



Leodrey Williams

CHANCELLOR'S REPORT

Presented to:

Board of Supervisors

Southern University and A & M College System

"Linking Citizens of Louisiana with Opportunities for Success"

71st Annual Livestock Show Huge Success

Southern University Ag Center

Leodrey Williams
Chancellor

Adell Brown Jr.
Exec. Vice Chancellor/Vice Chancellor for Research

Gina E. Eubanks
Vice Chancellor for Extension

Linda Batiste
Director of Finance

Christopher Rogers
Director of Technology Services

Editors
Bridget Udoh
Donna C. Badon

A. O. Williams Hall
P.O. Box 10010
Baton Rouge, LA 70813

Tel: (225) 771-2242

Fax: (225) 771-2861

Website:
www.suagcenter.com

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The Southern University Agricultural Research and Extension Center concluded its 71th Annual Livestock Show with participants from across the state the weekend of March 1, 2014. On the heels of last year's landmark 70th Anniversary event, the show continues to provide youth with opportunity to learn leadership and life-long skills, and build friendships for life. During the three-day event, young farmers and ranchers from across the state had the opportunity to display animals that were showcased or had won in parish competitions. After the show, judges named state champions in various breeds of beef and dairy cattle, swine, sheep, lamb, and goat. The all-time favorite mini-farm, featuring a variety of small farm animals, plants, and tours attracted over 500 school-age youth from local area schools. Tour stops explained different animals, their food sources, farming, and how agriculture affects everyday life. There were petting zoos for goats, rabbits, chicken and even duck.



**Non-Brahman Influence Heifer
Champion shown by Regan
Greene, - EBR**



**Reserve Champion Steer
shown by Reginald Matthews,
W. Feliciana Parish**

Other stops included demonstrations of SU Ag Center programs for families in the area of nutrition, tobacco cessation, veterinary care, gardening and a milking station.

This year, more than 500 contestants gathered at the SU Livestock Arena for the annual completion. Winn Parish produced the most contestants with 38; with several contestants in the 7-year age group. The youngest winner was 7-year old Kain Champagne of St. Mary Parish who won the Market Hog Championship, while Zack Hymel of St.

James Parish, also aged 7, took home the Reserve Hog Champion title. The heaviest animal was a Market steer that weighed in at 1350 lbs. shown by 16-year old female, Delacey Jackson, from Tangipahoa Parish. The highest price paid for an animal at the auction was \$5600.00 for the Reserve Champion Steer which was exhibited by Reginald Matthews from West Feliciana Parish, and purchased by Com. Mike Strain, SU Ag Center Support, La. Cattlemen Assn., Otis Wilson and Friends of West Feliciana. More than 700 youth from the surrounding parishes, with St. Helena coming the farthest away to participate in the tours this year.

Winners received premiums, rosettes, ribbons, and banners. An awards presentation for exhibitors of champion market animals was held, followed immediately by the Junior Auction Sale.

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Livestock Show Results

Continued from page 1

Market Champions

Grand Champion Market

Steer: Guy Haynes, Jeff Davis Parish (\$7,500)

Reserve Champion Market

Steers: Reginald Matthews, W. Feliciana Parish (\$5,600)

LA Breed Reserved Champion

Steer: Hunter McMillian, East Baton Rouge Parish (\$2,750)

Champion Market Hogs: Kain Campagne, St. Mary Parish (\$1,700)

Reserve Champion Market

Hogs: Zack Haymel, St. James Parish (\$1,850)

Champion Market Lamb:

Kain Campagne, St. Mary Parish (\$1,800)

Reserve Champion Market

Lamb: Caroline Dupree, Bossier Parish (\$1,050)

LA Breed Reserve Champion

Lamb: Tiffany Carey, Terrebonne Parish (\$850)

Champion market Goat: John Stephenson (\$700)

Reserve Champion Market

Goat: Clint Delaune, Bossier Parish (\$1,000)

2014 Beef Breeding Division

Category: Brahman Influence -

Bull Champion: Victoria Townson, Sabine Parish

Category: Brahman influence -

Heifer Champion: Caplan Young, Winn Parish

Reserve Champion:

Victoria Townson, Sabine Parish

Category: Non-Brahman Influence -

Bull Champion: Mitchell Miles, Winn Parish

Category: Non-Brahman Influence -

Heifer Champion: Regan Greene, East Baton Rouge Parish

Reserve Champion:

Morgan Thompson, East Baton Rouge Parish

Category: Commercial - Heifer

Champion: Mitchell Miles, Winn Parish

Reserve Champion:

Barbara Jean, Sabine Parish

Category: Beef Showmanship

Champion: Caitlyn Thompson, Bossier Parish

Reserve Champion:

Makayle Conner, Calcasieu Parish

2014 Junior Dairy Division

Category: Registered Dairy

Champion: Jordan Clement, Claiborne Parish

Reserve Champion:

Chandler Salley, Sabine Parish

2014 Commercial Dairy Division

Category: Commercial Dairy

Champion: Matthew Williams, Natchitoches Parish

Reserve Champion:

Landri Lech, Sabine Parish

Category: Dairy Showmanship

Champion: Chandler Blayne Salley, Sabine Parish

Reserve Champion:

Jordan Clement, Claiborne Parish

2014 Market Lamb Division

Category: Lamb Showmanship

Champion: Kaylee Wich, Bossier Parish

Reserve Champion:

Catherine Dupree, Bossier Parish

2014 Market Goat Division

Category: Goat Showmanship

Champion: Stacey Baker, Caddo Parish

Reserve Champion:

Clint Delaune, Bossier Parish

2014 Market Hog Division

Category: Hog Showmanship

Champion: Shaya Stuart, Ouachita Parish

Reserve v Champion:

Zack Haymel, St. James Parish

See the Metro section of Sunday, March 2, 2014 *Advocate* issue, for some snapshots of the event.

