

SECTION VIII – ENVIRONMENTAL AND EARTH SCIENCES

Posters

Concurrent Poster Session with Section I – BIOLOGICAL SCIENCES

Thursday Afternoon

Arthur J. Bond Engineering Building – Auditorium

Authors Set-up: Begins at 12:00 pm

Authors Present: 3:00 pm– 5:00 pm

Brad Bennett, Presiding (Biological Sciences)

Malia Fincher, Presiding (Environmental and Earth Sciences)

1. **g THERMOREGULATORY GENE VARIATION IN THE EASTERN FENCE LIZARD (*SCeloporus undulatus*) IN RESPONSE TO SILVICULTURE TREATMENTS IN A SOUTHEASTERN HARDWOOD FOREST.** *Thomas Haltigan*, Alabama A&M University; *Yong Wang*, Alabama A&M University; *William Sutton*, Tennessee State University; *Venkateswara Sripathi*, Alabama A&M University.

Understanding the impacts of forest management techniques on habitat and wildlife community composition is essential for long-term biological conservation. The life-history traits of ectothermic vertebrates, such as *Sceloporus undulatus*, are dependent on the thermal environment these organisms inhabit; thus, alteration due to anthropomorphic change may influence the expression of genes that are functionally associated with thermoregulation. As part of an ongoing research project evaluating the effects of prescribed fire and thinning regimes on herpetofaunal communities using a field experiment consisting of control impact and factorial complete block design from 2005 to 2018, herpetofauna were sampled throughout the active season which ranged from May to October each field year. A two-way analysis of variance (ANOVA) will be conducted to test treatment effect per x year on *S. undulatus* abundance. DNA was extracted from *S. undulatus* toe and tail clippings collected in 2017, 2018, and 2019 using the Qiagen DNeasy Kit. Primer pairs for five genes associated with thermoregulation and life-history were obtained from NCBI Primer-BLAST amplified via polymerase chain reaction (PCR). These genes will be sequenced and aligned with MUSCLE. Variation in gene sequences among populations will be interpreted using Principle Coordinated Analysis and visualized via heat map analysis in R. Correlation between variations in gene expression and variation in microclimate features among treatments will be analyzed with the HISAT2, StringTie, and Ballgown tools in R. My study will evaluate both *S. undulatus* community and genetic response to prescribed burning and thinning thirteen years after the initial implementation in the Bankhead National Forest (BNF), Alabama.

2. **u BACTERIAL COMMUNITY COMPOSITION OF BIOCHAR AMENDED SOIL.** *Autumn Hill*, Elica Moss, Alabama A&M University.

Climate change is one of the most critical issues concerning the modern world. The recent practice of amending soil with biochar, a carbon-rich product derived from the pyrolysis of organic material at relatively low temperatures, has become a promising method to minimize atmospheric CO₂ emissions (carbon sequestration), mitigate global warming, improve plant productivity, and nutrient cycling. Biochar affects physiochemical processes and has the ability to alter microbial community composition. This study observed the predicted carbon sequestration potential of four soils amended with biochar (0 mg/h, 5mg/h, 12.5 mg/h, 30.02 mg/h). Our study reflects a shift in microbial community structure and diversity with added biochar. Specifically, the higher bacteria diversity and increase in copiotrophic bacteria

(Actinobacteria) and a decrease in oligotrophic bacteria (Acidobacteria) is in-line with the theory of enhanced copiotrophic bacteria and reduced oligotrophic bacteria contributing to an increase in CO₂ emissions. However, our study also showed that with increased biochar amendment, there was a decrease in copiotrophic (Proteobacteria, Gemmatimonadetes, and Firmicutes) bacteria, which would signal a decrease in CO₂ emissions. The results reflected here confirm that biochar does alter microbial communities, however, there is a contradiction in terms of whether this addition indicates the role of oligotrophic and copiotrophic bacteria in carbon sequestration and thus deems further review and analysis.

***u* or ***g* Denotes presentation entered in student competition as an undergraduate or graduate student, respectively.