BioUpdate

Department of Biology, Middle Tennessee State University

Spring 2015

Lynn Boyd

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Message from the Chair

Thank you for your interest in the Biology Department at MTSU. What a great year for biology at MTSU! We moved into the new Science Building in August 2014 (see the special fall 2014 issue of *BioUpdate*). We finally have the facilities to match our exceptional teaching and research capabilities. In addition to the new building, there are many other great things going on in our department.

This past year, many other departments at MTSU and the University, as a whole, experienced declines in enrollment. However, the Biology Department saw a 9.5% increase in the number of majors. This is attributable to the excellent instruction and service provided by faculty and staff. Many thanks to all for this impressive growth.

The department family is also growing with new babies on the scene. Baby Delaney was born to Dr. Erin McClelland and Dr. Moses Prabu. Baby Ada was born to Dr. Ashley Morris and her husband, Chris. We are so happy for those families.

Dr. Alicja Lanfear was hired as a new instructor. We are thrilled to have somebody with her experience and expertise teaching anatomy and physiology courses.

Last year, Dr. Matthew Klukowski was promoted to full professor and Dr. Chris Herlihy was tenured and promoted to associate professor. Congratulations to both on this major accomplishment.

The department continues to excel in many areas. Our external funding and publication numbers are growing each year. As mentioned above, the number of majors is increasing. We are developing a strategic plan that will serve as a guide in the coming years. The plan will allow us to build on our strengths and take advantage of opportunities that exist in the realm of biology. Look for the strategic plan to be posted on the departmental website by the end of 2015.

This is my third year as chair of the department. It is a delight to work with the MTSU Biology Department. I am enormously grateful to our fabulous office staff. Our department is extremely fortunate to have such a dedicated and competent staff.

I encourage you to read this issue of *BioUpdate* and learn about the many interesting things going on with our faculty, students, and alumni.

Lynn Boyd

Tracking through an Indonesian Rainforest on a Fulbright

by Siti N. Hidayati

From February to July 2014, I was honored to spend time in my home country of Indonesia conducting research on *Rafflesia arnoldii*-the ZRUOG¶V ODUJHVW VLQJOH ORZHU SODQW XQGHU D Fulbright Senior Scholarship. When I was an undergraduate student at Gadjah Mada 8QLYHUVLW\ <RJ\DNDUWD ,QGRQHVLD D University of Kentucky, I worked on the life cycle of *R. patma*. Last year, I returned to take up a population study working with my colleague Dr. Agus Susatya at the University of Bengkulu.

The parasitic plant genus *Rafflesia* is restricted to tropical Southeast Asia. 7KH SODQWV DUH RIWHQ FDOOHG ³FRUSVH (*Amorphophallus titanum*) that gives off a rather unpleasant smell. From my own experiences, the smell from a *Rafflesia* IORZHU LVQ¶W [illegible] *flesia* owes its name to Sir Thomas Stamford Raffles, a British explorer, statesman, historian, and founder of Singapore. *Rafflesia* is a national natural treasure in Indonesia, symbolized on T-shirts and collectibles, and it contributes to ecotourism.

Siti sitting beside a *Rafflesia arnoldii* bud that is beginning to open in Sumatra, Indonesia, March 2014

All *Rafflesia* have unusual growth: no leaves, stems, true roots, or green photosynthetic tissue and a flower seen only outside its host plant, a vine (*Tetrastigma*) in the grape family. Growing from tiny seeds (<1 mm), a bud swells through the bark of *Tetrastigma* and grows to the size of a large cabbage head before it finally opens for 4 ±5 days after several months. The life cycle of *R. arnoldii* from seed to seed spans 3.7 ±5 years. How the seeds get into the host and germinate and how seedlings start growing is still unknown.

Most *Rafflesia* VLWHV DUH VPDOO DQG FRQWLQ IHZ IORZHUV 7KH SO term survival is seriously in question as tropical rain forests fall to timbering, plantations, and housing developments and as the climate changes. *Rafflesia* ¶V ELRORJ\ DOVR OHQGV LWVHOI WR SRWHQW nus, high bud mortality, rare pollination events (flowers not opening simultaneously, populations having one sex), long flower development, and highly fragmented populations. Propagation has been unsuccessful, though there is hope with the recent flowering of *R. patma* at the Bogor Botanical Garden using grafting techniques. Thus, habitat preservation is an essential part in the conservation of *Rafflesia*.

