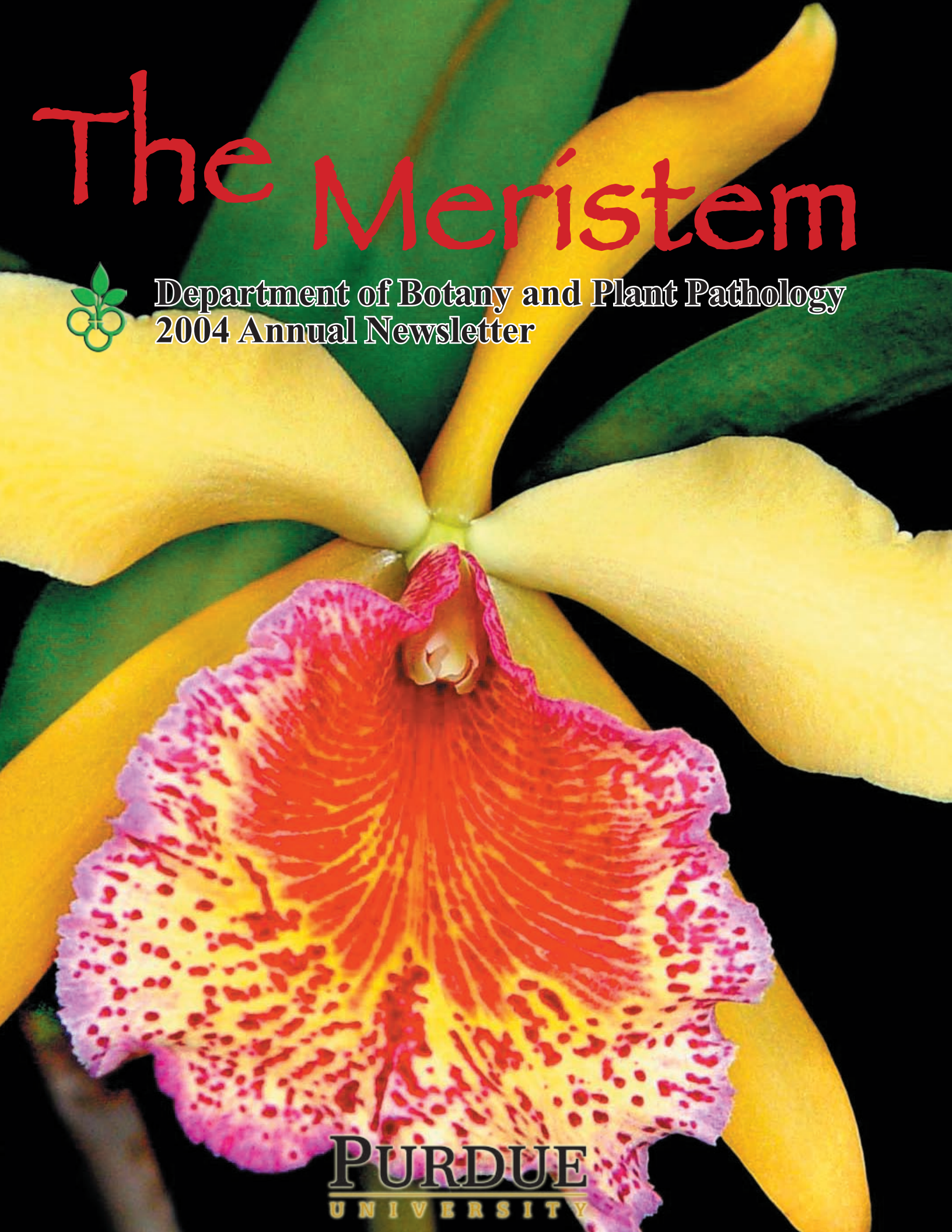
The Meristem

Department of Botany and Plant Pathology
2004 Annual Newsletter



PURDUE UNIVERSITY

Welcome

Dear Alumni and Friends;

As I reflect back upon 2004, I am pleased to say that the department continues to gain strength in all of its mission areas as well as in national prominence. This is a tribute to the outstanding faculty, staff, and students. And we continue to recruit top faculty and students. Later in 2005, Dr. Michael Zanis will join our faculty as an assistant professor. Michael is a plant evolutionary biologist. We also are recruiting an assistant professor of plant pathology that will have extension and research responsibilities in the landscape and ornamental area.

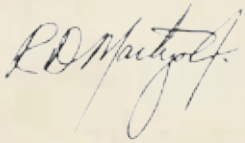
Our faculty, staff and students continue to be recognized for their many accomplishments. Several received national awards, were appointed to editorial boards of scientific journals, were promoted to higher academic and professional ranks, or achieved success in many other ways. You can read more about each of them, and others, inside. Similarly, our alumni continue to attain national recognition and/or significant professional opportunities. Several are highlighted in this issue. 2004 also was a milestone for one of our department's most famous faculty members – Dr. George Baker Cummins. In August, Dr. Cummins celebrated his 100th birthday with his wife Mildred. Dr. Cummins completed his Ph.D. degree from our department in 1935 under the direction of Dr. J. C. Arthur, the first department head. George joined the faculty that same year and remained active until his retirement in 1971. You can read more about his outstanding career inside as well.

As most of you probably know, the Asian soybean rust fungus, *Phakopsora pachyrhizi*, was discovered in the southern United States in November 2004. This highly destructive pathogen is a potential threat to soybean production in much of the United States, including the Midwest. I am pleased to say that our Plant & Pest Diagnostic Laboratory is up and running on the latest molecular diagnostic techniques and Purdue will be among the leaders in rust information as the 2005 soybean season gets under way.

2004 was a year of transition for Purdue Agriculture. Dr. Vic Lechtenberg, Dean of Agriculture for 10 years was named Vice Provost for Engagement at Purdue, and after a national search, Dr. W.R. "Randy" Woodson was named the new Dean of Agriculture. In addition, the name of the School of Agriculture was changed to the College of Agriculture, as were several others.

Our undergraduate students continue to excel in both academic performance and extracurricular activities. For example, Diana LaRiva, a junior plant biology major was named the 2004 Co-Most Valuable Pitcher for the Purdue Varsity Woman's Softball team and an Academic All-Big Ten honoree. And early in the 2005 season, Diana pitched the first-ever perfect game for Purdue, retiring 18 consecutive batters in a 8-0 shutout. David Doll, also a plant biology major, was elected the 2004 Inter Fraternity Council President from among 46 fraternities on campus representing 6,000 members. And Sarah Kessans (senior, plant biology) was honored as the 2004 Most Valuable Oarswoman for the Purdue Crew Team and later in 2005, she and team member Lisa Kohl will attempt to be the youngest female team to finish the 3,000 mile Woodvale transatlantic ocean rowing race.

As always, I want to thank all of the alumni and friends of the department that have contributed financially to the various scholarship and gift accounts in the department. Your contributions make a difference and touch students' lives in many ways. On behalf of the entire department, I thank you.



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FRONT COVER

Brassolaelio cattleya Keowee 'Newberry' from the Charles Bracker Studio

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Faculty Spotlight

Dr. Stephen Goodwin

Adjunct Associate Professor of Plant Pathology

B.S. - Duke University
Ph.D. - University of California, Davis

Dr. Stephen Goodwin is a Research Plant Pathologist with the Agricultural Research Service of the USDA. He joined the Department of Botany and Plant Pathology as an Adjunct Assistant Professor in June of 1995 and was promoted to Adjunct Associate Professor in 2000. Dr. Goodwin is from Virginia originally and has a B.S. in Botany from Duke University and a Ph.D. in Genetics from the University of California at Davis. He spent several years as a postdoctoral associate in the plant pathology department at Cornell University before coming to West Lafayette.

The long-term goal of Dr. Goodwin's research is to increase the level of resistance in cereal crops to foliar fungal pathogens by a better understanding of host-pathogen interactions. The primary research focus is the *Septoria tritici* blotch (STB) pathogen of wheat, *Mycosphaerella graminicola*. STB is one of the top wheat diseases worldwide, and can cause yield losses of 30 to 50%. Fungicide sprays are not economical for most U.S. wheat growers, so host resistance is the only viable means to manage STB.

Dr. Goodwin's research focuses on four main areas: pathogen genetics, genomics and population biology; pathogen phylogenetics, speciation and non-host interactions; mapping and identification of major resistance genes to STB in wheat; and wheat genomics and gene expression during resistance responses. A long-term interest is in understanding non-host resistance and how it can be incorporated into cereal-improvement programs. An unusual aspect of the research is that both the host and the pathogen are studied in the same laboratory for a more complete understanding of the host-pathogen interaction.

Mycosphaerella is an extremely large and diverse genus of fungi. When combined with related asexual fungi the total number of species in this group probably is more than 5,000. These fungi are extremely important economically and infect hosts spanning the range of plant diversity including dicots and monocots, gymnosperms, ferns, horsetails and lycopods. Gardeners concerned about leaf spots on tomatoes, strawberries or bearded irises, and consumers of wheat, barley, bananas or orange juice, all have been impacted by species of *Mycosphaerella* or related asexual species. Due to their ubiquitous occurrence and high economic impact, there is a great need for increased analysis of the genetics, population biology and host-pathogen interactions of these species.

One of the goals of Dr. Goodwin's research has been to develop the *M. graminicola*-wheat pathosystem as a model for species in this genus. As part of a collaborative team with scientists at Plant Research International in Wageningen, The Netherlands, Dr. Goodwin helped make the first genetic map of *M. graminicola*, which contains more than 300 markers on 23 linkage groups. Analyses of a cloned segment of the *M. graminicola* genome that has been used for DNA fingerprinting showed that it contained part of a transposon, some copies of which had specific mutations characteristic of repeat-induced point mutation (RIP), a mechanism for mutating repeated DNA. Previously, RIP was thought to be limited to the genus *Neurospora*, but

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its discovery in *M. graminicola* showed that it probably was present in the ancestors of the major fungal lineages and most likely has been maintained to protect fungi from invading transposons. Dr. Goodwin's group recently identified more than 51 polymorphic microsatellite or simple-sequence repeat (SSR) loci in *M. graminicola*, of which 23 were added to the existing genetic linkage map and now can be used by the global research community to analyze the genetics of this pathogen. Due to work by Dr. Goodwin and others, *M. graminicola* now is a model for fungi in the genus *Mycosphaerella*. This status enabled Dr. Goodwin and collaborators to convince the Joint Genome Institute of the U.S. Department of Energy to sequence the genome of this pathogen, the first in the genus to be sequenced.

To understand the patterns of evolution and mechanisms of speciation in this large and complex group, Dr. Goodwin has performed phylogenetic analyses of the genus *Mycosphaerella* and related asexual genera including *Cercospora*. The evolutionary trees showed that *M. graminicola* is closely related to the barley pathogen *Septoria passerinii* and other fungi from grass hosts. However, the ancestors of *M. graminicola* most likely evolved by a switch from a dicot to a monocot host, followed by adaptive radiation of many new species onto different grasses. Phylogenetic work with the genus *Cercospora* showed that they all evolved from a single common ancestor, which almost certainly had the ability to produce the phytotoxin cercosporin. Acquisition of a new trait, such as the ability to infect a new host or produce a toxin, seems to have stimulated the origin of many of the species in the genus *Mycosphaerella*.

A goal of the phylogenetic work was to identify pairs of pathogens that are closely related but have different hosts, for analyses of non-host resistance. The barley pathogen *Septoria passerinii* is closely related to *M. graminicola* but infects barley and not wheat, while *M. graminicola* infects wheat but not barley, and the question is: why not? Inoculation of each pathogen onto the other's host should provide an excellent model for the genetic dissection of non-host resistance in cereal crops. A potential stumbling block was that very little was known about *S. passerinii*. Work in Dr. Goodwin's lab resulted in cloning of the mating-type genes and finding high genetic variability within populations. Therefore, contrary to previous conclusions, *S. passerinii* most likely was a sexually reproducing species. Follow-up work by collaborators confirmed this and allowed the sexual cycle to be completed, so that *S. passerinii* can be developed as a complementary genetic model to *M. graminicola*.

Genes for resistance to *M. graminicola* can be identified by inoculating wheat with different isolates of the pathogen and scoring for disease. Dr. Goodwin's laboratory mapped five STB genes to different wheat chromosomes, spanning the A, B, and D genomes of hexaploid bread wheat. Amplified fragment length polymorphism and SSR or microsatellite markers were identified that were linked to each of the five genes. These markers now are being used to help transfer the resistance genes into improved cultivars of wheat through marker-assisted selection (MAS). One of the STB resistance genes was located on wheat chromosome 3BS, very near to genes for resistance to three other fungal pathogens. Dr. Goodwin's lab is now working as part of a collaborative project to combine these different resistance genes into a common linkage block that can protect wheat against all four pathogens simultaneously.

The current goal of Dr. Goodwin's research is to understand how the genes function. Various techniques including quantitative real-time PCR are being used to estimate gene expression during the resistance response. These studies have shown that many genes are activated in wheat plants within hours after inoculation with *M. graminicola*, and that plant responses begin even before penetration of the host by the pathogen. In addition to responses during the first 24 hours after inoculation, resistant plants have a late response beginning about 15 days after first contact with the pathogen, corresponding to the time at which fungal biomass increases during a susceptible response. Therefore, resistance to STB in *M. graminicola* is much more complicated

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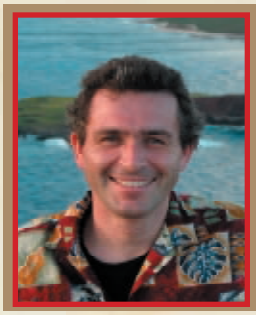
Faculty Spotlight



Dr. Steve Hallett

Assistant Professor of Weed Science

B.S. - Lancaster University, United Kingdom
Ph.D. - Lancaster University, United Kingdom

Dr. Steve Hallett comes to the Department of Botany and Plant Pathology via the University of Queensland (Brisbane, Australia), McGill University (Montreal, Canada) and Lancaster University (Lancaster, UK). Dr. Hallett is a weed scientist with training in plant pathology, and his research over the last 15 years has focused on the development of biological herbicides and plant pathogens with the potential to control weeds.

Dr. Hallett's biological herbicides research has continued at Purdue University with investigations of two fungal plant pathogens with strong activity against key weeds of midwestern cropping systems. The first of these fungi, *Myrothecium verrucaria*, has herbicidal activity against a wide range of important weed species. He has shown, however, that this activity is related to the production of a suite of toxins, some of which are toxic to mammals, including humans. The second fungus, *Microsphaeroposis amaranthi*, is a virulent pathogen of eight species of pigweeds and waterhemp. The Hallett lab investigated different ways in which this fungus might be integrated into midwestern cropping systems to control waterhemp and determined the environmental conditions that limit the efficacy of the fungus as a biological herbicide. Current research, being performed by Ph.D. graduate student, Daljit Singh, is investigating the cultural and genetic enhancement of *M. amaranthi* to improve its commercial potential.

The fungus *Myrothecium verrucaria* kills a number of weed species (shown: Common waterhemp L: treated, R: Control), but produces toxins detrimental to human health.

Necrosis on leaf of common waterhemp (*Amaranthus rudis*) caused by the candidate bioherbicide *Microsphaeropsis amaranthi*.

Hallett's applied research with bioherbicides is balanced by more fundamental research aimed at developing our understanding of the soil microbial communities associated with weeds. Soil microbes can play an important role in the decay of weed seed or the inhibition of weed seedling development. Using molecular techniques, lab technician, Kathy Anderson, has shown that weeds modify soil microbial communities in a species-specific way. Interestingly, some weed species appear to cause their own demise by culturing their own pathogens

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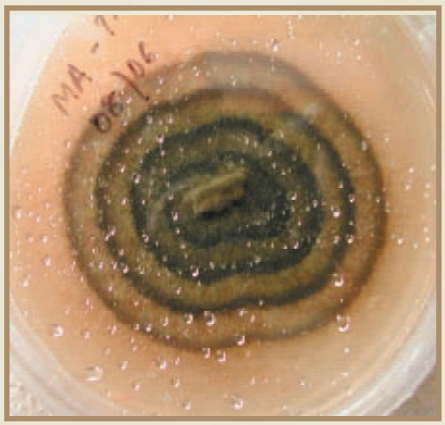
in the soil, whereas some weed species appear to become self-promoting by culturing beneficial microbial communities. Continuing work is examining the changes in soil microbial communities that occur under different cropping systems, and the impact that these different communities may have upon weed species.



Culture of *Microsphaeropsis amaranthi* on Potato Dextrose agar.

In recent years, Dr. Hallett has broadened his focus to include studies of the processes contributing to invasiveness in plants. Many plants have been transported between continents, accidentally or deliberately, and usually cause little damage. Occasionally, however, introduced plants misbehave, spreading over large areas and forming dense monocultures. These infestations can have serious ecological consequences, such as changing the structure of vegetation, altering hydrology, or affecting fire regimes. It is important to be able to recognize plant introductions that may result in environmentally damaging invasions and to understand the ecological processes by which these invasions occur. Following introduction from one continent to another, plants are displaced from a wide array of relationships with other organisms. Steve's group argues that it is a plant's ability to develop beneficial relationships in its new home, that is the primary determinant of its ability to establish, and it is its escape from former antagonists that is the primary determinant of invasiveness. Graduate student, Ashlee Mounteer, is currently investigating the interactions between a midwestern invasive plant, garlic mustard (*Alliaria petiolata*), and soilborne microbial communities in Germany, the United Kingdom, the eastern United States and the midwestern United States to test these hypotheses.