Annual Louisiana Small Farmer Conference Inspires Local Producers



Eubanks, Hill (holding certificate), Brown, Mellion-Patin, Augustine



Crisp from NASS addresses audience about 2012 Agricultural Census



Living legends, l-r: Marshall, Crawford (representative), Mellad

The Southern University Agricultural Research and Extension Center held its 4th Annual Louisiana Small Farmer Conference, March 13-15, at the SU Ag Center, gathering nearly 100 producers from across the state. This conference was designed for small farmers interested in building up existing farms, transitioning or moving towards diversifying family farms. This year's conference was themed "Equipping Louisiana Small Family Farm for the Local Food Movement."

The event kicked off with a visit to the *Red Stick Farmers' Market*, followed by a pre-conference grant writing session. The session titled, *Understanding the Nuts and Bolts of the Southern SARE Program* featured Mr. James Hill and Ms. Candace Pollock representing the Southern Sustainable Agriculture Research and Education (SARE) at Fort Valley State University/University of Georgia. The Opening Reception at 5:30 pm on March 13, 2014 was sponsored by Southern SARE.

On the morning of March 14, the conference thrust into full gear with the opening session presided by Dr. Dawn Mellion-Patin, Ag Specialist, SU Ag Center, and featuring Dr. Adell Brown, Jr., the

Executive Vice Chancellor and Vice Chancellor for Research; and Mr. Jeremy L. Hendrix, Special Advisor to the Commissioner on Minority Affairs, LA Dept. of Agriculture and Forestry. This was immediately followed by a keynote address entitled *Meeting the Demand for Locally Grown Foods* by Mr. Bobby Wilson, President, American Community Gardens Association, Atlanta, GA.

The concurrent breakout sessions included: *Backyard Flocks* presented by Theresia Lavergne, professor/Poultry Specialist, School of Animal Sciences, LSU AgCenter; *Diversifying Your Farm* - Nelson Daniels, Program Specialist, Ag & Natural Resources, Prairie View A&M University; *Soils: Composting as an Alternative* - Bob Dillemath, LA Master Gardener and Outreach Coordinator, Dept. of Public Works, EBR Recycling Office; *Direct Marketing of Local Foods* - Brennan Washington, Owner and Operator, Phoenix Gardens Farms, Lawrenceville, GA.

The lunch presentation focused on the 2012 Ag Census: *Implications for Louisiana Agriculture* by Nathan Crisp, State Statistician, USDA/National Agricultural Statistics Service. Immediately after

lunch was a panel discussion entitled *USDA Programs and Services Designed to Aid the Production of Local Foods*, moderated by Tiffany Franklin, Extension Associate, SU Ag Center. Panelists consisted of T. C. Chachere, Farm Loan Chief, Farm Service Agency: *Microloan Program*; Sam Willis, District Conservationist, Natural Conservation Service: *Seasonal High Tunnel Initiative*; Mary Kirk, Business and Cooperative Programs Technician, Rural Development: *Value Added Producer Grants*; and Orlando Phelps, Training Officer, Agricultural Marketing Service: *Farmers Market Promotion Program*.

The evening culminated in the Louisiana Living Legend Banquet, highlighting three award recipients as "heroes with ties and connections to Southern University" for their years of selfless service. The 2014 Louisiana Living Legends were Mr. Wesley Crawford, retired Agricultural Extension Agent and mentor who served in Monroe, Morehouse and Franklin Parishes for 33 years; Mr. Solon Marshall, retired Vocational Agriculture Teacher who taught in Richland and Franklin Parishes for 37 years; and Dr. Kirkland E. Mellad, retired Vice Chancellor for Research, SU Ag Center with 39 years of service at Southern University.

The event was coordinated by Dr. Dawn Mellion-Patin, Ag Specialist, and Zanetta Augustine, Associate Extension Specialist, SU Ag Center.

SU Ag Center Partners with Morehouse Parish Black Farmers

The Morehouse Parish Black Farmers and Landowners Association and the Southern University Agricultural Research and Extension Center entered into an agreement recently for a pilot program to explore the possibility of small farmers in Morehouse Parish growing vegetables for commercial retail markets. Another opportunity that this pilot will explore is the feasibility of growing vegetables to be sold for consumption in the local school districts.

La. House of Representatives District 16 Rep. Katrina Jackson, who serves on the Agriculture Committee, was on hand to express her continuing commitment to agriculture and the farmers of the area.

"Agriculture is still the number one industry in Louisiana and to have a partnership like this one, where there will be a major impact on children and the community is commendable," Jackson said.



SU Ag Center officials present check to Morehouse Black Farmers Assoc.

The signing of the agreement was covered by the local newspaper, [Bastrop Enterprise](#) and the article "Growing program planned" is available online; also by More-

house [Channel 8 - KNOE](#) news item entitled "Farmers in Morehouse Parish partner with Southern University," also available online.

The primary expected outcome of this pilot project is a realistic, factual and accurate assessment of how small farmers in Morehouse Parish can identify the opportunities in making the transition from growing agronomic crops to vegetables.

Odis Hill, Extension Agent, Morehouse Parish; and Dr. Dawn Mellon-Patin serves as project director and can be contacted at 225-771-3532.