In Bengkulu, some populations of *R. arnoldii* are along the main roads in relatively flat areas heavily visited by tourists. Others are deep in the forest, requiring hours-long hikes on steep slopes. For those who want to see *R. arnoldii*, keep in mind the leeches that are along the way, especially during the rainy season. Yet, seeing the blooming *Rafflesia* will certainly leave a long-lasting memory and be a once-in-a-lifetime experience.

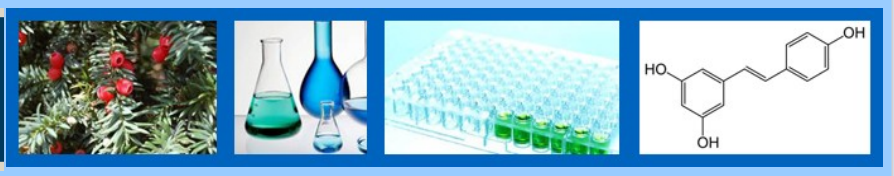
During my time in Bengkulu, approximately 20 populations of *R. arnoldii* were visited to establish long-term monitoring plots. Three other sites visited were first observed about 10 years ago and, at that time, they contained a large number of buds and flowers. Today, these sites are no longer with us. The mystery is that we do not know what happened to the plants in these populations since the host vines are still present and there are no signs of disturbance. The long-term plots will be visited every year to better understand the population dynamics of *R. arnoldii* in relation to a changing climate and other environmental disturbances. Only in this way will we get a handle on the long-term survival of populations, which is vital for the preservation of this fascinating plant.

Featured Faculty Member: Elliot Altman

Elliot Altman was born in Dallas, TX and attended Westbury Senior High School in Houston. His parents were very accomplished. His father was a student of Latin and Greek and received a perfect score in English on the SAT. Elliot says he never needed a dictionary while growing up! His mother was a concert pianist. She also has a photographic memory, a trait that Elliot wishes he had inherited.

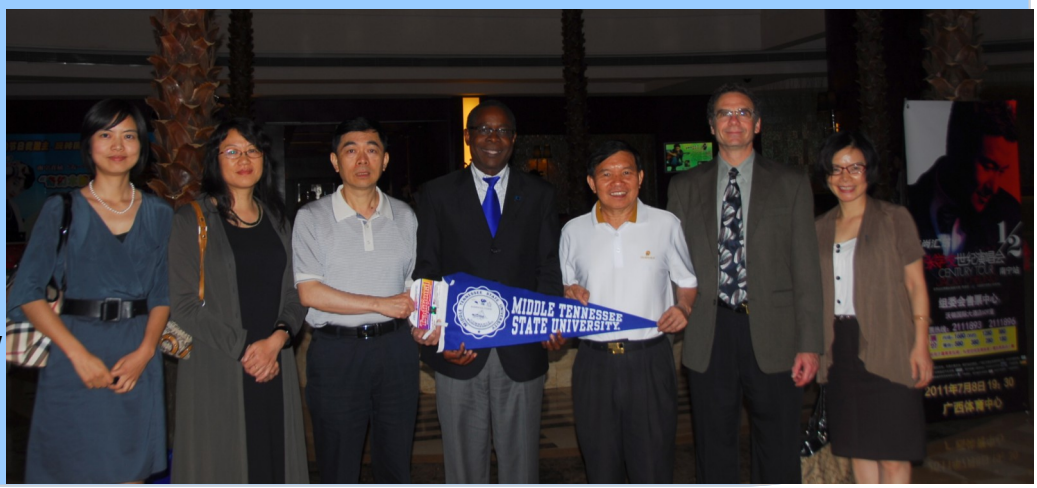
,Q (OOLRW UHFHLYHG KLV EDFKHORU¶V GHJUHH chemistry from Texas A&M University. He received his Ph.D. in molecular genetics in 1991 IURP WKH &DOLIRUQLD ,QVWLWXWH RI %LRORJ\ +LV protein, a chaperone that facilitates protein secretion in *Escherichia coli* ´ (OOLRW ZDV toral fellow at the University of Utah (1990 ±1994) and then moved to the University of Georgia as an assistant professor in the Department of Microbiology in 1994. Eventually, he became director of the Center for Molecular Bioengineering at the University of Georgia, a position he held from 1999 to 2010 before coming to MTSU. Elliot has been teaching the Molecular Genetics course (BIOL 4450/6450), as he also did at the University RI *HRUJLD ,W LV D FRXUVH WKDW KH VD\V PRVW SHRSOH GRQ¶ LQYROYHG +RZHYHU WKRVH H[SHULPHQWV DUH WKH W\SHV WKL ping the lab.