2004, A Year of Transition in Purdue Agriculture

Dr. Vic Lechtenberg was appointed Vice Provost for Engagement in July 2004. With 30+ years of experience, Vic Lechtenberg was an ideal candidate for the vice provost position. In this position, he will be trying to better leverage the university to help solve problems across the state of Indiana. This was much like what Lechtenberg did as Dean of Agriculture, only now the playing field is much larger, involving all of Indiana's citizens. To accomplish what is needed across the university, Dr. Lechtenberg will be relying on the vast expertise within Purdue Agriculture.

Dr. Vic Lechtenberg
Vice Provost for Engagement

Dr. Randy Woodson was appointed interim dean to keep Purdue Agriculture on track as Lechtenberg stepped into his new position. Woodson's goal was to set in place a vision for the school. That meant keeping the momentum going and keeping the school on track for the success that we have already been enjoying under Lechtenberg's leadership. In December 2004, after a national search, Dr. Woodson was named Dean of the College of Agriculture. He has played an influential role in Indiana agriculture through his service to various organizations and on state-appointed agriculture regulatory functions for the State of Indiana. "Agriculture at Purdue has a history rich in excellence and Randy Woodson will enhance this tradition" says Provost Sally Mason.

Dr. Randy Woodson
Dean, College of Agriculture

Faculty Spotlight

Dr. Tesfaye Mengiste

Assistant Professor of Plant Pathology

B.S. - Alemaya University, Ethiopia
M.S. - University of London, England
Ph.D. - University of Basel, Switzerland

Dr. Tesfaye Mengiste joined the Department of Botany and Plant Pathology in October 2002 as an Assistant Professor of Plant Pathology. Dr. Mengiste obtained his B.S. in plant sciences from Alemaya University of Agriculture in Ethiopia and his M.S. in plant biotechnology from the University of London in England. His Ph.D. research at the Friedrich Miescher Institute, Basel, Switzerland, focused on the molecular biology of DNA damage repair and homologous recombination in *Arabidopsis*. He spent three years as a post doctoral scientist at Syngenta Biotechnology in North Carolina prior to coming to Purdue. His research at Purdue focuses on the molecular genetics of host responses to necrotrophic pathogens. By exploring the biology underlying host response to necrotrophic pathogens, Tesfaye's long-term research goal is to improve disease resistance in economically important crops.

Plants possess diverse traits that enable their survival under pathogen pressure. Understanding the genetic control of these traits and the molecular signals that translate them into adaptive mechanisms will provide the foundation for rational crop improvement. Dr. Mengiste's lab studies plant defense responses to necrotrophic pathogens by using the *Botrytis cinerea* (*Botrytis*) and *Arabidopsis* interaction as a model pathosystem. This pathosystem represents broad host-parasite interactions covering many economically important agricultural and horticultural crops. Mengiste's aim is to identify the cellular and molecular factors required for resistance to necrotrophic plant pathogens, determine their genetic control, and their interaction with other defense response pathways. Eventually, these should provide the understanding of the biological processes, underlying responses to plant pathogens, in general, and necrotrophic pathogens, in particular, that can be exploited to expedite the development of disease resistant crop cultivars.

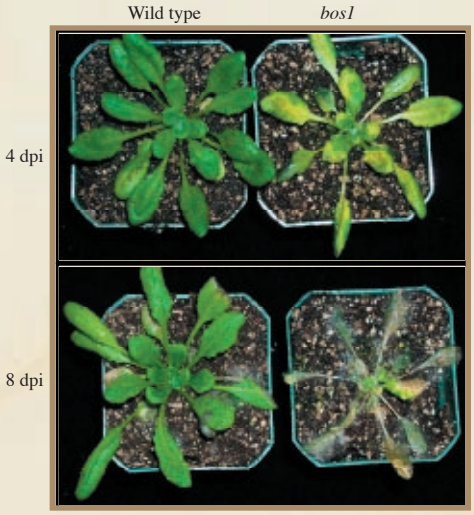


Figure shows the increased susceptibility of the *bos1* mutant plants to *Botrytis cinerea* infection. (dpi = days post infection)

Apart from being a typical necrotrophic pathogen representing diverse pathogens causing "rots," *Botrytis* causes significant pre- and post-harvest losses in many plants. It causes the gray mold disease that occurs under a wide array of conditions and over a wide geographical area, such as in the open field, in greenhouses, even in warehouses at 0-10°C in storage. For example, "bunch rot" of grapes, caused by *Botrytis*, is arguably the most important disease problem confronting the wine and raisin industry worldwide. The disease causes losses of 10% or more in some seasons. Limited or controlled *Botrytis* infection can result in a non-destructive stage of the disease known as "noble rot," which can be managed in order to make "noble" or "botrytised" wines. More often however, the fungus continues to penetrate the grapes on the vine causing them to rot, making wine making difficult. In strawberries and tomatoes, *Botrytis* infects leaves, stems, flowers, and developing and harvested fruits, resulting in an estimated loss of 25-30% in some seasons. Application of chemical fungicides is a common control strategy against *Botrytis*, however, fungicides may be toxic and non-biodegradable. Chemical residues can build up in the soil and throughout the food chain. Consumers are becoming increasingly conscious of the potential environmental and health problems associated with the build-up of toxic chemicals, particularly in food products. *Botrytis* also develops resistance to fungicides, which limits chemical crop protection.

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Tomatoes and strawberries, like these pictured to the left, are important host crops with significant pre- and post-harvest losses due to *Botrytis* infection.

Genetic resistance would provide an environmentally safe and more economical disease control option. However, no genetic resistance to *Boytrytis* has been identified in any crop species, and the biological processes that determine host resistance or susceptibility are not understood. The current understanding of the molecular genetics of host-pathogen interactions originate predominantly from studies involving biotrophic pathogens. However, the pathogenic strategies of necrotrophic pathogens are distinct from those of biotrophs. Necrotrophs trigger cell death (necrosis) in order to cause disease whereas biotrophs evade the initiation of cell death to enhance pathogenesis. In addition, full resistance to necrotrophic infection requires multiple loci as opposed to the more common single gene resistance to biotriophic infection.

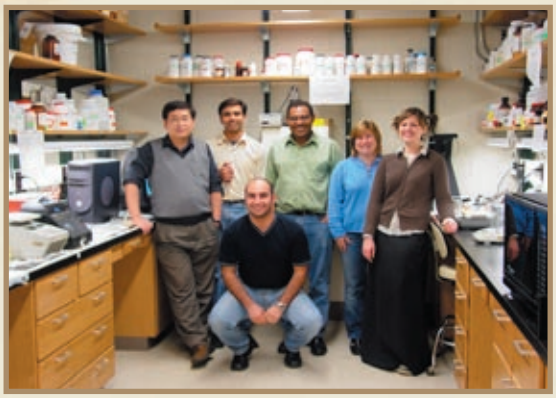
In his initial effort towards understanding host factors required for plant resistance to *Botrytis*, Dr. Mengiste and his lab have isolated the *Botrytis* susceptible 1 (*BOS1*) gene of Arabidopsis. *BOS1* encodes a MYB transcription factor protein that is required for resistance to *Botrytis* and at least one other necrotrophic pathogen tested, *Alternaria brassicicola*. The specific function of *BOS1* and its mechanism of action are subjects of current investigation in the Mengiste laboratory. However, several lines of evidence suggest a key role for *BOS1* in pathogen resistance: a mutation in the *BOS1* gene results in increased disease susceptibility; expression of the *BOS1* gene is induced by *Botrytis* infection; and a wild type copy of the *BOS1* gene restores *bos1* plants to wild type levels of disease resistance. Interestingly, lack of *BOS1* also caused increased sensitivity to abiotic stresses and to reactive oxygen species (ROS) suggesting a function for *BOS1* in controlling responses to some abiotic stress agents.

In a parallel effort, Dr. Mengiste has also isolated and characterized other Arabidopsis mutations that define independent genetic loci required for resistance to *Botrytis* in Arabidopsis. These mutants have both distinct and overlapping responses to various plant pathogens making them attractive for the molecular dissection of host responses to necrotrophic pathogens and determining their interaction with other defense and non defense response pathways. Among these mutants *bos2* shows altered responses to *Botrytis* only, suggesting a specific role for the *BOS2* gene in *Botrytis* resistance.

Recently, the Mengiste lab initiated research in the molecular dissection of the tomato defense responses to *Botrytis* infection. Their research in tomatoes will identify and study key components of the tomato defense response pathway. Knowledge gained in Arabidopsis will be used as a springboard to determine the regulatory components of the tomato defense response to necrotrophic infection.

Dr. Mengiste collaborates with research groups in the U.S., Austria and Germany. These groups focus on research areas dealing with plant signaling pathways.

In addition to his research, Dr. Mengiste is involved in the teaching activities of the department. He, along with Dr. Guri Johal, has developed and taught two graduate level courses in molecular plant pathology in the last two semesters.



Mengiste Lab - Front row: Synan AbuQamar (Ph.D. student). Back row, standing L to R - Dr. Fengming Song, Rahul Dhawan (Ph.D. student), Dr. Tesfaye Mengiste, Dr. Paola Veronese, Kristin Laluk (Ph.D. student).

Awards and Recognitions

Purdue Turf Science Team Receives 2004 Purdue Agriculture Team Award

The Purdue Turf Science Team was with the 2004 Agriculture Team Award. The success of this team is a result of the commitment and cooperation between members of the departments of Botany and Plant Pathology, Agronomy, and Entomology. Their efforts positively impact the College of Agriculture and the students, as well as the turf industry.

Turf science team members (L to R): Zac Reicher, Rick Latin, Tim Gibb, Cale Bigelow, Fred Whitford and Ron Turco.

Members of the turf science team are: **Dr. Rick Latin** and **Dr. Fred Whitford**, Department of Botany and Plant Pathology, Dr. Cale Bigelow, Dr. Zac Reicher, and Dr. Ron Turco, Department of Agronomy and Dr. Tim Gibb, Department of Entomology.

Dr. Rick Latin presenting the seminar "The Purdue Turf Science Program: On the Cutting Edge!"

The turf science program exemplifies what the Ag Team Award encourages. It is an outstanding example of interdisciplinary collaboration that allows its members to achieve their objectives in research, teaching, and extension. This program also serves an industry that affects all Indiana citizens, providing more than 10,000 jobs, adding more than $1 billion annually to the state economy, and supplying well-prepared graduates to contribute to its growth and vigor.

Dr. Randy Woodson presents Dr. Fred Whitford with his plaque at the 2004 Purdue Ag Team Award Program.

The turf science program serves groups that include golf course superintendents, sports turf managers, professional landscape operations, sod growers, cemetery managers, homeowners and Extension educators. The team publishes a newsletter, Extension bulletins, and maintains a web site. In addition, the program partners with the Midwest Regional Turf Foundation to put on four annual seminars to educate and train participants in application practices, pest identification and management.

Dr. Rick Latin receives his award plaque from Dr. Randy Woodson.

An awards ceremony was held May 11, 2004 in Whistler Agricultural Research Building. The team members presented a seminar and each was awarded a plaque from interim dean, Dr. Randy Woodson.

Congratulations to all the members of the 2004 Turf Science Team.

Awards and Recognitions

Pecknold Receives Career Recognition Award from Indiana Horticultural Society

In recognition of his 32 years of service to the fruit industry of Indiana and the Midwest, the Indiana Horticultural Society presented **Dr. Paul Pecknold** with the Career Recognition Award in January 2005 at their annual conference.

Dr. Pecknold has served the Indiana and Midwest fruit industry in many ways during the past 32 years. He contributed to many county and regional fruit grower meetings, state winter and summer meetings each year, and he answered many grower questions in person, on the phone, by mail, or via e-mail. He has made innumerable contributions to the "Facts for Fancy Fruit" newsletter and was a major contributor to the Midwest Tree Fruit Handbook and the Midwest Small Fruit Handbook. Paul also was a major contributor to the annual revision of the spray guides for both tree and small fruits. He was part of the team, along with Dave Matthew and Dick Hayden, that initiated the inter-state spray guides that midwestern fruit growers now enjoy. After Dave Matthew retired in 1988, and until very recently, Paul edited the Tree Fruit Spray Guide. That meant that he solicited updates from the Departments of Horticulture and Entomology, as well as plant pathology specialists in Indiana and all other states participating. He collated the changes, resolved the conflicts, and constructed the final camera-ready copy that was sent to the printer. He also designed the cover of the guide. Through this total effort, he has made a very significant and substantial long-term contribution to the tree fruit industry of the Midwest. Although unseen to the fruit industry, for a number of years, Paul has taken on a heavy teaching load in the Botany and Plant Pathology department, where he is a very popular and respected teacher. Paul has announced that he will be retiring from Purdue University in June 2005.

Two Faculty Promoted to Associate Professor

Dr. Guri Johal and **Dr. Jin-Rong Xu** were promoted to associate professor effective July 1, 2004.

Dr. Johal has emerged as a leading maize geneticist, having cloned the first disease resistance gene in maize (*HM1*) and leading the field of programmed cell death and disease lesion mimic mutants. Guri joined the Botany and Plant Pathology faculty in 2002.

Dr. Xu has clearly established himself as a leader in fungal genetics and host-parasite interactions. He is considered a pioneer in MAP kinase signaling pathways in filamentous fungi. Jin-Rong joined the Botany and Plant Pathology faculty in 1999.

Woloshuk Named to APS PRESS Editorial Board

Dr. Charles Woloshuk began a three-year term as a member of the APS PRESS Editorial Board in August 2004.

Senior editors Charles Woloshuk, Tim Paulitz, and Robert Martin replaced the retiring board members and are charged with establishing policies and procedures of APS PRESS, overseeing its financial management, and acquiring appropriate titles to meet its stated goals. Each senior editor oversees and serves as an advisor on assigned publication projects during their development stages.

Dr. Woloshuk is also serving as an associate editor for *Mycologia* and as an editorial board member for the *Journal of Food Protection*.

Awards and Recognitions

Excellence Through Diversity

Whitford Awarded Educator of the Year from the Mid-America Croplife Association

Dr. Fred Whitford, coordinator of the Purdue Pesticide Programs, has been awarded the Mid-America Croplife Association Educator of the Year Award. Fred Whitford is head of all commercial and private pesticide applicator training in Indiana. He has delivered more than 2,000 presentations; authored more than 200 research, Extension, and regulatory publications; and written two books. Fred was honored at the Mid-America Croplife Associations annual meetings in September 2004.

Pecknold Named Departments Outstanding Teacher

At the spring College of Agriculture Awards Banquet in April 2004, **Dr. Paul Pecknold** was honored as the Department of Botany and Plant Pathology's Outstanding Teacher. Paul was also nominated for the College of Agriculture's Outstanding Teacher Award for 2004. Even though Paul's nomination was not selected at the college level, he is truly one of the College's outstanding teachers. Paul brings excitement, humor, and real-life stories to his classes. He carefully scopes out the campus and nearby areas each semester to observe where important diseases are occurring and then takes his students on field trips to observe them firsthand. This "up close and personal" approach has been appreciated by the students and is one more reason our students are among the best in the country. Since 1998, he has captured the minds of almost 700 students, if only for a brief semester or two. He has personally influenced a number of students to pursue graduate studies in plant pathology. Paul is one of those teachers that students will remember for having a positive influence on them and setting them on their career track.

A/P Staff Receive Rank Advancements

The College of Agriculture confirmed the rank advancements of four departmental A/P staff; **Dr. Karen Rane**, Plant Disease Diagnostician in the P&PDL was promoted to the highest level of rank 6; **Dr. Fred Whitford**, Director of the Purdue Pesticide Programs was promoted to rank 5; **Mr. Glenn Nice**, Extension Weed Science Professional and **Ms. LeeAnn Glomski**, Research Scientist for the U.S. Army Engineer Research Development Center were promoted to rank 4.

The purpose of the advancement system for the A/P staff is to provide a framework for a meaningful review and advancement system, to recognize and reward excellence in the performance of assigned responsibilities, and to encourage continued achievement and service.

Faculty and Staff Honored for Service Anniversaries

The university annually honors clerical staff, A/P staff, and faculty for their years of service to Purdue. We are pleased that the following departmental personnel were recognized for their dedicated service to the Department of Botany and Plant Pathology, the College of Agriculture and Purdue University. They are:

Tom Bauman - 35 years of service
Tonya Byrd - 10 years of service
George Buechley - 25 years of service
Nick Carpita - 25 years of service
Cheri Janssen - 15 years of service
Andrew Martin - 20 years of service
Anna Olek - 15 years of service
Karen Rane - 15 years of service
Gail Ruhl - 25 years of service
Mary Alice Webb - 15 years of service
Janet Whaley - 15 years of service

Awards and Recognitions

Bob Mitchell Receives Inaugural "Exemplary Service Award"

Dr. Ray Martyn presenting a surprised Bob Mitchell with the "Exemplary Service Award" in December 2004.

In 2004, a new annual award was created to specifically recognize exemplary service to the department by a staff member. The Department of Botany and Plant Pathology is very fortunate to have such a large number of highly professional and dedicated personnel that give their all to the department day in and day out. This inaugural award was presented to **Mr. Bob Mitchell**, our departmental computer systems analyst, at our annual holiday gathering in December 2004. This award comes with a $500 personal check, a $500 professional development allotment, a personal plaque, as well as his name placed on a departmental plaque.

Bob Mitchell joined the department in 1977. Computers and technology have certainly changed throughout the years and Bob now oversees several hundred machines in the department, a multitude of servers, and a whole truckload of widgets and gadgets. Our departmental computer services and support are among the very best, if not the best, in the College of Agriculture.