20th Annual Black History Quiz Bowl Highly Successful

The SU Ag Center and the Division of Agricultural, Family and Consumer Sciences hosted the 20th Annual Black History Quiz Bowl on Thursday, February 27, 2014 SU Ag Center. The results are in. The "Southern Intellectuals" team took first place followed by "MANRRS Crusaders," and the "MANRRS Trail Blazers" came in third.

Chancellor Leodrey Williams in his welcome statement, emphasized that "all contestants are winners" by making efforts.



1st place winners—The Intellectuals

Six teams participated in this year's stiff competition. Each team consisted of four players, one of whom served as captain. A variety of topics were covered, including current events, politics, history, sports and entertainment. Vol-

unteers served as judges, time keepers, and official scorers.

The "Southern Intellectuals" team took first place followed by "MANRRS Crusaders," while the "MANRRS Trail Blazers" came in third.

Dr. Owusu Bandele, Professor Emeritus, has organized the event for the past 20 years, and can be reached at 225-284-0063 or obandele@cox.net.

Northern Connection Family and Home Gardening Project Launched

The Southern University Ag Center has recently launched a gardening project in the northern part of the state. The sole purpose of the Northern Connection Gardening Project is to engage youth and families in the development and implementation of year-round gardening in north Louisiana parishes.

The project is targeting youth and families in Caddo, Bossier, DeSoto, Morehouse, Madison, and West Carroll parishes. The team working on the project includes Family and Consumer Sciences and Agricultural educators. In each of these parishes, Southern University Ag Center Extension Educators are working to help families learn researched-based information by using experiential techniques of home gardening.

Many of the gardens are located at homes, childcare centers, schools, and housing authority. Educators are teaching families to prepare gardens based on their location and the amount of space available. These classes have been taught using gardening and food preservation objectives as a guide to ensure that they receive the necessary experiences to grow a garden. Additionally, educators are teach-

ing families to preserve foods after they have harvested produce from the garden. Families and other individuals are learning how to grow and preserve, as well as safe food handling techniques.

The Southern University Agricultural Research and Extension Center participated in the 2014 Ag Expo at the Ike Hamilton Expo Center in West Monroe, LA. The Extension agents reached more than 1,000 citizens during the two-day event. Participants that visited the gardening booth were able to ask questions and receive instructions on container, raised bed, and backyard gardening. Also, participants received G-90 Sweet Corn seeds, Hibiscus seeds, and other incentives to help them start their gardens. The project is being coordinated by Dr. Kasundra Cyrus.

For any questions or interest in programs on gardening and preserving foods, contact your local Agricultural Center Extension Office.



SU Ag Center employees disseminate information to participants of Ag Expo



Second Chance to Recover Program Influences Inmates Across the State

Three “Job Placement” workshops were held at the Caddo Correctional Center on February 4th, 19 and 20th, by Katherine Ervin, parent educator, Bossier Parish. There were 120 inmates in attendance for these workshops. The purpose of classes was to prepare inmates for release by enhancing their understanding, knowledge, and skills that will allow them to assume responsible economic roles and make financial decisions with confidence and competence.

The focus for this group was to inform participants about the importance of this stage in their lives, and the need to make positive, personal behavioral changes. And, to answer the question we often ask ourselves, “Am I qualified?” We all tend to wonder whether or not we can adjust to a new job, and accomplish what the

job requires.

The attendees were taught how to develop a resume, present themselves to potential employers, dress professionally for an interview, and how to inform a potential employer about their criminal background. They learned that the first step toward being successful is identifying what they want out of life.



Ervin teaches job placement skills to inmates at workshop in Bossier Parish

Ervin stated that participants were very happy with the workshop and the information they received. One participant said: “This workshop gave me ways to apply myself once I am released;” and another chimed in: “It opened my eyes to what I was doing wrong.” Additional workshops were scheduled for February 26 & 27, 2014.

When asked what could be done to make the workshop better, most of them said it was perfect. And to the question, “Will you use what you have learned today as a method of prevention or intervention?” The answer was a resounding Yes.

“We need more workshops like this; keep sending Ms. Ervin; I learned how to sell myself to potential employers,” were some of the comments from participants.

SU Ag Center Celebrates National Kick Butts Day

The SU Ag Center joined the nation in celebrating Kick Butts Day on March 19, 2014. “Kick Butts Day” is a national initiative to prevent young people from ever picking up a cigarette. In Louisiana, many activities marked the event.

The Southern University’s Communities of Color Network participated in a Kick Butts Day block party in Shreveport aimed at preventing tobacco use among kids. The 4th annual event kicked off at

4pm and lasted until 7pm at the corner of Travis and Louisiana Streets behind SUSLA’s Metro Campus.

The event was featured by KTBS and is available on their website. [Click here to read the full article](#)

The Southern University Ag Center and Christus Health Shreveport-Bossier joined forces to host the party and bring awareness to the problem of tobacco use among our youth.

“Our job is to empower them to get that information out, and let their peers and others know some of the harmful effects that are caused from the use of tobacco,” says Urina Holt, Southern University Ag Center’s Communities of Color Network. Holt serves as the Region 7 Coordinator.

Faculty and staff activities and accomplishments

Publications



Dr. Yadong Qi, professor, urban forestry published an article on the impact of UV radiation on trees in an *International Magazine*.

Ozone depletion in the upper atmosphere has resulted in a significant increase in solar UVA and UVB radiation on the Earth's sur-

face. When Ultraviolet B radiation reaches the Earth's surface it causes problems to public health and the environment. The need to reduce these impacts is crucial, but without understanding nature's ability to regulate and potentially curb these damaging properties, scientists are unable to devise preventative mechanisms. live oak.

