

N Legend - - Fencing - Streams Boundary - Roads Fields Buildings

The Winfred Thomas Agricultural Station (WTARS) represents and outdoor laboratory to carry out experiments involving food crops, small ruminants, cattle, sustainable agriculture, climate, forestry, environmental and other related disciplines. The nearly 1,000 acres facility in Hazel Green, Alabama is also used for various outreach programs including the Small Farms Outreach program and a popular tourist site as the Alabama Birding Trail #27.



# ates The WTARS



January 2021 - Volume 1, Issue 1



### WELCOME

Dr. Lloyd T. Walker

Dean&1890 Research Director

#### Dr. Lloyd T. Walker

as an 1890 Iand grant university are teaching research and service. Our research efforts here in our College of Agricultural, Life and Natural Sciences (CALNS) are visible, nationally rated and international acclaimed. This newsletter (inaugural) is intended to give you an insight into some of the outstanding research being conducted at our 980-acre Winfred Agricultural Research Thomas Station. As Dean and Research Director, I fully support the efforts of our students, faculty and staff in their efforts to ascent to the pinnacle of research expression and international recognition. We will continue on this quest and seek partners and collaborators as we advance our research interests.

Welcome to you our readers!

# Front & Center

### **Industrial Hemp Pilot Program**



Dr. Xianyan Kuang, Dr. Ernst Cebert, and Dr. Leopold Neochembeng (L-R) in front of a plot of industrial hemp at the WTARS (Summer 2019)

Following the 2018 Congressional Farm Bill, which allowed industrial hemp ( $\leq 0.3\%$  tetrahydrocannabinol - THC) to be cultivated by farmers and universities, the state of Alabama started issuing permits for its pilot program. Alabama A&M University (AAMU) was one of a few universities in the state that applied and received a permit in the 2019 inaugural season to initiated industrial hemp research program. More than 180 permits were issued to private growers and processors to produce industrial hemp (*Cannabis spp.*) for Cannabidiol (**CBD**) as a health supplement, **fiber** for industrial applications, and **grain** for food products. (*Continue, page 4-5*)

#### **Faculty Highlight**



**Dr. Bobwealth Omontese** bobwealth.omontese@aamu.edu

January 2021 – Vol. 1, Issue 1 The WTARS welcomes Dr. Bobwealth Omontese. Dr. Omontese joins the Department of Food and Animal Science, College of Agriculture, Life and Natural Sciences from the University of Minnesota's College of Veterinary Medicine/Food, Agriculture and Natural Resources where he completed postdoctoral research studying the relationships between hoof lesions and reproductive performance, milk production and behavior in lactating dairy cows. Furthermore, Dr. Omontese studied the impacts of different backgrounding systems on beef cattle performance, rumen ecology, and behavior of Angus cattle. His research focused on the application of advanced activity monitoring and diagnostic imaging systems to understand stress behavior and fertility responses in ruminants. At Alabama A&M, Dr. Omontese will focus on the application of activity monitoring technology to understand behavioral dynamics in heat-stressed in ruminants, the impacts on performance, and the potential for their use in early heat stress detection. Also, his lab will train students and cattle producers on the use of reproductive technology in ruminant production.



Mr. Lam Duong Ph.D. Candidate @AAMU lamduongvn@gmail.com

As an assistant professor at Nong Lam University, Vietnam, Mr. Duong was a leader and director of many projects in various disciplines of agriculture. His work in Vietnam resulted in successful research and development that produced organic fertilizer with his proprietary formulations, which have provided excellent results for numerous crops in Vietnam. Mr. Duong traveled to the United States to further his education in agricultural research. The path took him to <u>Auburn University</u> where he worked in the area of Plant Pathology from 2014 to 2016. He enrolled in the graduate program at Alabama A&M University to pursue a Ph.D. degree, and join Dr. Mentreddy's program in organic production of herbs, spices, and medicinal plants. In 2018, he introduced 63 Vietnamese turmeric varieties to Alabama A&M, and Auburn University to assess their adaption and development in Alabama and other locations in the US. His long-term goal is to identify varieties of turmeric from the collection with high curcumin concentration and rhizome yield, then develop them for small and middle farms in Alabama and the mid-south. His PhD. research also includes collaboration with Physicists at the University of Alabama Huntsville, whereby, turmeric rhizomes are exposed to Low-Temperature

Plasma (LTP) to assess its impact on reducing dormancy and inducing vigorous development of seedlings.