Over the years, Bob has worked with the faculty and staff to develop many cutting edge computer projects that support the discovery, learning, and outreach missions of our department. He has led the department and college in innovation and adoption of software and is a recognized authority and leader in the college in computing services. Bob has a reputation for being a stickler when it comes to computer services and appearance. Some may take exception to this, but his attention to detail and licensing issues and his desire for the highest level of professionalism in any product that comes from this department is very much appreciated. The list of projects that Bob has helped bring to fruition is long, but there is no one in the department that hasn't relied on his help at one time or another. He has saved many of us in the department when we thought we had lost everything. Although many think they are indispensable and irreplaceable to the department, no one comes closer to that than Bob. Everyone in the department knows that Bob takes his job and responsibility very seriously, day or night, weekday or weekend. The Department of Botany and Plant Pathology is indeed privileged to have Bob Mitchell and we recognize him for his exemplary and dedicated service to the department and the university.

PUCESA Presents Awards at Annual Banquet

In October 2004, the Purdue University Cooperative Extension Service (PUCESA) held their Annual Service Banquet Program and Awards Ceremony.

Dr. Paul Pecknold received the USDA Award for 30 years of service. **Doug Akers**, Boone County ANR Educator, received the IEEA 25 Year Award. Doug also received the IEEA Senior Award for his "Chicken Embryology" program in Boone County. This program introduced young children to a chick hatching educational experience through "Chicken Embryology" Doug received his M.S. degree from the Department of Botany and Plant Pathology in 1983.

Faculty Highlights

George Cummins Celebrates 100th Birthday!

George Cummins, with his wife, Mildred, blow out the candles at his 100th birthday celebration.

On August 29, 2004, Dr. George Baker Cummins celebrated his centennial birthday. His daughter states that his profession has aided to his longevity. His love of the outdoors and his passion about life and learning also help to keep him young.

Dr. Cummins is a world authority on the rust fungi, the Uredinales. He is recognized throughout the world as "Mr. Rust." His world-wide studies of the rust fungi took him to the Philippines, New Guinea, China, the Himalaya, central and southern Africa, and North and South America. His writings on the rusts in these regions informed and stimulated fellow scientists throughout the world. During his tenure at Purdue University and his post-retirement years a the University of Arizona, he published 120 refereed papers and 10 textbooks. His most recent book, the third edition of the *Genera of Rust Fungi* (2003), was completed at the age of 98.

After completing his M.S. degree at Michigan State University in 1928, George came to the Department of Botany and Plant Pathology to pursue his Ph.D. and assist the famous Dr. Joseph C. Arthur, the foremost authority on rust fungi of his generation. Dr. Arthur needed a mycologist to illustrate his rust flora of North America and to continue rust research after he retired, and George stepped in. Cummins completed his Ph.D. in 1935 and remained at Purdue University for more than three decades until his retirement in 1971. He became a full professor in 1947 and was head of the Department of Botany and Plant Pathology from 1966 to 1969. Dr. Cummins was Curator of the Arthur Herbarium from 1938 to 1971, and he built it to be one of the largest working herbaria of plant rusts in the world.

During his professional career at Purdue, he was active in the Mycological Society of America, and he held all of their National Offices; he was President of the society in 1946. In 1967 he was made a Life Member of the society. He also was active in the American Phytopathological Society, the Mycological Society of Mexico, the Torrey Botanical Club, American Society of Plant Taxonomists, the Southwestern Association of Naturalists, the Indiana Academy of Sciences, and the International Association for Plant Taxonomy. In 1963 his outstanding achievements were acknowledged with an honorary doctorate degree from Montana State University. For his significant contributions to mycology, the School of Agriculture, and Purdue University, Dr. Cummins was awarded an honorary doctorate degree in 1981. Also in 1981, Dr. Cummins was awarded the Mycological Society of America's highest award, the Distinguished Mycologist Award.

Dr. George Cummins is a scholar whose contributions to Purdue, the state of Indiana, the nation, and the world have been truly monumental.

Schools Become Colleges

In the fall of 2004, the Purdue Board of Trustees approved the renaming of the schools of agriculture, consumer and family sciences, education, engineering, liberal arts, pharmacy, nursing and health sciences, science, and technology as colleges rather than schools.

Provost Mason said the renaming "better reflects the comprehensive, multidisciplinary range of academic programs offered by the schools."

Faculty Highlights

Emeritus Distinguished Professor Inspired by Passion of Orchids

Dendrobium

Orchids images courtesy of the Charles Bracker Studio

At one of the lowest and darkest periods of Charles Bracker's life, a passion for orchids and his love of digital photography have lifted his spirit and rescued him.

In 2001, Charles' wife, Anri, passed away from pancreatic cancer. She had fallen in love with orchids after a trip to Hawaii in the 1980's and started a small collection in their home and cared for them until her death. Anri's wish was that Charles donate her collection to members of the Lafayette Orchid Society. Her fear was that Charles wouldn't physically be able to care for her 40 orchids, since he also has been suffering from lower spine degeneration. But he couldn't part with the orchids. So with the help of his brother, he transformed his basement into a high-tech plant growth facililty where he now has more than 2,000 orchids. He has a steady stream of visitors daily to view his growing collection.

Phragmipedium besseae

Charles also has become the editor of a monthly newsletter for the Lafayette Orchid Society and improved the publication to be among the very best in the nation and given the Lafayette group national status. Charles developed a second passion for digital photography. The photography allows him to capture unique details of the orchids that can't be seen by the naked eye. He has 20,000 orchids photos and his photographs have been displayed in the Watson Crick Gallery in Lilly Hall at Purdue University and are available at a local art gallery in Lafayette. Charles has recently been featured in the local newspaper and visited by the Mayor of West Lafayette. He donated a framed and signed copy of one of his photos for the Mayor's office. For Charles, it is a labor of love and an inspiration. We would like to thank Charles Bracker for sharing his story and photos with us. The cover photo on this year's *Meristem* if from Charles' collection

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High School Students Receive Department Recognition for Science Fair Projects

Dr. Ray Martyn present Christopher Knapp with his his first place prize of $50.

Again this year, the Department of Botany and Plant Pathology sponsored two awards at the Annual Lafayette Regional Science and Engineering Fair held at Stewart Center.

Projects from two students from West Lafayette High School were selected to receive our department awards. **Christopher Knapp's** project titled "Growth stimulatory effects of ammonium on duckweed" was awarded a first place prize of $50. Second place was awarded to **Elisabeth Rutherford** for her project titled "Organic acids acting as sperm chemoattractants in *Ceratopteris richardii*." Christopher and Elisabeth are both freshman at West Lafayette High School and were guided by their science teacher, Marshall Overley.

Elisabeth Rutherford accepts her second place prize of $25 from Dr. Carole Lembi.

Both students displayed their projects at SpringFest in April.

2004 Grants

Excellence Through Diversity

T. S. Abney, Ohio State University Research Foundation, $20,000, March 1, 2004 through February 28, 2005. "Indiana *Phytophthora Sojae* losses – Part of Ohio State University's 'Limiting Losses to *P. Sojae* in the North Central Region'."

T. S. Abney, University of Wisconsin-Madison, $8,600, March 1, 2004 through February 28, 2005. "Indiana whitemold of soybeans."

T. S. Abney and **A. Westphal**, Indiana Soybean Board, $48,000, May 1, 2004 through April 30, 2005. "Sudden death syndrome: 2004 Root infection/foliar response of soybean varieties and influence of water regimes, microbial communities, and levels of SDS pathogen disease severity."

T. S. Abney, Southern Illinois University, $10,000, March 1, 2004 through February 28, 2005. "Indiana's NC 'SDS' variety test of soybeans."

T. S. Abney, Southern Illinois University, $10,000, March 1, 2004 through February 28, 2005. "Indiana's NC 'Frogeye leaf spot of soybeans' research."

T. S. Abney, Indiana Soybean Board, $30,000, May 1, 2004 through April 30, 2005. "Phytophthora root rot: 2004 Identify dominant races of soybean phytophthora."

J. A. Banks and D. E. Salt, $150,000, U. S. Department of Energy, September 1, 2004 through August 31, 2005. "Genetic and molecular dissection of arsenic hyperaccumulation in the fern *Peteris vittata*."

N. C. Carpita, C. J. Staiger, M. C. McCann and W. E. Vermerris, National Science Foundation, $99,000, September 1, 2004 through August 31, 2007. "Identification and characterization of cell wall mutants by fourier transform infrared and near-infrared spectroscopies."

N. C. Carpita, U. S. Department of Energy, $312,000, August 15, 2004 through August 14, 2005. "Purification and molecular cloning of the synthases of cereal (1→3),(1→4)-β-D-glucans."

Z. Chen, National Science Foundation, $5,000, June 1, 2004 through September 30, 2005. "Arabidopsis 2010: Functional analysis of WRKY transcription factor gene family from Arabidopsis."

Z. Chen, National Science Foundation, $300,000, October 1, 2004 through September 30, 2005. "Analysis of the *WRKY* transcription factor gene family for Arabidopsis."

R. C. Coolbaugh, Foreign Agricultural Service, $39,765, September 1, 2004 through August 31, 2006. "Norman Borlaug International Science & Technology Fellowship Program Morocco at Purdue University."

R. J. Green, Indiana Mint Council, $4,000, January 1, 2004 through December 31, 2004. "Disease and insect management in mint."

S. G. Hallett, Purdue Research Foundation, $14,715, July 1, 2004 through June 30, 2005. "Parasites lost, parasite regained: Proposing a new hypothesis for plant invasion and naturalization."

S. G. Hallett, Purdue Research Foundation, $7,000, June 1, 2004 through August 15, 2004. "Understanding the link between striga infestation and degraded African soils."

G. S. Johal, USDA – National Research Initiative. $78,000, July 1, 2004 through June 30, 2005. "Harnessing S-hsl, a naturally occurring suppressor of a maize disease lesion mimic mutation."

W. G. Johnson, Iowa State University, $13,875, July 1, 2004 through June 30, 2006. "Influence of cropping and weed management systems of weed communities."

W. G. Johnson, J. W. Barnes, **K. D. Gibson** and S. C. Weller, Cooperative State Research Service, $37,962, July 1, 2004 through June 30, 2006. "Glyphosate-resistant horseweed: Prevalence, distribution, areas at risk in Indiana and Ohio."

W. G. Johnson, **A. Westphal** and **J. E. Creech**, Cooperative State Research Service, $94,029, July 1, 2004 through June 30, 2007. "Influence of winter annual weed management on *Heterodera* glycines population dynamics and summer annual weed emergence."

W. G. Johnson, J. W. Barnes, **K. D. Gibson** and **R. A. Dewell**, Indiana Soybean Board, $26,109, April 1, 2004 through March 31, 2005. "Developing effective management strategies for glyphosate-resistant horseweed."

2004 Grants

W. G. Johnson, **A. Westphal**, **J. E. Creech**, J. Faghihi and V. R. Ferris, Indiana Soybean Board, $24,670, March 1, 2004 through February 28, 2005. "Influence of winter weed management and cropping system of weed growth and seedbank dynamics and Scn population density."

C. A. Lembi, Army Engineer Research & Development Center, $53,605, May 1, 2004 through April 30, 2005. "Aquatic plant management research."

C. A. Lembi, California Rice Board and USDA-ARS, $10,000, January 1, 2004 through December 31, 2004. "Spatial and temporal variation in the composition of filamentous algae present in California rice fields."

R. D. Martyn, **G. Ruhl** and **K. Rane,** USDA, CSREES, $65,000, July 1, 2004 through June 30, 2005. "The national plant diagnostic network."

R. D. Martyn and **I. A. Thompson**, Agricultural Research Service, $24,000, September 1, 2004 through September 30, 2005. "Computerization of data on rust specimens in the Arthur Herbarium at Purdue University."

R. D. Martyn, Virginia Polytechnic Institute & State University, $1,495, September 1, 2002 through September 29, 2004. "Integrated pest management collaborative research support."

T. Mengiste, National Science Foundation, $174,181, August 15, 2004 through July 31, 2005. "Molecular dissection of plant defense responses to necrotropic pathogens."

R. E. Pruitt, National Science Foundation, $5,000, June 1, 2004 through July 1, 2005. "Analysis of a novel method of genetic reversion in Arabidopsis."

R. E. Pruitt, National Science Foundation, $220,000, August 1, 2003 through July 31, 2005. "Analysis of a novel mechanism of genetic reversion in Arabidopsis."

J. S. Yaninek and **G. E. Ruhl**, Indiana Department of Natural Resources, $12,608, January 1, 2004 through December 31, 2004. "2004 Indiana CAPS Program Core Projects."

J. S. Yaninek, C. S. Sadof and **G. E. Ruhl**, Indiana Department of Natural Resources, $103,750, January 1, 2004 through December 31, 2004. "1) Sudden oak death survery, 2) Old world bollworm trapping, and 3) Indiana 2004 wood-boring beetle warehouse and perimeter survey."

G. E. Shaner, Agricultural Research Service, $84,639, June 8, 2004 through June 7, 2005. "Fusarium head blight of wheat: Epidemiology and management by genetic and chemical means."

A. Westphal, Southern Illinois University, $9,000, March 1, 2004 through February 28, 2005. "The application of new technologies to control of sudden death syndrome."

A. Westphal and **G. E. Shaner**, Mary S. Rice Farm Estate, $6,000, March 1, 2004 through February 28, 2005. "Field demonstration trials at the Purdue Agricultural Centers."

A. Westphal and A. R. Leroy, Indian Soybean Board, $24,163, May 1, 2004 through April 30, 2005. "Potential of root knot nematodes to damage soybean crops in Indiana."

C. P. Woloshuk and D. Maier, Kansas State University, USDA, $79,619, December 1, 2004 through December 1, 2005. "Consortium for integrated management of stored product insect pests."

J.-R. Xu, USDA-NRI, $243,500, October 1, 2004 through September 30, 2006. "Functional genomics of *Fusarium graminearum*, the wheat and barley scab fungus."

J.-R. Xu, U.S. Wheat and Barley Scab Initiative, $38,325, October 1, 2004 through September 30, 2005. "Further characterization of two pathogenicity factors identified in *Fusarium graminearum*."

J.-R. Xu, U.S. Wheat and Barley Scab Initiative, $42,500, October 1, 2004 through September 30, 2005. "Genomics of *Gibberella zeae*, the head scab fungus."

J.-R. Xu, Purdue Research Foundation, $13,263, July 1, 2004 through June 30, 2005. "Insertional mutagenesis in the wheat scab fungus *Fusarium graminearum*."

J.-R. Xu, National Science Foundation, REU program, $19,000, June 1, 2004 through August 15, 2004. "Functional genomic studies in the rice blast fungus."

2004 Publications

Adhikari, T. B., H. Wallwork, and **S. B. Goodwin**. 2004. Microsatellite markers linked to the *Stb2* and *Stb3* genes for resistance to *Septoria tritici* blotch in wheat. *Crop Science* 44:1403-1411.

Adhikari, T. B., X. Yang, **J. R. Cavaletto**, X. Hu, **G. Buechley**, H. W. Ohm, **G. Shaner**, and **S. B. Goodwin**. 2004. Molecular mapping of *Stb1*, a potentially durable gene for resistance to *Septoria tritici* blotch in wheat. *Theoretical and Applied Genetics* 109:944-953.

Adhikari, T. B., **J. R. Cavaletto**, J. Dubcovsky, J. Gieco, A. R. Schlatter, and **S. B. Goodwin**. 2004. Molecular mapping of the *Stb4* gene for resistance to *Septoria tritici* blotch in wheat. *Phytopathology* 94:1198-1206.

Anderson, K. I. and **S. G. Hallett**. 2004. Herbicidal spectrum and activity of *Myrothecium verrucaria*. *Weed Science* 52:623-627.

Barnes, J., **W. G. Johnson**, **K. D. Gibson**, and S. Weller. 2004. Crop rotation and tillage system influence late-season incidence of giant ragweed and horseweed in Indiana soybean. Online. *Crop Management* doi:10.1094/CM-2004-0923-02-BR.

Bluhm, B. H., M. A. Cousin and **C. P. Woloshuk**. 2004. Multiplex real-time PCR detection of fumonisin-producing and trichothecene-producing groups of Fusarium species. *Journal of Food Protection* 67:536-543.

Bruno, K., L. Tenjo, J. Hamer and **J.-R. Xu**. 2004. Expression and localization of PMK1 during different plant infection stages. *Eukaryotic Cell* 3:1525-1532.

Buckeridge, M. S., **C. Rayon**, B. Urbanowicz, M. A. S. Tine and **N. C. Carpita**. 2004. Mixed linkage (1→3),(1→4)-β-D-glucans of grasses. *Cereal Chemistry* 81:115-127

Chen, K., **B. Fan** and **Z. Chen**. 2004. Activation of programmed cell death by pathogen-induced receptor-like protein kinases from Arabidopsis. *Plant Molecular Biology* 56:271-283.

Donald, W. W., D. Archer, **W. G. Johnson**, and K. A. Nelson. 2004. Zone herbicide application controls weeds and reduces residual herbicide use in corn. *Weed Science* 52:821-833.

Donald, W. W., **W. G. Johnson**, and K. A. Nelson. 2004. In-row and between-row interference by corn (*Zea mays*) modifies annual weed control by preemergence residual herbicide. *Weed Technology* 18:497-504.

Egel, D. S., R. Harikrishnan and **R. Martyn**. 2004. First report of *Fusarium oxysporum* f. sp. *niveum* race 2, causal agent of Fusarium wilt of watermelon in Indiana. *Plant Disease* 89:108

Fischer, D. A., R. G. Harvey, **T. T. Bauman**, **S. Phillips**, S. E. Hart, G. A. Johnson, J. J. Kellos, P. Westra and J. Lindquist. 2004. Common lambsquarters (*Chenopodium album*) interference with corn across the north central United States. *Weed Science* 52:1034-1038.