Elliot was hired as the director of the Molecular Biosciences Ph.D. program. Under his direction, the program has grown each year. Today there are 30 students working to achieve their GRFWRUDWHV (OOLRW¶V ODERUDWRU\ KDV WKUHH PDLQ UHVHDU using metabolic engineering, exploring natural products as a source of new nutraceuticals and pharmaceuticals, and the development of new or improved peptide therapeutics. His research has made him the holder of 16 issued U.S. patents. Elliot is also director of the Tennessee Center for Botanical Medicine Research (TCBMR), which was highlighted in the spring 2012 issue of *BioUpdate*.



His research has taken him to various locations in Germany and China, where he has had the opportunity to see sights in both countries that most tourists do not get to see. Elliot says he is all about science all the time. His wife, Ronni, who has run his laboratory since 2002, is also a scientist, and most of their conversations at home have centered around science and the various projects being investigated in their laboratory. He credits Ronni for a great deal of his success in research. She has the innate ability to implement protocols and conduct experiments that have led to some very impressive results. He says that Ronni is one of the best scientists that he has known and has had the privilege to work with.

The Altmans have two daughters, Alyssa and Sarena. As for hobbies and interests outside the laboratory, Elliot says he is a rather boring person because his life is all about science. He loves research and loves instilling his passion for research in students. When he wakes up on a work day, KH FDQ¶W ZDLW W tory to see what new results his team has discovered.



Featured Faculty Member: Jeffrey Walck

Jeff Walck was born in Waynesboro in south-central Pennsylvania. He grew up in nearby Greencastle, where he attended Greencastle-Antrim High School. After high school, Jeff first attended Shippensburg University and then transferred to Cornell University and received his B.S. in biology with honors in 1989. After Cornell, he entered the University of Pittsburgh to start a Ph.D. in bird anatomy and systematics, but soon discovered he wanted to work on plants. He then spent a year as the flora of Pennsylvania intern at the University of Pennsylvania and Academy of Natural Sciences in Philadelphia. Jeff spent summers working for the Nature Conservancy as a field botanist searching for populations of rare plants.

Jeff went to graduate school at the University of Kentucky, where he received his 3K ' LQ +LV GLVVHUWDWLRQ ZDV ³&RPSDUDWLYH Embedd *Solidago shortii* and Two of Its Geographically-Widespread Congeners: An Investigation LQWR WKH &DXVHV RI 3ODQW 5DULW\ DQG and married Dr. Siti Hidayati, a plant ecologist and tropical biologist (see the story DERXW 6LWL¶V UHVHDUFK RQ SDJH $IWHU UHF year postdoctoral fellowship in the lab of Dr. Dan Crawford, studying molecular systematics at the Ohio State University. In the fall, 1999, Jeff began teaching at MTSU.

Jeff has taught Exploring Life (BIOL 1030), General Biology (BIOL 1120), Seminar on Environmental Problems (BIOL 3070), General Ecology (BIOL 3400), Senior Seminar (BIOL 4200), Conservation Biology (BIOL 6460) and Graduate Seminars (BIOL 6650, 6660). Along with teaching, Jeff has maintained a rigorous research program involving both undergraduate and graduate students. To date, he has mentored eight graduate students who have received their degrees.

Siti, Edwin and Jeff beside a Titum arum (*Amorphophallus titanium*) in Cibodas Botanical Garden, Java, Indonesia, May 2014

-HII¶V HDUO\ UHVHDUFK DW 0768 PRVWO germination of various plants, (2) the conservation ecology of cedar glade plants and exotic plants, and (3) the evolution and biogeography of seed dormancy among North American ±Asian disjunct plants. As part of his research on cedar glade plants, Jeff helped start the Center for Cedar Glade Studies, a component of the Department of Biology.