"The goal is to discover UVB protection strategies, leading to a better understanding of the UVB tolerance mechanisms of various broadleaf trees in the Southern US," Dr. Qi said.

The article was published in *International Innovation*, by Research Media Ltd., and available online at <http://www.international-innovation-northamerica.com/magazines/128/files/14.html>

Study results have shown that broad leaves can absorb over 90% of UVB radiation; and found the pecan tree (*Carya illinoensis*) to be among those tree species with a high tolerance to UVB radiation. Study findings will enhance the ability to predict the role of UV and climate change on both wild and urban forests and select UV tolerant species to maintain healthier and more sustainable forests in the future.

"Promoting the most UVB-tolerant species could also bring social benefits in urban areas, since incorporating trees into the urban landscape could help protect inhabitants from excessive UV radiation."

The project was funded by US Department of Agriculture – National Institute of Food and Agriculture.



Fatemeh Malekian, professor,

food and nutrition serves as project director on a USDA/NIFA funded grant entitled "Combating Childhood Obesity with Caregivers as Change Agents."

An article titled "Shake Off your weight" was published in the winter issue of *LA Agriculture Magazine*, available at [LSU AgCenter](http://www.lsuagcenter.com) website on this project.

This article is related to Southern University Agricultural Research and Extension Center obesity pro-

ject authored by Fatemeh Malekian, Sebhatu Gebrelul, Kasandra Cyrus, Janana Snowden from SU Ag Center; Betty Kennedy from Pennington Biomedical Research and Extension Center; and Jack Losso from LSU Ag Center School of Nutrition and Food Science.

Faculty and staff activities and accomplishments contd.

Sarah Sims, Family and Consumer Sciences Extension Aide in Madison Parish conducts a 1st Thursday Lunch and Learn Program in Tallulah every month. The February 4th program covered the topic of Heart Health, with Dr. Everett Wade Brown as the guest speaker. Brown is a physician at Madison Parish Hospital/Rural Health Clinic. He was trained at LSU Health Science Center, specializing in Internal Medicine and Pediatrics.

“The program was outstanding with high attendance; we had 30 participants at our 1st Thursday program in spite of the bad cold weather that day, yes we had snow!!! And they came out for the program,” Sims said.

Sims developed 1st Thursday program to educate, inform and inspire behavioral change in the attendees. Topics can include sessions on health and nutrition, fitness, social media, financial secu-

rity, mental health, and disaster preparedness, to name a few. The sessions last about an hour and usually include some kind of meal.

The goal is to share information and to introduce the attendees to the variety of programs and services offered by the SU Ag Center. At the end of the day, participants receive literature to take home as



Sims poses with youth at workshop site

reference material.

Sims also conducted a youth workshop titled "Why Do You Always Have To Say Please?" at the elementary schools in Tallulah during the Literacy Activities

throughout the district for the students and parents. The “story-time” lesson focused on character-building, in which the youth learned that good manners are important in all places, especially away from home. The activity reinforced the importance of good hygiene and good manners in every situation.

“We will follow through with ongoing lessons and activities to



Guest speaker Dr. Brown teaches participants how to maintain healthy life styles through diet, exercise and medicine.

teach the children basic manners and etiquette,” Sims said.

Ahmad R. Robertson, Asst. Area Agent, works with small farmers on planting, transplanting vegetables in Tangipahoa and St. Helena Parishes this season.



Robertson demonstrates the proper way to plant Irish potato in the bed.



Mr. Pernell Chaney and Daryl Myles shared cultural practices of planting potatoes on Bardwell's Vegetable Garden in Greensburg, LA



Steve Holmes transplant seedlings in Hammond, LA

Faculty and staff activities and accomplishments contd.

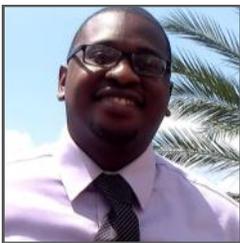


Fatemeh Malekian, professor, food and nutrition, has accepted an invited to serve as a panelist for the review of grants for the upcoming cycle of NI-

FA's Community Food Project Competitive Grant Program. This program is administered by the National Institute of Food and Agriculture within the United States Department of Agriculture and \$5 million in funding has been authorized by Congress to support three types of projects: Community Food Projects, Planning Grants, and Training & Technical Assistance Grants. The goals of the Community Food Project Competitive Grant Program is to meet the food needs of low-income individuals through food distribution, community outreach to assist in participation in Federally assisted nutrition programs, or improving access to food as part of a comprehensive service, including goals to:

- Increase the self-reliance of communities in providing for the food needs of the communities;
- Promote comprehensive responses to local food access, farm, and nutrition issues; and
- Meet specific state, local or neighborhood food and agricultural needs

Two panels will be assembled with one scheduled to meet in Washington, D.C. from **July 14– August 1, 2014**. Assignments are made to ensure the broadest diversity possible given the available panelists.



Christopher Chappell, research associate, urban forestry, has been appointed Commissioner on the Board of Com-

missioners of the Tangipahoa Mosquito Abatement District No. 1, effective February 12, 2014 - 2016.

The purpose of the Board is to provide essential District services to detect and suppress mosquitoes,

and to reduce the chance of disease transmission and discomfort to the people who live, work, or enjoy outdoor activities within the district.