Flaherty, J. E. and **C. P. Woloshuk**. 2004. Regulation of fumonisin biosynthesis in *Fusarium verticillioides* by a zinc binuclear cluster-type gene, *ZFR1*. *Applied Environmental Microbiology* 70:2653-2659.

Gibson, K. D., A. J. Fischer and T. C. Foin. 2004. Compensatory responses of late watergrass (*Echinochloa phyllopogon*) and rice to resource limitations. *Weed Science* 52:271-280.

Gibson, K., **D, R. Dirks**, C. R. Medlin and **L. Johnston**. 2004. Detection of weed species in soybean (*Glycine max*) using multispectral digital images. *Weed Technology* 18:742-749.

Goodwin, S. B. 2004. Minimum phylogenetic coverage: An additional criterion to guide the selection of microbial pathogens for initial genomic sequencing efforts. *Phytopathology* 94:800-804.

Gumaelius, L., B. Lahner, D. Salt and **J. Banks**. 2004. Arsenic hyperaccumulation in gametophytes of *Pteris vittata*. A new model system for analysis of arsenic hyperaccumulation. *Plant Physiology* 136:3198-3208.

Hardebeck, G. A., Z. J. Reicher, R. F. Turco, and **R. Latin**. 2004. Application of *Pseudomonas aureofaciens* strain Tx-1 for control of dollar spot and brown patch on fairway height turfgrass. *Horticultural Science* 39:1750-1753.

Johnson, W. G., J. Barnes, **K. D. Gibson**, and S. Weller. 2004. Late season weed escapes in Indiana soybean fields. Online. *Crop Management* doi:10.1094/CM-2004-0923-01-BR.

Lao, N. T., D. Long, S. Kiang, G. Coupland, D. A. Shoue, **N. C. Carpita** and T. A. Kavanagh. 2004. Mutation of a family 8 glycosyltransferase gene alters cell wall carbohydrate composition and causes a humidity-sensitive semi-sterile dwarf phenotype in Arabidopsis. *Plant Molecular Biology* 53:647-663.

Latin, R. 2004. New turfgrass diseases. *Grounds Maintenance* 3:25-31.

2004 Publications

Latin, R. and **P. Harmon**. 2004. Managing gray leaf spot in the Midwest. *Golf Course Management* 72:10:89-92.

Li, L., **C. Y. Xue**, **K. Bruno**, M. Nishimura and **J.–R. Xu**. 2004. Two PAK kinase genes MST20 and *CHM1* have distinct functions in *Magnaporthe grisea*. *Molecular Plant Microbe Interactions* 17:547-556.

Manli, Y., E. Wardzala, **G. S. Johal** and J. Gray. 2004. The wound-inducible *Lls1* gene from maize is an ortholog of the Arabidopsis *Acd1* gene, and the *LLS1* protein is present in non-photosynthetic tissues. *Plant Molecular Biology* 54:175-191.

Park, G., **K. Bruno**, N. Talbot, C. Staiger and **J.–R. Xu**. 2004. Independent genetic mechanisms mediate turgor generation and penetration peg formation during plant infection in the rice blast fungus. *Molecular Microbiology* 53:1695-1707.

Peña, M. J., P. Ryden, M. Madson, A. Smith, W-D. Reiter and **N. C. Carpita**. 2004. Galactosylation of xyloglucans is essential for maintenance of cell wall tensile strength during cell growth in plants. *Plant Physiology* 134:443–451.

Peña, M. J. and **N. C. Carpita**. 2004. Loss of highly branched arabinans and debranching of rhamnogalacturonan I accompany loss of firm texture and cell separation during prolonged storage of apples. *Plant Physiology* 135:1305-1313.

Penning, B. W., **G. S. Johal** and M. M. McMullen. 2004. A major suppressor of cell death, *slm1*, modifies the expression of the maize (*Zea mays L.*) lesion mimic mutation *les23*. *Genome* 47:961-969.

Pirttilä, A., M. L. M. McIntyre, G. A. Payne and **C. P. Woloshuk**. 2004. Expression profile analysis of wild-type and fcc1 mutant strains of *Fusarium verticillioides* during fumonisin biosynthesis. *Fungal Genetic Biology* 41:647-656.

Pitt, W. M., **S. B. Goodwin**, G. J. Ash, N. J. Cother and E. J. Cother. 2004. *Plectosporium alismatis* comb. nov., a new placement for the *Alismataceae* pathogen *Rhynchosporium alismatis*. *Mycological Research* 108:775-780.

Rutherford, G., **M. Tanurdzic**, M. Hasebe and **J. A. Banks**. 2004. A systemic gene silencing method suitable for high throughput, reverse genetic analyses of gene function in fern gametophytes. *BMC Plant Biology* 4(1):6.

Schmidt, A. A. and **W. G. Johnson**. 2004. Influence

Veronese P., X. Chen, **B. Bluhm**, J. Salmeron, R. Dietrich and **T. Mengiste**. 2004. The BOS loci of Arabidopsis are required for resistance to *Botrytis cinerea* infection. *Plant Journal* 40:558-574.

Sellers, B. A., Cordes, J. C., Smeda, R. J., and **W. G. Johnson**. 2004. Waterhemp control in transgenic and conventional corn varieties. Online. *Crop Management* doi:10.1094/CM-2004-1208-01-RS.

Takeda, S., T. Zerihun, I. Hofmann, A. Probst, K. Angelis, H. Kaya, A. Takashi, **T. Mengiste**, M. M. Scheid, K. Shibahara, D. Scheel and J. Paszkowski. 2004. BRU1, a novel link between genetic/epigenetic inheritance and meristem development in Arabidopsis. *Gene and Development* 18:782-793.

Tanurdzic, M. and **J. Banks**. 2004. Sex determining mechanisms in land plants. *Plant Cell* 16:61-71.

Tharp, B. F., J. J. Kells, **T. T. Bauman**, R. G. Harvey, **W. G. Johnson**, M. M. Loux, A. R. Martin, D. J. Maxwell, M. D. K. Owen, D. L. Regehr, J. E. Warnke, R. G. Wilson, L. J. Wrage, B. J. Young and C. D. Dalley. 2004. Assessment of weed control strategies for corn in the north central United States. *Weed Technology* 18:203-210.

Thompson, I. A., **J.-R. Xu**, **D. M. Huber** and D. G. Schulze. 2004. Gene deletion of manganese peroxidase-like genes in *Magnaporthe grisea*. *Phytopathology* 94:S103.

Urbanowicz, B. R., **C. Rayon** and **N. C. Carpita**. 2004. Topology of the maize mixed-linkage (1→3),(1→4)-β-D-glucan synthase at the Golgi membrane. *Plant Physiology* 134:758–768.

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Westphal, A., A. F. Robinson, A. W. Scott, Jr. and J. B. Santini. 2004. Depth distribution of *Rotylenchulus reniformis* under crops of different host status and after fumigation. *Nematology* 6:97-107.

Yu, J., P.-K. Chang, J. W. Cary, D. Bhatnagar, T. E. Cleveland, G. A. Payne, J. E. Linz, **C. P. Woloshuk** and J. W. Bennett. 2004. The clustered pathway genes in aflatoxin biosynthesis. *Applied Environmental Microbiology* 70:1253-1262.

Zhao, X., **C. Xue**, **Y. Kim** and **J.–R. Xu**. 2004. A ligation-PCR approach for generating gene replacement constructs in *Magnaporthe grisea*. *Fungal Genetics Newsletter* 51:17-18.

2004 Extension Publications

Nice, G., P. Sellers, **B. Johnson** and **T. Bauman**. BP-69-W, Kudzu in Indiana.

Latin, R. and **D. Egel.** BP-67, Foliar Disease Control Using MELCAST.

Latin, R. BP-106-W, Turfgrass Disease Profile: Brown Patch.

Latin, R. BP-125-W, Turfgrass Disease Profile: Seasonal Actiity of Turfgrass Pathogens

Pecknold P., S. Weller, R. Foster and B. Bordelon. ID-169, Midwest Commercial Small Fruit and Grape Spray Guide.

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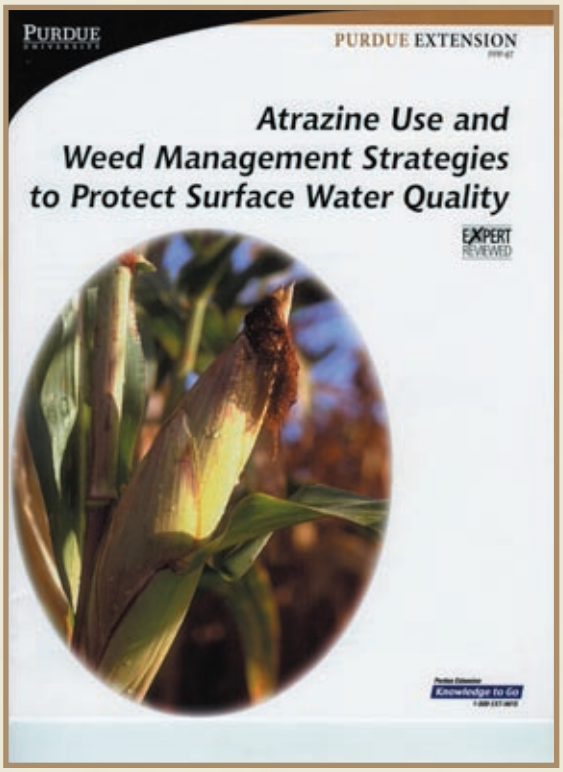
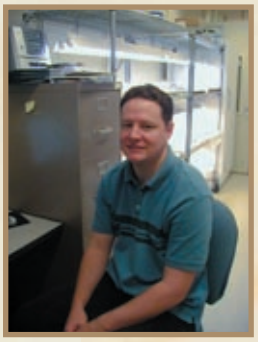


Post-Doctoral Researchers

Excellence Through Diversity



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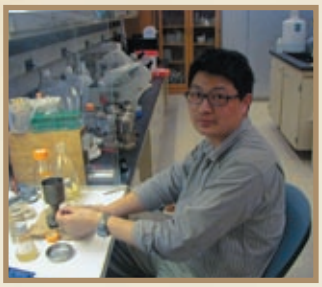

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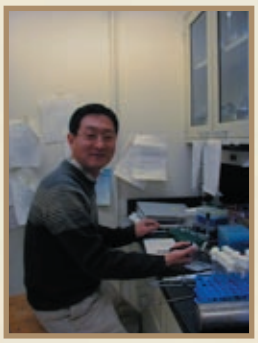

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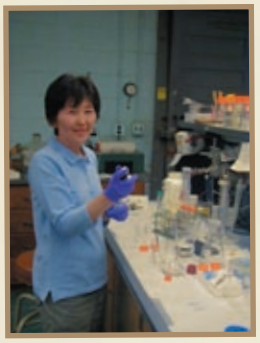

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Dr. Brian Penning
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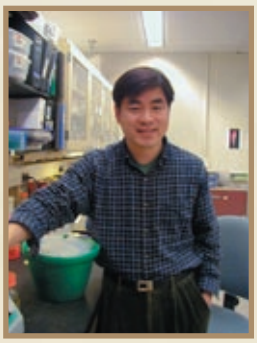

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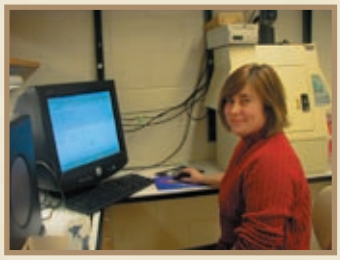

Dr. Paola Veronese
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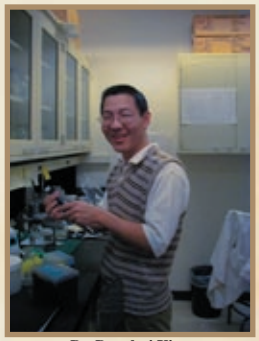

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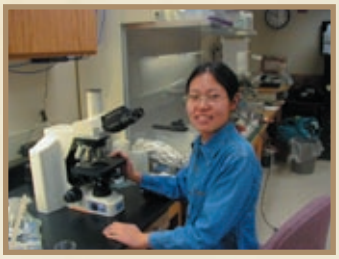

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Ph.D. Shenyang Ag. University, China
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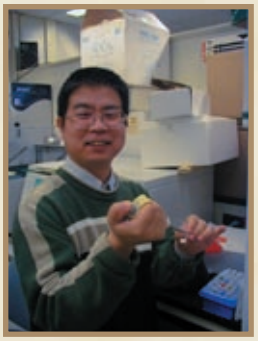

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Post-Doc Accepts Faculty Position

Dr. Tika Adhikari, a post-doc research assistant in the laboratory of Dr. Steve Goodwin, accepted a faculty positon in 2004 at North Dakota State University working on wheat pathology.

Dr. Adhikari work for two years in the Goodwin lab where he focused on finding molecular markers that were linked to resistance genes and the patterns of gene expression during the response of wheat to the fungal pathogen *Mycosphaerella graminicola*.

International Highlights

Foz do Iguacu, Brazil Hosts the VII World Soybean Research Conference

Wonderful view of the famous Iguassu Falls, Brazil. 70% of the falls face Brazil. The natural border between Brazil and Argentina is the Iguassu (Big Water) River.

Drs. Ray Martyn and Scott Abney attended the VII World Soybean Research Conference in Foz do Iguacu, Brazil in March 2004. This international conference, held every five years, is the largest conference in the world related to soybeans. In 2004, it combined three different soybean associations: The World Soybean Research Conference, the International Soybean Processing and Utilization Conference, and the Brazilian Soybean Congress. The conference was held in the beautiful town of Iguassu, home to the largest set of waterfalls in the world, Iguassu Falls, and the world's largest hydroelectric dam, Itaipu Dam. Approximately 1800 people attended the week-long conference.

China Delegation Visits Purdue to Discuss Phytophtora Root Rot Research

A delegation from the Heilongjiang Academy of Agricultural Sciences (HAAS) in northeast China came to Purdue to discuss Dr. Scott Abney's Phytophthora root rot research program in early June 2004. This four person delegation spent the day visiting with members of Abney's program and also visited with department head, Dr. Ray Martyn. After concluding their discussions in the Department of Botany and Plant Pathology, the group met with Ms. Lonni Kucik of the International Programs in Agriculture office to promote exchange of researchers between HAAS and Purdue University. The visitors were: Dr. Wancheng Fang, Directory of International Cooperation at HAAS, Mr. Wang Guijiang, Professor of Potato Research, Mr. Wang Yong, Associate Professor of Maize Research, and Mr. Wang Jiexin, Vice President of HAAS. Ms. Ma Schumei, a soybean pathologist at HAAS has requested funds to have Dr. Abney visit Heilongjiang Academy to establish cooperative research on Phytophthora root rot of soybeans.

Goodwin continued from page 5

than believed previously, involving both early and late responses from the host. Future work will involve wheat and barley gene chips to look at the expression of tens of thousands of genes simultaneously. Work with the barley gene chip showed that non-host resistance responses also are initiated early but involve different genes compared to the resistance in wheat. Having a sequenced genome of the pathogen and the gene chips for wheat and barley opens a whole new frontier and makes this an extremely exciting time to be doing research on host-pathogen interactions.

Dr. Goodwin is extremely grateful to the dedicated, hard work provided by current technicians Jill Breeden and Jessica Cavaletto, and by recent postdoctoral associate Dr. Tika Adhikari, who performed many of the experiments described above.

Huber Visits All-Union Russian Scientific Research Institute of Phytopathology

Dr. Sanin, Director of the Russian Research Institute of Phytopathology, explains the genetic selection program for rust resistance in wheat to Dr. Richard Pilch, Dr. Anatolig Makorov, Sergey Kozhevnikov and Dr. Don Huber.

On two occasions in 2004, Dr. Don Huber visited the All-Union Russian Scientific Research Institute of Phytopathology (VNIIF) to review their plant pathology programs. The objective of these trips was to coordinate and develop opportunities for international cooperation and linkages. Huber was impressed with their research productivity with rather limited facilities and other resources. They have some excellent scientists and there are many areas where cooperation will be mutually beneficial. Several of the pathogens on our "Select Agents List" are endogenous to Russia so their research is directly applicable to our preparation and prevention of these exotic diseases. They have very strong programs in bacterial, fungal, and viral diseases of potato, cereals, and other crops; as well as a long history of biological disease and insect control and molecular biology research. The visits were both educational and enjoyable, and hopefully, successful in building working relationships with some very good scientists.

Brazilian Alumnus Shares Knowledge of Soybean Rust on Visit to the U.S.

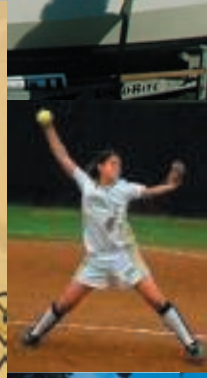
Dr. Alvaro Almeida, a lead researcher at Brazil's National Center for Soybean Research, Embrapa Soybean, visited the department in November 2004. Almeida is a 1986 graduate of the department with a Ph.D. in plant pathology under the direction of Dr. Richard Lister, and committee members Scott Abney and Greg Shaner.

With the USDA confirmation of soybean rust in early November at a research farm at Louisiana State University, Dr. Almeida's visit proved to be a very educational for the department and university. During his visit Dr. Almeida presented a seminar on soybean rust and met with several groups from Botany and Plant Pathology and Agronomy.