His research today has shifted to understanding how climate change will affect plant regeneration from seeds. This encompasses basic aspects (e.g., effects on germination) as well as applied aspects (e.g., design of *ex situ* seed banks and restoration of projects). His research program has ongoing projects in Australia (smoke germination), India (Himalayan plants), Sri Lanka (mangroves), Japan (*Viburnum*), and China (grassland species). He is starting research projects in Indonesia and in South Africa, both focusing on climate change. He is collaborating on another project with Chicago Botanic Garden, University of Wyoming, and University of Melbourne (Australia), examining germination traits and genetic/environment interactions and incorporating the information into predictive models on geographic ranges of species. To date, Jeff has published 67 papers in peer-reviewed journals (about 40 while at MTSU). Some of these journals include *Nature*, *Global Change Biology*, *Annals of Botany*, *American Journal of Botany*, *Seed Science Research*, *Castanea*, *AoB PLANTS*, *Journal of the Torrey Botanical Society*, *Plant Species Biology*, *Australian Journal of Botany*, *International Journal of Plant Sciences*, *Canadian Journal of Botany*, *Annals of the Missouri Botanical Garden*, and *Journal of Biogeography*.

Featured Faculty Member: Jeffrey Walck (*cont.*)

Jeff and Siti at Yanchep National Park, Southwestern Australia, June 2014

In addition to teaching and research, Jeff is a subject editor for *Plant and Soil*, a member of the Science Committee of the Cumberland Seeds Project, and a member of the Rare Plant Advisory Committee for the Tennessee Division of Natural Areas.

In 2005, Jeff received the Distinguished Research Award at MTSU. From 2007 through 2009, he was a Distinguished Visiting Scholar at the University of Western Australia and Kings Park and Botanic Garden (Perth, Australia). In 2013, Jeff was a visiting professor for Senior International Scientists at the Chinese Academy of Sciences. He has been recognized several times for ³0DNLQJ D 'LIIHUHQFH LQ /LYHV R

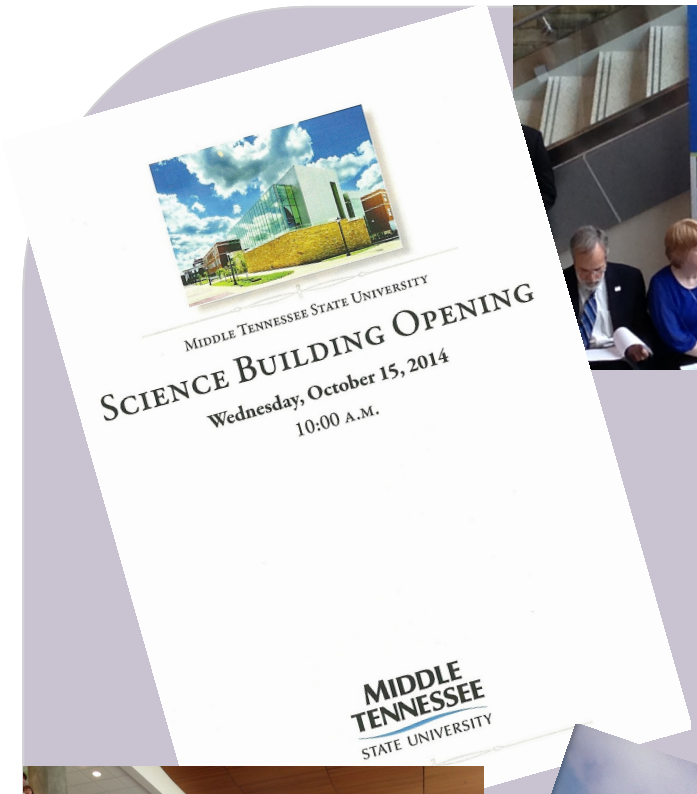
Both Jeff and Siti enjoy bird-watching, traveling, and learning about different cultures. They have lived for two years in Australia and two months in Beijing. Jeff has served as an invited scientist in Australia, China, Taiwan, South Korea, Japan, and Indonesia. He and Siti have also visited the United Kingdom, Poland, Germany, Singapore, and Mexico.

Jeff and Siti have a son, Edwin, who has gotten a tremendous education in different cultures due to all the traveling his family has done. Edwin began his travel experiences at the age of two months, when he ventured out with his parents to collect data from field plots. Even today, he helps in the lab and field. Not many children get the opportunities to travel and experience other countries as Edwin has. Even with all this experience in field and lab research, Jeff and Siti say that, currently, Edwin does not want to be a biologist!

