



Entomology & Plant Pathology

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Greetings from the Department of Entomology and Plant Pathology

Dr. Phil Mulder, Department Head



Welcome to the inaugural issue of the EPP Newsletter for the Department of Entomology and Plant Pathology at Oklahoma State University. We will continue to publish the Sensilla newsletter each month, and will focus the EPP Newsletter on annual highlights and other activities within the department. We encourage everyone to go on-line often to view either of these informative issues. In this section, using my twitter handle, I would like to provide you with some 2016 highlights from our department. In

a way, picking out a twitter handle reminded me of picking out names for your children, not realizing how the kids on the playground will butcher that name or make fun of it. You just have to roll with the punches and if you can't laugh at yourself then what fun is life. Oh well! Guess I am stuck with it now. Please feel free to tweet me some time. Sooner or later, I may figure out how to be good at it.

Departmental Highlights

In this first issue of our newsletter, we want to highlight several things from 2016. First, is the growth in our undergraduate program, we currently stand at 46 entomology majors. My goal when I took this job was to have 50 undergraduates enrolled in five years. Well, guess I did not attain that goal just yet, but we are well on our way. When I started in 2007, we had three undergraduates, so I believe we have discovered a recipe for success and continued growing for the past nine years. In the past five years, we have experienced an 86.4% increase in enrollment for our undergraduate program. One of only 14 entomology majors across the nation, OSU is second in undergraduate enrollment. And I

should point out that we are doing this with less than half the average number of entomology faculty members of these other institutions. In 2013/14, we did two things that helped us immensely in attaining this level of growth. The first was to add to our entomology options and modify existing ones. After visits with Dr. Jacque Fletcher (at that time Head of the National Institute for Microbial Forensics & Food and Agricultural Biosecurity – NIMFFAB), and Dr. Robert Allen, (Professor/ Interim Head and Director of Forensics Sciences, OSU Tulsa) we added an option in bioforensics. We felt that if we constructed an option where students could possibly transition from a B.S. in entomology into a graduate level program

associated with either microbial forensics or animal/human forensics we could attract more majors. This has paid some incredible dividends in a short amount of time with double digit majors selecting that option and more on the horizon. The second thing we did was hire Dr. Wyatt Hoback on a 100% teaching appointment. Dr. Hoback already had a very active forensics program in Nebraska and literally hit the ground running in July, 2104. He has already graduated two M.S. students and currently mentors 2-3 more, while teaching a vast majority of our major's courses, and also mentoring several undergraduate students. His presence in "Insects and Society" has also resulted in more majors in entomology and his

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student contact hours continue to grow. He has also developed an online textbook that generates funds to further support our program and teaches an online offering of Insects and Society to nearly 100 students each summer. In addition to these changes, we also reconstructed our pre-med/pre-vet option to align as a 3+1, where students could take three years as an entomology major, apply to medical or veterinary school and if they were successful in getting in and completing their first year, they would then receive the B.S. in entomology. This has proven to be quite difficult to achieve, but one of our undergraduates did just that (entered vet school at OSU) at the beginning of the fall semester.

With the loss of so many faculty (12 in the past six years – with only 3 added back) in both disciplines, our curriculum has continued to evolve, but our great team of faculty are continuing to find ways to move forward in a positive manner. Obviously, the budget often dictates these situations, but the faculty have stepped up and provided new courses (e.g. Forensic entomology), shifted teaching responsibilities, and prioritized student instruction. These folks are extremely creative and innovative in developing alternative ways of addressing our curriculum issues and I am optimistic for the future developments that will arise.

In the arena of research, we continue to emphasize the land-grant mission with very active programs in human and animal health, microbial forensics, food safety, insect borne transmission of diseases, diagnostics development, IPM, invasive species monitoring, resistance management, cultivar development and screening, soil-borne plant diseases, mycology, bacteriology, plant disease epidemiology, efficacy trials, insect and plant disease biology and ecology, biological control, alternative pest control, stored product management, worker safety, conservation entomology, endangered species, termite pre- and post-treatment strategies, bed bug management/demonstration, and pesticide safety education/recycling/certification. We currently have two Regents Professors within the department, Dr. Kris Giles and Dr. Haobo Jiang. Dr. Giles works on wheat insect research and biological control, while Dr. Jiang is an insect molecular biologist/biochemist working on insect immune responses. I have asked Dr. Jiang to provide a summary of his work over the past few years and highlight some of his more recent publications in

this newsletter. I have also asked Dr. Nathan Walker to highlight his work on turfgrass plant pathology/IPM during his career at OSU and provide examples of publications pertinent to his work. In addition, Dr. Tom Royer, IPM Coordinator and Co-Coordinator for Extension Programming within the department will highlight some of his extension work. Dr. Robert Hunger will also highlight some of his extension and research work with the Wheat Improvement Team (WIT). Drs. Hunger, Royer, and Giles are all members of that highly productive team. I have also asked Dr. Andrine Shufron to describe the contributions and impact of our “Insect Adventure” outreach program. Thank you to all that have contributed to this inaugural issue of the EPP newsletter.

Finally, we want to hear from you, our alumni, friends, and supporters. In this issue, we take a look back at two graduate students from 2000 and 2006 in entomology and plant pathology, respectively. We may be asking some of you receiving this newsletter for an interview, to hear about where life has led you. Special thanks to Kevin Macaluso (2000) and Chris Meador (2006) for providing some insight into their past, and perspectives on their future.