SCHEDULE OF EVENTS

April 5: Wisteria Alliance, Container Gardening. Contact Dawn Mellion-Patin at 225-771-2242

April 11-13: 45th Annual Horse Show and Trail Ride. Contact Christie Monroe at 225-771-2242

April 16: 10th Annual Procurement CONFERENCE. Contact [Gloria London](#) at 225-771-2242

Resilient trees

DR YADONG QI

Dr Yadong Qi has been teaching urban forestry for over two decades. In her latest pursuits, she is exploring tree species' ability to react and respond to UV and a changing climate

Could you provide an overview of your research activities and objectives? Why is research on tree tolerance to ultraviolet (UV) radiation important?

Future uncertainty of ozone recovery and global climate change has precipitated a critical need for the systematic evaluation over the impact of UV on trees and urban forest ecosystems. My team has been taking biophysical, anatomical and biochemical approaches to assessing how tree species interact with UV radiation in their natural setting. The goal is to discover UVB protection strategies, leading to a better understanding of the UVB tolerance mechanisms of various broadleaf trees in the Southern US.

Can you clarify the difference between UVA, UVB and UVC radiation?

UV radiation is electromagnetic radiation from the Sun with a wavelength of 100-400 nm. This is classified into three subtypes: UVA (315-400 nm), which is not absorbed by the stratospheric ozone layer, UVB (280-315 nm) and UVC (100-280 nm). Most UVB is absorbed by the ozone layer but only some reaches the Earth's surface; and UVC is completely absorbed by the ozone layer and atmosphere. The level of UV radiation that reaches the Earth's surface depends on a number of factors, including ozone, time of day and year, latitude, altitude, weather conditions and reflection. Both UVA and UVB cause problems to public health and the environment.

What characteristics were you looking for when you began studies of UV tolerance at whole leaf level?

We looked at the leaf optical properties of 35 broadleaf species using a UV-visible spectroradiometer and an integrating sphere. We discovered that, at whole-leaf level, tree leaves can generally absorb 91-95 per cent, reflect 5-9 per cent and transmit <1 per cent of incident UVB radiation, regardless of tree species or leaf age. Even though leaf surface reflectance provides the first line of defence against UVB radiation, this tells us that leaves absorb a large amount of UVB.

How much have you uncovered about UV penetration and absorption within leaves at an anatomical scale?

Since leaves absorb over 90 per cent of UVB radiation, we were keen to figure out where and how such a high amount of UVB is absorbed. As a result, we used a fibre optic microprobe system combined with our own anatomical knowledge of the leaf to measure the depth of UVB light penetration. We identified 23 broadleaf tree species that can attenuate 92-99 per cent of the UVB absorbed through their epidermal layers. Epidermal attenuation is shown to be the dominant UVB screening characteristic in most species studied, though our results show that other species allow UVB to penetrate through to palisade tissues, which may cause damage to the leaf's photosynthetic apparatus. This underlines the importance



of effective epidermal function in protecting broadleaf trees from UVB radiation.

Have you faced any significant challenges over the course of this project?

While we have enjoyed strong support from the US Department of Agriculture – National Institute of Food and Agriculture (USDA-NIFA), securing additional funding has been a challenge. Studies of this nature, involving multifaceted tasks which are time consuming and encompass a number of species, require long-term institutional commitment and significant external funding. We will continue to seek extramural funds and expand our research through existing and new collaborations, nationally and internationally.

Finally, what is the anticipated impact of this research?

Having established laboratory protocols to investigate leaf optical properties; a mobile UV monitoring station to study tree canopy influence on UV transfer; and a large database for more than 30 southern broadleaf species, we will comprehensively analyse all available data and compare all the species studied. It is anticipated that the research will generate new insight into UVB screening strategies and the biophysical and biochemical UVB tolerance mechanisms in certain southern trees. This information will enhance the ability to predict the role of UV and climate change on both wild and urban forests and select UV tolerant species to maintain healthier and more sustainable forests in the future.



Turning a new leaf

The link between excessive UVB and skin cancer has long been established, yet its impact on plants and trees remained elusive. The latest research conducted by the **Southern University Agricultural Research and Extension Center**, USA, is set to change this scenario; shedding light on UVB tolerance in trees

THE OZONE LAYER is critical for sustaining life. Absorbing most of the ultraviolet (UV) entering the stratosphere, ozone layer protects plants and animals from the most harmful effects of solar radiation.

However, since the mid-20th Century, statistics have shown that ozone levels over the Northern Hemisphere have decreased by 4 per cent per decade. Ozone depletion can be caused by free radical catalysts, many of which are naturally occurring. However, a number of synthetic compounds – most famously chlorofluorocarbons (CFCs), which were once used widely in aerosol sprays and refrigeration technology – have been responsible for significant damage to the ozone layer. Widespread anthropogenic ozone depletion is seen to have contributed heavily to the formation of the Antarctic ozone hole, discovered in 1985 by independent scientist James Lovelock.

Strict regulations introduced in 1989, namely the Montreal Protocol on Substances that Deplete the Ozone Layer, have since curbed the use and production of CFCs and recent analyses suggest that ozone depletion has recovered in correspondence. However, it is predicted that the ozone layer may not recover to pre-1980 levels until the mid to late 21st Century – and both natural and anthropogenic N₂O emissions remain a significant threat to the stability of the ozone layer.

Ozone depletion in the upper atmosphere has resulted in a significant increase in solar UVA and UVB radiation on the Earth's surface. Whilst UV radiation is essential for life and is a crucial component in the human body's ability to produce vitamin D, increased levels of UV can raise the risk of skin cancers and eye disease. According to the World Health Organization (WHO), 20 per cent of the 12-15 million yearly cases of blindness through cataracts may be due to, or have been enhanced by, increased exposure to UV radiation. The need to reduce these impacts is crucial, but without understanding nature's

Monitoring UVA and UVB reduction by the tree canopy of live oak.

ability to regulate and potential curb these damaging properties scientists are unable to devise preventative mechanisms. The most promising biome for further study is the world's forests, both natural and managed. Seen as the Earth's lungs, they could not only help absorb potentially ozone-depleting substances, but may go some way to regulating UVB radiation.