Jeff, Siti, and Edwin in Seoul, South Korea, November 2014

Jeff, Siti, and Edwin at the Great Wall of China

Grand Opening of the New Science Building



Grand Opening of the New Science Building

Master of Ceremonies John Hood

President Sidney A. McPhee

Governor Bill Haslam

State Senator Bill Ketron

Grand Opening of the New Science Building

TBR Chancellor John Morgan

Faculty Representative Tammy Melton

Student Representative Kenneth Ball

Ribbon Cutting

Department Logo Shirts and More

The department is selling shirts, backpacks, insulated lunch bags, coffee mugs, lanyards and stadium cups that sport the department logo. The shirts come in five styles: a light tan short-sleeve or long-sleeve T-shirt with the logo on the upper right front and an enlarged color logo on the back; a dark green short-sleeve or long-sleeve polo shirt with the logo on the upper right front; and, a long-sleeve denim shirt with the logo on the upper right front. Several faculty and students have been seen wearing the shirts. The coffee mugs are white with the logo in blue on both sides (visible whether you are right- or left-handed). The stadium cups are 16 oz. blue plastic with a white MTSU Biology logo. The key lanyards are blue ribbed polyester cord with a white MTSU Biology logo.

Come by and check out the merchandise in SCI 2044. You might even want to add your own personal flair by custom ordering a T-shirt with your favorite color combination. T-shirts can be ordered in short or long sleeves. We can special order hoodies (including RealTree camo).

Prices are as follows (cash only):

T-shirts	Short-Sleeve:	$12.00	Insulated lunch bag:	$8.00
	Long-Sleeve:	$16.00		
			Drawstring backpack:	$5.00
Polo shirts	Short-Sleeve:	$25.00		
	Long-Sleeve:	$28.00	Coffee Mugs:	$3.00
Heather gray pull-over hoodie: (printed like T-shirts)		$25.00	Stadium Cups:	$1.00
			Key Lanyards:	$2.00

All items can be purchased (cash only) in the department office from Virginia McKnight (615-898-2291) or by email from Becky Elrod (Rebecca.Elrod@mtsu.edu.).

MTSU Center for Environmental Education and Environmental Studies

by Cindi Smith-Walters

The 2013 ±2014 year was one of changes for the center. Following the name change, individuals from both the University and community voiced concern. One SHUVRQ IURP WKH ORFDO VFKRROV VDLG WKDW WKH ORQJ JKW of the good things the CEE has accomplished in the ODVW \HDUV WR EH µORVW¶ ZLWK WKH QDPH FKDQJH that and comments like it in mind, consideration was given and the name has been revised to its final version, the MTSU Center for Environmental Education and Environmental Studies, CEES for short. CEES encompasses community, school, and informal education outreach; the TAMP program; the Center for Cedar Glades Studies; and a number of other efforts.

Although funding for full-time staff has been lost, the year has been a busy and productive one for Drs. Smith-Walters and Kelly. Dr. Kim Sadler has an article focusing on her work with the Center for Cedar Glades on page 13 of this issue of *BioUpdate*. A summer program with city schools, Discovery Center and Camp Marvel continued this past summer and, again, was a great success. New this year was the use of MTSU pre-service teachers to work with elementary students in the areas of water quality, habitats, natural history of raptors, and more. This program was covered in a pictorial spread in the local newspaper, the *Daily News Journal*. Dr. Kelly provided this resume-building opportunity for his students.

COMMUNITY OUTREACH

In addition to the Camp Marvel experience, each summer the center works with local schools and Agricultural Extension to support the use of school gardens and outdoor classrooms. One of the most recent : L WK schools is the newly opened Overall Creek Elementary in Murfreesboro. In consulting with Don Bartsch, principal, an environmental focus was developed for the school that uses the land, creek, and retaining pond on the property to enhance teaching and learning. Before WKH VFKRRO¶V R-SHQLQJ 'U 6PLWK-Walters spoke to the Murfreesboro City School Board regarding the project and received approval.

Overall Creek Elementary

Overall Creek Elementary first-grade STEAM (Science, Technology, Engineering, Art, and Math) unit kicks off with a book reading in the Overall Woods

CEES cont.

TAMP (Tennessee Amphibian Monitoring Program)

TAMP, a statewide program to monitor amphibians, is sponsored by CEES and the Tennessee Wildlife Re- VRXUFHV $JHQF\ 7KLV \HDU¶V DFFRPSOLVKPHQWV LQFOXGH but are not limited to, the following:

> A five-hour TAMP workshop was conducted at the University of Tennessee in Knoxville. Participants were given a slide and sound presentation that covered all 21 frog and toad species in Tennessee, and were then quizzed on their knowledge. This has been a popular workshop for the University of Tennessee and is incorporated into the UT Wildlife and Fisheries Science Fall Camp. A video montage from the 2013 camp can be seen at https:// www.youtube.com/watch? v=j1h8UdNjLYw& feature=youtu.be.