Dr. Haobo Jiang

Regents Professor

It has been sixteen years since I joined OSU in the summer of 2000. Our research group is continuously supported by NIH, OSU, DASNR and EPP to carry out various projects. Our studies are mainly focused on antimicrobial immune responses of the tobacco hornworm *Manduca sexta* and, more recently, the malaria mosquito *Anopheles gambiae*. The molecular mechanisms discovered in the biochemical model species form a knowledge base for us to explore similar processes in the vector of human diseases and other insects. We initially worked on the prophenoloxidase (PPO) activation reaction in *M. sexta*, which is responsible for the melanotic encapsulation of malaria parasites in mosquitoes. Over the years, the research program has largely expanded in the following directions: 1) In collaboration with Dr. Kanost's group at KSU, we discovered protease cascade pathways that coordinate melanization and other defense responses in *M. sexta* [1]. Similar cascades exist in mammals to cause blood coagulation. 2) We participated in major genome projects by analyzing immunity-related genes in the fruit fly, mosquito, honey bee, red flour beetle, and hawk moth. These projects laid a foundation for future research in these

and other insects [2]. 3) We adopted cutting-edge technologies to quantify thousands of gene transcripts and their protein products simultaneously and identified those associated with innate immunity [3, 4]. These explorations stimulated functional analyses of the newly discovered proteins. 4) We collaborated with structural biologists at OSU and KSU and elucidated three-dimensional structures of the key defense proteins in *M. sexta* and *A. gambiae* [5]. These structures provided insights into the mechanisms of substrate binding and enzyme catalysis. To date, our works at OSU have yielded 84 original research articles in scientific journals, including *Science*, *Nature*, *PNAS*, *JBC* and *IBMB*. These accomplishments were made by the graduate students and research specialists. Seven PhD and seven MS students graduated from the lab. Some of the students have already become independent principal investigators.

The department has provided me excellent opportunities to teach graduate students insect biochemistry, insect molecular biology, and biotechnology. I enjoy working with graduate students who strive for knowledge beyond traditional entomology. I appreciate the support provided by the department. Every day is a blessing for me to work with this collegial faculty of entomology and plant pathology.

Recent Publications

- Kanost, M.R., Jiang, H. (2015) Clip-domain serine proteases as immune factors in insect hemolymph. *Curr. Opin. Insect Sci.* **11**, 47-55.
- Zou, Z., Evans, J., Lu, Z., Zhao, P., Williams, M., Sumathipala, N., Hetru, C., Hultmark, D., Jiang, H. (2007) Comparative genome analysis of the *Tribolium* immune system. *Genome Biol.* **8**, R177.
- Gunaratna, R., Jiang, H. (2013) A comprehensive analysis of the *Manduca sexta* immunotranscriptome. *Dev. Com. Immunol.*, **39**, 388-398.
- He, Y., Cao, X., Zhang, S., Rogers, J., Hartson, S., Jiang, H. (2016) Changes in the plasma proteome of *Manduca sexta* larvae in relation to the transcriptome variations after an immune challenge: evidence for high molecular weight immune complex formation. *Mol. Cell. Proteomics*, **15**, 1176-1187.
- Hu, Y., Wang, Y., Deng, J., Jiang, J. (2016) The structure of a prophenoloxidase (PPO) from *Anopheles gambiae* provides new insights into the mechanism of PPO activation. *BMC Biol.* **14**, 2.



Dr. Nathan Walker

Professor

I joined the Department in 1999 in the capacity as the Turfgrass IPM Scientist/Turfgrass Pathologist after receiving my Ph.D. from the University of Arkansas. My responsibilities at that time were 80% research and 20% teaching. My research efforts are focused on the integrated management of turfgrass pests including fungi and nematodes. My teaching responsibilities included an undergraduate course in Turfgrass Integrated Pest Management and Phytonematology. Currently, I have 78% research, 13% teaching, and 9% extension appointment and have added a graduate course in Integrated Pest Management that I co-teach. My principal role in extension is to run the turfgrass Disease Diagnostic Laboratory, which principally serves the commercial sports turfgrass industries.

Oklahoma State University has a long history in bermudagrass cultivar development for both commercial and residential applications. My research program is focused primarily on the important diseases of bermudagrass. One of the most important diseases of bermudagrass is spring dead spot (Fig 1) and is disease of importance in Oklahoma and throughout the region of the US where the grass enters cold temperature induced winter dormancy. Our understanding of the disease has been somewhat limited because it is a soilborne disease, making it difficult to observed disease progression, and the springtime symptoms occur long after the disease was active in the previous fall. The disease is also somewhat unusual in that three different species of a fungus cause



Figure 1: Spring Dead Spot

the disease. I am currently in my third cycle of US Golf Association grant funding to develop methods to improve bermudagrass resistance to the disease. The first grant focused on transforming one of the casual fungi to express green or red florescence proteins so that the presence of the fungus could be visualized in the plant (Fig 2).

The second grant effort was to do the same thing with a second species of the fungus and to compare the two disease pathosystems. A significant finding from both studies was that the fungus colonized susceptible bermudagrasses very differently than resistant/tolerant bermudagrasses. In hosts that are severely diseased, the fungus causes decay of root tissues. In contrast in resistant/tolerant bermudagrasses the fungus colonizes roots internally and does not cause decay.