*Covid-19* short-circuited many ongoing student types of research in laboratories on the main campus of AAMU. However, students at the WTARS took advantage of the outdoor research facility to continue their work. With mandated safety procedures in place for Covid-19, the WTARS remained Covid-free all summer with uninterrupted work. No positive Covid-19 case was reported among the personnel at the WTARS. Visitors are required to follow CDC protocols.



Left picture - Dr. Srinivasa Mentreddy discussing research work with students Khadi Badiane Sophia Madison, and Trang Pham; Center picture - Ms. Madison and Ms. Badiane are collecting data on field plots of basil and other plants; Right picture - Ms. Badiane and Ms. Makala Smith (R) follow safety protocols by sanitizing their workspace. (Pictures by Lam Duong).

#### The Animal Science Side



At the WTARS, a Fall calving season fits best with our Black Angus beef cow-calf operations. Calving season began in early September and lasted until mid-November. Our goal in Fall 2021 is to shorten the calving season by synchronizing estrus in all eligible animals and exposing the heifers to proven bulls earlier than cows. Females will be pregnancy-checked 45 days after removal of bulls and non-pregnant animals will be culled. Currently, additional management tools are being introduced including e-monitoring of activities to

assess performance base daily activity. We invite farmers to visit the station to learn more about the reproductive management of beef cattle (Contact Dr. Bobwealth Omontese for more information).



**Bayer Crop Science Corn and Soybean** 

#### The Crop Science Side

Every year numerous entries of new corn and soybean genetic lines are planted at the WTARS. These lines represent the latest varieties from Bayer Crop Science to be evaluated during the growing season before being released for commercial production. Local farmers are invited to visit the station and be introduced to these new genetic lines during the growing season before their release. Bayer Crop Science Agronomists collaborate with AAMU faculty and students during the valuation process for these crops (Contact: ernst.cebert@aamu.edu).

#### **The Root Zone**

Dr. Monday Mbila and his team member Drs. Dedrick Davis, Xinhua Xiao, Xianyan Kuang, and Mrs. Moonsun Yang are conducting projects related to the "Expansion of the Alabama Mesonet for minimizing the impacts of extreme weather in agriculture" for the weather station at WTARS and twenty other weather stations deployed across Alabama; and "Estimating the Carbon Budgets for Major Crops in Alabama" at WTARS. Manuscripts are being prepared using data collected for these projects. (Contact monday.mbila@aamu.edu for information).



Left: An Eddy Covariance Flux system installed at WTARS for measuring heat, water, and CO<sub>2</sub> exchange as well as other trace gases within its fetch footprint for major cropping systems in Alabama.

*Right*: Schematic diagram of carbon budgets for soil surface, crop vegetation and above canopy.

#### The Root Zone (cont.)



Dr. Qunying Yuan and her team members Drs. Dedrick Davis, Xinhua Xiao, Xianyan Kuang, and Mrs. Rong Xiao are conducting a project titled "Effects of tillage and residue management on soil microbial community: soil CO<sub>2</sub> effluxes and soil physical properties in a biofuel sorghum feedstock production system" at the WTARS. Our data in the first two growing seasons suggest soil CO<sub>2</sub> effluxes are affected by row position and growth stage (Kuang *et al.*, Agrosystems, Geosciences & Environment, 2021); comprehensive data collected during the previous growing seasons are being analyzed for publications.

(For information contact: <u>qunying.yuan@aamu.edu</u>)

#### **The Forestry Section**



More than 200 acres of diverse species representing old-stands of sweetgum, switchgrass and others used for renewable energy studies during the 1980s & 90s, alongside 70,000 newly planted short-leaf pines represent a foundation for continued research opportunities among the faculty and their collaborators (*contact: kozma.naka@aamu.edu*)

Nearly 60% of the African-American foresters employed by the United States Forest Service (USFS) are graduates of Alabama A&M University (AAMU). The Forestry Program at AAMU continues to break new ground in addressing relevant issues related to the role of forestry in our environment, renewable energy, and climate change. Nearly 70,000 new pine seedlings were recently planted alongside old-growth of various species planted more than twenty years ago, in collaboration with the Tennessee Valley Authority to study the use of fast-growing species for renewable energy. With an established Center for Forest Ecosystem Assessment, most of the AAMU faculty in the Forestry, Ecology and Wildlife Program, along with US Forest Service personnel, engage in a wide array of ecological impacts of managing the upland hardwood

forests of the nearby Bankhead National Forest, to achieve the desired future condition for these stands.