> The 2014 TAMP workshop for the University of Tennessee was conducted October 24, 2014.

> TAMP continued work with the Tennessee Naturalist Program (TNP) in the 2013-14 year, conducting one program on TAMP and two programs on Tennessee amphibians. As a result of this collaboration, two TNP volunteers signed up and conducted TAMP routes this year. Former TNP volunteers for the Hampton Station and Flewellyn routes volunteered again for 2014.

> Each new TAMP volunteer in 2013-14 was given a copy of the TAMP CD. This CD is a joint venture between TWRA and MTSU and includes recordings of all species that occur in Tennessee, hypothetical species, a section on similar-sounding species, and sound quizzes. This CD is available to educators statewide, including Tennessee Naturalist Program participants.

> As in previous years, all TAMP data has been entered into the NAAMP (North American Amphibian Monitoring Program) database and a GIS-based TAMP database.

> An integrated database containing all TAMP data from 2004 to 2014 was completed. This database is designed to be used with GIS and will be incorporated into the Tennessee Wildlife Resources Agency's State Wildlife Action Plan (SWAP). The SWAP plan addresses the management of non-game species of greatest conservation need in the state, and we are happy to be part of this effort.

Barking Treefrog *Hyla gratiosa* (© 2014 Robert English Leaps; used with permission)

BOTANY AND MICROBIOLOGY

This past year, the CEES has had a very able intern, Shannon Smith, who has worked on a website with information and a series of laboratory activities using medicinal plants to teach biology concepts. Shannon has experience with the TCBRM (Tennessee Center for Botanical Medicine Research) at MTSU and was a perfect individual to bring the two centers together through the development of lessons specifically for grades 9-12 biology educators. These lessons can be used also by home-school audiences, informal educators, and introductory college-level students. The website contains lessons, supplements, links to lectures and videos, and guides for experiments that correlate to a standard curriculum. They can be used as stand-alone lessons or as a unit of study. Exciting for educators is that all activities use materials that are inexpensive and reliable. Directions for assembling the scientific equipment is included and materials can be easily found at local home improvement stores, grocery stores, co-ops, or online. In brief these lessons:

* focus on grade 9-12 biology
* include lectures & videos to highlight concepts
* foster experiential learning through teacher-led activities

(*cont.*)

CEES cont.

* provide instructions for equipment construction, cover such topics as organism interactions, genetic concepts, Chi square analysis, and a wealth of cellular concepts.

This QR code opens the site, or you can go to the center site to find a link.

GRADUATE STUDENT SUMMER RESEARCH

Several MSE (Math and Science Education) doctoral students in biology worked through the summer on a variety of research projects including assessment of a statewide informal education program that gets inner-city youth into nature for a day, a few days, a week, or more. Great Outdoors University (GOU) is funded by the Tennessee Wildlife Federation and has not had a formal assessment done. Angelique Troelstrup developed a report for GOU, suggested ways to evaluate and assess the program, and developed draft rubrics and surveys. David Owens continued his research in evaluat- LQJ 7HQQHVVHH 6WDWH 3DUNV¶ gram that occurs statewide each summer in several state parks. Additionally, the data collected by State Parks on a pilot program in a Tennessee elementary school was reviewed. Reports on both were written and provided to TSP. Mary Ellen Lohr had previously collected data on the use of technology in elementary science teacher preparation and, working in conjunction with Angelique, was able to assess and process those data. The project resulted in a presentation at a regional meeting and will likely lead to a publication.

PUBLICATIONS, POSTERS AND PRESENTATIONS

Smith-Walters, as both a faculty member and codirector of the center, continues to be active in state and national organizations including board membership in the Tennessee Academy of Science and the Tennessee Environmental Education Association (TEEA). At the TEEA state conference, she presented two sessions, one of which was with an MSE doctoral candidate, Sandra Lampley. At the Tennessee Science Teachers Association, she presented two different sessions with another MSE student, Heather Barker, and one with David Owens. In addition, several book chapters were published, one of which, with Heather Barker, was on research done in BIOL 3000, a course to prepare ele- PHQWDU\ WHDFKHUV WR WKH Pre-VHUYLFH 7HDFKHUV¶ Efficacy and Attitudes toward /HDUQLQJ DQG 7HDFKLQJ 6FLHQ can be found in *Cases on Research-Based Teaching Methods in Science Education*. Other book chapters LQFOXGH ³Out, Find Out!: Exploring Na- WXUH ZLWK)LHOG *XLGHV´ *Developing Environmental Awareness in Children: A Nature Studies Guide for Parents and Educators* DQG ³'LYHUVLW\ R *Passing the State Elementary and Middle School Proficiency Tests: Essential Content for elementary and middle school (4-8) Science Teachers.* In press is the FKDSWHU ³8VLQJ 9LGHR DQG 7HDFKHUV)RU $ZDUHQHVV *Application of Visual Data in K-16 Science Classrooms*. Dr. Smith-Walters collaborated with a number of individuals on journal articles and other publications, including one with a local assistant principal and doctoral candidate Christa Campbell and articles with former MTSU students.