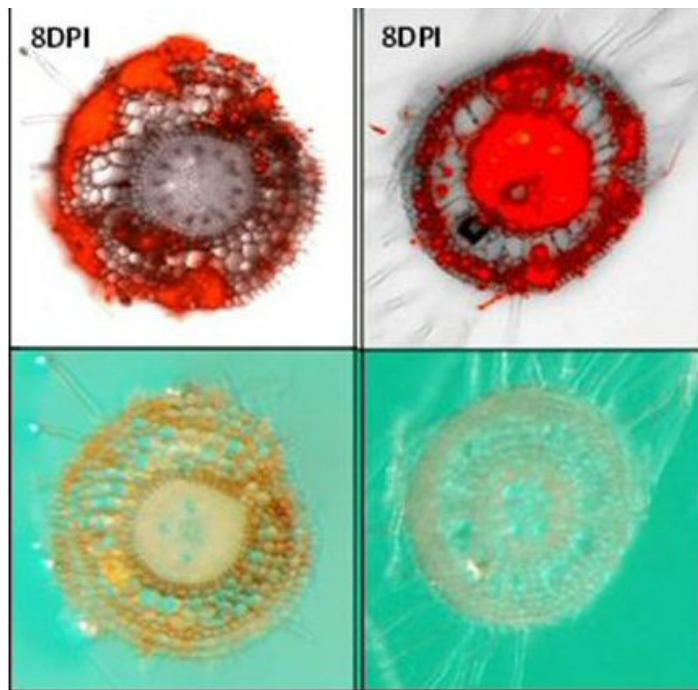


Figure 2. Colonization of bermudagrass roots by *Ophiosphaerella korrae*. Cross-section of susceptible root with extensive colonization (top left) in red and associated necrosis (bottom left) and cross-section of tolerate root with vascular colonization (top right) in red and no associated necrosis (bottom right).

This is very similar to how fungal symbiotic endophytes colonize grasses. So we are currently using these two contrasting responses to determine if a toxin is released when the fungi colonizes susceptible hosts and which genes are expressed by the fungi and hosts during colonization or diseases. The ultimate goal is to determine the traits that are most important in resistant/tolerant bermudagrasses and ensure that these are incorporated into future, new bermudagrass cultivars.

Other responsibilities I have include screening new fungicide and nematicide chemistries that have yet been released to the turfgrass industry (Fig 3).

Most of this work is conducted in Stillwater at either the Plant Pathology Research Farm or the Turfgrass Research Center. I also do fungicide and nematicide demonstration work at golf courses and had trials in Stillwater, Edmond, and Broken Arrow this year.



Figure 3: Fungicide evaluation plots

Photos by Nathan Walker

Recent Publications

- Flores, F., Marek, S., Orquera, G., and Walker, N. 2017. Molecular Identification and Multilocus Phylogeny of *Ophiosphaerella* Species Associated with Spring Dead Spot of Bermudagrass. *Crop Science (In Press)*.
- Graf Grachet, N., and Walker, N. 2016. First Report of Brown Ring Patch Caused by *Waitea circinata* on Perennial Ryegrass (*Lolium perenne*) in Oklahoma. *Plant Dis.* 4:855.
- Rogers, J., Walker, N., Young, C. 2016. The Effect of Endophyte on Nematode Populations in summer-dormant and Summer-Active Tall Fescue. *Journal of Nematology* 48:87-94.
- Flores, F. J., Marek, S. M., Anderson J. A., Mitchell, T. K. and Walker, N. R. 2016. Reactive oxygen species production in response to *Ophiosphaerella* spp. colonization of bermudagrass roots. *Acta Horticulturae (In Press)*.
- F. J. Flores, S. M. Marek, J. A. Anderson, T. K. Mitchell, and N. R. Walker. 2015. Infection and colonization of several bermudagrasses by *Ophiosphaerella korrae*. *Phytopathology* 105:656-661.



Dr. Tom Royer

Professor

I was hired in 1997 as the Extension Small Grains Specialist; however, since 2006, I have also served as the IPM Coordinator for the Division of Agricultural Sciences and Natural Resources (DASNR).

Since 2008, I have served as Co-Coordinator for Extension Programming within the department. I have a 10% research and 90% extension appointment.

My extension responsibilities include wheat, corn, sorghum, canola, soybean insects, and IPM. In collaboration with Dr. Kris Giles (Research Small Grains Specialist) and Dr. Norman C. Elliott (USDA ARS Research Leader and Adjunct Professor) we devised the “Glance and Go” system for greenbug monitoring in wheat. This monitoring system uses sequential sampling to arrive at an easier, quicker, cheaper, and more reliable control decision when growers assess aphid populations in wheat. The system has been widely tested and embraced, and the concept has been expanded to include “Glance n’ Go” for Russian wheat aphid. In addition, we (Dr. Elliott, Dr. Giles and me along with a team from Texas A&M and Kansas State University) developed a “Quick Count” sampling system for sorghum headworms that works in a similar fashion.

Another challenge that we have concentrated on over the past three years has been the encroachment and subsequent explosion of sugarcane aphids in sorghum. Oklahoma farmers and ranchers plant between 300,000 and 400,000 acres of sorghum annually. Oklahoma ranks about fourth nationally in the production of grain sorghum and eighth nationally in forage sorghum, according to data from USDA National Agricultural Statistics Service. This pest was first noticed on sorghum in Oklahoma in 2013, and has subsequently become a severe economic problem. In 2015 the sugarcane aphid was found in 27 counties infesting a minimum of 200,000 acres statewide.