Almeida stated that knowledge is power, especially when it comes to combating a serious new soybean disease. Brazilian soybean growers have battled the fungal disease the past three crop seasons and farmers in the United States could be joining in that battle as early as 2005. American soybean producers and agricultural researchers can learn from Brazil's soybean rust experience. Dr. Almeida and Embrapa Soybean researchers are studying soybean cultivars in hope of identifying a resistant genes to soybean rust.

Asian soybean rust is caused by *Phakopsora pachyrhizi*, a fungus that is spread by wind-blown spores. The disease causes plant defoliation, poor pod set and fill, and ultimately reduced yields. When this disease was reported in Africa, no one expected it would cross the Atlantic Ocean, but it arrived in Paraguay in 2001 and in Brazil in 2002. Although Brazil is a major soybean-producing nation and competes with the U.S. in world markets, Almeida said that Brazilian farmers are not happy to see soybean rust make its way to America and perhaps, instead, this could lead to greater international cooperation on finding resistant varieties.

Graduate
Programs



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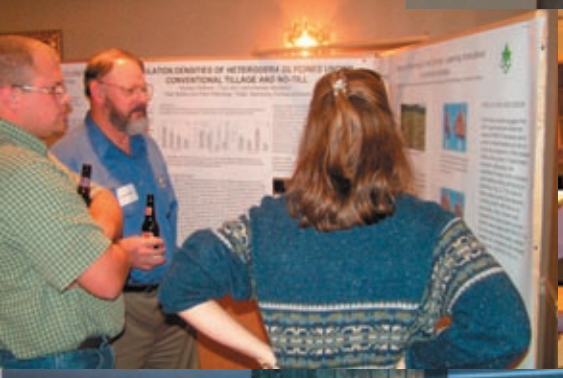


Alumni Highlights

April Mason Named New Dean for Colorado State University's College of Applied Human Sciences

Dr. April Mason began her duties as dean of Colorado State University's College of Applied Human Sciences on August 1, 2004. Colorado State President, Larry Penley, said "April Mason is the kind of national leader we had hoped to find to serve as the new dean of the College of Applied Human Sciences. Her extensive experience at Purdue, a land grant institution, will further elevate the college's national stature."

April received her B.S. degree in Biology from Mount Union College in Ohio. She then began her graduate education in the Department of Botany and Plant Pathology at Purdue University under the direction of Dr. Brian Larkins. April received her M.S. in 1980. She then continued on at Purdue and received her doctorate in Foods and Nutrition. After receiving her Ph.D., April became an assistant professor of Foods and Nutrition and an Extension specialist. In 1993, she spent a year in the Laboratory of Biochemistry at the National Heart, Lung, and Blood Institute at the National Institutes of Health. Mason was appointed associate dean for Extension in the School of Consumer and Family Sciences at Purdue in 1996 and she served as associate dean of Discovery and Engagement since 2002. She was recently awarded the State International Facilitation Award for an International Study Tour in Ireland by Epsilon Sigma Phi, the national cooperative extension professional organization. Mason is also a member of the Sigma Xi, the American Association of Family and Consumer Sciences, the Institute of Food Technologists, and the American Society for Nutrition Sciences.

April Mason will be honored in April 2005 by the College of Agriculture, Purdue University, with the Distinguished Agricultural Alumni Award.

Chancellor Larry Vanderhoef Named "Sacramentan of the Year"

Dr. Larry Vanderhoef, Chancellor at the University of California, Davis has been named "Sacramentan of the Year" by the Sacramento Metro Chamber.

Dr. Vanderhoef was recognized for his career and lifetime achievement as chancellor at UC Davis and the important contributions he has made in the Sacramento region. A few examples of his achievements are his steadfast leadership that led to the building of the Robert and Margrit Mondavi Center for the Performing Arts and also for leadership during the expansion of the UC Davis Medical Center. The medical campus expanded to more than three million square feet of buildings that houses a nationally renowned cancer center, a world-class research center for the study of autism and a new trauma and emergency facility. In addition, Vanderhoef was instrumental in establishing the UC Davis Connect, a program that links new business ventures with university and community resources needed to succeed. Dr. Vanderhoef has been chancellor at UC Davis since 1994.

Dr. Vanderhoef received his Ph.D. from Purdue University in 1969 from the Department of Botany and Plant Pathology. The College of Agriculture awarded Dr. Vanderhoef the Distinguished Agricultural Alumni Award in 1994 and an Honorary Doctorate in 2000.

Excellence Through Diversity

Alumni Highlights

Sellers Accepts Faculty Position at the University of Florida

Dr. Brent Sellers joined the University of Florida, IFAS, Range Cattle Research and Education Center and Agronomy Department in January 2005. This position is at the rank of Assistant Professor with an Extension/research appointment. His research and Extension activities will focus upon weed control in pastures and rangeland. Brent is a native of Indiana. He received a B.S. degree in Biology followed by a M.S. degree in the Department of Botany and Plant Pathology with a specialization in weed science at Purdue University. Brent completed his doctorate degree in weed science at the University of Missouri, where he is currently finishing his post-doctoral fellow appointment under the supervision of Dr. Reid J. Smeda.

The EEAOC in Tucumán Names Ploper as New Director

The Experimental Agricultural Station Obispo Colombres (EEAOC) in Tucumán, Argentina named **Dr. L. Daniel Ploper** as the new director in early 2004.

The EEAOC is a entity of the government of the Province of Tucumán. Their purpose is to find solutions to the agricultural and cattle problems of the Province and to increase the quality and quantity of agricultural production.

L. Daniel Ploper received his Ph.D. in 1987 from the Department of Botany and Plant Pathology under the direction of Dr. Scott Abney.

APS French-Monar Awards Committee Honors Ivancovich

The American Phytopathological Society (APS) French-Monar Awards Committee has awarded **Dr. Antonio Ivancovich** and several of his colleagues one of the APS French-Monar Group Membership Awards for 2004. This award is intended to familiarize more plant pathologists working in Latin American countries with the advantages of membership in APS.

Antonio Ivancovich is a soybean disease specialist with Argentina's National Institute of Technology Agriculture. He received his Ph.D. in 1990 under the direction of Dr. Scott Abney here in the Department of Botany and Plant Pathology.

Leite Joins Faculty of the Center for Viticulture and Small Fruit Research at Florida A & M University

Dr. Breno Leite joined the faculty of the Center for Viticulture and Small Fruit Research at Florida A & M University in Tallahassee, Florida in early 2004. Breno is responsible for the Plant Pathology Laboratory and his research will be focused on grapevine diseases, especially Pierce's Disease and diseases of small fruits. He will also be involved in the biological control program, coordinated by the Biological Control Center, USDA/Florida A & M University.

Breno received his B.S. and M.S. degrees from State University of Campinas, São Paulo, Brazil and his Ph.D. in 1992 from the Department of Botany and Plant Pathology under the direction of Dr. Ralph Nicholson here at Purdue University.

Dr. Dagnatchew Yirgou Honored at 50th Anniversary of Alemaya University Celebration

In November 2004, Mr. Mezgebou Amlak accepted the Certificate of National Award and Medallion for Outstanding Achievement in Agricultural Research at the 50th anniversary of Alemaya University in Ethiopia posthumously for **Dr. Dagnatchew Yirgou**. Alemay University wished to honor Dr. Yirgou for his service to the nation and for his contributions he the development of agriculture in Africa and beyond. Mr. Amlak was invited to deliver the Dr. Dagnatchew Yirgou Memorial Lecture on this special occasion. His lecture was titled "A Celebration of a Life Well Lived" with emphasis on Dr. Yirgou's career.

Dr. Yirgou received his M.S in 1961 and Ph.D in 1964 from our department. Contributions can be made to the Dr. Dan Yirgou Scholarship Fund at Purdue University (see donation form included with this publication).

Dr. Janis McFarland Named WSSA Fellow

The Weed Science Society of America (WSSA) held their annual meetings in Honolulu, Hawaii in February 2005. At the awards program, **Dr. Janis McFarland** was named a WSSA Fellow. Fellows are active members of WSSA who are honored for significant meritorious contributions to weed science and to WSSA. Potential fellows are nominated for fellowship by other active members, recommended by the Fellows and Honorary member Subcommittee and elected to fellowship by the WSSA Executive Committee.

Dr. McFarland received her B.S. from Virginia Tech. She graduated Magna Cum Laude and was elected to Phi Beta Kappa. Janis received her M.S. in plant pathology and her Ph.D. in plant physiology from the Department of Botany and Plant Pathology at Purdue University. During her master's program, she was under the direction of Dr. Andy Jackson, and her doctoral program was under the direction of Dr. Dan Hess. While at Purdue, Janis received the DuPont Departmental Award for Outstanding M.S. and Ph.D. Student and the Outstanding Graduate Student Award from the Weed Science Society of America. She began her career with Ciba Geigy Corporation as a chemist studying the fate of crop protection products in animals and plants. Janis became group leader of the plant metabolism group in 1991 and manager of environmental metabolism in 1993. As manager of environmental metabolism she directed a team of 25 scientists. In 1994, Janis was selected to lead Ciba Geigy's efforts on EPA's Triazine Special Review. She and her teams were responsible for conducting over 200 new studies on the risk, exposure, and agricultural benefits of atrazine and simazine. In 1997, Janis became Director of Environmental Stewardship and Food Quality for Novartis Crop Protection. In this position, her department was responsbile for Integrated Pest Management, Environmental Stewardship, and Food Quality Protection Act activities including water monitoring, education, and research. She worked closely with universities, government agencies, and growers to promote safe and effective agricultural practices that are protective of the environment. In her current position as Head of Regulatory Affairs for Syngenta Crop Protection, Janis is responsible for registration and stewardship for Syngenta Crop protection products. She has authored or co-authored more than 45 publications and EPA Guideline study reports. Janis is active in the Weed Science Society of America and CropLife and has served on the Board of Directors of WSSA, as Chair of the Strategic Planning Committee and on several other committees.

2004 Seminar Series

Mr. David Smith, Department of Botany and Plant Pathology, Purdue University. *"Evaluation of Microsphaeropsis amaranthi as a bioherbicide for the control of waterhemp, Amaranthus tuberculatus."* (M.S. research seminar)

Dr. Karen Koch, Department of Plant Biology, University of Florida. *"Sucrose metabolism, sugar sensing, and resource allocation."*

Dr. Jeffrey Barnes, Department of Botany and Plant Pathology, Purdue University. *"Assessment of crop management factors contributing to the occurrence of glyphosate-resistant horseweed populations in Indiana."*

Dr. Joseph Anderson, Department of Agronomy, Purdue University. *"Barley and cereal yellow dwarf virus resistance: New insights into virus replication and the mechanism of resistance."*

Dr. Xiaobing Yang, Department of Plant Pathology, Iowa State University. *"Searching the patterns of large-scale distribution and occurrence of plant diseases."*

Dr. John Yoder, Department of Vegetable Crops and Weed Science, University of California, Davis. *"Plant-plant signaling in the rhizosphere: Host recognition by parasitic plants."*

Dr. John Niederhauser, Department of Plant Pathology, University of Arizona. *"The role of the potato in feeding a growing world population."*

Dr. Lieuan Evans, Department of Plant Pathology, Ag Canada. *"Role of micronutrients in managing disease."*

Dr. Robert Hartzler, Department of Agronomy, Iowa State University. *"Selling the importance of weed biology to extension clients."*

Mr. Cameron Cooley, Department of Botany and Plant Pathology, Purdue University. *"Osmoregulation in the xerophile, Eurotium rubrum."* (M.S. research seminar)

Ms. Holly Ruess, Department of Botany and Plant Pathology, Purdue University. *"Molecular analysis of adult plant resistance in maize to Cochilobolus carbonum race 1."* (M.S. research seminar)

Mr. Ian Thompson, Department of Botany and Plant Pathology, Purdue University. *"Investigation of manganese oxidation by Gaeumannomyces graminis var. tritici and Magnaporthe grisea."* (Ph.D. research seminar)

Dr. John Bowman, Plant Biology, University of California, Davis. *"Establishment of polarity in leaves."*

Mr. Milos Tanurdzic, Department of Botany and Plant Pathology, Purdue University. *"Genetic and genomic studies of seed-free plants: Sex determination in ferns and whole genome analysis of lycopods."* (Ph.D. research seminar)

Dr. Ron Walcott, Department of Plant Pathology, University of Georgia. *"Molecular taxonomy and detection of bacterial plant pathogens in plants."*

Dr. Robert Pruitt, Department of Botany and Plant Pathology, Purdue University. *"A novel mode of inheritance in plants."*

Dr. Steve Harris, Department of Plant Pathology, University of Nebraska. *"Regulation of polarisome function in the filamentous fungus Aspergillus nidulans."*

Dr. C. S. Prakash, Department of Plant and Soil Science, Tuskegee University. *"Current controversy with GM crops: Role of scientists as communicators."*

Dr. Steve Scofield, USDA, Department of Agronomy, Purdue University. *"Functional pathogenomics in hexaploid wheat."*

Dr. Ernest Cebert, Department of Plant and Soil Science, Alabama A & M University. *"Collaborative opportunities with Alabama A & M."*

Dr. Allen Miller, Department of Plant Pathology, Iowa State University. *"Choreography of barley yellow dwarf virus gene expression."*

Dr. Jin-Rong Xu, Department of Botany and Plant Pathology, Purdue University. *"Regulation of infection-related morphogenesis in the rice blast fungus."*

Dr. S. P. Dinesh-Kumar, Department of Molecular, Cellular and Developmental Biology, Yale University. *"Plant innate immunity: Lessons learned from N gene and TMV interactions."*

Dr. Ragan Callaway, Department of Biological Sciences, University of Montana. *"Soil biota and exotic plant invasion."*

Dr. Bruce Watkins, Department of Food Science, Purdue University. *"Plants: Nutrients, toxicants, and phytochemicals."*

Ms. Kathryn Wilkinson, Department of Botany and Plant Pathology, Purdue University. *"A potential new biological control agent, bacterium SG-3: Mode of action and control of noxious cyanobacteria."* (Ph.D. research seminar)

SWPAC Highlights

The staff at the Southwest Purdue Agricultural Center was actively involved in learning, discovery and outreach in 2004 . Below are some highlights of individual efforts as well as a description of the year as a whole.

• **Dan Egel** is the new editor of the Fungicide and Nematicide Tests (APS Press). One of his first duties was to organize additional submission dates for volume 60. Plus, for the first time, there will be real-time submission/acceptance of articles that report data for Asian soybean rust studies. Dan also worked to bring the *Fusarium oxysporum* f. sp. *niveum* race situation up to date (Figure 1).

Figure 1: A watermelon plant exhibits the one-sided wilt typical of Fusarium wilt. Race 2 of *Fusarium oxysporum* f. sp. *niveum* has been confirmed in SW Indiana. No commercial watermelon varieties are available with resistance to race 2.

• Frankie Lam has developed an alternative sampling technique for cucumber beetles on muskmelon. He compared sampling with yellow sticky traps to directly counting beetles. For those growers who want to count beetles directly, Frankie found that the best time to count beetles was midday.

• Chuck Mansfield has been working with Scott Abney and Andreas Westphal on the effect of cover crops and previous crop on the incidence of sudden death syndrome in soybean.

• Chris Gunter continues to work on mineral nutrition of tomato. His work is helping tomato growers avoid disorders such as yellow shoulder of tomato. With the help of a mineral nutrition laboratory that will be built soon, Chris also will extend his work to cucurbits. Chris is also involved in muskmelon and watermelon variety trials (Figure 2).

Figure 2: Watermelon fruit from several different varieties are stacked at the end of each row after harvest. Muskmelon and watermelon varieties are evaluated in trials every year at the SW Purdue Ag Center. At least 13 years of trial results have been published annually in the Midwest Vegetable Variety Trial Report, where growers can study the results and decide which varieties to grow on their

During the 2004 season, work continued on pumpkin pest management. Downy mildew was present again in 2004, representing a significant source of yield loss. Even high input treatments did not greatly reduce the severity of downy mildew. A yellow decline was again noticed on pumpkin this year in plots at SWPAC, as well as in commercial fields. In 2003 and 2004, a significant correlation was noted between this disease and squash bug populations. Although this disease appears superficially similar to cucurbit yellow vine reported in Oklahoma and other states, important differences between the disease in Indiana and Oklahoma exist. For example, we have never observed a yellow vine of watermelons in Indiana; in Oklahoma, watermelons are considered to be more susceptible than pumpkins.

Compared to the 2003 season, rainfall was distributed more evenly over the summer. More rain resulted in an increase in foliar diseases. These included early blight and Septoria of tomato, gummy stem blight of watermelon, and Alternaria leaf blight of muskmelon. Another factor in

Excellence Through Diversity

the occurrence of these diseases was the length of the rotation and the history of the disease in that location. Increased rainfall was also correlated with an increase in certain soil borne diseases, such as mature watermelon vine decline and Phytophthora diseases.

Other diseases are not as closely related to weather. A few cases of bacterial fruit blotch of watermelon occurred in southwest Indiana. This disease can be seed transmitted. Downy mildew of pumpkins was quite widespread across Indiana. Some growers reported severe yields losses due to downy mildew. This disease requires the introduction of the proper spore type from the Gulf States as well as relatively cool, dewy nights.

Great Weather Brings Record Crowd to Campus for Springfest 2004

An estimated 40,000 visitors enjoyed the Springfest activities in April 2004. With more than 100 free activities offered by two dozen schools and departments, there is something for everyone.

The Department of Botany and Plant Pathology showcased exhibits that show how botany, plant pathology, and weed science impact their daily lives. Everyone enjoyed the hands-on activities and learned about common plant parts you eat everyday, fungi, and other microbes that cause plant disease, genetic resistance, weeds in your lawn and garden, and much more.