Presentations this past year include those done by Dr. Kelly on behalf of Population Connection and TEAMS (Tennessee Educators of Aquatic and Marine Science). Dr. Smith-Walters conducted presentations and workshops mentioned above, but also worked with MSE students Jeffery Bonner and David Owens to conduct teacher training at the statewide Tennessee Association of the Gifted conference.

The Center continues as a sponsor of the statewide Tennessee Naturalist Program (TNP): http://tnnaturalist.com/. Dr. Smith-Walters serves as treasurer and an instructor. TNP is a series of classes that introduces the natural history of Tennessee to adults. Graduates join a critical corps of TNP volunteers providing education, outreach, and service dedicated to the appreciation, understanding, and beneficial management of natural resources and natural areas in their communities. TNP teaches Tennesseans about the natural world, inspires the desire to learn more, instills an appreciation of responsible environmental stewardship, and channels volunteer efforts toward education of the general public and conservation of natural resources. The program continues to grow,

CEES cont.

adding chapters across the state and working on in-depth Tier II classes on specific topics planned for the near future. TNP has been the subject of a number of articles including one this past year in *Tennessee Conservationist* magazine.

CEES is in a rebuilding phase that will include relocation to Davis Science Building when renovations there are complete. Until then, the center will continue its good work reaching out to teachers, youth leaders, students, and the general public to keep our environment healthy and help make responsible, informed environmental decisions.

If you have questions about the center or would like to be involved in some way, please contact codirectors, Padgett Kelly at jpkelly@mtsu.edu or Cindi Smith-Walters at cindi.smith-walters@mtsu.edu.

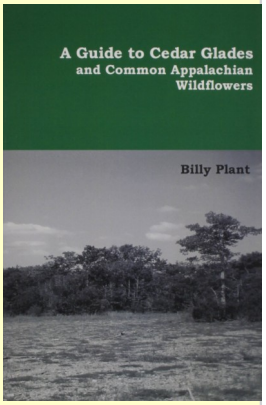
Cedar Glades Studies

The Center for Cedar Glade Studies
Middle Tennessee State University

by Kim Cleary Sadler

Save the dates May 1 and 2, 2015! Come and celebrate cedar glades! Plan to attend the Annual Elsie Quarterman Cedar Glade Wildflower Festival May 1 and 2, 2015, at Cedars of Lebanon State Park. The weekend opens on Friday afternoon, May 1, with the 9th Annual Research Roundtable followed by an informational evening program at 7 p.m. and toe-tapping bluegrass music for the general public. Saturday events begin early with a morning bird-watching hike, followed by hourly informative natural history programs and guided hikes out to the glades throughout the day. The Saturday evening programs will have you either hooting or croaking, depending on your preference for WKH ³RZO SURZO´ RU ³IURJ IUROLF ,I \RX DUH LQWHUHVWHG in attending the Research Roundtable or the Wildflower Festival and need more information, please contact Jeff Walck at jeffrey.walck@mtsu.edu or Kim Sadler at kim.sadler@mtsu.edu.

Cedar Glade Resources. The Center for Cedar Glade Studies is in the Fairview Building, Room 202-D, but will relocate with the Center for Environmental Studies to Davis Science Building next year. For those of you interested in teaching about cedar glades, the Cedar Glade Educator Activity Guide, Flatrock Glade Plant Guide, and DVD are great sources of information. Also available are the Cedar Glade Endemic Plants poster, Cedar Glade pamphlet, and *A Visit to the Limestone Glades* DVD. For any of these resources, contact Kim Sadler at kim.sadler@mtsu.edu or the Center for Cedar Glade Studies at gladecenter@mtsu.edu. Electronic copies of the plant guide, educator guide, and videos are available on the Center for Cedar Glade Studies website, www.mtsu.edu/glade-center. Walker Library is maintaining a digital collection of theses, dissertations, and other works related to cedar glades. Visit the following link to view these items: http://digital.mtsu.edu/cdm/landingpage/collection/cedar.