Oklahoma growers requested an emergency Section 18 registration from the EPA to allow producers to use a specific chemical known to be effective on this pest. The IPM team (consisting of myself, Dr. Ali Zarrabi, Kelly Seuhs, Dr. Giles, Dr. Josh Lofton, Tracy Beedy and Jessica Pavlu along with USDA researchers Dr. Norm Elliot and Dr. Scott Armstrong) moved quickly to assess the effects of this pest on sorghum yield, to determine an accurate and effective monitoring method, and to evaluate chemical products and sorghum cultivars for control. Our rapid response to this emergency resulted

in saving Oklahoma sorghum producers between \$7.2 million and \$14.4 million in total grain yield, depending on whether individual producers sprayed their crop once or twice.

Our battle against this pest continues. In 2016 we were successful in obtaining a \$298,000 grant from USDA’s National Institute for Food and Agriculture (NIFA) to develop a sampling program for sugarcane aphids that is aimed at saving producers time and money when dealing with losses from this pest.

In my capacity as Extension Co-Coordinator for the Department of Entomology and Plant Pathology this past year, we (Dr. John Damicone - fellow Extension Co-Coordinator and other extension faculty) have begun the arduous task of developing what we call “EPP Essentials” for our OSU Extension County Educators. The purpose of these on-line tutorials is to provide Extension Educators with information on the basics of entomology and plant pathology, while simultaneously serving as annual in-service training for county personnel. The first two modules for this program will be offered in January, 2017 and two new modules will be released monthly throughout the year, ultimately providing eight hours of in-service training. In view of increasing challenges related to shrinking budgets and increasing need for training, we are very excited to offer this new approach to continuing education for our Oklahoma State County Educators.

Recent Publications

- **Royer, T.A., D. Arnold, B. Hellie.** 2016. Common insects of field crops in Oklahoma. E-1043. Oklahoma Cooperative Extension Service, Stillwater, OK.
- **Royer T.A. and K.L. Giles.** 2017. The OKANOLA project: challenges in managing insect pests of canola in the southern plains (In Press, due April 2017) In: Reddy, G.V.P. Integrated Management of Insect Pests on Canola and Other Brassica Oilseed Crops. CAB International, Boston, MA.
- Bowling, R., E. Maxon, M. Brewer, D.L. Kerns, J. Gordy, N. Seiter, **N.C. Elliott**, M. Way, **T. Royer**, S. Biles, J. Thomas, D. Buntin. 2016. Sugarcane aphid (Homoptera: Aphididae): a new pest on sorghum in North America. Journal of Integrated Pest Management. (2016) 7 (1) 12; DOI: 10.1093/jipm/pmw011



Dr. Robert Hunger

Professor

I started my career at OSU in 1982 with an appointment that was originally split between Research and Teaching. During the mid-1990s, responsibility for Wheat Disease Extension was added. Although having a three-way split at times is demanding, it also allows me to be involved in all the components of a Land Grant University, which is an involvement I have embraced and enjoyed during my nearly 35 year career at OSU.

My primary research responsibility is to collaborate with the Wheat Improvement Team (WIT) under the leadership of Dr. Brett Carver to incorporate disease resistance into improved wheat varieties adapted for production in Oklahoma and the southern Great Plains. Primarily this involves testing OSU wheat breeder lines in the field and in the greenhouse/growth chambers to determine their reaction to multiple diseases. From 1983 through 2016 (34 years), nearly 65,000 wheat lines have been evaluated in the field and/or in greenhouse/growth chamber testing for reaction to seven different wheat diseases. This information is used by the WIT to identify lines for advancement toward release. Since the inception of the WIT in the late 1990s, OSU has released 20 winter wheat varieties that currently are planted on nearly 50% of the wheat acreage in Oklahoma as well as on a significant acreage in other states. My research responsibility also has involved investigation of practical problems associated with disease of wheat that occur in Oklahoma. This research has involved virus diseases of wheat (for example, the wheat soilborne mosaic/wheat spindle streak mosaic complex; wheat streak mosaic) and fungal diseases of wheat (for example, tan spot). Since 1982, these research efforts have resulted in publication of more than 100 research/professional articles, and 12 students have received post-graduate degrees under my mentoring.

Involvement in developing improved wheat varieties and conducting research on wheat diseases, facilitates my provision of disease extension assistance to wheat growers. This assistance typically is related to wheat disease diagnosis and updates as well as disease control and fungicide recommendations. Information on these topics typically is provided to producers and other interested parties in a variety of ways such as responding to telephone/email inquiries (approximately 200/year), by diagnosing wheat disease problems in

conjunction with the Department's Plant Disease and Insect Diagnostic Lab, by producing an electronic wheat disease advisory that is distributed to all OSU extension personnel as well as nearly 200 growers and other interested individuals, by producing extension-type publications (more than 300 such publications have been produced over my career), and by attending producer meetings/field days (for example, nearly 6,000 miles were traveled within Oklahoma from March through May 2016 attending and presenting at more than a dozen such meetings). Although at times such a commitment to extension conflicts with research and teaching efforts, the enjoyment of interacting and working with producers to facilitate wheat production in Oklahoma is rewarding and far outweighs the demands.