Dr. Andreas Westphal, Outreach Coordinator, and his assistant, **Amy Deitrich**, were responsible for the planning and coordination of the Botany and Plant Pathology exhibits. As always, they did a great job.

Gail Ruhl paints the face of a very patient young girl, while her family watches.

Janani Varadarajan gives a young admirer a balloon compliments of the department.

Muthu Balasubramaniam, the expert face painter, gives this young lady one of his best designs.

Dick Smith shows a springfest guest how to spot the nematodes on this soybean plant.

Ian Thompson explains fungi to this springfest visitor.

Ian Thompson and Cameron Cooley talk before the Springfest crowds come inside to see the displays in Lilly Hall.

The two regional science fair winners, Monika Freiser and Matt Wan, displayed their winning poster at Springfest.

Graduate student, Dave Hillger, cooks bratwurst for the graduate student food tent. Springfest is the GSO's biggest fundraising event for the year.

P&PDL Highlights

Gail Ruhl and **Dr. Karen Ran**e, along with other cooperating Extension Specialists in the Departments of Botany and Plant Pathology, Entomology, Agronomy and Horticulture diagnosed a total of 2578 samples in 2004.

Of the 2578 sample submissions to the P&PDL, 2506 were submitted as physical samples, 17 were submitted as digital images accompanied by physical samples and 55 were submitted strictly as electronic digital images via a standard web-based method made available in 2004 to all Indiana educators and the general public.

Of the 71 total electronic samples submitted, 42 digital images were submitted by County Extension Educators for various clientele, while 29 were submitted directly by the general public. Electronic submission of a digital sample to the Plant and Pest Diagnostic Lab was assessed the same $11 (in-state) and $22 (out-of-state) charge as a physical sample. There was no additional charge for follow-up physical samples requested by diagnosticians who desired more detail for an accurate identification or problem diagnosis than was provided by the initial digital images submitted.

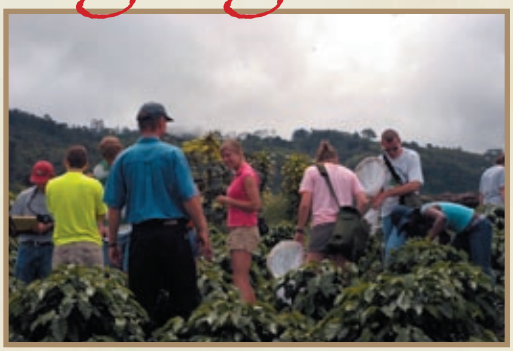
The majority of samples were received by the P&PDL during the months of July, August and September. Same day service was provided to 38% of the samples received during 2004 and 52% of the samples were completed in three days or less. A total of 66% of the samples received were diagnosed within five working days and 84% of all samples received were answered within 10 working days. An extended turn-around time of greater than 10 days (16% of samples) was documented for those samples requiring more extensive culture work and laboratory testing.

The Plant and Pest Diagnostic Laboratory serves as the plant disease diagnostic facility for the Indiana Department of Natural Resources (IDNR) and thus the expertise of the P&PDL plant disease diagnosticians is an integral part of the regulatory function performed by the IDNR. The P&PDL and the IDNR worked together in 2004 to survey nurseries in the state of Indiana for the presence of *Phytophthora ramorum*, the causal agent of sudden oak death. *P. ramorum* was isolated in June 2000 from dying trees in California. Since its discovery in North America, *P. ramorum* has been confirmed in forests in California and Oregon and in nurseries in California, Oregon, Washington, and British Columbia. There are programs addressing *Phytophthora ramorum* in forest settings and in production nurseries. On March 8, 2004, Claude R. Knighten, Public Affairs Specialist for USDA/APHIS Plant Protection and Quarantine, reported the confirmation of *Phytophthora ramorum*, the fungus-like causal organism of sudden oak death (SOD) disease on six varieties of camellia samples taken from Monrovia Nursery, in Azusa, California. Hosts and associated plants were destroyed. As of December 2004, 21 states reported positive confirmation of *Phytophthora ramorum* on nursery stock originating from a large nursery in southern California and a nursery in Oregon. Indiana established an emergency quarantine of California nursery stock susceptible to sudden oak death on March 30, 2004. Twenty nurseries were surveyed and the 800 samples submitted all tested negative for *P. ramorum*.

Also during 2004, the P&PDL provided disease diagnosis on 120 corn and three soybean fields for the IDNR Phytosanitary Certification Program as well as disease diagnosis on 57 corn field samples for entry into the National Agricultural Plant Information System (NAPIS) database.

Maymester Highlights

Costa Rica 2004 - Biodiversity in Natural and Agricultural Systems in the Tropics



This intensive Maymester course began in May 2004 and is designed to familiarize students with emerging issues in tropical biodiversity, agriculture and agroforestry. The course is expressly interdisciplinary and integrates material from forestry, horticulture, entomology, plant pathology, weed science, ecology, and agronomy. Specific course objectives include: 1) exposing students to life in the tropics, and cultivating an appreciation for tropical ecosystems and agriculture, 2) promoting an awareness of connections between farmers, consumers, and foreign policy in the US and farming systems in the tropics, 3) understanding how biodiversity issues are integrated into tropical agriculture and 4) developing an appreciation for the goals and practices of sustainable agriculture in the tropics relative to the US. The course has two major phases. In the first, readings and lectures arranged at Purdue provide students with a general understanding of tropical ecosystems and tropical agriculture/agroforestry systems. The second phase, relies primarily on case studies and field trips to expose students to tropical biodiversity and to the sustainable management of various crops in the tropics. The location of the second phase of the course will rotate each year between Costa Rica and Trinidad and Tobago. The course is co-taught in Costa Rica by **Kevin Gibson**, Chris Oseto and Tamara Benjamin and in Trinidad by **Kevin Gibson** and **Steve Hallett**.

Your Door to Discovery

New Alumni

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MAY 2004

Iris Almeida-Perez
Doctor of Philosophy
Major Professor: Nick Carpita
Thesis Title: "Arabidopsis cell wall ß-galactosidase gene family: Expression, catalytic activities and biological function in galactose dynamics"
Iris is a staff scientist at Unidad de Biotecnologia CENIAP-INIA in Venezuela.

David Doll
Bachelor of Science
Major: Plant Biology
David is continuing his academic career at the University of California, Davis to pursue his M. S. in plant pathology.

Valerie Kinney
Master of Science/Non-Thesis
Major Professor: Ray Martyn
Valerie is a microbiologist at Pharmaceutical Systems, Inc. in Mundelion, Illinois.

Sarah Knapke
Bachelor of Science
Major: Plant Biology
Sarah is continuing her academic career here in the Department of Botany and Plant Pathology pursuing her M.S. degree under the direction of Dr. Bob Pruitt.

David Smith
Master of Science
Major Professor: Steve Hallett
Thesis Title: "Evaluation of *Microsphaeropsis amaranthi* as a bioherbicide for the control of waterhemp, *Amaranthus tuberculatus*"
David is continuing his studies towards a Ph.D. under the direction of Dr. Scott Abney here in the Department of Botany and Plant Pathology.

Ian Thompson
Doctor of Philosophy
Major Professor: Don Huber
Thesis Title: "Manganese oxidation by plant pathogenic fungi"
Ian is currently a post-doctoral research associate in the J. C. Arthur Herbarium, Department of Botany and Plant Pathology.

Michael VanOosten
Master of Science
Major Professor: Ron Coolbaugh
Thesis Title: "The regulation and expression of the CYP72A sub-family of abscisic acid hydroxylases in *Arabidopsis thaliana*"
Michael is pursuing a Ph.D. here at Purdue University in the Department of Horticulture.

AUGUST 2004

Brian Foss
Master of Science/Non-Thesis
Major Professor: Scott Abney
Brian is a research technician in Scott Abney's Lab here in the Department of Botany and Plant Pathology.

DECEMBER 2004

Reuben Pillsbury
Bachelor of Science
Major: Environmental Plant Studies
Reuben started a nine-month internship with the Student Conservation Association doing invasive plant removal in the national parks of California in January 2005.

Holly Ruess
Master of Science
Major Professor: Guri Johal
Thesis Title: "Adult plant resistance in maize to *Cochliobolus carbonum* Race 1"
Holly is working for Macherey Nagel in Illinois as a DNA Sales Representative.

Milos Tanurdzic
Doctor of Philosophy
Major Professor: Jody Banks
Thesis Title: "Genetic and genomic studies of seed-free plants: Sex determination in ferns and whole-genomes studies of lycopods"
Milos is a post-doctoral research associate at Cold Spring Harbor Laboratories in New York.

Undergraduate Highlights

Reuben Pillsbury First Environmental Plant Studies Graduate

In December 2004, the Department of Botany and Plant Pathology graduated its first student in the new Environmental Plant Studies (EPS) major.

Reuben Pillsbury, a native of Fortville, Indiana, was drawn to this new major the summer before his first semester at Purdue. Reuben's original plan was to enter a program in the Department of Ag and Biological Engineering or Civil Engineering's Environmental Engineering Program. Since his interest was more in the environmental aspect than the engineering aspect, he decided to research our new Environmental Plant Studies major. After checking out the website and reviewing the classes in the program, his interest was piqued and he made the switch. Reuben graduated with a GPA of 3.18, was recognized several times with semester honors, and received several college and departmental scholarships. He also did a study abroad during Maymester 2003 in England, Wales, and the Netherlands. The department currently has six students in the EPS major, with two scheduled to graduate in May 2005.

Department Recognizes Outstanding Undergraduates

The Department of Botany and Plant Pathology is pleased to acknowledge the talents and efforts of several of our outstanding undergraduate students.

Sarah Knapke
Rockville, IN

Sarah Knapke, a senior in our plant biology major, was selected as our ***Outstanding Senior***. Sarah is a member of the Honor Societies of Phi Sigma Pi and Phi Eta Sigma. She is active in the Botany Club, Shreve Club, and local church. Sarah was awarded the Chapple Scholarship from Purdue University and she began a masters program in our department in the Fall of 2004 with Dr. Bob Pruitt.

Sarah Kessans
Salem, IN

Sarah Kessans, a junior in our plant biology major, was selected as our ***Outstanding Junior***. Sarah is an extremely energentic and ambitious young woman. Sarah came to Purdue with excellent credentials and her exceptional academic performance has continued. She has done this while being an active member of the Purdue Varsity Crew. Sarah and a fellow crew teammate plan to participate in the 2005 Woodvale Atlantic Rowing Race.

Lauren Greig
Evansville, IN

Lauren Greig, a sophomore in our environmental plant studies major, is our selection as ***Outstanding Sophomore***. Lauren is an outstanding individual and student; her overall GPA is 3.27. She spent spring break 2004 in France with her French 380G course. The class blended language instruction with the study of French cooking and its role in French life. Lauren plans on working in a third world country providing agricultural aid after graduation. She is interested in the Peace Corp Master's Program.

Fred Beckman
Valparaiso, IN

Fred Beckman, a freshman in our plant biology major and a member of the Air Force ROTC program, was selected as our ***Outstanding Freshman***. With Fred's very good academic performance and his leadership training in the ROTC program, we believe that this is the first of many achievements he will accomplish.

Undergraduate Highlights

Excellence Through Diversity

Recognitions Complete Students Final Semester

Senior **David Doll** was selected as the Inter Fraternity Council President of the Year in 2004. David was the President of Triangle Fraternity. Selection for this award was based on 46 fraternities representing approximately 6,000 members.

During his final semester, David was one of seven students chosen in the College of Agriculture to receive a $2,000 Undergraduate Research Scholarship. He conducted his research project with Dr. Steve Hallett in the area of biological control and then presented a poster at the College of Agriculture competition in April 2004. David finished his plant biology degree program with a cumulative GPA of 3.45. He is continuing his academic career at the University of California, Davis.

Among his many accomplishments, David also drove in the famous Purdue Grand Prix. He started during his freshman year when he was the driver for Tarkington Hall's entry. He was credited for resurrecting the Grad Prix tradition at Tarkington. Due to mechanical failure during his final race in 2004, David was only able to complete 82 of the 160 laps and finished in 24th place.

LaRiva Named Co-Most Valuable Pitcher for 2004 Varsity Softball Season

Diana LaRiva, a native of Tustin, California, is a stand-out pitcher for the Purdue Varsity Softball Team. 2004 was an outstanding year for the California girl. She was named Co-Most Valuable Pitcher at the team's postseason banquet. She was also an Academic All-Big Ten honoree. Diana is majoring in our plant biology option. Her cumulative GPA is 3.41.

Her softball statistics are equally impressive in 2004. She recorded a 15-13 record in 37 appearances, including 29 starts. She pitched 14 complete games including five shutouts. Diana rewrote the Purdue single-game and single-season strikeout records. She struck out 17 batters against Indiana/Purdue at Fort Wayne en route to a single-season record 196 strikeouts. Her compiled ERA was 2.03. She allowed just 50 earned runs in 172.1 innings of pitching. In the Capital Classic against Utah State in March 2004, Diana tossed a complete game no hitter. Later that weekend she recorded a one-hitter against IUPUI. She ranked among the top 10 in the Big Ten in four categories in 2004: she was third in caught looking strikeouts with 62, eighth in swinging strikeouts with 196, eighth in pitching starts with 29, and ninth in appearances with 37. In Big Ten Conference play Diana ranked fifth in looking strikeouts with 22 and 12th in total strikeouts with 56. She entered the Purdue career top five in ERA, shutouts and strikeouts.

The 2005 season has started and Diana is beginning where she left off. On February 11, 2005, Diana tossed a historic perfect game in an 8-0 win over UMKC in the Hilton Classic in Las Cruces, NM. This was the first perfect game in Purdue softball history.

Undergraduate Highlights

Kessans Honored as Most Valuable Oarswoman

The Kenneth M. Butler Award for Most Valuable Oarswoman is an award voted on by the entire Purdue Crew Team. The 2004 recipient was **Sarah Kessans**. Sarah, a junior in our plant biology program, has been a member of the Purdue Crew Team since coming to campus in fall of 2001.

Not only does Sarah excel as a member of the crew team, she excels academically. Sarah was awarded a $2,000 Undergraduate Research Scholarship. She conducted her research project with Dr. Nick Carpita and presented it at the college poster competition in April 2004. During the summer of 2003, Sarah conducted research abroad in the laboratory of Dr. Fiona Doohan in Dublin, Ireland. She was able to perform very high-end research in plant pathology. The research she conducted was worthy of a paper, which is pending publication in *Plant Molecular Biology*. Due to her success in international research, Sarah was nominated for a national undergraduate research award sponsored by the Forum of Education Abroad.

Sarah is a very disciplined and driven young woman. Sarah and her fellow crew team member, Emily Kohl, have registered to compete in the 2005 Woodvale Atlantic Rowing Race. This event is called the "World's Toughest Rowing Race." The team plans to row 2,900 nautical miles in less than 60 days. The two must train for the physical demands of the race and also meet the challenge of raising the almost $200,000 needed for the endeavor. These two will be the youngest American women to ever row across an ocean. If you are interested in reading more about their adventure or contributing to their fund drive, check out the their website: <http://web.ics.purdue.edu/~skessans/>.

Undergraduate Opts for France on Spring Break

Lauren Greig started taking French in high school back in Evansville, Indiana and has continued here a Purdue. She has taken French 201, 202, 212, 301, and 302.

In the spring 2004 semester, Lauren signed up for French 380G, "French Gastronomy: French Culture Through Cooking" adding to her love of the French culture. This class blended language instruction with the study of French cooking and its role in French life. From the time the group of nine students boarded the bus at the Purdue Memorial Union until they returned from France, the classmates spoke only French. The students took cooking classes with French chefs and saw the role of the cuisine in the French culture. The class also asked many questions, went sightseeing, met people and chatted for hours, of course, entirely in French. The trip was based at the Ecole des Trois Ponts, which is housed in the 18th century Chateau de Matel in Roanne, France. Lauren said it was difficult being forced to speak totally in French, but she was glad they did it. Lauren is majoring in our environmental plant studies option and plans on joining the Peace Corps Master's Program after graduation.