ANSWERING THE CALL FOR RESEARCH

Dr Yadong Qi, a Professor at Southern University (SU) Urban Forestry Program and a Research Scientist at SU Agricultural Research and Extension Center (SUAREC) in Louisiana, has more than 20 years of research experience in tree physiology, forest ecology and urban forestry. Having served as a forestry expert on a number of US and Chinese advisory panels, she has a particular interest in urban and community forestry management and urban ecosystem analysis. Qi has already contributed substantially to the field, but in her current research she now seeks to explore tree species ability to absorb UVB, and what this means for society and the environment.



Dr Gordon Heisler, retired meteorologist from USDA-FS Northern Station studies the urban tree influences on urban climate variables including ultraviolet (UV), air temperature, wind and humidity.

In addition to leading a talented and multidisciplinary team at SUAREC, Qi is collaborating with researchers at a national level, including the US Department of Agriculture (USDA) Forest Service, USDA UVB



Monitoring and Research Program, and the University of Vermont. By studying leaf UVB tolerance, Qi and her team could make wider contributions to climate change research and urban forestry policy.

DEVELOPING A METHODOLOGY

From their research base in East Baton Rouge Parish, a US city with relatively high annual levels of UVA and UVB, Qi's team selected 35 popular subtropical broadleaf tree species including many species of oak, ash, elm, magnolia, hickory, birch, beech and maple. To ensure that this project, the first of its kind in a southern US state, was accurate, comprehensive and comparative, all leaf samples were collected from a local arboretum and urban tree farm on the SU campus.

In order to assess the epidermal UVB screening effectiveness and depth of UVB penetration in a number of tree species, the SUAREC team first measured leaf reflectance, transmittance and UVB absorption at the whole-leaf level using the state-of-the-art UV-visible (UV-Vis) spectroradiometer with an integrating sphere.

Subsequently, the researchers studied leaf morphology and anatomy to assess how UVB is absorbed and then penetrated into leaves of various species. Together with a fibre optic microprobe system, they were able to assess the depth of UVB penetration within leaf tissues. Whilst a UV-Vis spectrophotometer and a high performance liquid chromatography (HPLC) were employed to investigate UV absorbing compounds, the group used the chemical reagent Naturstoffreagenz A (NA) to stain the leaf sample before studying each sample under high-end fluorescent microscopy in order to localise and visualise these compounds.

PROMISING RESULTS

As well as showing that leaves can absorb over 90 per cent of UVB radiation, the research has differentiated species of tree with a higher tolerance to UVB radiation. In particular, Qi's investigations have demonstrated that

leaves of the pecan tree (*Carya illinoensis*) have a high tolerance to UVB thanks to its upper epidermis, which absorbs nearly all the UVB radiation, while some UVA is absorbed by the mesophyll tissue, and blue and red light are able to penetrate deeper for effective biological functions.

The project has also shed light on the biochemical mechanisms which protect leaves from excessive UVB. Through HPLC assays, which differentiated UV absorbing compounds within the leaf, the group has identified 10 'natural sunscreen' compounds in 12 tree species: two major phenolic acids and eight major flavonoids, including chlorogenic acid, gallic acid, quercetin hydrate, rutin, kaempferol, apigenin, myricetin, naringenin, kaempferol-3-o-glucoside and kaempferol-3-o-rutinoside. Indeed, in many of the species studied, there was a strong presence of UV-absorbing compounds in the upper and lower epidermis, the vascular bundles and the leaf hairs, if present. Thus, the leaf epidermal layers play an important role in attenuation of harmful UVB radiation.

Significantly, Qi's research has shown that the concentration of UVB absorbing compounds in leaves increases as UV radiation rises during the growing season. As such, the scientists are a step closer to understanding the biochemical mechanisms which help plants tolerate enhanced UVB levels.

A COLLABORATIVE APPROACH

Effective partnerships and collaborations have been key to the success of the project so far. Whilst Qi has been supported by the knowledge and expertise of Drs Vanessa



Dr Yadong Qi and her students measuring depth of light penetration into leaf.

Ferchaud, Kit Chin, Wesley Gray, Shuju Bai and Kamran Abdollahi at SU, these studies have involved researchers and specialists from across the US. Of note, Dr Gordon Heisler from the USDA Forest Service played an important role in project planning, development and implementation, and his background in urban tree influences on urban microclimates has been indispensable. Meanwhile guidance from Dr Thomas Vogelmann of the University of Vermont led to the successful establishment of a robust fibre optic microprobe protocol.

Finally, Dr Wei Gao of the USDA's UVB Monitoring and Research Program was instrumental in providing the ambient UVB data and technical support necessary for the UVB mobile station and data calibration. "This project has certainly benefitted from enhanced intellectual interaction and long-term research collaboration between scientists and collaborators," Qi concludes.

POSITIVE APPLICATIONS

Many years of analysis have illuminated some of the biochemical processes involved in UVB protection strategies in leaves and provide much-needed information on the impact of ozone depletion and increased UVB exposure on forest ecosystems. Not only will this aid future climate negotiations, but will support landscape-scale forest management, enabling landowners to maintain forests to buffer harmful compounds, harvest the aforementioned medicinal properties and continue to provide wood and fibre resources.