Wheat Improvement Team

Selected Publications in 2016

- 2016. Carver, B.F., C.M. Smith, W.-P. Chuang, R.M. Hunger, J.T. Edwards, L. Yan, G. Brown-Guedira, B.S. Gill, G. Bai, and R.L. Bowden. Registration of OK05312, a high-yielding hard winter wheat donor of *Cmc4* for wheat curl mite resistance. *Journal of Plant Registrations* 10:75-79
- 2016. Li, G., X. Xu, G. Bai, B.F. Carver, R. Hunger, and M. Bonman. Identification of novel powdery mildew resistance sources in wheat. *Crop Science* 56:1817-1829
- 2016. Murray, T.D., W.W. Bockus, R.L. Bowden, R.M. Hunger, and R.W. Smiley. Diseases of Wheat (*Triticum spp.* L.). Published by the American Phytopathological Society at <http://www.apsnet.org/publications/commonnames/Pages/Wheat.aspx>



Dr. Andrine Shufan

Associate Extension Specialist

As the land-grant institution, Oklahoma State University's "mission triangle" consists of research, teaching and extension. With insects outnumbering humans a billion to one, entomology must function in this mission to explore the human-arthropod interface, educate people on this invaluable group of animals, and serve their many needs. The Department of Entomology and Plant Pathology is committed to an educational outreach program that strives to enlighten and excite students and adults regarding the impact of entomology on their daily lives. The mechanism for the EPP Department's outreach is a program called the Insect Adventure. Being Oklahoma's only live bug petting zoo, the Insect Adventure is in great demand and thus has a multitude of opportunities to exercise its credo: "science literacy through insect inquiry."

The Insect Adventure has its roots in the educational outreach efforts of all the faculty and staff going back many years. In 2003, outreach crystalized into the hiring of a graduate student to coordinate the insect husbandry and presentation efforts of the department. In 2005, students received a grant to renovate the insectary building to make it suitable as a visitor's center. Then in 2008, the Cooperative Extension Service funded a full-time Associate Extension Specialist position to coordinate presentations, supervise rearing of arthropod colonies, and maintain the facility.

The Insect Adventure has come a long way since those humble beginnings. The facility now rears 80 species of arthropods, has 5 part-time student employees, and maintains a greenhouse and 2 cargo vans. In the past 5 years, the program has visited 49 counties in Oklahoma, been invited to New Mexico, Arkansas, and Texas, and has delivered over 2000 presentations to 1.5 million people. The Insect Adventure has been invited to state, county, and street fairs, birthday parties, libraries, civic events, and innumerable classrooms. The program also hosts summer camps, insect festivals, the Entomological Society of America's annual Insect Expo, teacher trainings, and Eagle Scout projects. Insect Adventure recently began offering Saturday public open hours and typically sees 65 visitors each of those days. The Insect Adventure now charges \$3 per person for visits to the facility and \$300 for its appearances off-campus.

This fee helps cover travel expenses, presenter's time, hourly workers, and animal maintenance and replacement costs. The Insect Adventure also focuses on educational support of pre-service and active educators, 4H and FFA activities, and departmental undergraduate recruitment efforts. Insect Adventure is currently striving to assess its impact on the citizens of Oklahoma and connect that with increasing undergraduate enrollment in entomology at OSU.

Insect Adventure presentations allow folk of all ilk and all ages to comfortably explore the fascinating world of bugs. Touching is encouraged and many hands-on activities are offered. The set-up is easily transported by a single person and so there is almost no event imaginable that the Insect Adventure cannot be a marvelous addition to. Hopefully you and yours will come and experience a memorable Insect Adventure soon!



Insect Adventure



Andrine and Dr. Phil Mulder



Board of Regents Lou Watkins



Senator James Lankford



Andrine and Dr. James Trapp



Looking through a child's eyes



Insectary Camp - 2010



Barbara Brown

Administrative Assistant

Worked from 1999 – 2004 at OSU then returned to campus after a year's pause, living in Oklahoma City. To date, I have 10 years on campus, with 8.5 years in Entomology and Plant Pathology (EPP). Prior to EPP I worked in

Payroll, the Business School, and the Department of Art.

Current job duties – Attempt to insure that reports are processed in a timely manner, maintain records on personnel, submit Electronic Personnel Action Forms (EPAFs), update EPAFs for international students, Safety Officer for the department, Employment verification for employees, maintain departmental spreadsheets on faculty, staff, student, post-docs, and student workers, complete fund changes, reallocation forms, hound faculty about progress reports and enter them into REEport, complete separation checklist forms for faculty, staff, and graduate students, conduct performance review for office staff, submit position descriptions (People Admin) and justifications for

new positions (Cornerstone), complete summer salary requests for faculty, in collaboration with Dr. Mulder complete student and faculty surveys for ESA and APS, assemble promotion and/or tenure notebooks for faculty, enter Budget Development Data for the department, submit authorization to fill requests, Fair Labor Standards Act (FLSA) educator for the department, recorder for faculty and Advisory Committee meetings, and try to keep the department head organized.

Previous Experience

Born in Brooklyn, NY and lived there for 25 years. Moved to Ponca City, OK in 1977 and worked for Conoco, and Smith Gruner drill bit company in Ponca City.

Other Interesting Facts

Enjoys watching a good mystery, walking, fishing, and finding a phenomenal bargain while shopping.