2004 Undergraduate Students

Excellence Through Diversity

*Fredrick Beckman**
Plant Biology
Hebron, Indiana

Heather Becraft
Plant Biology
Granger, Indiana

Janelle Donahue
Plant Biology
Evansville, Indiana

Jennifer Dudash
Environmental Plant Studies
Kokomo, Indiana

*Haley Gale**
Plant Biology
Lebanon, Indiana

*Lauren Greig**
Environmental Plant Studies
Evansville, Indiana

Joshua Haun
Plant Biology
Dyer, Indiana

*Sarah Kessans***
Plant Biology
Salem, Indiana

Diana LaRiva
Environmental Plant Studies
Tustin, California

*Adam Leonberger***
Plant Biology
Indianapolis, Indiana

John McMillan
Crop Protection
Greenfield, Indiana

*Kendra Meade**
Plant Biology
Fort Branch, Indiana

*Rachel Mertz***
Plant Biology
West Lafayette, Indiana

Patricia Quackenbush
Environmental Plant Studies
Fort Wayne, Indiana

Scott Stuck
Plant Biology
Wolcottville, Indiana

Yenny Suanthie
Plant Biology
Surabay, Indonesia

Antonio Troche
Environmental Plant Studies
Fremont, Indiana

Elizabeth Vucolo
Environmental Plant Studies
Flemington, New Jersey

*Departmental Scholarship Recipient

**Department and College of Agriculture Scholarship Recipient

2004 Graduate Students

Synan Abu Qamar - Ph.D.
Major Prof. - Tesfaye Mengiste
Amman, Jordan

Mitchell Alix - Ph.D.
Major Prof. - Carole Lembi
Valparaiso, Indiana

Jon-Joseph Armstrong - M.S.
Major Prof. - Kevin Gibson
Muscotah, Kansas

Muthu Balasubramaniam - Ph.D.
Major Prof. - Sue Loesch-Fries
Chennai, India

Burton Bluhm - Ph.D.
Major Prof. - Charles Woloshuk
Starksville, Mississippi

Clay Britton - Ph.D.
Major Prof. - Carole Lembi &
Bob Pruitt
Overland Park, Kansas

Min-Wen Cheng - M.S.
Major Prof. - Don Huber
Tainan, Taiwan

Cameron Cooley - M.S.
Major Prof. - Charles Woloshuk
Normandy, Tennessee

J. Earl Creech - Ph.D.
Major Prof. - Bill Johnson
Lewiston, Utah

Vince Davis - M.S.
Major Prof. - Bill Johnson
Macomb, Illinois

Amanda Deering - Ph.D.
Major Prof. - Bob Pruitt
Mount Pleasant, Michigan

Rahul Dhawan - Ph.D.
Major Prof. - Tesfaye Mengiste
Punjab, India

Braham Dhillon - Ph.D.
Major Prof. - Guri Johal
Luhhiana, India

Richard Dirks - Ph.D.
Major Prof. - Kevin Gibson
West Lafayette, Indiana

Chad Dyer - M.S.
Major Prof. - Tom Bauman
Freedom, Indiana

Luke Gumaelius - Ph.D.
Major Prof. - Jody Banks
Salem, Indiana

David Hillger - Ph.D.
Major Prof. - Kevin Gibson
Peebles, Ohio

Amber Hopf - Ph.D.
Major Prof. - Jody Banks
Petersburg, Indiana

Amr Ibrahim- Ph.D.
Major Prof. - Sue Loesch-Fries
Giza, Egypt

Yangseon Kim - Ph.D.
Major Prof. - Jin-Rong Xu
Suwon, South Korea

Preekamol Klanrit - Ph.D.
Major Prof. - Mary Alice Webb
Mueng Udonthani, Thailand

Sarah Knapke - M.S.
Major Prof. - Bob Pruitt
Rockville, Indiana

Greg Kruger - M.S.
Major Prof. - Andreas Westphal
Mount Gilead, Ohio

Kristin Laluk - Ph.D.
Major Prof. - Tesfaye Mengiste
Fountain Hills, Arizona

Ryan Lee - Ph.D.
Major Prof. - Bob Pruitt
Bedford, Indiana

Lei Li - Ph.D.
Major Prof. - Jin-Rong Xu
Shanghai, China

Zhenghua Luo - Ph.D.
Major Prof. - Zhixiang Chen
Guangqhou, China

Ashlee Mounteer - Ph.D.
Major Prof. - Steve Hallett
Rexburg, Idaho

Maggie Ngar - Ph.D.
Major Prof. - Ray Martyn
Bonner Springs, Kansas

Eric Ott - M.S.
Major Prof. - Bill Johnson
Prairie Du Sac, Wisconsin

Daljit Singh - Ph.D.
Major Prof. - Steve Hallett
Chandigarh, India

David Smith - Ph.D.
Major Prof. - Scott Abney
Bremen, Indiana

Justin Stewart - M.S.
Major Prof. - Rick Latin
Berne, Indiana

Janani Varadarajan - Ph.D.
Major Prof. - Ron Coolbaugh
Channai, India

K. M. Vinod - Ph.D.
Major Prof. - Zhixiang Chen
Trichur, India

Jeremy Weber - M.S.
Major Prof. - Kevin Gibson
Brookville, Indiana

Kathryn Wilkinson - Ph.D.
Major Prof. - Carole Lembi
South Lyon, Michigan

Hugh Young - Ph.D.
Major Prof. - Guri Johal
Bellefonte, Pennsylvania

Xinhua Zhao - Ph.D.
Major Prof. - Jin-Rong Xu
Zhejiang, China

Zuyu Zheng - Ph.D.
Major Prof. - Zhixiang Chen
Beijing, China

Graduate Highlights

Burt Bluhm Receives 2004 Indiana Seed Industry Graduate Study Award

Marshal Martin presents Burt Bluhm with the 2004 Indiana Seed Industry Graduate Student Award.

Each year the Ag Alumni Seed Improvement Association, the Indiana Crop Improvement Association, the Indiana Seed Trade Association and the Public Varieties of Indiana provide a $2,000 cash award to support a graduate student whose program of study is relevant to the seed industry. This year the recipient of this prestigious award is **Burt Bluhm**.

Burt's research is centered on developing PCR methodologies for detecting mycotoxigenic *Fusarium* species. A rapid method for detecting mycotoxigenic *Fusarium* is important to the brewing industry, those concerned about bioterrorism, as well as others who need to know if these fungi are in their raw materials or end products. Burt completed his M.S. degree in 2003 and is working towards his Ph.D. with Dr. Charles Woloshuk.

Purdue Graduate Student Government Honors Distinguished Teaching Assistant

Muthukumar ('Muthu') Balasubramaniam was honored by the Purdue Graduate Student Government as the university's 2004 Distinguished Teaching Assistant. Muthu has been a teaching assistant for eight consecutive semesters and the student coordinator for the departmental summer research internship program for the past two summers. Muthu was selected as the departments outstanding teaching assistant in 2003.

While serving as a teaching assistant each semester, Muthu also has been conducting his thesis research titled "An S-nitrosothiol as the long-distance mobile signal in the establishment of systemic acquired resistance conferred by localized TMV infection in resistant tobacco plants." He is a Ph.D. student with Dr. Sue Loesch-Fries and is nearing the completion of his research.

Cameron Cooley Named Departments Outstanding Teaching Assistant for 2004

Cameron Cooley was named the department's Outstanding Teaching Assistant at the annual Celebration of Graduate Student Teaching banquet in April 2004. Cameron was selected from 10 department teaching assistants for the award. Each university honored teaching assistant received an engraved plaque in recognition of their teaching excellence.

Cameron was a teaching assistant for two semesters. He was a TA in BTNY 210, Introduction to Plant Science, BTNY 305, Fundamentals of Plant Classification, and BTNY 301, Introductory Plant Pathology. He also was a mentor for the MARC-AIM program in the summer of 2003 and served as a tutor for college algebra for Summer Bridge Students in the College of Business.

Cameron is a M.S. student with Dr. Charles Woloshuk and he is specializing in plant pathology and his research project is titled, "Osmoregulation in the xerophilic fungus, *Eurotium rubrum*." He is in the final stages of completing his thesis and set to graduate in 2005.

Graduate Highlights

Wilkinson Receives a First Place for Presentation from the Purdue Environmental Sciences and Engineering Institute

In April 2004, **Katie Wilkinson**, Ph.D. student with Dr. Carole Lembi, placed first in the oral student presentation contest sponsored by the Purdue Environmental Sciences and Engineering Institute, at the 5th Annual Environmental Research Symposium. Katie was one of eight student presenters. It was a tough competition and Katie did an outstanding job.

Undergraduate, David Doll, also gave a talk on his research project and did a superb job. He handled some very tough questions in an impressive manner.

The goal of this symposium is to promote awareness of environmental research and to foster and encourage idea and information exchange among the members of the Purdue community, other academic institutions, industry, and government agencies.

Faculty and Students Inducted into Gamma Sigma Delta Honor Society

The department would like to congratulate **Dr. Steve Hallett**, **Dr. Andreas Westphal**, and graduate student, **Valerie Kinney**, on their induction into the Gamma Sigma Delta Honor Society in 2004. At the 33rd Annual Recognition and Initiation Program of the Purdue Chapter in April 2004, the society recognized academic achievement and accomplishments of students, faculty, and alumni.

Weed Science Students Bring Home Awards From NCWSS Weed Science Contest

The 2004 North Central Weed Science Society (NCWSS) Weed Science Contest was held at the University of Minnesota's Southern Research and Outreach Center in Waseca, Minnesota. There were 11 teams and over 50 individuals competing from landgrant schools in the north central region.

Winning Graduate Team: (L to R) - Mary Gumz, HLA, Earl Creech, BTNY, Eric Ott, BTNY, and Vince Davis, BTNY.

Our Purdue students brought home a number of awards. The graduate team of **Earl Creech**, **Vince Davis**, **Eric Ott** (Dept. of Botany and Plant Pathology), and Mary Gumz (Dept. of Horticulture and Landscape Architecture) received 1st place overall. Individual awards were given to Earl Creech, 1st place graduate individual, Mary Gumz, 2nd place graduate individual, Vince Davis, 4th place graduate individual, and Eric Ott, 9th place graduate individual. 1st place individual in weed identification went to Mary Gumz, and 1st place team in field sprayer calibration went to the team of Earl Creech, Vince Davis, Eric Ott, and Mary Gumz. Graduate student, **Chad Dyer**, also participated as an individual.

This team was coached by Dr. Bill Johnson and Ph.D. student Dave Hillger. Congratulations to all the students and coaches on an outstanding contest and good luck in 2005.

Graduate Highlights

Outstanding Ph.D. Graduate Student Award Presented to Ms. Lei Li

Dr. Ray Martyn presents the Outstanding Ph.D. Graduate Student Award to Ms. Lei Li.

Ms. Lei Li was the recipient of the 2004 Outstanding Ph.D. Graduate Student Award. Lei has been a student with Dr. Jin-Rong Xu's program since 2000. Her first project was to determine the function of PAK kinases in the rice blast fungus. She accomplished this and is the first author of the resulting publication. Her second project was to test RNAi silencing in *Magnaporthe grisea*. In collaboration with a post-doc in the Xu lab, Lei silenced two of the five *M. grisea* genes tested. A manuscript based on this work is in preparation. Her main thesis work is to use the promoter trapping approach to identify fungal genes specifically expressed at different plant infection stages. She has generated 2,500 transformants with two promoter-GFP constructs. Using an onion epidermal cell penetration assay, Lei has identified 10 mutants that are defective in plant penetration or specifically express GFP in different infection stages. Genes tagged in a few of these mutants have been recovered. At least one of them is a novel virulence factor. Based on her data, Dr. Xu was able to prepare a BARD proposal which was funded in 2003. As least two more publications should result from her thesis. In addition to her research projects, Lei has been assisting other lab members on several projects. She also participated in the rice blast functional genomics project for recovering genes disrupted in insertional mutants. Being the first graduate student in Dr. Xu's lab, Lei has mastered various techniques and helped in the training of new lab members.

Lei Li has also served as a teaching assistant for BTNY 590M - Molecular Approaches to Plant Pathology. This lab-based course required a lot of preparation and organization. She did an excellent job and her hard work was essential for the success of this course.

Dr. Jin-Rong Xu and his student Lei Li after she was awarded the Outstanding Ph.D. Graduate Student Award.

Lei is a very talented graduate student with a GPA of 3.82. She is very helpful to other students and technicians in the Xu lab and also to other groups. She interacts well with the other graduate students and participates in the departmental functions. She is an active participant in the fungal biology journal club. She also has been a mentor the past two summers to REU students and visiting students involved in TAIL-PCR for gene recovery in the rice blast fungus.

Lei Li is valued and respected by those who interact with her. She is very quiet and doesn't expect any fanfare or recognition for her assistance and accomplishments.

Lei received an engraved plaque, a cash award of $300 and her name has been engraved on the departmental plaque. She is scheduled to complete her thesis project in late 2005.

Graduate Highlights

Dr. Ray Martyn presents graduate student, Vince Davis, with the 2004 Outstanding M.S. Graduate Student Award.

Vince Davis Receives the Outstanding M. S. Graduate Student Award

Mr. Vince Davis began his M.S. program in May 2003 under the direction of Dr. Bill Johnson. Dr. Johnson met Vince in December of 2002 at the North Central Weed Science Society Meeting in St. Louis, Missouri. The two began talking about graduate school and Vince's undergraduate research project at Western Illinois University. Dr. Johnson was impressed with his understanding of agronomic practices related to production of a non-traditional crop and his ability to verbally communicate the results of his research. As Dr. Johnson continued his discussion about graduate studies and his career goals, it became very apparent that Vince was not the typical undergraduate student. Vince has had some practical work experience, not only on a family farm, but also as an intern with Monsanto and as an agronomist and trial supervisor with Wyffels Seed Company. Vince has a very keen understanding of weed-crop interactions, plant growth and development, and the impact applied crop biotechnology has on pest management. He also has a tremendous work ethic.

Dr. Johnson feels very fortunate to have recruited Vince to come to Purdue to start his master's program. Vince was immediately instrumental in contacting extension educators in Indiana and finding a grower field with glyphosate-resistant horseweed. He initiated field research projects in this field in addition to assisting with all of Dr. Johnson's research projects within a month of arriving at Purdue. Since then, Vince and Johnson have initiated rather labor intensive field biology trials at SEPAC to investigate growth patterns and winter mortality of this weed. In addition, Vince is responsible for coordinating the extensive field survey project to determine the distribution of this weed in Indiana. He routinely leaves well before sunrise, returns after dark, and works on weekends and holidays to accomplish all of the duties associated with his research and other research projects.

Vince is also an excellent public speaker. He won 1st place in the graduate student oral paper contest at the 2003 NCWSS Meeting in Louisville, Kentucky. He has presented the results of his research at Purdue Weed Science field days, at field days in Illinois and was invited to discuss his research at the Mid America Ag Show in Indianapolis in January 2005. These are especially noteworthy accomplishments for a M.S. student.

Vince Davis and his major professor, Dr. Bill Johnson, just after Vince received the award for Outstanding M.S. Student.

Vince has a strong desire to pursue a career in weed science and crop production technology. He is highly motivated and has charted a course in his coursework and research that will provide the training and background to achieve his goals. Dr. Johnson feels that Vince is one of the hardest workers and most highly motivated students he has been associated with. He excels in all areas.

Vince was awarded a plaque, a cash award of $200 and his name has also been included on a departmental plaque. He plans to complete his M.S. degree in early 2006.

Graduate Highlights

Graduate Student Receives Second Place Honors at North Central Weed Science Society Meetings

In December 2004, at the North Central Weed Science Society Meetings in Columbus, Ohio, **Earl Creech** received a 2nd place award for his oral presentation titled "Soybean cyst nematode and winter annual weeds in Indiana: Distribution and producer concern." Earl is a Ph.D. student in Dr. Bill Johnson's program

Department Awards Graduate Students Travel Grants

The department recognizes the value of graduate students attending and participating in scientific meetings. In 2004, seven students were awarded $250 each to attend a regional, national, or international meeting where they presented either a poster or oral presentation of their research. These awards are made possible by voluntary gift money from alumni and friends.

Katie Wilkinson, Aquatic Plant Management Society, Tampa, Florida, July 11 - July 14, 2004. "A potential biological control agent, bacterium SG-3: Made of action and effect on two economically important cyanobacteria."

Yangseon Kim, American Phytopathological Society, Anaheim, California, July 31 - August 4, 2004. "Characterization of MST11 gene in the rice blast fungus."

Amber Hopf, International Plant Growth Substance Association, Canberra, Australia, September 20 - September 24, 2004. "Plant hormones and the sex determination process in the fern *Ceratoptuis richardii*."

Chad Dyer, North Central Weed Science Society, Columbus, Ohio, December 13 - December 16, 2004. " Weed control and soil longevity of KIH-US5, acetochlor, dimethenamid and s-metolgehlor."

Earl Creech, North Central Weed Science Society, Columbus, Ohio, December 13 - December 16, 2004. "Soybean cyst nematode and winter annual weeds in Indiana: Distribution and producer concern."

Vince Davis, North Central Weed Science Society, Columbus, Ohio, December 13 - December 16, 2004. "Indiana glyphosate-resistant horseweed (*Conyza covodensis*) survey: Current status."

Dave Hillger, North Central Weed Science Society, Columbus, Ohio, December 13 - December 16, 2004. "A survey of problematic weeds in corn and soybeans in Indiana."

Ivy-leaf morningglory (*Ipomoea hederacea*) - Photo taken by Wes Everman while working in his research plots at the Agronomy Farm in 2001.

Collage of herbaceous forest plants from graduate student Jeremy Weber's research study in 2004.

Graduate Student and Post-Docs Enjoy the 6th Annual Texas Barbecue

It's no different on the weekends, our graduate students and post-docs need nourishment!

With a host of new post-docs and graduate students joining the department, this annual event is a great time to get to know each other in a fun and relaxed setting.

Each fall Ray and Carol Martyn invite all of the post-docs and graduate students to their home for an afternoon of good ole Texas cooking and fun and games. Everyone plays a little air hockey and spends the early afternoon practicing for the annual "Killer Dart Championship." Then the competition begins. Those interested in the famed championship pair up with a friend and the darts begin to fly.

Graduate students, **Dave Hillger** and **Vince Davis** were crowned "2004 Killer Dart Champions." Dave and Vince both are repeat champions with other partners in previous years. Dave was a winner in 2000 and Vince was a winner last year in 2003. These students each received a certificate and a $50 textbook credit. For everyone else, well, there is always next year.

Lijuan Xing and Melissa Kruger battle at a game of air hockey, while Greg Kruger watches and learns.

Chad Dyer and Greg Kruger decide to play air hockey before the dart competition began.

Ashlee Mounteer removes her practice shots and is getting ready for the competition to begin.

Kristen Laluk looking like a pro in her first "Killer Dart Championship."