Promoting the most UVB-tolerant species could also bring social benefits in urban areas, since incorporating trees into the urban landscape could help protect inhabitants from excessive UV radiation. "The ability of

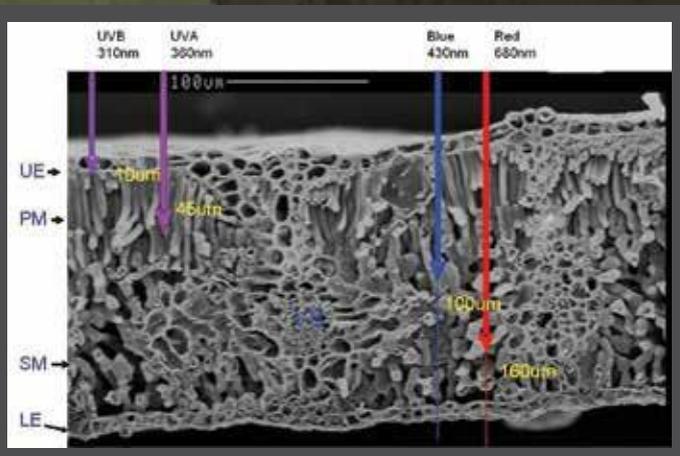


Illustration of depths of UVA, UVB, blue and red light penetration into leaf tissues of Pecan tree. UE: upper epidermis, PM: palisade mesophyll, SM: sponge mesophyll, LE: lower epidermis, VS: vascular system.

trees to absorb UV radiation can significantly benefit the urban environment, explains Qi. "Our research has shown that tree leaves in general can absorb over 90 per cent UV radiation and individual tree canopies such as southern live oak (*Quercus virginiana*) can reduce solar irradiance by an average of 60-80 per cent, the canopy's UV reduction power rises significantly with an increase in leaf area index." Greening urban spaces is by no means a new concept, yet it has grown in popularity as the effects of pollution, and indeed UV, on residents have become more apparent. If a high tree canopy is encouraged, the health of increasingly urbanised societies could improve significantly.

LOOKING TO THE FUTURE

As the research project led by SU enters its second phase, the group aims to investigate seasonal UVA and UVB induced genetic changes in selected urban tree species in order to determine how UV tolerance relates to DNA damage and repair mechanism in trees. Having already established an outdoor mobile UV monitoring station, they will be able to study UVA and UVB transfer at the tree canopy level to see if they can further verify results.

Qi sees this second phase as necessary to understand trees coping mechanisms to increased UVB exposure: "Another aspect of biochemical research is now needed to investigate UVB-induced genetic changes in tree species, assessing UV tolerance relative to DNA damage and the tree's repair mechanism. Only when all these approaches are put together will we be able to gain a better understanding of UV tolerance mechanisms in trees".

DISSEMINATION

The conversation sparked by these studies is one to watch in the coming years. With more people living in cities than ever before,

Graduate Student
Meng Wang and
George Janson
USDA UVB
Monitoring
Network scientist
assembled the first
comprehensive UV
monitoring mobile
station at SU.



Dr Vanessa Ferchaud, postdoc research scientist at SUAREC studies the UV absorbing compounds identified from tree leaves.

and the repair process of the polar ozone holes still far from complete, this area of climate and forestry research leaves many unanswered questions for the new generation of scientists. SUAREC actively promotes training opportunities for graduate students and scholars, and attracts interested parties from further afield.

The studies carried out by the collaborative team have culminated in presentations at a number of conferences organised by the International Society of Arboriculture, the International Society of Optics and Photonics, the American Society of Plant Biologists, USDA-NIFA, the USDA Agricultural Research Service (USDA-ARS) and the Chinese Academy of Forestry. In addition, the work has generated four journal articles and a book chapter as well as three MS and one PhD theses.

The data collected is of such value that the USDA Forest Service Northern Research Station is currently using them to support ongoing UV-iTREE modelling. SUAREC's UVB mobile station for the USDA UVB Monitoring and Research Program and will undoubtedly lead to yet more insight into a once little known function of forests.

INTELLIGENCE

THE UV RADIATION PROTECTION STRATEGIES EXHIBITED BY A DIVERSE GROUP OF BROADLEAF TREES

OBJECTIVES

Ozone depletion in the upper atmosphere has resulted in a significant increase in solar ultraviolet (UV)B radiation (280-315 nm) on the Earth's surface. Effects of the enhanced UVB on living organisms and ecosystems have been a major concern for more than three decades. The goal of this research is to understand how tree species, especially the southern broadleaf trees of the USA, interact with UV radiation, what kind of protective strategies or mechanisms they possess in order to cope with the harmful UVB radiation. This information is useful for predicting the impact of future uncertainty of ozone recovery and global climate change on forest trees, the largest biomass on the Earth.

KEY COLLABORATORS

Dr Gordon Heisler, US Department of Agriculture (USDA) Forest Service • Dr Wei Gao, USDA UVB Monitoring and Research Program, Colorado State University • Dr Thomas C Vogelmann, University of Vermont • Dr Vanessa Ferchaud; Dr Kit L Chin, Southern University Agricultural Research and Extension Center • Dr Shuju Bai; Dr Wesley Gray; Dr Kamran Abdollahi, Southern University and A&M College

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CONTACT

Dr Yadong Qi
Professor of Urban Forestry

Southern University and A&M College
Southern University Agricultural Research and Extension Center, Ashford O Williams Hall
Room 233, James L Hunt Street
Baton Rouge
Louisiana 70813, USA

T +1 225 771 4408
E yadong.qi@gmail.com

YADONG QI is Professor in Urban Forestry at Southern University A&M College and Research Project Director at Southern University Agricultural Research and Extension Center. She received her BSc and MS from China, and PhD from Stephen F Austin State University, USA, in 1991. She joined SU a year later and has since played a key role in establishing the nation's first BSc in Urban Forestry, and subsequent MS and PhD programmes.