2016 Awards & Honors

Faculty

- Jackie Lee and Kevin Shelton
2016 Outstanding IPM Achievement Award for Bed Bug Management
- Eric Rebek and Jennifer Olson
The American Society for Horticultural Science Southern Region 'Extension Communications Award'
- Haobo Jiang
Regents Professor
- Justin Talley
State Specialist Award/Oklahoma Association of Extension Agriculture Agents-June
- Edmond Bonjour
Outstanding Leadership Program Director International Association of Programs for Ag Leadership
- Brad Kard
15 year recognition Pin received in September.

Grad Students

- Chris Timmons
FAPC Symposium Oral Presentation
2nd place
- Natalie Gahm
ESA-SWB Macrophotograph
1st Place
- Theresa Andrews and Charles Konemann
ESA-SWB M.S. Poster Competition
1st and 2nd Place
- Tracey Payton-Miller
ESA-SWB Ph.D. Poster Competition
1st Place
- Krista Pike
ESA-SWB M.S. Oral Competition
1st Place
- Kylie Sherril, Omar Arias, Fernanda Proano and Shelby Fraser
2nd Annual Research Symposium for Biological Sciences.
1st, 2nd and 3rd Place
People's Choice Award
- Andres Espindola
Graduate College Summer Dissertation Fellowship
- Gabriela Orquera Tornakian
Distinguished Graduate Fellowship
- Claudia Diaz Proano
Sitlington Enriched Graduate Scholarship



Timmons



Gahm



Andrews



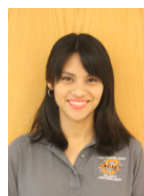
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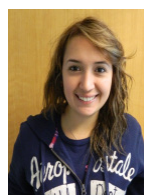
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Espindola



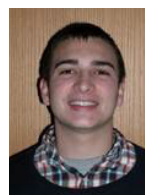
Orqueara



Diaz

Undergraduate Students

- David Bradt
2015-16 Niblack Research Scholar
- Chase Morgan and Thomas Hess
ESA-SWB Undergraduate Poster Competition
2nd and 3rd Place
- Kylie Sherril
ESA-SWB Undergraduate Oral Competition
3rd Place



Bradt



Hess



Sherril

Where Are They Now?

This section of our newsletter will address the current role of alumni from our department. How they arrived at their present position and where they began their journey with OSU. For this inaugural issue I visited with an entomologist and a plant pathologist that graduated in 2000 and 2006. I asked them both the same sets of questions and try to dig into how their OSU experience may have benefited them in their present position.

Interview with Dr. Kevin Macaluso



Mulder – How many degrees do you hold from OSU and when was your last graduation date?

Dr. Mac – I graduated in 2000 with one degree from OSU, my PhD in entomology.

Mulder – What was your major emphasis and who was your advisor?

Dr. Mac – the major emphasis was tick-host interactions and my advisor was Dr. Stephen Wikel.

Mulder – Do you feel that our department prepared you well for your current job?

Dr. Mac – Yes, at the time the department was on the cutting edge of research technology, course work and applied laboratory experiences in my area. Two very useful courses that prepared me particularly well were a grant writing course taught by Dr. Melanie Palmer and Scientific Presentations with Dr. Jack Dillwith. These were critical courses in my career development.

Mulder – What was your first post-graduate job, your current position, how long have you been in your present position and how do you support your research?

Dr. Mac – I became a Ruth L. Kirschstein National Research Service Awards (NRSA) F32 Postdoctoral Fellow in the Department of Microbiology and Immunology, University of Maryland School of Medicine, from 2000 to 2004. In my current position I am the Mary Louise Martin Endowed Professor in the Department of Pathobiological Sciences. I am also an adjunct member of the Department of Entomology, located in the Louisiana Agricultural Experiment Station. My research focuses on the interplay between Rickettsia and arthropod vectors, resulting in transmission of these bacterial pathogens to vertebrate hosts. These include tick- and flea-borne spotted fever agents. Funding from the NIH since 2001 by a number of awards including a NRSA K22 Career Development Award, two NIH

R21 awards, and two current R01's have supported my studies on transmission models of rickettsioses. I serve as a regular member for NIH Vector Biology Study Section, and have served as an ad hoc reviewer on several special emphasis panels since 2009. I have served on the Military Infectious Disease Research Program (MIDRP) peer review since 2009 and as ad hoc reviewer for many other organizations including the National Tick-borne Disease Research Fund. I still work with ticks, but have learned how to incorporate the bacterial pathogens into the equation. I currently have two postdoctoral fellows, two PhD students, and two undergraduate students in my laboratory. In 2011, I became the director for the LSU SVM 'Summer Scholars Program' and in 2015, I became the co-PI on our NIH T-32 for pathology training program with Tulane University.

Mulder – Why did you choose this area for career interest?

Dr. Mac – I always had a keen interest in disease transmission dynamics and the cycle of the disease triangle – host, pathogen, and vector.

Mulder – How much mentoring did you feel you needed after completing our program and moving into your present position?

Dr. Mac – I still seek mentoring from senior faculty – and I am still in contact with previous mentors from graduate school and my post-doc. I actually received a different type of mentoring at each level (graduate student, post-doc, etc.). Running a laboratory was sort of a continuation of what I was doing in graduate school but with different parameters and different expectations. Mentoring was critical when starting to write more grants and moving toward totally independent research from the post-doc to my present position.

Mulder – What is the emphasis of your current position?