## Continue from page 1 - Front & Center - AAMU Pilot Hemp Program

In 2019, AAMU was the only institution in Alabama to have experimental plots with multiple varieties to begin the process of identifying suitable cultivars of industrial hemp for the region. Cursory observation and analyses during the first season indicated many challenges must be overcome for successful commercial production of the crop. Among these challenges are the consistency of reliable seed sources for adaptable varieties, controls for weeds, diseases, and insects.



Additionally, standard agronomic practices must be established along with reliable economic data for both small and large producers. Demand for CBD continues to drive an elusive market, due to a void in the supply chain for experienced hemp processors in the region, combined with continued restrictive government regulations.



Hemp materials including seeds, bast-fiber, hurd-fiber, micro-fiber along with SEM characterization from the AAMU's 2019 and 2020 summer growing seasons are being processed and analyzed to develop new products. SEM analysis was carried out by <u>Dr. Vijaya Rangari</u>, at the Materials Science laboratory, <u>Tuskegee University</u>. Faculty at AAMU (Biology; Dept of Animal and Food Sci; College of Engineering) are also engaged in research to characterize industrial plant components and assess their potential use wherever applicable for food, feed, hygiene, antimicrobial properties, and natural products for the supplement industry sectors.

AAMU is partnering with multiple private industries to explore properties of the hurd-fiber for the production of hempcrete, an environmentally friendly green-building product (GBP). The use of industrial hemp fiber in the construction business will supplement and enhance the existing wood-product industry in Alabama. As an annual crop with great yield potential, hemp will add to the portfolio of crops that farmers can select to grow in rotation with traditional choices. Researchers at AAMU are also exploring the potential of industrial hemp fiber to create new industries for natural materials for use in the developing <u>automobile industry</u> sector in the state of Alabama.

## The Back Page



Dr. Jeffrey Steiner Associate Director, GHIC **Collaboration** – **Oregon State University's** (OSU) Global Hemp Innovation Center (GHIC) is home to the world's leading experts in hemp research. The largest of its kind in the nation, it promises to advance the research of hemp and its market potential across multiple diverse industries and research fields to serve the growing international demand for innovative approaches to food, health, and fiber. Alabama A&M University's WTARS represents one of 10 sites across the nation where Essential Oil Hemp (EOH) varieties from OSU are being tested. With the approval of the Alabama State Department of Agriculture and Industries (AGI), six varieties of EOH from OSU were planted at the WTARS during the 2020 growing season and were evaluated for their performance in Alabama.



Cannabidiols accumulation in the trichomes of EOH.



Miscanthus plots at the WTARS at vegetative stage (top) and flowering (bottom), 2020.

The WTARS is the site of multiple populations of Miscanthus species being studied as a potential biomass feedstock. AAMU is collaborating with the University of Illinois Urbana-Champaign (UIUC) and Huntsville-based HudsonAlpha Institute for Biotechnology to address yield and flowering traits using phenotyping and genomics. Dr. Erik Sacks of UIUC and Dr. Kankshita Swaminathan of HudsonAlpha summarized that, Miscanthus is rapidly emerging as a premier crop for bioenergy feedstock. They view the project as being well-aligned with the USDA/NIFA's mission to "develop renewable and sustainable sources of biofuels from plant biomass" through enhancing productivity of "terrestrial plants that can be used as feedstocks for biofuel production". At AAMU/WTARS, Drs. Xianyan Kuang and Xinhua Xiao are actively engaged in the assessment of phenotyping, and soil health components of the project, respectively.

<b>Updates</b> From WTARS is designed and written by Dr. Ernst Cebert, Interim Manager of the Research Station with support from:							
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