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the split application was less than the equivalent rate applied early season. In these cases, an earlier supplemental timing or a higher rate may have been more effective.

As expected, the highest net return for nitrogen fertilizer applications occurred when corn market price was \$6 per bushel, with the highest net return occurring for the single, early-season application of 240 pounds of nitrogen per acre (Figure 2). Even though yields were similar when 240 pounds of nitrogen per acre were applied regardless of timing, net return to the grower for the single application compared to the dual application was increased by \$14.95 per acre.

The present AgCenter nitrogen recommendation is 180-240 pounds of nitrogen per acre on irrigated alluvial soils, with the higher rates suggested for the heavier clay soils. Findings from this study confirm the present nitrogen recommendation of about 240 pounds of nitrogen per acre for irrigated alluvial clay soils. Although 180 pounds of nitrogen per acre applied early season was not adequate in these trials, supplemental nitrogen applied as late as tassel emergence was effective in most years, not sacrificing yield. Oftentimes visual nitrogen-deficiency symptoms late in the season can alert the grower that additional nitrogen is needed. Also, recent advances in diagnostic tools such as remote sensing are being refined to aid in identifying late-season nitrogen problems. Determining optimal nitrogen needs is challenging because of the complex interaction between climatic factors affecting the availability of soil nitrogen and plant demand. An in-season nitrogen fertilizer management system permits the grower to make decisions based on the plant's needs for the current season, maximizing return and minimizing environmental concerns.

Rick Mascagni is a professor at the Northeast Research Station, St. Joseph, La.; Brenda Tubaña is an associate professor in the School of Plant, Environmental and Soil Sciences; Michael Salassi is the Fairbanks Endowed Professor and Michael Deliberto is a research associate in the Department of Agricultural Economics and Agribusiness.

Shake Off Your Weight

Fatemeh Malekian, Sebhatu Gebrelul, Kasundra Cyrus, De'Shoin Friendship, Janana Snowden, Betty Kennedy and Jack Losso

Obesity is widely recognized as one of the most critical health threats to families and children across the country. The direct medical costs and losses of worker productivity for obesity and obesity-associated chronic diseases in Louisiana and the rest of the country are staggering. Reducing obesity can be accomplished by diet and exercise and altering hunger or satiety signals.

Resistant starch is a substance in some foods that contributes to an increase in dietary fiber, supports a healthy weight, helps maintain healthy blood sugar levels and promotes digestive health. Resistant starch is found in beans, peas, lentils, foods cooked and then cooled (potatoes, pasta), whole-grain breads and cereals, and bananas.

Whey protein is produced during the cheese development process and aids in maintaining a healthy weight, reducing appetite, building and repairing lean muscle and reducing muscle loss.

Researchers from the Southern University Agricultural Research and Extension Center in Baton Rouge, in collaboration with scientists from the LSU AgCenter and Pennington Biomedical Research Center, conducted a study to show the effect of whey protein and resistant starch in combination in the form of shakes and smoothies on satiety and energy expenditure and reduction of body weight. The primary goal of this project was to develop innovative food products effective in reducing body fat.

The 26 study participants were 18-40 years old, African-American males and females with BMIs (body mass index) greater than 30. The participants were divided into two groups. The treatment group consumed shakes and smoothies made with whey protein and resistant starch, and the control group consumed the same shakes and smoothies made with starch powder. The shakes were consumed by the participants every morning for 24 weeks. Dietary intake was assessed at the beginning of the study, and every participant kept a food diary. The participants came to Southern University weekly for body weight measurements, to obtain their shake mixes, submit their daily diaries, attend nutrition education classes and complete questionnaires and evalua-

tion forms. Nutrition education was conducted once a week for 12 weeks and once a month for the remaining 12 weeks. To monitor body fat distribution, a Dual X-Ray Absorptiometer (DXA) was used at the beginning and at the end of study.

Participants in both groups lost weight, including one who lost 62 pounds. The treatment group, especially those who participated in nutrition education classes and applied what they learned to their diets and lifestyles, lost significantly more weight than the control group. These variations in weight loss, along with findings from many other weight loss and weight management studies, suggest that future weight loss programs must be more individualized and include nutrition education.

The participants were encouraged to drink their shakes and smoothies for breakfast. Not skipping breakfast is recommended in a weight loss program because people who eat breakfast tend to lose more weight at higher rates than those who do not eat breakfast. The participants in this study who lost the most weight were the ones who consumed the shake early in the morning, compared to participants consuming the shakes after exercising and later during the day. Additionally, diaries reflected that changes in daily food selection and eating schedule can be determining factors for consistent weight loss.

The results of this study are promising. Whey protein and resistant starch incorporated into food, in conjunction with nutrition education intervention, can be used in developing noninvasive, practical, consumer-friendly and cost-effective approaches to combat the national obesity epidemic.

Fatemeh Malekian and Sebhatu Gebrelul, professors; Kasundra Cyrus, specialist; De'Shoin Friendship, associate specialist; and Janana Snowden, post-doctoral fellow, all from the Southern University Agricultural Research and Extension Center; Betty Kennedy, community outreach specialist, Pennington Biomedical Research Center; and Jack Losso, professor, LSU AgCenter School of Nutrition and Food Science.