Dr. Mac – Vector-Rickettsia interactions centered on arthropod-borne rickettsial diseases. After starting my

faculty position at LSU School of Veterinary Medicine, I focused my research on identifying the tick-derived molecular mechanisms associated with rickettsial infection of ticks. We have been able to identify and functionally characterize tick molecules activated during rickettsial infection as well as identifying the first tick receptor for rickettsial adherence/invasion. We also have worked vigorously towards developing an animal model of *R. parkeri* rickettsiosis. This model will be essential for downstream analysis of rickettsial genetic mutants and vaccine testing. In addition to the tick-borne SFG *Rickettsia*, we also have pursued research towards the emerging flea-borne rickettsial pathogen *R. felis*. First described in the United States in 1991, *R. felis* is now recognized as a cause of ~15% of non-dengue, non-malarial febrile illnesses in parts of Africa. We generated the first isolate available for research in the United States. We subsequently have generated other isolates and developed bioassays to examine horizontal transmission on artificial and animal model hosts. Interestingly, we have recently described horizontal transmission by cofeeding arthropods and demonstrated how the pathogen moves between flea species. As an adjunct member of the entomology department at LSU I teach in the medical/veterinary entomology course every other spring.

Mulder – Was the salary associated with your positions after graduate school in line with your expectations?

Dr. Mac – Yes, they actually exceeded my expectations. During my post-doc the salary was competitive. Particularly at the faculty level, now that I am at the Veterinary School at Louisiana State University, the salary has been highly competitive.

Mulder – Looking back would you have taken a different direction or taken additional classes or pursued other studies to prepare yourself for the job market?

Dr. Mac – The track I took was sufficient in moving to the next step in the process. The background I gained in insect physiology and biochemistry, combined with vector-borne diseases, prepared me well.

Mulder – Now Mac I would like to ask you some personal questions, so please feel free to tell me that you would prefer not to answer if you are uncomfortable with these questions. Okay?

Dr. Mac – No problem.

Mulder – Has your career choice melded well with your personal time and/or family time?

Dr. Mac – Yes, for me there was no other way but academia, where many of the benefits are really non-tangible. Your schedule and research emphasis is your own to determine, there is flexibility, you can travel personally or professionally as much as you feel is necessary. I was able to be very active in raising my daughters, even coaching them in soccer, basketball, and volleyball. For me, my two children are now pretty much grown (2 girls, ages 15 and 12) and the freedom that I have allows me time to spend with them and enjoy my own life. I still enjoy playing racquetball and look forward to another opportunity to play you. Hopefully, I have improved enough to do much better this time.

Mulder – I am sure you would run the old man all over the court now.

Mulder – Mac, where do you see yourself in the next 5, 10, 15, or 20 years? What role would you like to explore?

Dr. Mac – I have taken a Leadership course, but would like to continue to explore and grow my research presence over the next five or more years. I am currently 43 years old and would like to grow that portfolio then perhaps around age 55 aspire to an administrative role, but perhaps not quite that early.

Mulder – Well Mac the final question. Even though you have subsequently developed other loyalties, do you still cheer for the Cowboys?

Dr. Mac – Absolutely! Each week I get together with another alumnus and have a debriefing session about the latest game. Still a big fan!

Mulder – Mac I cannot thank you enough for being part of our inaugural issue of the EPP New Newsletter and look forward to seeing you again as I did at the International Congress of Entomology. Keep up the great work you are doing and thank you for representing our department with such distinction.

Dr. Mac – It was my pleasure and I really enjoyed seeing you again at the meeting.

Mulder – Thank you so much Mac and be safe.

Interview with Dr. Chris Meador



Mulder - How many degrees do you hold from OSU and when was your last graduation date?

Dr. Meador – I graduated in 2006 with one degree from OSU, my PhD in Plant Pathology.

Mulder – What was your major emphasis and who was your advisor?

*Dr. Meador – The major emphasis was soil-borne diseases of peanut and weeds as alternative hosts for *Sclerotinia sclerotiorum* and *Sclerotium rolfsii*. Dr. Hassan Melouk was my major advisor.*

Mulder – Do you feel that our department prepared you well for your current job?

Dr. Meador – Yes, at the time I was not anticipating an industry position, but it did provide me all the plant pathology background and research methods that I needed to be successful.

Mulder – What was your first post-graduate job, your current position, and how long have you been in your present position?

Dr. Meador – Initially, I was hired as a research scientist for Syngenta, and about 6 months later moved to a second company, Valent USA. For most of the past ten years I have been working with Valent USA as a field market development specialist, initially in Mississippi, but now in Weatherford, Texas. This involves establishing and monitoring plot work, reporting data, and establishing relationships with university and private cooperators.

Mulder – Why did you choose this area for career interest?

Dr. Meador – I enjoyed working in an applied research position. It was an attractive position and a reasonable offer, plus, I actually had the job several months before graduation.

Mulder – How much mentoring did you feel you needed after completing our program and moving into your present position?

Dr. Meador – I actually received a different type of mentoring with each position. Moving from a plant pathology graduate program to a job with industry that

changes almost hourly. Most industry positions provide extensive on the job training and I have also been lucky to work closely with many seasoned colleagues who wanted to see me be successful as well.

Mulder – What is the emphasis of your current position?

Dr. Meador – Initially, I worked in seed treatment development as a research scientist. After a few years, I moved into marketing and stayed there as a Marketing Manager for about two years. I really wanted to be in Texas near the family, therefore, I moved back into the research and development group covering TX, NM, OK and LA. Now, I spend a very low percentage of time on marketing, but the job and focus of my position varies quite a bit based on the season and types of products being emphasized. I have a great deal of flexibility in my schedule and I am able to work at home when I am not traveling.