For more reading about cedar glades, former graduate student Billy Plant published *A Guide to Cedar Glades and Common Upland Wildflowers*. A copy of the book can be purchased from Amazon.

News from the 2014 Elsie Quarterman Cedar Glade Weekend. The 8th Annual Research Roundtable was held at Cedars of Lebanon State Park, organized by Dr. Jeff Walck and facilitated by Dr. Vince Cobb. On Friday afternoon, more than 25 people representing academia, state and federal agencies, and NGOs attended the Roundtable.

On Friday evening, Rita Venable talked about butterflies of Tennessee. Author of the recently released *Butterflies of Tennessee: Field and Garden*, she shared highlights from her book and spoke about butterflies of Tennessee.

On Saturday, a beautiful May day provided a great opportunity to enjoy glade hikes organized by Kim Sadler and led by Drs. Kurt Blum and Tom Hemmer-O\ %LOO\ 3ODQW 0 6 ¶ 5RJ rector, Natural Areas Program) and John Froeschaur

(*cont.*)

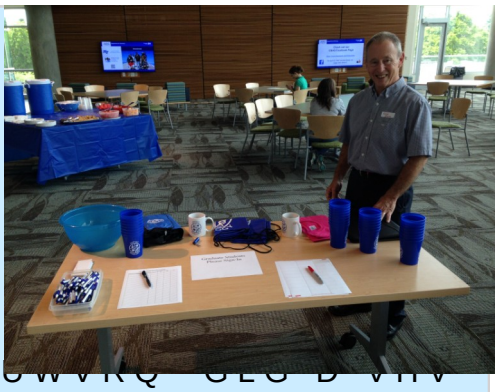
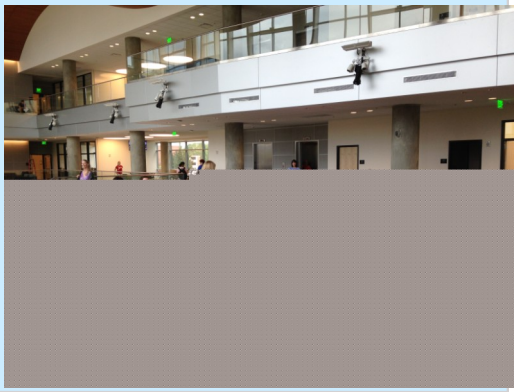
Cedar Glades Studies

(State Parks, Middle Tennessee naturalist). Melissa Turrentine led a large group of families through the smaller glades surrounding the newly renovated Nature Center recently completed by Buddy Ingram, ranger at the park. Linda Robinson (aunt of the Department of Biology's Dr. Brian Robinson) led a session on gardening with native plants; her team of Wilson county gardeners transformed the outdoor area behind the nature center with native plants.

Several speakers gave updates on glade management or current research.

Brian Bowen, TDEC Natural Areas Program administrator	Update on management plans in the barrens and glades
Ashley Morris, MTSU	Development of microsatellite markers for *Astragalus bibullatus* and *Dalea foliosa*, and long-term plans
Bill Wolfe, USGS	Stones River National Battlefield hydrology study
Vince Cobb, MTSU	Rattlesnake behavior at Flat Rock Cedar Glades and Barrens
Michael Rhoades, MTSU	Spatial autocorrelation reveals positive relationship between soil depth and species richness in Middle Tennessee's cedar glades

In Memory. Vanderbilt professor emerita Dr. Elsie Quarterman died peacefully in her sleep in June at age 103. The cedar glade festival weekend is named for her. After retirement she continued to work as an advocate for the conservation of Tennessee land and was instrumental in early decisions about land purchases by the Tennessee Nature Conservancy. Her nephew, John Quarterman, has a blog with a collection of stories about Dr. Quarterman.
www.okraparadisefarms.com/blog/elsie

Former students of Dr. Quarterman gathered at the Elsie Quarterman Wildflower Festival to celebrate her 100th birthday.
Front row, left to right: Carol Baskin (University of Kentucky), Elsie Quarterman, Gail Baker (Florida Natural Resource Division). Back row, Jerry Baskin (Univ. of Kentucky), Tom Hemmerly (MTSU). Photo used with permission from Ann Quarterman.

Fall 2014 Graduate Student Reception