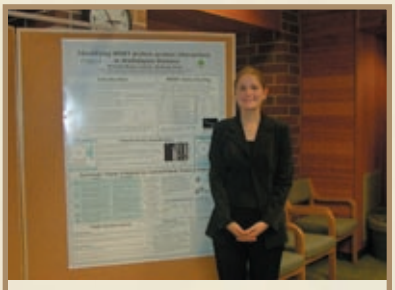
Sarah Knapke giving it her best shot in during her first "Killer Dart Championship."

Department Highlights

Dr. Ray Martyn and Muthu Balasubramaniam welcome the students on their first day at Purdue.

Laura Divine in Dr. Sue Loesch-Fries' lab where she worked on the development of tools to study alfalfa mosaic virus replication.

In the lab of Dr. Tesfaye Mengiste, Farah Meah studied the genetic control of *Arabidopsis thaliana* to the fungal pathogen *Botrytis cinerea*.



Michelle Moyer, University of Wisconsin, worked with Dr. Zhixiang Chen and his lab in identifying WRKY proteins-protein interactions in *Arabidopsis thaliana*.

In the lab of Dr. Robert Pruitt, Mirayda Torres conducted a study of sequence changes for hothead mutation in *Arabidopsis* using IN/DEL primers.

Summer Research Program Exposes Student to Valuable Research Tools and Techniques

The goal of our summer undergraduate research program is to expose students to some of the best faculty in the country and to pique their interest in pursuing a graduate degree, hopefully with Purdue University.

The 2004 program hosted four students to campus for eight weeks of new and exciting research. Bob Pruitt and Muthu Balasubramaniam welcomed these students and followed them through their eight weeks here at Purdue. Muthu was their mentor and friend as they spent their summer in the laboratories of the Department of Botany and Plant Pathology.

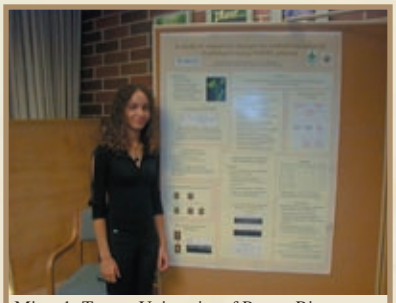
For more information and pictures of the 2004 SRP check out our website at:
<http://www.btny.purdue.edu/>

(L to R) - SRP Coordinator, Bob Pruitt, Laura Divine, Michelle Moyer, Farah Meah, Mirayda Torres, and Graduate Student Mentor, Muthu Balasubramaniam pose for a final picture together at the end of the poster session.

Girls night out! After a long day in the lab, the four girls go out to unwind at Applebee's.

SRP Coordinator, Bob Pruitt, and Graduate Student Mentor, Muthu Balasubramaniam, have a welcome luncheon with the new students and discuss the summer research program.

Farah Meah, Benedictine University, showcases her research at the final poster session in late July.

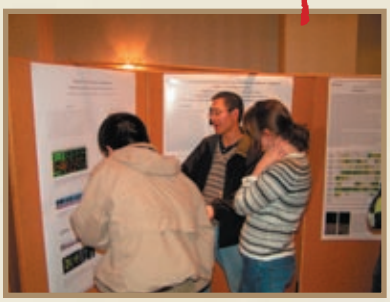


Mirayda Torres, University of Puerto Rico, stands proudly next to her final research poster.

Laura Divine, Mount Mary College, poses with Muthu Balasuramaniam and Dr. Sue Loesch-Fries after her oral presentation on her summer research project.

Miranda Torres and her new friends from the Pruitt Lab: Bob Pruitt, Trulie Junk, Jessica Young, Ryan Lee, and Liese Pruitt .

Department Highlights

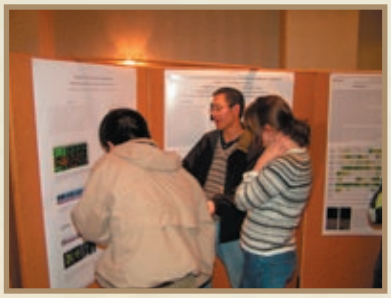


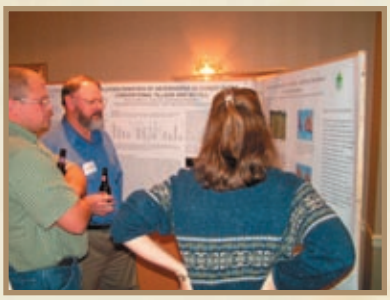
Annual Event Showcases Graduate Student and Post Doctoral Research

This annual social event is a great time for everyone to take an evening to socialize in a nice setting away from campus and the laboratory settings that they are used to day in and day out.

For the last five years, faculty, post docs, and graduate students take this opportunity to share their research with fellow departmental colleagues. It brings all the disciplines within the department together for one night during the semester and gives everyone a chance to meet the newest students and post docs.

This event is also the venue for announcing the year's outstanding M.S. and Ph.D. students. **Lei Li**, a student with Dr. Jin-Rong Xu, was awarded the Outstanding Ph.D. Student Award and **Vince Davis**, a student with Dr. Bill Johnson, was awarded the Outstanding M.S. Student. (See articles on pages 44-45).





Your Door to Discovery

Department Enjoys Annual Picnic and Softball Game

The Annual Botany and Plant Pathology fall picnic was held on Sunday, September 26th at Happy Hollow Park.

It was a lovely fall afternoon and the park provided many activities for picnic goers. The afternoon started with hot dogs and hamburgers on the grill, made especially tasty by Ray Martyn and Larry Mow. These treats were complimented by a table full of picnic favorites. We all enjoyed a great lunch.

Then the fun began. It was time for the annual softball game between the faculty/staff team and the student/post doc team. Everyone came ready to play for the coveted title of the "Winning Team." The faculty/staff team took a commanding lead the first four innings. The student/post- doc team had to figure out the devasting pitching of Pam Mow. Well, they finally did and the student/post-doc team exploded with a 14 run 5th inning. With no relief pitchers in the bullpen, the faculty/staff team dug in and played hard, but it wasn't enough and the student/post-doc team pulled out the victory by one run. The final score was 29 to 28.

It's a good thing this game is an annual event, because there were a lot of sore and injured people walking the halls the next day. Charlie Woloshuk pulled a hamstring running the bases, Dave Smith broke his foot sliding into home (he was wearing boots, oh my!), and Ryan Bonnell had two scraped up hands and knees from sliding head first into home plate. The rest of us weren't quite as bad, but we all had sore muscles and slight limps for several days.

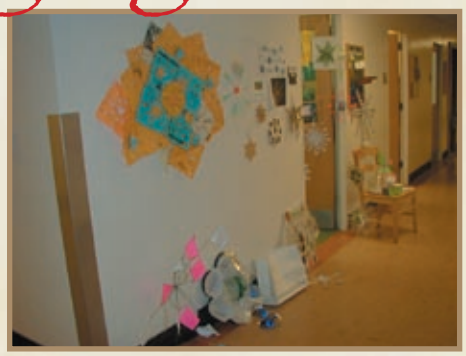
At least we have a year to heal and practice up. Right!! We all are looking forward to the rematch next year.

The "Winning Team" - Mandy Deering, Joe Armstrong, Vince Davis, Greg Kruger, Sarah Knapke, Ian Thompson, Harley Rowbotham, Dave Smith, and Ryan Bonnell.

Faculty/Staff Team - Andre Woloshuk, Charlie Woloshuk, Steve Hallett, Guri Johal, Bill Johnson + Jacob, Steve Goodwin, Ray Martyn, Pam Mow, and Larry Mow.

Department Highlights

Snowflake Contest Returns to Botany and Plant Pathology Holiday Festivities



Snowflake entries in front of "Supreme Snowflake Judge" Carole Lembi's office in Lilly Hall.

The revival of the "Snowflake Contest" brought Lilly Hall to life in late November and early December. Especially in front of Supreme Snowflake Judge, Dr. Carole Lembi's, office. This contest was new to most of the department. There were a few members of the department who participated in previous events, but the majority of us experienced this for the first time. The rules were set, a secret committee was formed and then the department began receiving daily snowflake spybot e-mail alerts telling of bribery, cheating, and all sorts of tom foolery. Dr. Lembi shared snowflakes from the 1980 archives and everyone enjoyed several weeks of snowflake mania. We also had an entry from outside of the department. A young man, Yinnon, was walking past Carole Lembi's office and decided he wanted to join the fun and went to his mother's office and made his own snowflake entry. The fun was contagious.

Crystal Reinken presents Ryan Lee with his Grand Prize Trophy as he was announced the Snowflake Contest Winner.

All the entries were showcased at the Annual Chili Cook off and Holiday Gathering in mid-December. Carole Lembi, Supreme Snowflake Judge, served as master of ceremonies. The whole department enjoyed the competition and the awards ceremony was absolutely hilarious. Here is a list of the winners and the award they received:

Sarah Knapke and Amanda Deering enjoy sampling the different entries in the Chili Cook Off.

Grand Prize: The Best of the Best: Ryan Lee
Best Entry from an Undergrad Student: Sarah Kessans
The Try Again Next Year Award: Truly Junk
Best Use of Materials Award: Jessica Young
The Most Waste of Time Award (now known as the RAY MARTYN TROPHY): tie between Ryan Bonnell and Diana LaRiva & Don Huber and Min-Wen Cheng
Least Ingenuity Award: Nolan Shumway
Greatest Ingenuity Award: Glenn Nice
Most Realistic Snowflake: JoAnne Fisher (and we hope we all get invited to her 2-hour roller-blading lesson with Ray Martyn)
Honorary Mentions: Janet Whaley and Braham Dhillon
A Special Honorary Award for Yinnon

Nick Carpita accepts his prize for placing first in the Chili Cook Off competition.

Gifts for the 2004 Giving Heart Angel Tree Project.

Before the snowflake fun began, the department enjoyed the Annual Chili Cookoff. Fifteen cooks shared their favorite chili and everyone shared in many different holiday goodies. It was a close competition and when the votes were counted, Nick Carpita was the first place winner for his Chipotle Chili entry. Second place honors went to Dave Smith and Ron Coolbaugh received third place.

The department also participated in the 2004 Giving Heart Angel Tree Project sponsored by the Boiler Network. With the donations of money and gifts we helped 13 children have a better holiday.

The Corydon Democrat
Corydon, Ind.

August 4, 2004

Sports

Barbados 'oar' bust!

Two women planning to race across the Atlantic

PURDUE Alumni

Row, Row, Row Your Boat:
Two Purdue women face the challenge of crossing the Atlantic

American Fire Atlantic Challenge
All-American Entry in the

WOODVALE EVENTS ATLANTIC ROWING RACE 2005

One Boat - 2,900 Nautical Miles - Two Rowers and One Incredible Challenge

www.web.ics.purdue.edu/~skessans

Rowing Across the Pond: An Atlantic Dream

SARAH KESSANS
PURDUE UNIVERSITY

It all started innocently enough. I was tired, broke, American college kid spending the last of my summer days abroad strolling through the streets of London, always in search of the next adventure. I had already spent an incredible two months at University College Dublin working in the Environmental Resource Management Department as an intern, performing cutting-edge research in plant pathology and experiencing the wonderful culture that Ireland had to offer. At the end of the summer of 2003, I was simply looking for a book in an Oxford Street bookshop to read on my trans-Atlantic flight home. As a member of the Purdue Varsity Crew team, I have a passion for rowing, and the book I had picked up on the clearance rack looked interesting. I spent the last few pounds in my pocket on the book and a Cadbury's Fruit and Nut bar.

The book was Debra Veal's *Rowing It Alone*, and in it she explained in detail her participation in the 2001 Atlantic Rowing Race. She had, after her husband dropped out of the race, rowed solo across 3,000 miles of the Atlantic Ocean through storms, brilliant sunsets, incredible wildlife, and both a mental and physical challenge unrivaled in the sport of rowing. She talked about surfing down waves in her 24' long boat and about how proud she felt upon completion of the race. The book was page-turning and inspiring. By the time I touched down in a stormy Chicago, I was hooked. As I waited for my connecting flight, watching the lightning flash across the sky, a storm of another kind was brewing in my head.

Research on the internet revealed that the next trans-Atlantic race was set for 2005, and I wanted to be in it. After some careful thought, I brought the idea up to my rowing team. Most of my teammates thought I was crazy, but the idea raised the heart rate of Emily Kohl. She jumped at the idea. Her passion for rowing equaled mine, and we both started deliberating on the possibility of the voyage. In January 2004, after talking to several past ocean rowers and finding the answers to our many questions, we registered for the Woodvale Events Atlantic Rowing Race 2005, set to start in November of 2005.

So, what exactly does this venture entail? It is a race consisting of 30 double-handed teams of rowers who will attempt to row across 2,900 miles of the Atlantic Ocean from the Canary Islands to the West Indies in nearly identical 24 foot long ocean rowing boats. It is a race that will test not only our physical endurance and mental stamina, but also our human spirits. We will be the only American entry in the race, one of four all-female teams, and one of the youngest crews ever to attempt the feat. How unique is the event? Fewer than 200 people in the world have ever rowed across an ocean, whereas more than 2,000 have scaled Mt. Everest. Only 10 Americans have ever rowed an ocean.

The race will take approximately 60 days to complete, and we are shooting for the women's record, which stands at 50 days, 7 hours. We will attempt this by rowing in two hour shifts for 24 hours a day, one of us rowing while the other sleeps. With the proper training, we hope to cover over 50 miles a day eating freeze-dried food and drinking desalinated ocean water. Favorable currents and trade winds across the mid-Atlantic will aid us in our journey, but other than that, we will be completely self-supporting once we cross the starting line. Two support yachts will follow the race fleet in case of emergencies, and we will carry sufficient navigation and communication equipment onboard. Our only means of propulsion will be four oars and our desires to succeed: sails and motors are clearly against the race rules. With our success, we will prove that any dream can be accomplished with hard work and determination.

Although the race represents a formidable challenge, so does even getting to the starting line. With a budget of over

RESEARCH ON THE INTERNET REVEALED THAT THE NEXT TRANS-ATLANTIC RACE WAS SET FOR 2005, AND I WANTED TO BE IN IT.

Going the distance

PURDUE WOMEN'S ROWING COACH JERE JENKINS ISN'T TOO SURE WHY ANYONE WOULD WANT TO SIT IN A BOAT FOR MORE THAN 50 DAYS. TWO OF HIS ROWERS, SARAH KESSANS AND EMILY KOHL, HAVE REGISTERED FOR THE 2,900-MILE WOODVALE ATLANTIC ROWING RACE IN OCTOBER 2005.

The course starts at the **Canary Islands** and ends in **Barbados.** "I think they're nuts," he says. "But if there's two people that can do it, it's them." **Kessans**, a senior studying plants biology, got inspired last year when she read **Debra Veal's** account of the race, ***Rowing it Alone.*** She went to her crew to find a partner, and **Kohl** was convinced. "We're very passionate about rowing," says Kessans, in the understatement of the day, "and we just wanted to **keep rowing after college.**" Even before they tackle the training, they have the **unenviable task of raising funds** to cover registration, travel, training, and equipment costs. They'll need more than **$100,000**, but so far they're enthusiastic.

Companies in Kessans' hometown of **Salem, Indiana**, have appreciated their sense of adventure. A **construction company** kicked in a couple thousand dollars, the local **YMCA** doled out free memberships, and **a bank** agreed to give them financing. Both Kessans and Kohl, who **graduated this past June** with a history degree, did **marathons** in the fall. "As far as athletes go, **they are the most driven people that I know,** they'll go to the well every time," he says. "But I still think they're nuts."

MARCIE GOOD

'Adrenaline-pumping' 60-day Atlantic race attracts crew members

By Maggie Ladd
Staff Writer

"All I need is a little music, and I can row forever."
– Emily Kohl

Two Purdue students already have their Christmas lists ready to go for 2005.

Sarah Kessans and Emily Kohl, both members of the Purdue Crew Team, plan on spending the 2005 Christmas season in sunny Barbados. Only they will have to row 2,900 miles in fewer than 60 days.

Months ago, Kessans, a senior in the School of Liberal Arts, registered with Woodvale Events Atlantic Rowing Race, a distance of 2,900 nautical miles. They will depart from Tenerife, located in the Canary Islands, and row to Barbados, located in the West Indies.

The route is similar to that of Christopher Columbus's and the start date is ideal, because teams will be able to take advantage of the predominantly southwesterly-flowing currents. All teams will be under the

October of 2005, will have 30 teams traveling across the Atlantic Ocean. They will depart from Tenerife, located in the Canary Islands, and row to Barbados, located in the West Indies.

The route is similar to that of Christopher Columbus's and the start date is ideal, because teams will be able to take advantage of the predominantly southwesterly-flowing currents. All teams will be under the

sure because the approximate race time is 60 days.

Kessans and Kohl said they are hoping for first place and wish to finish within 50 days.

"All I need is a little music, and I can row forever," said Kohl.

Kessans first became interested in the race while working at an internship in Dublin, Ireland. She said a lot of Europeans enter the race, and its popularity is larger in Europe compared to the United States.

Kessans said she and Kohl are the only all-America crew team," said Kessans. "Kohl ate up the idea."

Kessans said she and Kohl

Photo courtesy of Emily Kohl

Sarah Kessans and Emily Kohl, both members of the Purdue Crew Team, will row 2,900 miles starting in October to try to be the first of 30 teams to reach Barbados in the West Indies.

and signed up a few weeks later. "I've always been a sucker

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Features

"Adventure is worthwhile in itself."
~Amelia Earhart

Sarah Kessans has rowed throughout her college career. Her journey across the Atlantic Ocean this fall will be her most challenging yet.

THINGS TO DO

Rowers to race across the Atlantic