Mulder – Was the salary associated with your positions after graduate school in line with your expectations?

Dr. Meador – Yes, they actually exceeded my expectations, particularly at the management level.

Mulder – Looking back would you have taken a different direction or taken additional classes or pursued other studies to prepare yourself for the job market?

Dr. Meador – I would have taken some business courses to help in my current position. It would have been nice to learn more about what drives sales from a business perspective.

Mulder – Chris I would like to ask you some personal questions, so please feel free to tell me that you would prefer not to answer if you are uncomfortable with these questions. Okay?

Dr. Meador – No problem.

Mulder – Has your career choice melded well with your personal time and/or family time?

Dr. Meador – Early on yes it was perfect. When I shifted to the management position it became difficult because of all the travel. I still travel 30% - 40% of the time, but my work is now much more balanced with my family. I have three children (2 girls – 8 and 3 years old, and 1 boy – age 6 years) and a wife of 14 years. The freedom

to work out of the home allows me time to spend with them and enjoy my life.

Mulder – Chris, where do you see yourself in the next 5, 10, 15, or 20 years? What role(s) would you like to explore?

Dr. Meador – No change for the next five years as my focus has to be on the family. In 10 years, I might consider a personnel management position more seriously. I would like to retain a small research, sales, and management component. In 15 years I might entertain looking at different options, specifically owning a consultant business.

Mulder – Well Chris the final question. Even though you have subsequently developed other loyalties, do you still cheer for the Cowboys?

Dr. Meador– Absolutely! Especially during Football season. If we make the NCAA basketball tournament I really keep up with that as well.

Mulder – Chris I cannot thank you enough for being part of our inaugural issue of the EPP New Newsletter and look forward to seeing you again as I have at almost every APS meeting. Keep up the great work you are doing and thank you for representing our department with such distinction.

Dr. Meador – It was my pleasure.

Mulder – Thank you so much Chris and be safe.

Select Publications from the OSU Department of Entomology and Plant Pathology

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Looking Ahead - 2017

American Phytopathological Society Meetings (2017/18)

- Southern Division Meeting – College Station, TX., February 17-20, 2017
- APS Annual Meeting – San Antonio, TX., August 5 – 9, 2017
- 11th International Congress of Plant Pathology – Boston, MA., July 29 – August 3, 2018

Entomological Society of America Meetings (2017)

- Southwestern Branch ESA Meeting – Austin, TX., April 9 – 13, 2017
- ESA Annual Meeting – Denver, CO., November 5-8, 2017

OSU Spring Graduations

- OSU Graduate Student Commencement – May 12, 2017, Stillwater, OK
- OSU Undergraduate Student Commencement – May 13, 2017 Stillwater, OK

20 • SUPPORT THE DEPARTMENT

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Burton/Fargo Graduate Student Fund (Fund # 21-09100) \$ _____

This scholarship supports graduate students enrolled in the Department of Entomology at Oklahoma State University. The student must demonstrate financial need, and demonstrate satisfactory progress in their degree program.

Whitehead/Walton Graduate Student Scholarship (Fund # 21-28000) \$ _____

This scholarship is available to any entomology graduate student demonstrating satisfactory progress in their degree program.

Stiles Memorial Scholarship (Fund #21-3000) \$ _____

This scholarship is available to any undergraduate resident of Oklahoma and the recipient must be a full-time student enrolled in entomology.

Bieberdorf Entomology Scholarship (Fund #21-31400) \$ _____

This scholarship supports undergraduate students that demonstrate satisfactory progress during the spring and fall semesters, or strong potential as an incoming freshmen.

D.E. Howell Scholarship Fund (Fund # 21-34600) \$ _____

The scholarship supports full-time students in the Department of Entomology who displays high academic achievement (GPA 3.0 or higher) and outstanding leadership. Preference is given to incoming freshman but an upper classman can be considered.

Int'l Grad Student Memorial Scholarship in Honor of Boubakary Aminatou Fund (Fund # 21-69300) \$ _____

The recipient must be enrolled as a full-time graduate student at Oklahoma State University in the Department of Entomology and Plant Pathology. The recipient must have significant documented financial need and must be fully accepted into the Entomology and Plant Pathology graduate program. Selection preference shall be given to students who graduated from a high school in a country outside the United States.

Entomology Museum (Fund # 21-33900) \$ _____

Income received annually from this gift shall be used to support the K.C. Emerson Insect Collection in the Department of Entomology at OSU.

Plant Pathology (Fund #21-30300) \$ _____

Income received annually from this fund shall be used for program support of plant pathology.

The Insect Adventure Support Fund (Fund # 21-60700) \$ _____

This fund provides support to maintain, improve, and expand the 'INSECT ADVENTURE' Entomology educational outreach program, in the Department of Entomology and Plant Pathology.

The OSU Insect Systematics Collection Fund (Fund #21-60900) \$ _____

This fund provides financial support for purchase of rare and unique insects or insect collections to enhance research and teaching in the Entomology and Plant Pathology Department at Oklahoma State University.

Entomology Program Development (Fund #21-27900) \$ _____

Income received annually from this fund shall be used for program support of entomology.

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Used to support the Urban Entomology Endowed Program and related research/extension activities.

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